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SCOUT LAUNCH VEHICLE PROGRAM

FINAL REPORT - PHASE VI

Abraham Leiss

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2013 Cunningham Drive
Hampton, Virginia 23666

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FOR U.S. GOVERNMENT AGENCIES ONLY

NASA
National Aeronautics and
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TABLE OF CONTENTS

*Published under separate cover as NASA CR-165950, Part 2
**Published under separate cover as NASA CR-165950, Part 3

LIST OF FIGURES

LIST OF FIGURES, Continued

LIST OF FIGURES, Continued

LIST OF FIGURES, Continued

LIST OF FIGURES, Continued

LIST OF FIGURES, Continued

LIST OF FIGURES, Concluded

LIST OF TABLES

LIST OF TABLES, Continued

LIST OF TABLES, Continued

LIST OF TABLES, Continued

LIST OF TABLES, Continued

LIST OF TABLES, Continued

LIST OF TABLES, Continued

LIST OF TABLES, Continued

LIST OF TABLES, Continued

LIST OF TABLES, Continued

LIST OF TABLES, Continued

LIST OF TABLES, Concluded

LIST OF SYMBOLS AND ABBREVIATIONS

A	Army
A - Z	Task and Job Order Designations
ALERTS	Industrywide Failure Reports Initiated by GIDEP
AA - ZZ	Scout Task Codes
AAA - ZZZ	DITTO
A - G	Vehicle Configurations
A → G	Vehicle Section Designations
A - M	Appendix Designations for This Report
ABL	Allegany Ballistics Laboratory
Abs.	Absolute
AC	Alternating Current
ACS	Attitude
ACS	Automatic Control System
Add.	Additional
AD/I-C	Air Density No. 1-C
ADIE	Air Density Instrument Experiment
ADL	Administrative Direct Line
Adminis.	Administration
AEC	Atomic Energy Commission
A.E.C.	DITTO
AEDC, A.E.D.C.	Arnold Engineering Development Center
AEM	Applications Energy Missions
AEROS	German Satellite
AF, A.F.	Air Force
AFB	Air Force Base
AFSC	Air Force Systems Command
AFWTR	Air Force Western Test Range
AGC	Aerojet General Corporation
AGE	Aerospace Ground Equipment
A-IQSY	NRL Solar Explorer Satellite
AL	Atomic Energy Commission Special Funds
Alg.	Algol
ALT.	Altitude
AMM.	Ammunition
Anal.	Analysis
AN/FPS	Radar System
ANS	Astronomical Netherlands Satellite
AN/MPS	Radar System (Module MPS-26)
Approx.	Approximately
ARIEL	United Kingdom Satellite
ASTWg.	Air Force Space Test Wing
atch. Hdwe.	Attachment Hardware
A.U.	Astronimical Unit
AZ	Azimuth
AZUR	German Satellite
609A	Air Force Blue Scout Program
ATJ-S	Type of Graphite in Initiators
AN/FRW	Range Safety Transmitter (Command Destruct)

SYMBOLS AND ABBREVIATIONS Continued

B/A	Base-A Section
BATT.	Battery
BE	Beacon Explorer
BE3A9	Fifth-Stage Motor Designation
BKNO	Igniter Pellets
BPDAD	SAMTEC NOVA Job Order Designation
B/U	Build Up
C	Certified
CA	Call (Contractual)
CART.	Cartridge
Cas	Castor
CAS	Cooperative Applications Satellite
C-Band	Radio Frequency Range
CCF	Component Cleaning Facility
CCN	Contract Change Notice
CCTV	Pan Tilt Heads
CCW	Counter Clockwise
C/F, C of F	Construction of Facilities
C.G.	Center of Gravity
Chmb.	Chamber
CHG., chng.	Changes
CIR., cir.	Circuits
C/O	Checkout
Comp.	Components
Comp.	Composite
Complet	Completion
Cont.	Control
CPFF	Cost Plus Fixed Fee
C.R.	Cost Reimbursable
C.R.	Contractor's Report
CRA	Centro Ricerche Aerospaziali
Cse.	Case
Cs. P/Fit	Case Pole Fitting
CTM	FM/FM Transmitter
CTM/UHF	Telemetry Transmitter
CTR	Center
CW	Clockwise
DAD	Dual Air Density
DAL	Dallas
db	Decibel
DCASO	Defense Contract Audit Service Organization
DC	Direct Current
DEG, deg.	Degrees
DEMO	Demonstration
Dept.	Department
Des., Desn.	Design

SYMBOLS AND ABBREVIATIONS Continued

DEST.	Destruct
Dev.	Development
Dia, DIA	Diameter
DIR	Design Information Release
Div.	Division
D_N	Down
DOD	Department of Defense
D.O.F.	Degree of Freedom
DR	Drawing
DSA	Defense Supply Agency
DTD	Dated
Dwgs.	Drawings
DWI's	Daily Work Items
E	E Separation System
EAP & T	East African Post and Telecommunication
ECS	Environmental Control System
EDT	Eastern Daylight Time
E-G	E-G Separation System
EGSE	Electrical Ground Support Equipment
ELEC.	Electrical
Emerg.	Emergency
E.O.	Engineering Order
EOLE	French Satellite
ERNO	European Research Organization
ESA	European Space Administration
ESRO	European Space Research Organization
EVAL., EV.	Evaluation
EX	Explorer
EXP	Explorer
EXP.	Expense
EXT., Extens.	Extend, Extension
Engr.	Engineering
F	Failure
F	Fahrenheit
Fab.	Fabrication, Fabricate
FAIL.	Failure
FFP	Firm Fixed Price
Flt.	Flight
FM	Frequency Modulation
F.P.I.	Fixed Price Incentive
F.P.I.A.	Fixed Price Incentive Award
FPQ	Radar
FPS	Radar System
fps, FPS	Feet Per Second
FS	Feasibility Study
ft.	Feet
ft./sec.	Feet Per Second
FT-LBS	Foot Pounds

SYMBOLS AND ABBREVIATIONS Continued

FUNDS	Agency and Fiscal Year Fund Code (See Page
FW-4S	Fourth-Stage Motor
FY	Fiscal Year
g	Acceleration
G	Separation System
G & A	General and Administrative
GBL	Government Bill of Lading
GFE	Government Furnished Equipment
GFP	Government Furnished Property
G/Hz	Acceleration Density
GIDEP	Government/Industry Data Exchange Program
G.M.T.	Greenwich Mean Time
GRP	German Probe
GSA	General Services Administration
GSE	Ground Support Equipment
GSFC	Goddard Space Flight Center
Guid.	Guidance
HA	High Altitude
HAAP	Huntsville Army
HCMM	Heat Capacity Mapping Mission
Hdcp.	Headcap
Hdwr.	Hardware
HE	High Energy
H.E.P., HEP	High Energy Propulsion
HF	High Frequency
Hg	Mercury
HI	Hercules, Incorporated
HIB	Hercules, Incorporated/Bacchus Plant
H_2O_2	Hydrogen Peroxide
HP	High Pressure
HPC	Hercules Powder Company
Hq., HQ.	Headquarters
H.S., H/S	Heat Shield
HSD	Hawker Siddeley Dynamics
HTC	Hampton Technical Center
HTPB	Hydroxyl Terminated Polybutadiene
Ign.	Igniter
IGN	Ignition
IKS	Spin Motor
Imp.	Improvement
IMS	Institutional Management System
in., IN	Inches
Inc.	Include
incl.	Inclination Angle
Incorp.	Incorporated

SYMBOLS AND ABBREVIATIONS Continued

INS	Improved Navy Satellite
Inspt.	InspectionInstru. Instrumentation
Insul.	Insulation
Invest.	Investigation
IRIG	International Range Instrumentation Guide
IRP	Instrumented Research Package
ISC	Italian Space Commission
I_{sp}	Specific Impulse, sec.
I_t	Total Impulse, LB-SEC.
ITEM	Compute Code Number at LRC.
OTT-IN645	Electronic Diode
J.O.	Job Order
JPGEN	Generator
K_D	Displacement Gain deg/deg
KG	Kilogram
KHz	Kilohertz
Km	Kilometer
Km/Sec	Kilometer per second
Kr/Kd	Rate of Displacement Gain Ratio, per Second
KSC	Kennedy Space Center
kw	Kilowatts
θ	Pitch Angle
Δ	Delta Difference
Ψ	Yaw Angle
ϕ	Roll Angle
μ	Mean Value (degrees)
σ	Standard Deviation Angle
$\dot{\theta}$	Pitch Rate (deg./sec.)
$\Delta\dot{\theta}$	Pitch Tip-Off (deg./sec.)
$\dot{\Psi}$	Yaw Rate (deg./sec.)
$\Delta\Psi$	Yaw Tip-Off (deg./sec.)
LAN. SW.	Lanyard Switch
L/B	Lower B-Section
lb., LB	Pound
LB_F	Pounds Force
LB_M	Pounds Mass
L/D	Lower D-Section
LDR	Leader
Lf.	Life

SYMBOLS AND ABBREVIATIONS Continued

Lmt.	Limitting
LOS	Loss of Signal
L.O.WT	Lift-Off Weight
LRC, LaRC	Langley Research Center
LT	Left
LTRS	Letters
LTV	Ling Temco Vought (Later Changed to LTV INC.
LV COORD.	Launch Vehicle Coordinator
LMSC	Loockheed Missiles and Space Company
LWP	Langley Working Paper
Lwr.	Lower
M	Scout Configuration as X-2M or X-3M
M.	Meters
M.	Master (Lead Man)
M	Pitch Moment: Disturbance
M	One Million
M-2	Air Force Fourth Stage
M-H	Minneapolis Honeywell
MAB	Missile Assembly Building
MAGSAT	Magnetic Particle Satellite
MARK	Scout Launcher
MAT'L	Material
max.	Maximum
Maint	Maintenance
MCR	Motorola C-Band Beacon
MDC	Mission Director Center
Mech.	Mechanical Engineer
Mech.	Mechanism
MER	Mechanical Equipment Room
MFC	Mechanical Fit Check
MGSE	Mechanical Ground Support Equipment
MIG	Miniature Integrating Gyro
Misc.	Miscellaneous
MO.	Monthly
M, MOD, MODS	Modification to Contract
MOPS	Missile Operations Phone System
MOS.	Months
MPS	Radar System
MRA	Material Review Action
MRB	Material Review Board
MSD-T	Missiles and Space Division, Texas
MSO	Mission Support Office, WTR
Mfg.	Manufacturing
MSS	Missile Space System
MTRS	Motors
MTS	Meteroid Technological Satellite
MWG	Mission Working Group
MOD	Ministry of Defense

SYMBOLS AND ABBREVIATIONS Continued

N	Navy
N	Yaw Moment -FT/LBS
NA	Navy
NACA	National Advisory Committee for Aeronautics
NAD	Navy Ammunition Depot
NORAD	North American Air Defense
NAS	NASA Contract Designation
NASA	National Aeronautics And Space Administration
NAVPLANTREPO	Naval Plant Representative Office
NAVPRO	Naval Plant Representative Office
NAVASTROGRU	Navy Astronautics Group
NDT	Nondestructive Test
N.D.T.T.	Nondestructive Test Techniques
NEMAR	Near Earth Mission Analysis Routine
NH	Communication Frequency at San Marco
N. MI., N.M.	Nautical Miles
N_2	Nitrogen
N.O.	Number
NOCC COORD	Network Operations Control Center Coordinator
NOVA	Navigation Satellite
NOTS	Navy Fifth-Stage Motor
NPE	Neutral Point Explorer
NRL	Naval Research Laboratory
N/TM	NAASA Telemetry Station
NTR	NASA Test Representative
O	Orbit
OA	Office of Applications
OAB	Ordinance Assembly Building
OAST	Office of Aeronautics and Space Technology
OART	Office of Aeronautics and Research
OD, O.D.	Outside Diameter
OFO	Orbiting Frog Otilith
OLC	Operations Logistics Coordinator
Ops.	Operations
OSB	Operational Support Building
OSCAR	Navy Transit Satellite
OPS DIR	Operations Director
OSF	Office of Space Flight
OSSA	Office of Space Science and Applications
OST	Office of Space Transportation
OV	Designation for Air Force Vehicle
P	Probe
P	Processing
PA	Physics and Astronomy
PAET	Planetary Atmospheric Experiment Test

SYMBOLS AND ABBREVIATIONS Continued

PBAA	Polybutadiene Acrylic Acid
PBAN	Polybutadiene Acrylic Acrilonitrile
PCM	Pulse Code Modulation
PD	Pitch Down
PAM/FM/FM	Pulse Amplitude Modulation Frequency Modulation
PDT	Pacific Daylight Time
pers., prsnl.	Personnel
Pkg.	Package
P/L	Payload
PLOO	Pacific Launch Operations Office
PMEL	Plant Maintenance Electrical Laboratory
PMR	Pacific Missile Range
PP	QCEB-PP-011, Quality Control Document
PQ	Propulsion Qualification Test
Pred.	Predicted
PREP.	Preparation
Pres.	Pressure
Prgm., Prog.	Program
PROJ. COORD.	Project Coordinator
PROB.	Probability
psi	Pounds Per Square Inch
pt.	Point
PST	Pacific Standard Time
PU	Pitch Up
P21A	NASA Probe
P76	Air Force Satellite
q	Pressure
Q.A.	Quality Assurance
Q.C.	Quality Control
QCEB	Quality Control Evaluation Board
QCPP	Quality Control Program Plan
QRRR	Quarterly Replenishment Requirements Report
QUAL	Qualification
R	Revision
R	Recertify
RAM	Radio Attenuation Measurement (LaRC Spacecraft)
Reconfig.	Reconfigure or Reconfiguration
Recert	Recertification
RCO	Range Control Officer
RCS	Reaction Control System
R&D	Research and Development
R-Day	Reconstruction Day
R	Task R (for Special Requirements)
REF	Reference
REC	Receiving
Red.	Redesign

SYMBOLS AND ABBREVIATIONS Continued

REL	Release
REMO	Resident Engineering and Management Office
REPS	Representatives
REQ'D	Required
Ews.Reps.	Resident Representatives
Res.	Resistance
Re	Reentry
RETRO	Retrograde
Rev.	Revision
Rev.	Review
Retrans.	Retransfer
R/F	Radar Frequency
RFD	Sandia Corporation-AEC Spacecraft
RFI	Radio Frequency Interferehce
RF, R/F	Radio FrequencyRMRB
RMRB	Rocket Motor Review Board
RKT	Rocket
R-0-Day	Zero Ready Day
RAE	Royal Aircraft Establishment
RPL	Redstone Propulsion Laboratory
RMS	Root Mean Square
RPM	Revolutions per Minute
RPM	Program Management Funds
RPT	Report
RR	Certified Twice
R/S	Remove From Storage
RT	Right
RTG	Radioisotope Thermal Generator
RV	Vehicle Reliability
R/Y	Roll-Yaw
S	Scout
S	Success
SA, S.A.	Subauthorization
SAGE	Stratopheric Aerosol and Gas Experiment
SAI	Science Applications, Inc.
SAMSO	Space and Missile Systems Organization
SAMTEC	Space and Missiles Test Center
SAS	Small Astronomy Satellite
SB	Scout Boosted Systems Division
S-Band	Radar Frequency Band
SBASI	Single Bridgewire Apollo Standard Initiator
SCAMA	Switching Conferencing and Monitoring Arrangement
Sched.	Schedule
SCOUT	Space Orbiting Utility Test - NASA Launch Vehicle
Scout Coord.	Scout Coordinator
S/C MON	Spacecraft Monitor
S/C TC	Spacecraft Test Conductor

SYMBOLS AND ABBREVIATIONS Continued

SEAM	Systems Engineering and Maintenance
Sec.	Section
Sec.	Seconds
SECOR	Army Satellite
Sep.	Separation
SEMTECH	Electronic Diode (T.I.)
SERT	Lewis Laboratory Spacecraft
SEV	Systems Evaluation Vehicle
SFP	Single Failure Point
Shlf.	Shelf
Sh. Lf. Ext.	Shelf Life Extension
S/L	Shelf Life
SLC	Standard Launch Complex
$SLUG-FT^2$	Units of Measurement for Inertia
SM	San Marco
S-M	Sustaining - Major Contracts
SN, S/N	Serial Number
SNI	Ground Station
SOLRAD	Solar Radiation Satellite
S-O	Sustaining Obligations - Others
SOP	Standard Operating Procedures
SPAC	Scout Program Accounting Control System
SPEAR	Scout Performance Evaluation and Ascent Reconstruction
SPFLTR	SPEAR Filter Computer Control System
SPEC.	Specifications
SPO	Scout Project Office
SRT	Scientific Research & Technology
SS	Space Science
S^2ET	Scout Standard Environmental Test
S^3T	Scout Standard Systems Test
SSS-A	Small Scientific Satellite-A
SST	Supersonic Transport
ST	Scout Test
ST	Development Vehicles
Stand. STD	Standard
Stdy	Study
STR	Structural
STA	Station
STAT.	Static
STAR	Government Requirement that Rocket Motors Carry the Name of a Star
STADAN	Space Tracking Data Acquisition Network
STDN	Space Tracking and Data Acquisition Network
STG.	Stage
STO	Space Transportation Office
STRAD	Air Force Organization
SUI	Injun/Air Density Experiment
Sub.	Subsequent
Subs.	Subcontractors
Sup.	Support

SYMBOLS AND ABBREVIATIONS Continued

Sust.	Sustaining
SVAFB	Beacon Radar
S/W	Stop Work
SW	Switch
SYS	Systems
T	Time
T.C.	Thiokol Chemical
TCC	Thiokol Chemical Company
T/D	Tear Down
TDI	Tele-Dynamics, Inc.
Tech.	Technician
TEM	Thiokol/Elkton Motor
TIP	Transit Improvement Program
Tip-off	Tip-Off Angle
TIR	Test and Inspection Report
TM, T/M	Telemeter, Technical Memorandum
TMC	Communications Circuit at San Marco
T.O.	Task Order
TOLIP	Trajectory Optimization and Linearized Pitch Computer Program
TPGEN	Tape Processor and Generator
TRANSAT	Navy Satellite
TRS	Primary Source of T/M Data
Tst.	Testing
Tsts.	Tests
TTY	Teletype
TUB.	Tubing
TX	Prefix to Motor Number
U/B	Upper B Section
U/D	Upper D Section
UHF	Ultra High Frequency
Ult.	Ultimate
UK	United Kingdom
UNIVAC	Type of Computer in the LMSC Central Computing Facility
Upr.	Upper
USAF	United States Air Force
UT	United Technology
UTC	United Technology Corporation
VC	Vought Corporation
VAFB	Vandenberg Air Force Base
VDL	Voice Direct Line
VEGA	Beacon
Veh.	Vehicle Engineer
Veh., VEH	Vehicle
VHF	Very High Frequency
VMSC	Vought Missiles and Space Corporation
Vol.	Volume

SYMBOLS AND ABBREVIATIONS Concluded

VWZC	6595th Space Test Group, AFWTR
VSD	Vought Space Division
WA	Work Authorization
WFC	Wallops Flight Center
WI	Wallops Island
WLOD	Telemetry Station (Western Launch Operations Doppler Directorate)
WTR	Western Test Range
WMV	
X	Experiment
X	Experimental
X	Shipping
XLDB	Type High Energy Propellant
XSR	Fourth Stage Motor
YL	Yaw-Left
YR	Yaw-Right

SCOUT PROGRAM FISCAL YEAR FUND EXPENDITURES CODE

NASA				INTERNATIONAL			AIR FORCE				NAVY	AEC	YEAR
DEV. & SRT	SEAM	PROD.	AEROS	ESRO	ITALY	UK-X4 UK-5 UK-6	59-6 62-6 63-32	63-29	66-95	68-F 0071			
VA		PA					RA				NA		60-61
VB		PB					RB	YB			NB		62
VC		PC					RC	YC				TC	63
OD	SD	PF					RD	YD					64
OE	SE	PE					RE	YE			NW		65
OF	SF	PF					RF	YF					66
OG	SG	PG					RG		NG				67
OH	SH	PH							NH	YH			68
OI		PI					RI	YI					69
OJ		PJ		EJ					NJ				70
		PK		EK					NK		NK		71
		PL		EL		UL			NL	YL			72
		PM		EM		UM			NM				73
		PX	AX			UX			NX	YX			74
		PW	AW	EW		UW				YW	NW		75
		PQ	AQ	EA		UQ				YQ			76
		PZ				UZ				YZ			7T
		PT	AT		IT	UT				YT	NT		77
		PV	AV		IV	UV				YV			78
		PS			IS	US				YS			79
		PU			IU	UU				YU	NU		80
		PO			IO	UO				YO			81
					IP					YP			82

CODE

A - AEROS-B
E - ESRO
I - ITALY
N - NAVY (DIRECT & A.F. (66-95))
O - NASA-SS-SRT (180)
P - NASA PRODUCTION (490)
R - AIR FORCE
S - NASA SYS. ENGR. & MAINT. (497-90)
T - AEC
U - UK-X4, UK-5, UK-6
V - NASA DEVELOPMENT FUND (890)
Y - NAVY BY AIR FORCE (63-29) AND (68-F-0071)

A	1961	X	1974
B	1962	W	1975
C	1963	Q	1976
D	1964	Z	1977
E	1965	T	1977
F	1966	V	1978
G	1967	S	1979
H	1968	U	1980
I	1969	O	1981
J	1970	P	1982
K	1971		
L	1972		
M	1973		

INTRODUCTION

NASA's unmanned launch vehicle program consists of various liquid and solid fuel motor stages that propel a spacecraft into space. The smallest unmanned launch vehicle, with orbital capability, is the Scout. The Scout is distinguished by being the only all-solid fuel major NASA launch vehicle.

The Scout program, managed by the NASA Langley Scout Project Office, has been divided into eight phases. The data of phases one through five have been published by NASA in 1969 and 1974.

This publication is dedicated to Phase VI and includes updated information on Phases I through V and advanced planning information on Phase VII.

The Scout dates back to the beginning of the United States' space program. Its conception was at the NACA Langley Research Center. For many years the NACA Pilotless Aircraft Research Division had been conducting research programs investigating supersonic and hypersonic flight programs from Wallops Island, Virginia. In 1957 a group of engineers, using the historical data from the launching of many multi-solid-propellant rocket combinations, started an investigation of various combinations of existing solid propellant motors that could orbit a small satellite. This investigation resulted in Scout configuration X-1 after many motor combinations were proposed.[1]

The first contract was awarded in May of 1958 for the second stage. Many contracts have been awarded since then, including the major contracts to the Vought Corporation, who later became the Scout prime contractor as a result of winning the initial competition in April 1959. The first vehicle (ST-1), manufactured by Chance Vought Aircraft Company and assembled by the Langley Research Center, was launched on July 1, 1960. The first Phase VI vehicle was launched August 16, 1971.

The Scout Project Approval Document states the following objectives: (a) to procure Scout launch vehicles, including launch services, for the accomplishment of NASA missions in Space Science, Applications and in Space Technology; in addition, to procure Scout launch vehicles and services on a reimbursable basis for other authorized users; (b) to provide engineering services for production vehicles, for corrective changes or improvements in systems and procedures as required to maintain the operational capabilities of the Scout launch vehicle system; and (c) to provide for major product and performance improvements as may be required and approved in support of Scout's role in the national launch vehicle family.

The Scout Project Development Plan states the following objectives:

(a) Development. To develop a relatively inexpensive, reliable, solid-propellant rocket vehicle for use as a satellite launcher and research vehicle.

(b) Operational. To maintain a standard configuration vehicle suitable to the requirements of NASA and the Department of Defense. Similar launch

[1] Configurations are described in table I.

equipment, checkout equipment, and procedures compatible with the vehicle shall be maintained and repaired or replaced as required at Wallops Island, Virginia, and Vandenberg Air Force Base, Western Test Range, California. To improve production vehicles, specifically by the correction of deficiencies uncovered during operational use of the vehicles.

(c) Reliability. To achieve and maintain a success ratio of 90 percent or greater.

(d) Launch. To coordinate and launch approved missions for various payload agencies.

(e) Major Product Improvement. Product improvement of the Scout vehicle has been primarily aimed at increasing the overall vehicle reliability, and at improving vehicle performance by incorporating selective changes compatible with the basic Scout design. Performance improvements have been achieved by incorporating improved motors for all four stages of the Scout, with a performance gain at the start of Phase VI of approximately 220 percent, and 320 percent at the conclusion of Phase VI.

In addition to the wide variety of NASA research programs that have been conducted in space and in reentry technology, there have been other significant programs and users. The Department of Defense has had a significant program in space research. The U.S. Navy Strategic Systems Projects Office has been a major continuing Scout user for the Transit navigation satellite program. The Transit spacecraft provides navigation data not only for the operational fleet but for commercial shipping worldwide. Cooperative and reimbursable spacecraft launches have been conducted for France, Germany, Italy, the Netherlands, the United Kingdom and the European Space Research Organization making Scout a truly international program.

A significant addition to the Scout capability was realized with the establishment of the Scout San Marco launch complex near the equator off the coast of Kenya. The Italian Centro Ricerche Aerospaziali had the bold concept of placing Scout launch and range facilities on two mobile platforms off the Kenya coast in Ngwana Bay. On April 26, 1967, with the successful launch of the Italian's atmospheric physics spacecraft, San Marco B, the soundness of this concept was demonstrated. A successful series of eight (the eighth was the first launch of Phase VII and the first F-1 configuration) launches has been conducted at this facility with Italian, United Kingdom, and U.S. spacecrafts.

Seventy-four Scout space launches have preceded the first launch of Phase VI. By the time S-192 (the last and fifteenth launch of Phase VI) was launched on May 14, 1981, ten Scout vehicles of Phase VII had been launched. Phase VI costs actually ended on May 22, 1976, five years prior to the launch of the fifteenth and final Phase VI Scout. The fourteenth (S-179) Phase VI Scout was launched on May 22, 1976. From 1976 to 1981 vehicle S-192 was a stand-by vehicle for the Navy Transit Program. The Navy Transit Satellite Program was extremely successful causing a delay in replacement satellite requirements.

Figure 1 outlines the Scout program schedule of launches by year, including vehicle and satellite designations. Figure 1 also shows the launch frequency per year and the phase designations. Note that Phase VI slow launch schedule covered a six-year span for the fourteen vehicles. Phase VII has already expanded its launch schedule of the sixteen vehicles beyond an eight-year span. Phase VI was accomplished at a 100 percent success launch record. This great accomplishment resulted in a 95 percent overall production vehicle success ratio.

The historical data (technical and financial) of the Scout program has been documented since its inception and takes pride in its technical success and its financial achievement. It is the intention of the author to present the history of all technical systems and administration of the Scout Program during this phase.

SPECIAL RECOGNITION

Special recognition is given to the support of the Scout Project Office for their effort on behalf of this publication, especially to Nell Turpen and Elaine Crawford for their excellent support.

ORDER LAUNCHED	1	2	3	4	5	6	7	8	9	10	11
CY LAUNCH			PHASE I								
1960	ST-1 (Test)	ST-2 (LaRC)	ST-3* (Air Density/S-56)								
1961	ST-4 (EX-9)	ST-5* (S-55)	ST-6* (EX-13)	ST-7 (P-21)			PHASE II				
1962	ST-8 (R-1)	ST-9 (P21-A)	111* (SOLRAD) (NRL)	112* (AF-1)	117 (AF-2)	114* (R-2)	115 (EX-16)	118 (NA-1)			
1963	126 (AF-3)	119* (NA-2)	121* (AF-4)	116 (RFD-1)	120 (NA-3)	113 (AF-5)	110* (R-3)	132* (AF-6)	122R (EX-19)	PHASE III	
1964	127R (ARIEL-2)	125R (NA-4)	128R* (AF-7)	124R (SERT)	129R (R-4)	134R (EX-20)	130R (RFD-2)	123RR (EX-22)	133R (EX-23)	135R (EX-24)	137R (I-1)
1965	136R (EX-27)	131R (A-1)	138R (EX-30)	139R (FR-1)	140C (NA-5)		PHASE IV				
1966	142 (NA-6)	141C (R-5)	143C (NA-7)	145C (AF-8)	146C (NA-8)	147C (AF-9)	148C (AF-10)	149C (NA-9)	150C (AF-11)		
1967	151C* (AF-12)	154C (NA-10)	153C (I-2)	155C (ARIEL-3)	156C (NA-11)	152C* (ESRO 2A)	157C (NA-12)	159C (R-6)	158C (AF-13)		
1968	162C (NA-13)	160C (EX-37)	164C (R-7)	161C (EX-39)	165C (EX-39)	168C (R-8)	167C (EX-41)				
1969	172C (ESRO 1B)	169C (GRS-A)					PHASE V				
1970	176C (NA-14)	171C* (RAM-C)	174C (OFO)	175C (EX-42)							
1971	173C (SM-C)	144 →	177C (EX-44)	180C (CAS-A)	166C (GRP-A)	163C (EX-45)	183C (UK-4)		144CR* (PAET-A)		
1972	184C (MTS-A)	182C (NA-15)	170C (SAS-B)	185C (ESRO-4)	181C (AEROS-A)		PHASE VI				
1973	178C (NA-16)										
1974	190C (SM-C2)	188C (UK-X4)	191C (EXP-52)	186C (AEROS-B)	189C (ANS-A)	187C (UK-5)					
1975	194 (SAS-C)	195 (NA-17)	196F* (DAD)								
1976	179 →	193 (GP-A)	197 (NA-19)	179 (NA-18)							
1977	200 (NA-20)		PHASE VII								
1978	201 (AEM-1)										
1979	202 (AEM-2)	198 (UK-6)	203 (AEM-3)								
1980											
1981	192 →			192 (NAVY)[a]							

* Failed.

(a) Launch costs of 192 was transferred to Phase VII.

Figure 1.- Schedule of Scout Program Launches.

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CHAPTER I - SCOUT LAUNCH VEHICLE PROGRAM

The Scout launch vehicle program is divided into eight phases described as follows:

(1)	Phase I	Development of the Scout Launch Vehicle (9 vehicles)
(1)	Phase II	Prototype of Production Scouts (14 vehicles)
(1)	Phase III	Scout Recertification Program (14 vehicles)
(2)	Phase IV	Systems Management of Scout (25 vehicles)
(2)	Phase V	Incentive Procurement (15 vehicles)
(3)	Phase VI	Award Fee Procurement (15 vehicles)(4)
	Phase VII	Continuing Program (15 vehicles)(4)
	Phase VIII	Final Scout Program - D.O.D. (10 vehicles)

This document includes all aspects of Phase VI and is the final report on this phase. The time period if April 1968 through June 30, 1976. The first Phase VI launch was Scout vehicle S-180C, configuration B-1, placing spacecraft CAS-A into an earth orbit (figure 2). The designation for all Scout configurations is listed in Table I. Figure 3 details the Scout orbit capabilities and also shows configuration details.

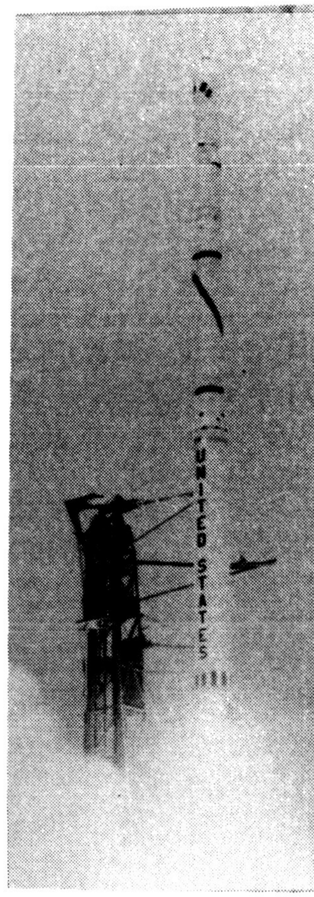

Figure 2.- Scout vehicle S-180.

The Scout launch vehicle is a four-stage guided research booster utilizing solid propellant rocket motors capable of boosting payloads of varying sizes in orbital, reentry, and probe missions. Figure 4 shows a sketch of a typical Scout vehicle. Figure 5 illustrates the motor systems and parts of Scout-D. Only one Scout-D was previously launched in Phase V. Eight of the Phase VI vehicles were Scout-D. Scout vehicle 191C had a BE-3 fifth stage. This was the only 5-stage Scout vehicle. Five previous Scout vehicles have had a NOTS-17 payload kick-stage not part of the booster. Figure 6 shows the launch of S-191C. This vehicle contained many new program developments. Scout 191C was equipped with the first high pressure third

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(1) All aspects of Phases I, II, and II are covered in a final report published in Langley Working Paper 804 dated 11/20/69.
(2) All aspects of Phases IV and V are covered in a final report published in Langley Technical Memorandum TM X-72628.
(3) Detailed in this publication.
(4) The launch of the 15th vehicle of Phase VI was part of the Phase VII program.

stage (Antares IIB), and the first Scout fifth-stage attitude correction system as well as the above-mentioned first fifth-stage BE-3 motor.

TABLE I. DESIGNATION OF SCOUT CONFIGURATIONS

CONFIGURATION	FIRST STAGE	SECOND STAGE	THIRD STAGE	FOURTH STAGE	FIFTH STAGE	QUANTITY** LAUNCHED
X	Algol IA	Dummy	Antares IA	None	None	1
X-1	Algol IA	Castor IA	Antares IA	Altair IA	None	7
X-IA	Algol IA	Castor IA	Antares IA	Altair IA	NOTS-17	1
X-2	Algol IA	Castor IA	Antares IIA	Altair IA	None	2
X-2B	Algol IA	Castor IA	Antares IIA	Altair IIA	None	1
X-2M	Algol IA	Castor IA	Antares IIA	M-2	None	3
X-3	Algol IIA	Castor IA	Antares IIA	Altair IA	None	6
X-3A	Algol IIA	Castor IA	Antares IIA	Altair IA	NOTS-17	2
X-3C	Algol IIA	Castor IA	Antares IIA	None	None	1
X-3M	Algol IIA	Castor IA	Antares IIA	M-2	None	1
X-4	Algol IIA	Castor IA	Antares IIA	Altair IIA	None	13
X-4A	Algol IIA	Castor IA	Antares IIA	Altair IIA	NOTS-17	2
X-5C	Algol IIA	Castor IIA	Antares IIA	None	None	1
A	Algol IIB	Castor IIA	Antares IIA	Altair IIA	None	11
A-1	Algol IIC	Castor IIA	Antares IIA	Altair IIA	None	1
A-2	Algol IIC	Castor IIA	Antares IIB	Altair IIA	None	0
B	Algol IIB	Castor IIA	Antares IIA	Altair IIIA	None	25
B-1	Algol IIC	Castor IIA	Antares IIA	Altair IIIA	None	5
B-2	Algol IIC	Castor IIA	Antares IIB	Altair IIIA	None	0
*C	Algol IIC	Castor IIA	Antares IIA	Altair IIIA	BE-3	0
D-1	Algol IIIA	Castor IIA	Antares IIA	Altair IIIA	None	15
E-1	Algol IIIA	Castor IIA	Antares IIB	Altair IIIA	BE-3	1
F-1	Algol IIIA	Castor IIA	Antares IIB	Altair IIIA	None	2
G-1	Algol IIIA	Castor IIA	Antares IIIA	Altair IIIA	None	2

OTHER REFERENCE DESIGNATIONS:

Algol I-Aerojet Senior, 33KS-120,000
Algol II-45KS-100,000
Algol IIIA ●

Castor I-XM33E5, XM-75, 27KS-55,000
Castor IIA-TX354-3 ●

Antares I-X-254, XM-70, 38DS-14,000
Antares IIA, X-259, 33DS-21,540
Antares IIB ●, HP-X259-B4
Antares IIIA, Thiokol

Altair I-X248, XM-69, 40DS-3100
Altair II-X258, XM-94, 24DS-5850
● Altair IIIA, FW4S or XSR 57-UT-1 TEM640-1, 27.4KS6,016, STAR-20

NOTS-17, XM-78, NOTS100-17, 43K-882

● BE-3A9/15-DS-5770 (Bacchus engine, Thiokol motor)

*Program canceled.
**Includes data through S-203C (S-199 on standby)
●Only motors in inventory.

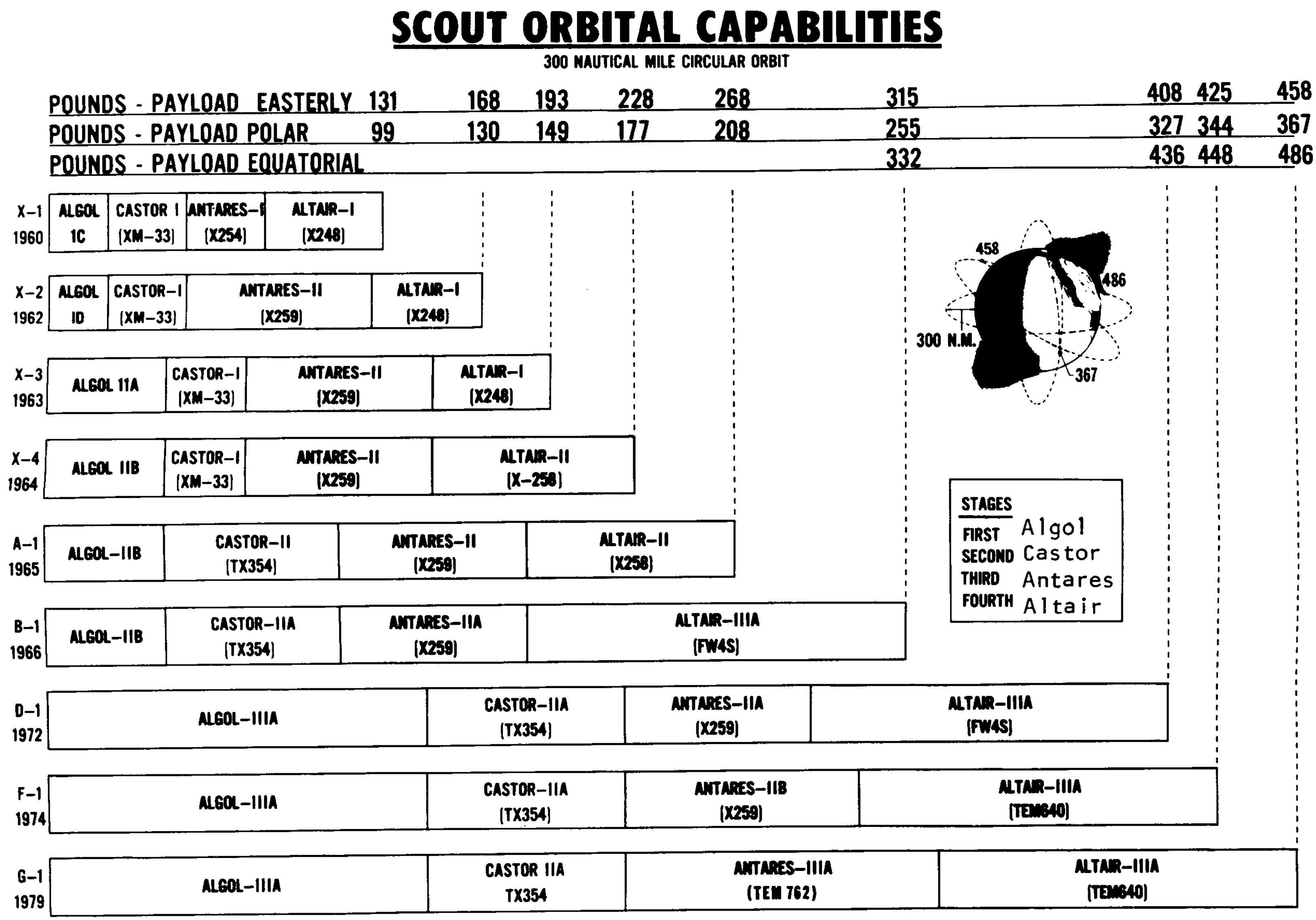

Figure 3. SCOUT VEHICLE GROWTH

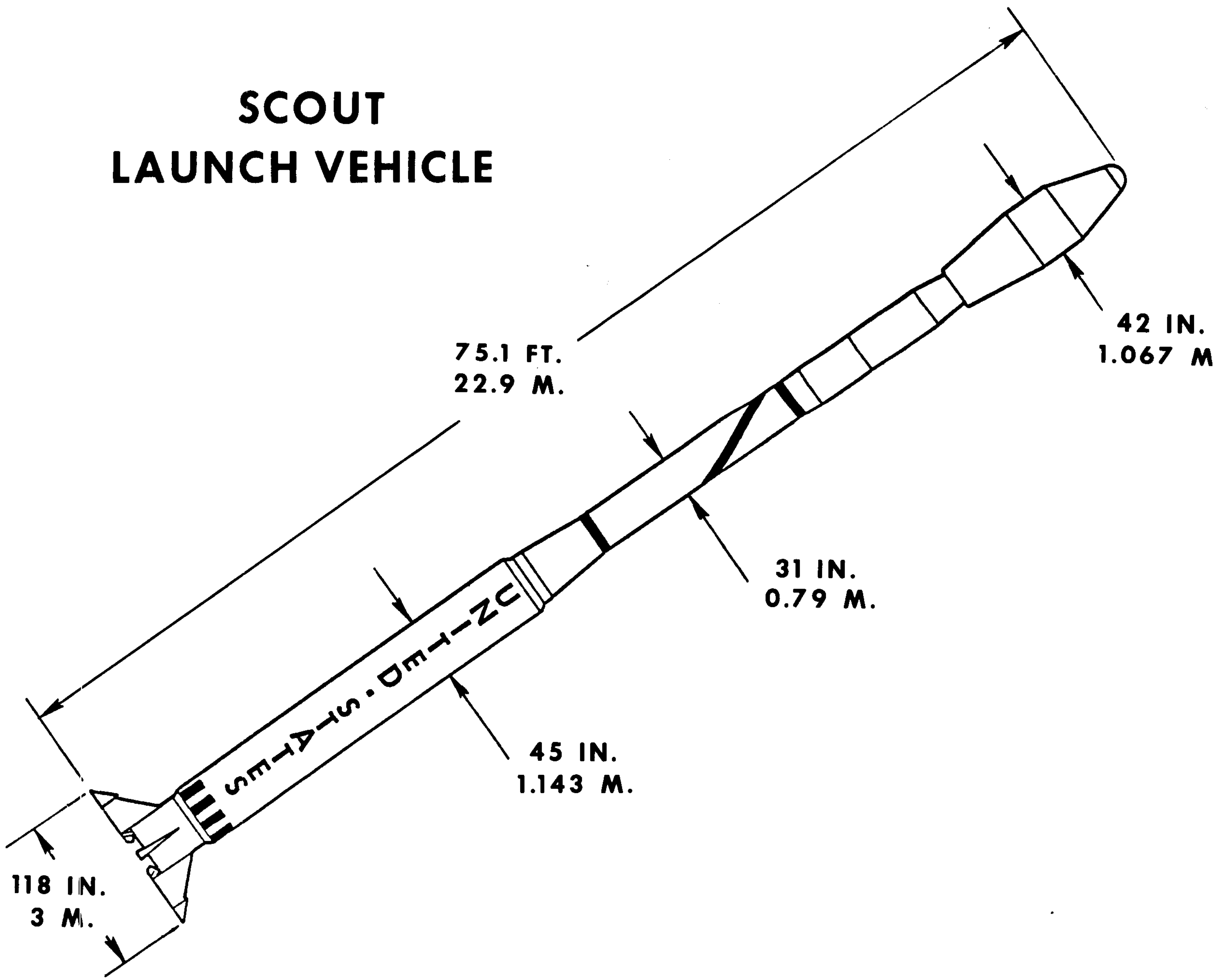

Figure 4.- Scout-D Launch Vehicle.

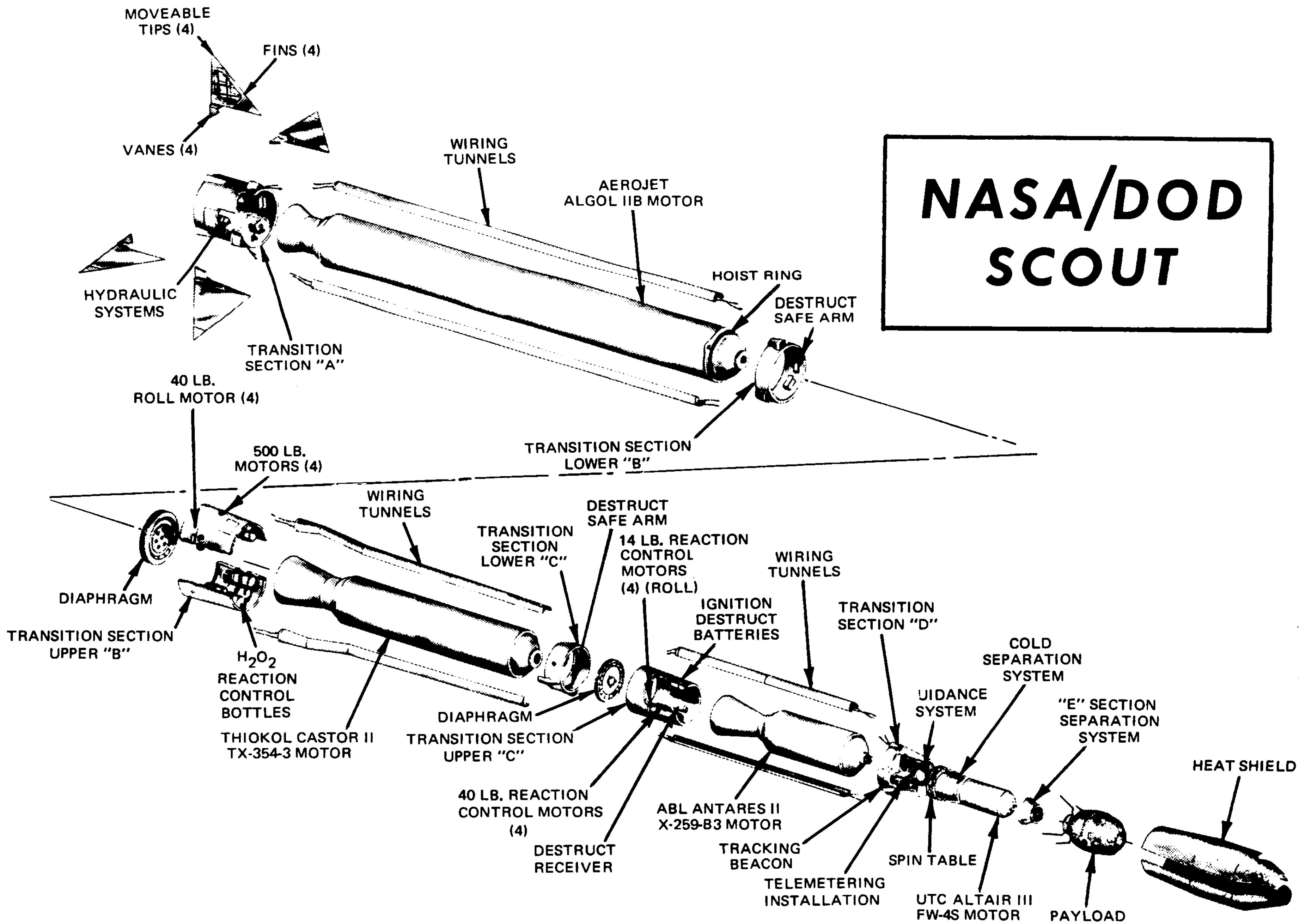

Figure 5.- Scout vehicle systems and structures.

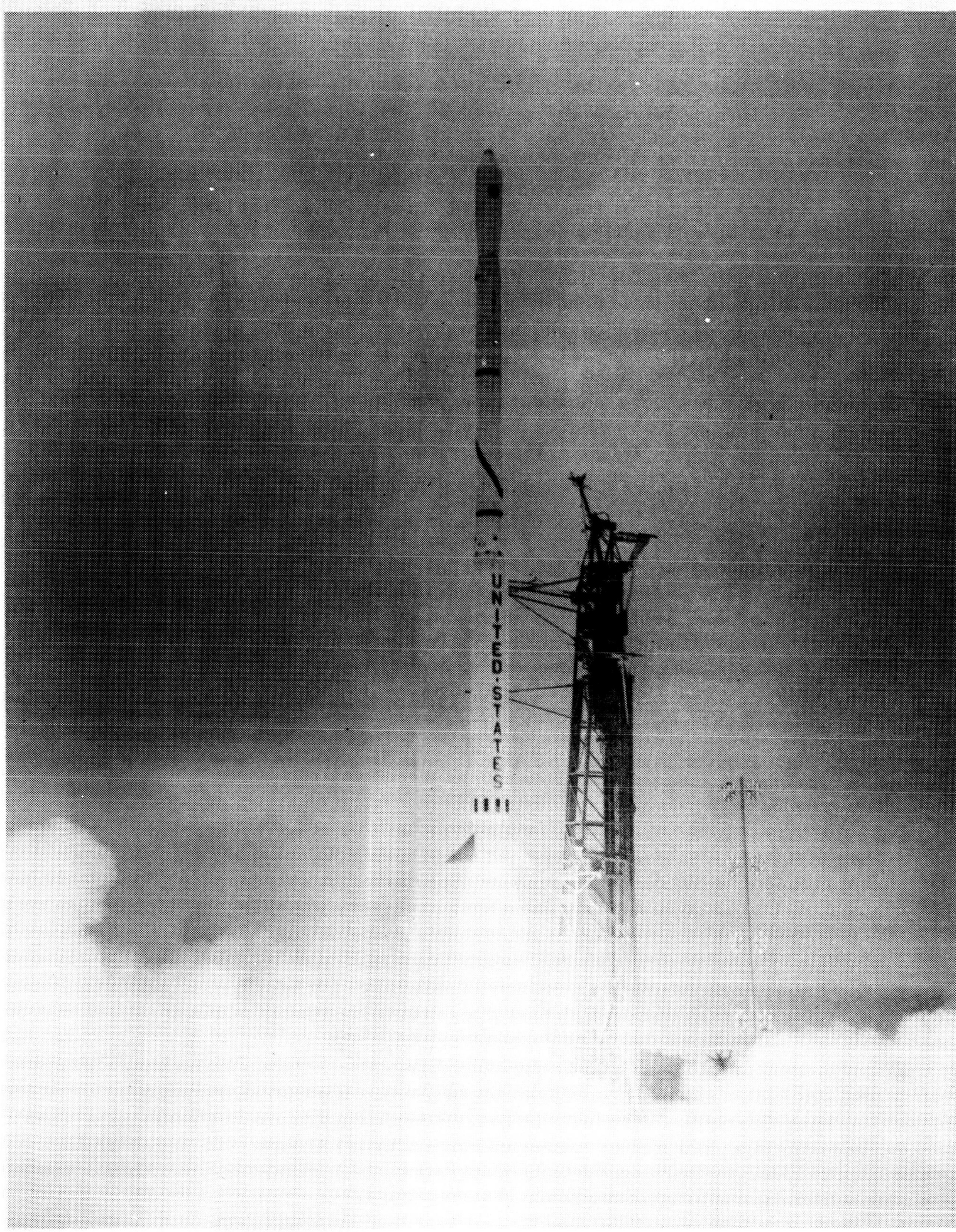

Figure 6.- S-191C Launch Vehicle.

This additional stage helped the Scout 191C satellite obtain an apogee of 102,015.25 km with a polar orbital period of 3032.4 minutes. Prior to Scout 191C the maximum apogee was the satellite of Scout 163C at 26,912.3 km with an equatorial orbital period of 469 minutes.

All of the fifteen Scouts in Phase VI were successful orbital missions. The last reentry mission was Scout vehicle 171C, a Phase V vehicle, launched September 30, 1970. Only one additional probe mission was scheduled, Scout vehicle 193C, a Phase VII vehicle. Information on Scout probe and reentry missions are documented in Appendix A. However, for all trajectories, the first-stage motor remains attached to the vehicle after burnout and the vehicle coasts to an altitude that results in a nominal q of approximately 40 pounds per square foot at first-stage separation. The maximum q is 2,200 pounds per square foot which occurs during first-stage burning and is reached at about 36,000 feet altitude. The majority of Scout launch requirements have been aimed at achieving near-earth orbits. Figure 7 illustrates a profile in a typical Scout mission. Because of the strong emphasis in the past and in the foreseeable future on orbit missions, the bulk of the performance data presented will deal with this aspect of Scout orbital capability.

For orbit missions the Scout vehicle utilizes the first three stages to boost the fourth stage plus payload to the desired injection altitude. The fourth stage is then used as the injection stage by accelerating the payload to the desired orbital velocity. The injection altitude is controlled by a predetermined pitch-rate program which commands the guidance and control system to steer the vehicle along the desired trajectory. Figure 8 illustrates the Scout boost trajectory pitch program orbit mission. Orbit inclination is determined by the latitude and vehicle heading angle at injection. These parameters are controlled, for a given mission, by the launch azimuth and any heading angle change obtained by yaw torquing.

Figure 9 illustrates a typical Scout orbital mission boost trajectory. The second stage is not ignited until the dynamic pressure reduces to the level which insures second-stage control system capture. A short coast phase following first-stage burnout is sometimes necessary to obtain the proper conditions for second-stage ignition. When the second stage is ignited, simultaneous separation from the first stage occurs.

A nominal coast period of 5 seconds follows second-stage burnout during which the payload heat shield is ejected. Third-stage ignition and second-stage separation then occur simultaneously. During the first three boost phases the vehicle pitch-rate program is designed to command the vehicle to fly a zero-lift (gravity turn) trajectory. Following third-stage burnout the control system orients the vehicle to the proper injection attitude. Following a long third-stage coast phase (200 to 600 seconds, depending upon the mission) the payload plus fourth stage is then ignited and accomplishes the necessary injection into orbit. The payload may or may not be separated from the empty fourth stage following burnout. Table II lists the sequence of events of a typical launch.

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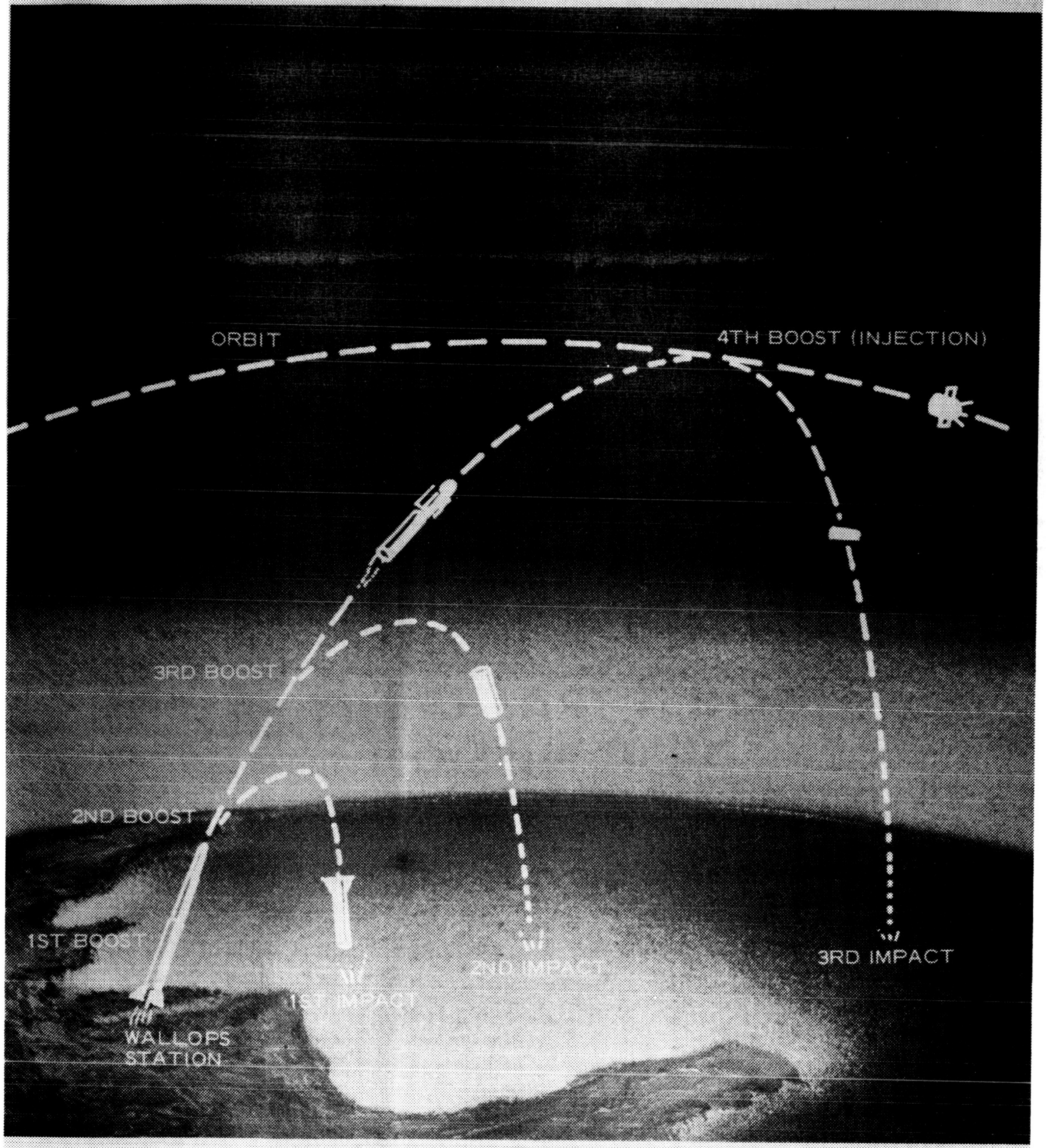

Figure 7. - Typical boost ascent and payload injection into orbit.

2

BOOST TRAJECTORY PITCH PROGRAM ORBIT MISSION

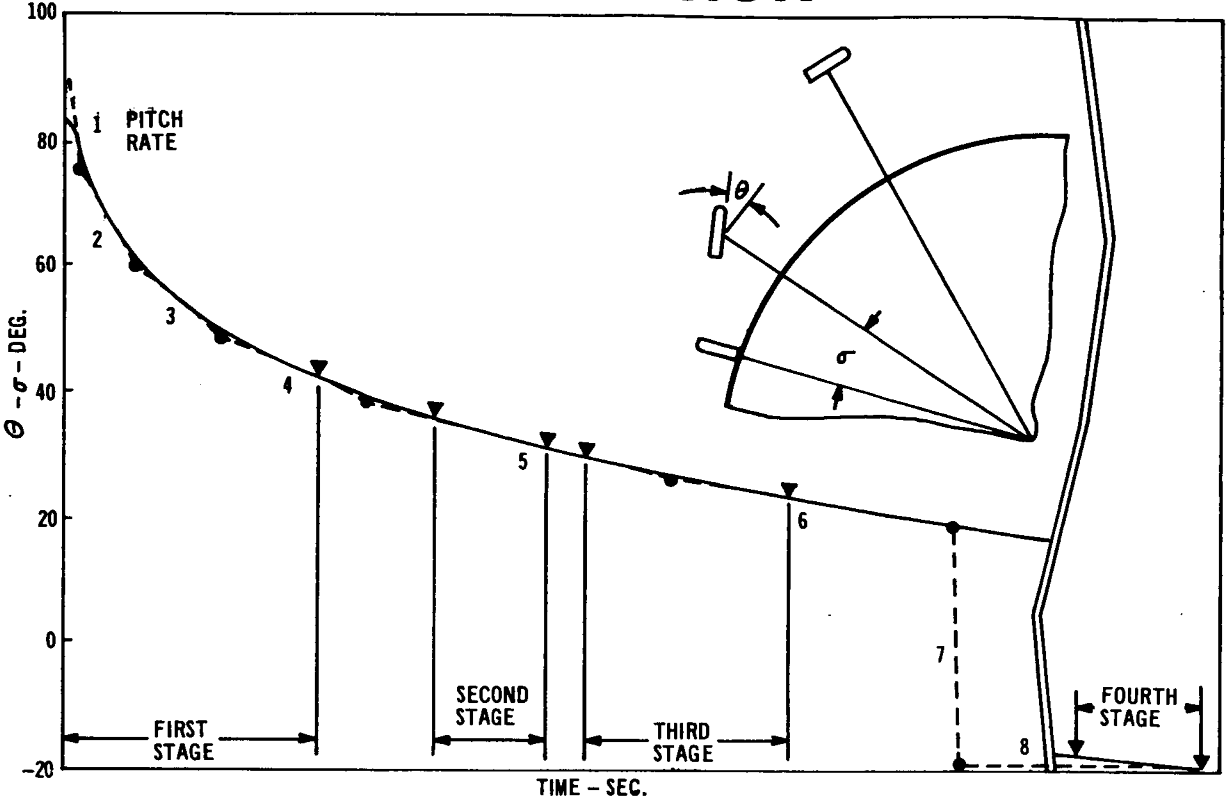

Figure 8.- Scout boost trajectory pitch program orbit mission.

BOOST TRAJECTORY ORBIT MISSION

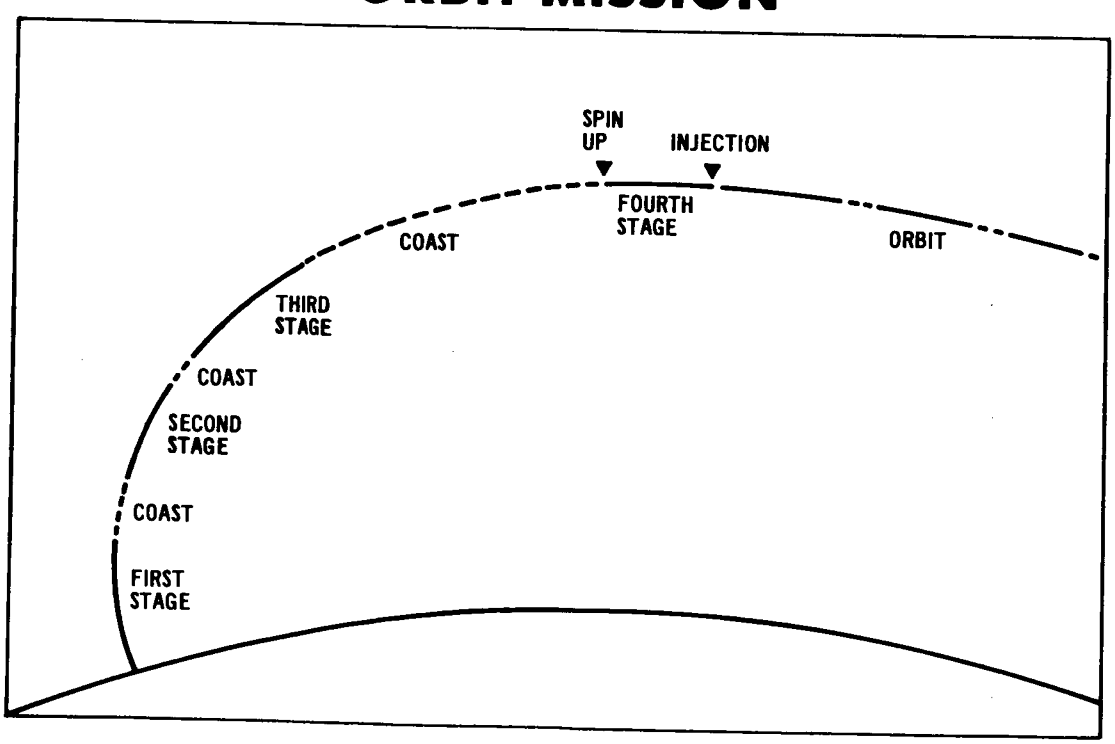

Figure 9.- Typical Scout orbital mission boost trajectory.

TABLE II - SEQUENCE OF EVENTS AND GUIDANCE PROGRAM.

TIME (SEC.)	EVENT	TIME (SEC.)	EVENT
0.00*	LIFT-OFF	178.36	STG. 3 IGNITION
			ACTIVATE "C"
0.10	START TIMER		SEPARATE STG. 2
	(6) PITCH RATES	212.03	STG. 3 BURNOUT
84.56	STG. 1 BURNOUT		(2) PITCH RATES
86.04	STG. 2 IGNITION	217.03	ACTIVATE COAST CONTROLS
	ACTIVATE "B"	720.02	SPIN & 4TH SQUIB IGN.
	SEPARATE STG. 1		
	(2) PITCH RATES	721.52	SEPARATE STG. 3
125.29	STG. 2 BURNOUT	722.02	RETRO
176.66	SEPARATE H/S	726.37	STG. 4 IGNITION
		759.92	STG. 4. BURNOUT

*PREDICTED LIFT-OFF OCCURS 0.13 SECONDS AFTER IGNITION

Figures 10, 11, 12, 13, and 14 illustrate the circular orbit performance of the Scout launch vehicle.

The data illustrated in figures 10, 11, and 12 are for Scout D. Phase VI consisted of five configurations designated as follows:

SCOUT	CONFIGURATION	SCOUT	CONFIGURATION	SCOUT	CONFIGURATION
178C	A-1	183C	B-1	188C	D-1
179C	B-1	184C	D-1	189C	D-1
180C	B-1	185C	D-1	190C	D-1
181C	D-1	186C	D-1	191C	E-1
182C	B-1	187C	B-1	192C	G-1

B-configuration orbital parameters were presented in a previous publication(1). The final B-1 Scout was the ninety-fourth Scout launch on May 22, 1976 designated Scout vehicle 179CR. The one and only Scout A-1 configuration was the Scout 178C vehicle launched on October 29, 1973. This was the eighty-fourth Scout launch. Figure 3 includes configuration A-1 data. Detailed information on A-1 has not been presented because configuration A-1 was never used again. Configuration E-1 is a Scout-D with a fifth stage. Figure 14 presents the orbital capabilities of a five-stage Scout launched from VAFB. Scout vehicle S-192C was the fifteenth and last vehicle of Phase VI configured as G-1.

Performance capability available for the users in the time period of 1971-1974 was increased upon the completion of the Algol III development program. The Algol III replaced the Algol IIB as the first-stage motor. The new motor which has 1.83 X 10^6 pounds-seconds total impulse more than the Algol II is also five inches larger in diameter (45 inches). This increase in diameter provides 6,800 pounds of additional propellant and also incorporates improved materials and techniques. The increase from Scout B-1 to Scout D-1 can be noted in figure 3. The first Scout D-1 was Scout S-184 from Wallops Island shown in figure 15.

Scout vehicles are launched from three geographical areas as shown in figure 16. The easterly launch site is Wallops Island as mapped in figure 17(a). The Vandenberg Air Force Base site as shown in figure 17(b) is for polar orbits. Figure 17(c) shows the African launch site (Italian government-owned) which is used for equatorial orbits. Figure 18 shows S-190 being prepared for launch at the San Marco Range. The Italian engineers for the San Marco-B spacecraft are checking the spacecraft before launching. The spacecraft was launched from a platform at sea off the coast of Kenya, Africa, at 10:05 G.M.T., February 18, 1974. Tracking data from NASA's Space Tracking Data Acquisition (STADAN) stations in Quito, Equador, and Lima Peru, indicate that the spacecraft

(1)Published in Langley Technical Memorandum TMX-72628.

CIRCULAR ORBIT PERFORMANCE

WALLOPS ISLAND LAUNCH - DUE EAST
VAFB LAUNCH - POLAR ORBIT
SAN MARCO LAUNCH - DUE EAST

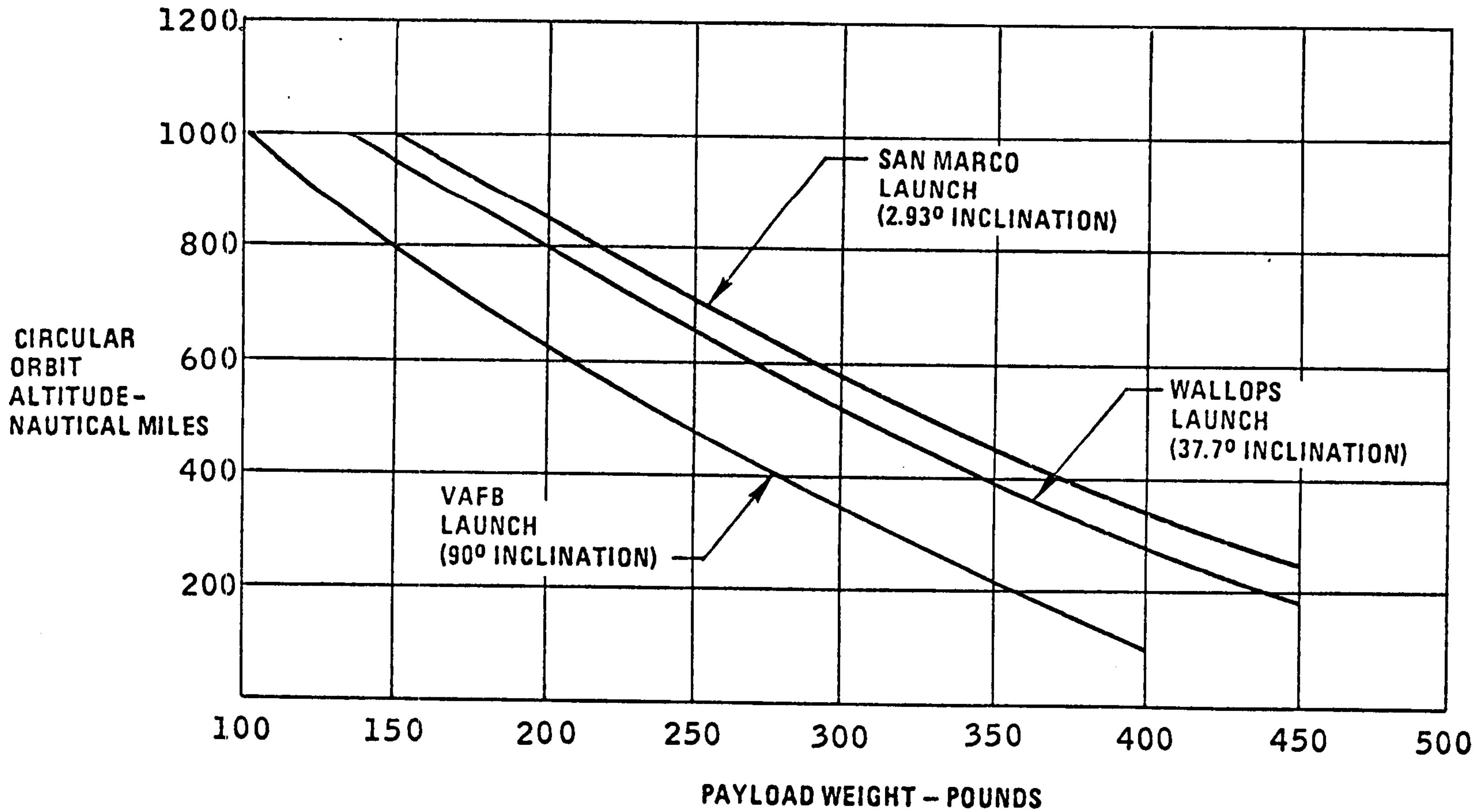

Figure 10.- Scout-D circular orbit performance

ORBIT MISSION PERFORMANCE

WALLOPS ISLAND LAUNCH

DUE EAST

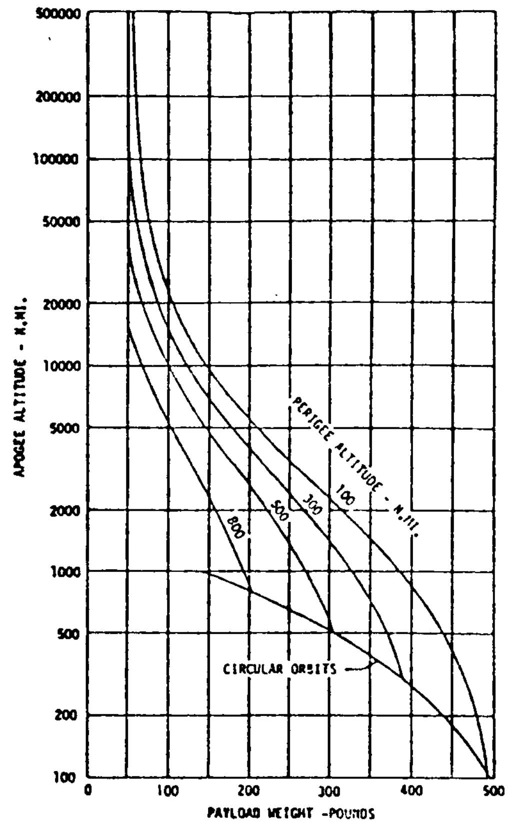

Figure 11.- Scout-D easterly orbit capability.

ORBIT MISSION PERFORMANCE

VAFB LAUNCH
POLAR ORBITS

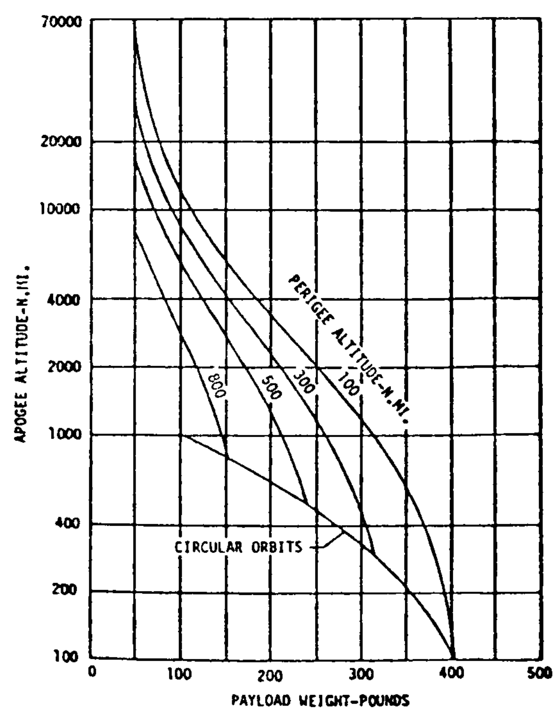

Figure 12.- Scout-D polar orbit capability.

ALGOL IIIA
CASTOR IIA
ANTARES IIB
ALTAIR IIIA
1.07 METER DIA. HEATSHIELD

SCOUT F-1

ORBIT INCLINATION = 2.9°

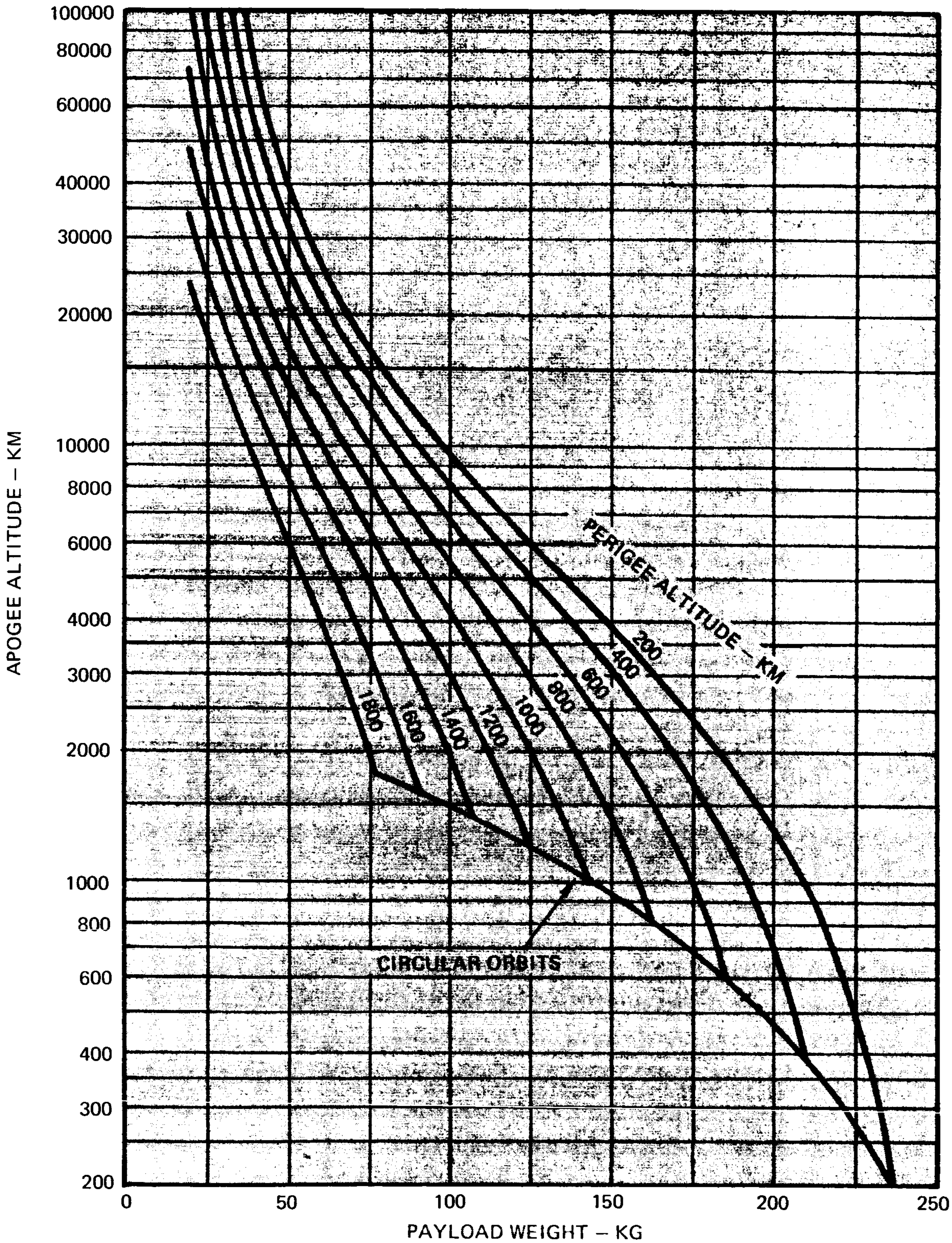

Figure 13.- Elliptical Orbit Performance - Equatorial San Marco Launch.

ALGOL IIIA
CASTOR IIA
ANTARES IIB
ALTAIR IIIA
ALCYONE IA

SCOUT E-1

ORBIT INCLINATION = 90°

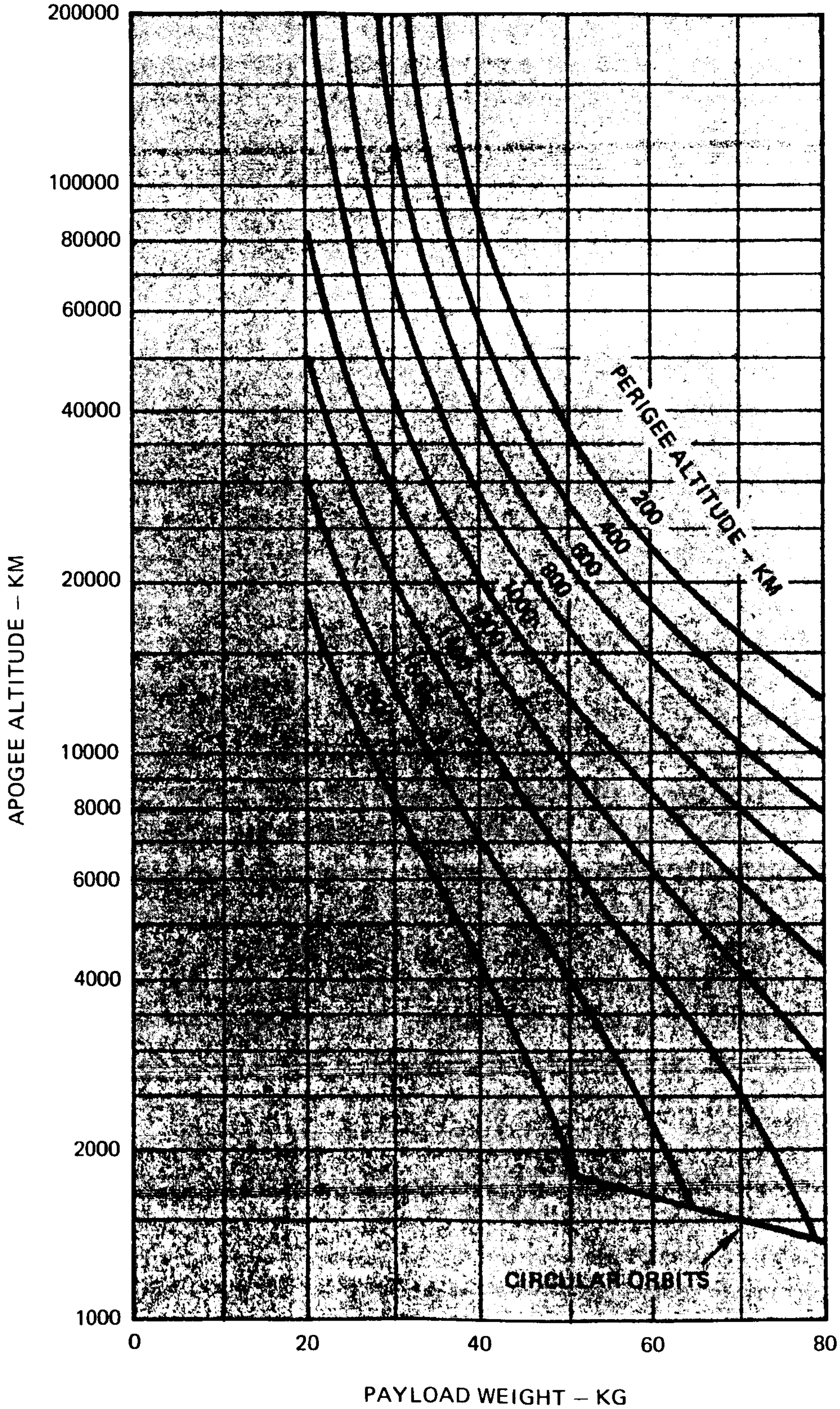

Figure 14.- Apogee altitude - Vandenberg AFB Launch.

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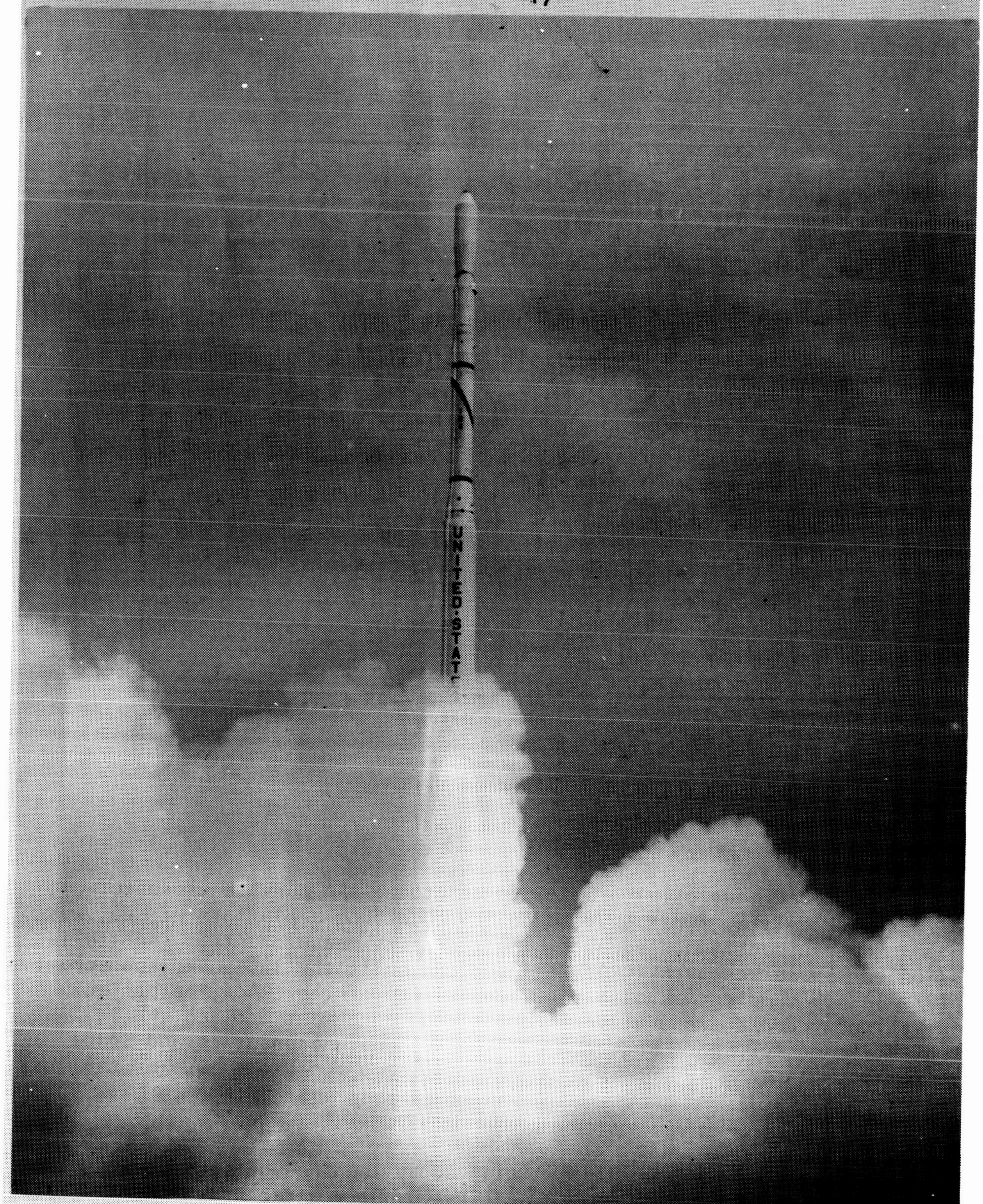

Figure 15.- Scout S-184, First D-1 using the first Algol IIIA.

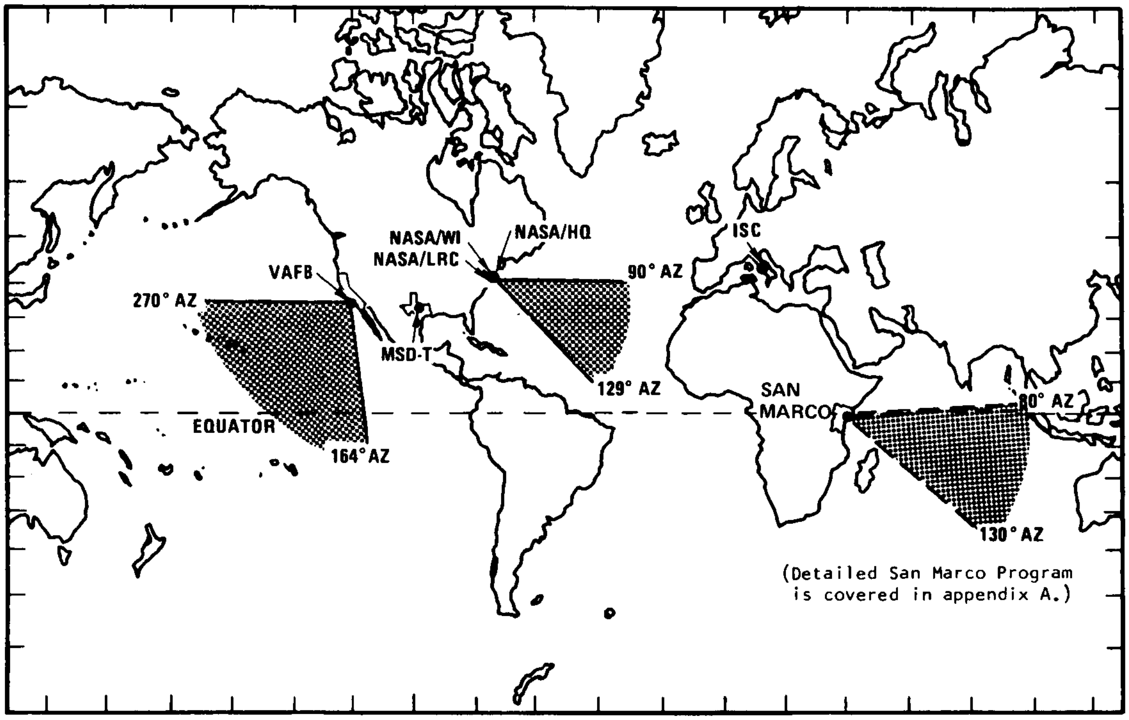

Figure 16.- Total Scout geographical complex.

is in the prescribed equatorial orbit with an apogee and perigee close to nominal. The satellite, first ever to be launched from a platform at sea, was designed to obtain continuous equatorial air density measurements. The Italian Commission for Space Research (CRA) designed and built the 368-pound spacecraft. The entire launch complex was also a responsibility of the CRA. The project was carried out under a cooperative international agreement between the Italian Commission for Space Research and the National Aeronautics and Space Administration. Figures 19 and 20 show the base camp and blockhouse of the San Marco complex.

The Mark I launcher was used for the initial Scout launches but has been replaced by Mark II. Scout S-124 was the first Scout vehicle using the Mark II launcher which was launched July 20, 1964. The Mark II launcher (figures 21 and 22) is provided with a movable base to permit azimuth control between 65 degrees and 205 degrees and a cantilevered elevating launch boom to permit pitch control to the 90-degree position required for launch. The launcher with the Scout vehicle in position permits check out of the vehicle in the horizontal position.

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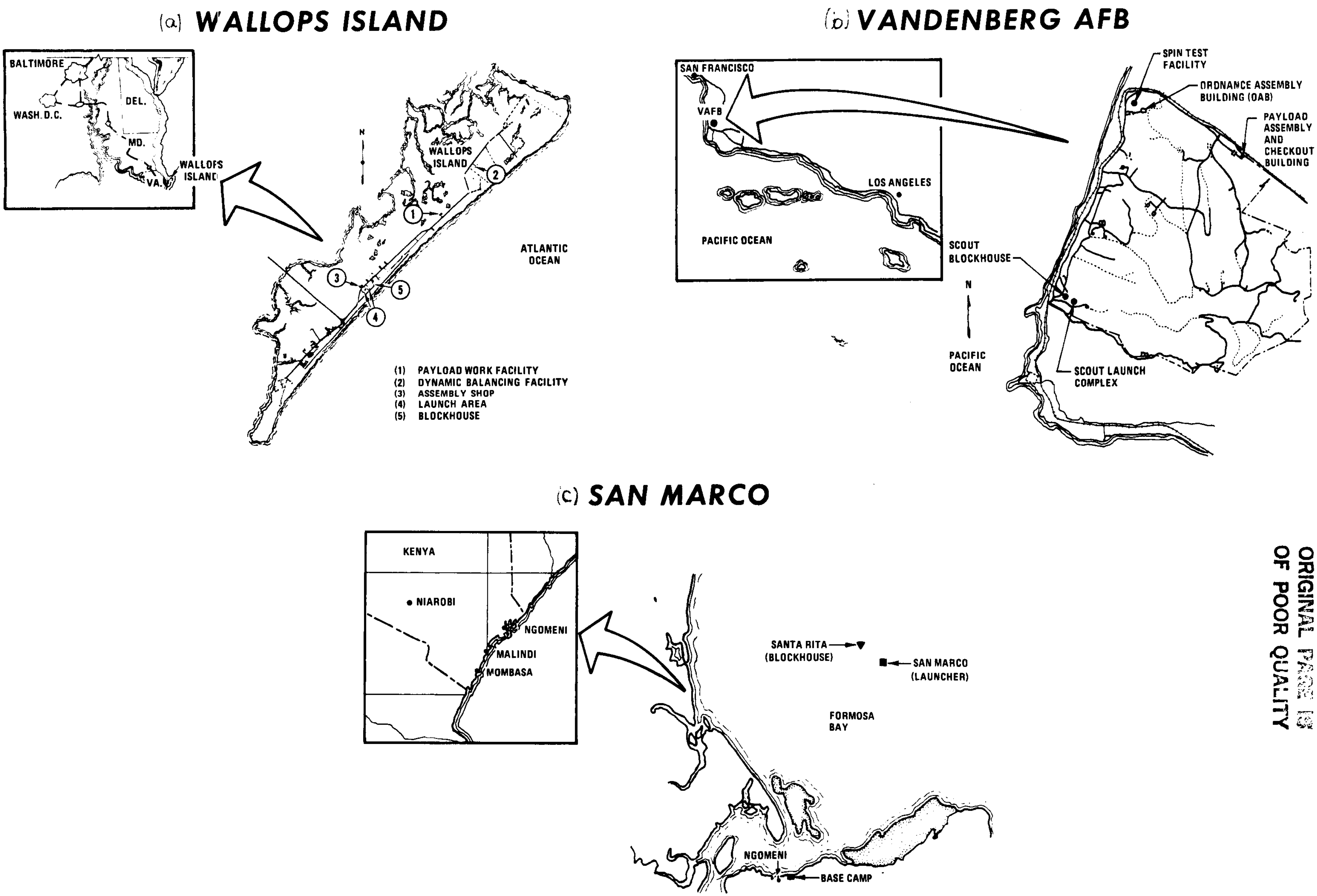

FIGURE 17.- SCOUT LAUNCH SITES.

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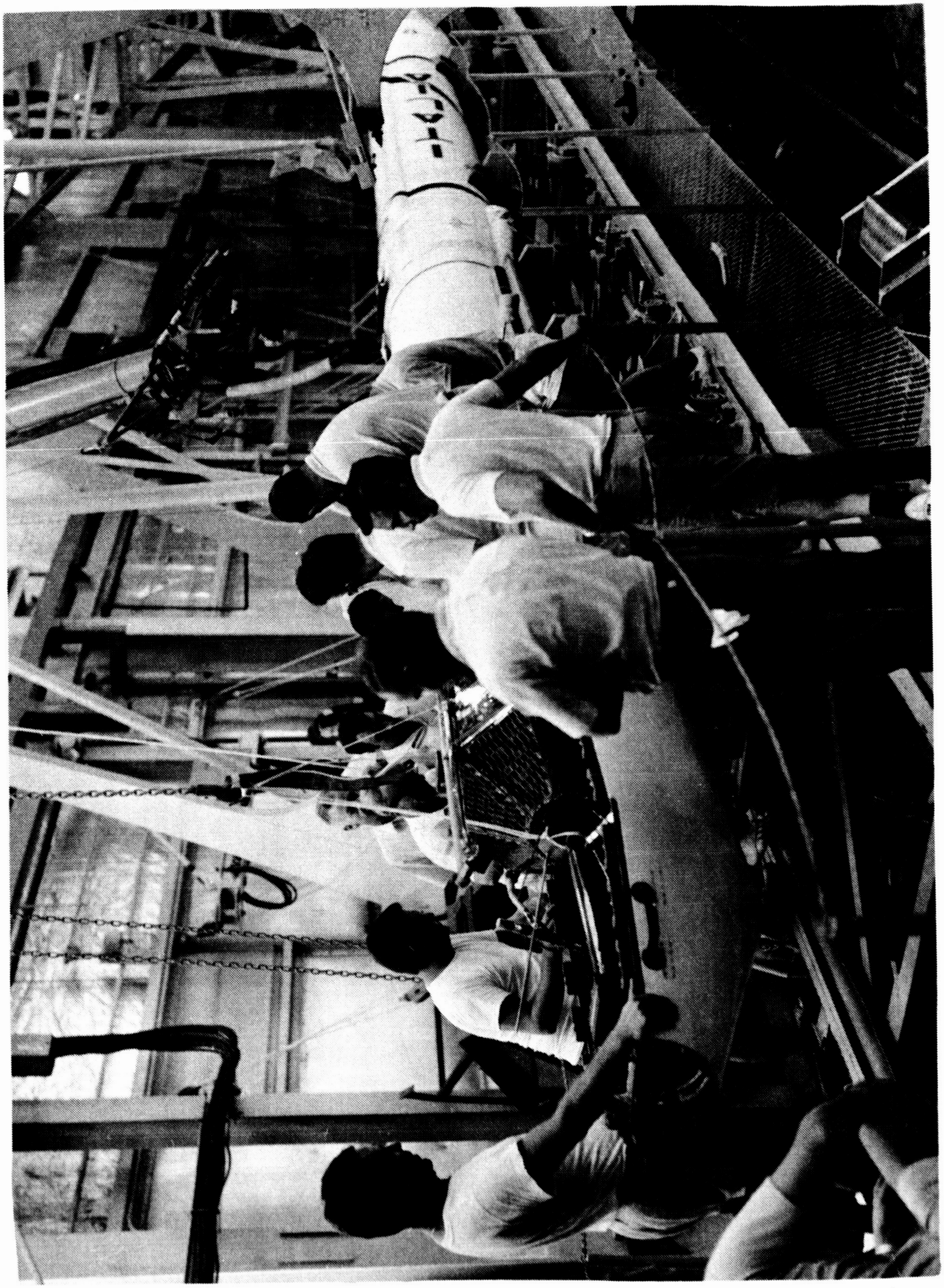


Figure 18.- S-190 being prepared for launch at the San Marco Range.

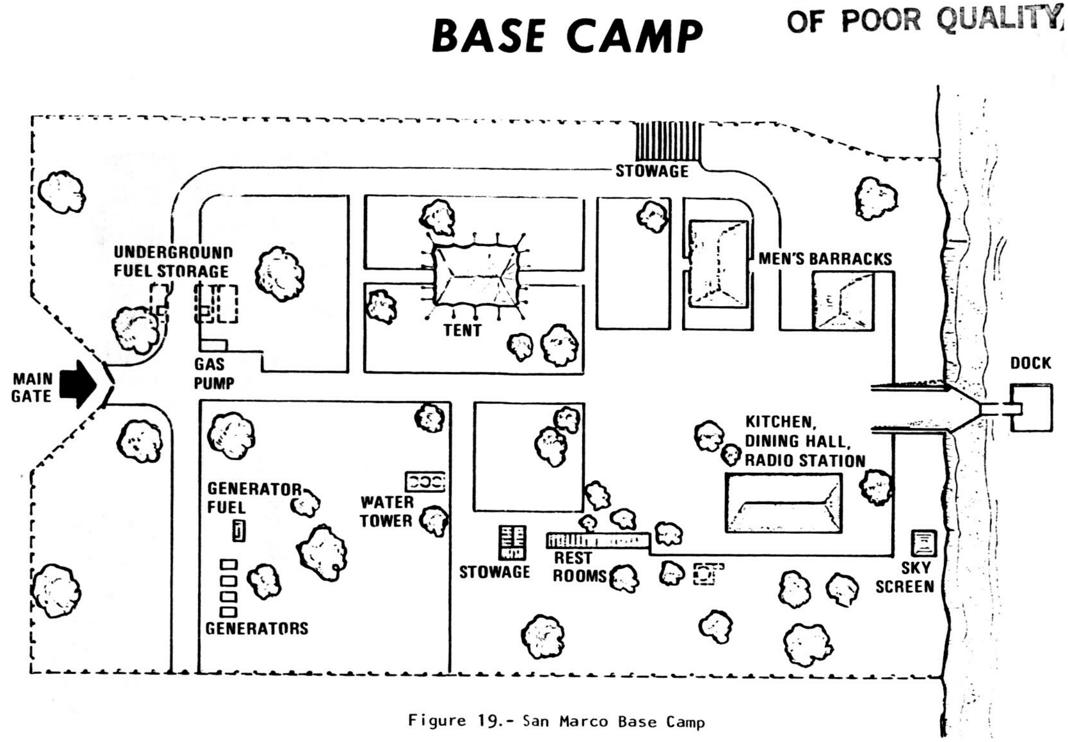


Figure 19.- San Marco Base Camp

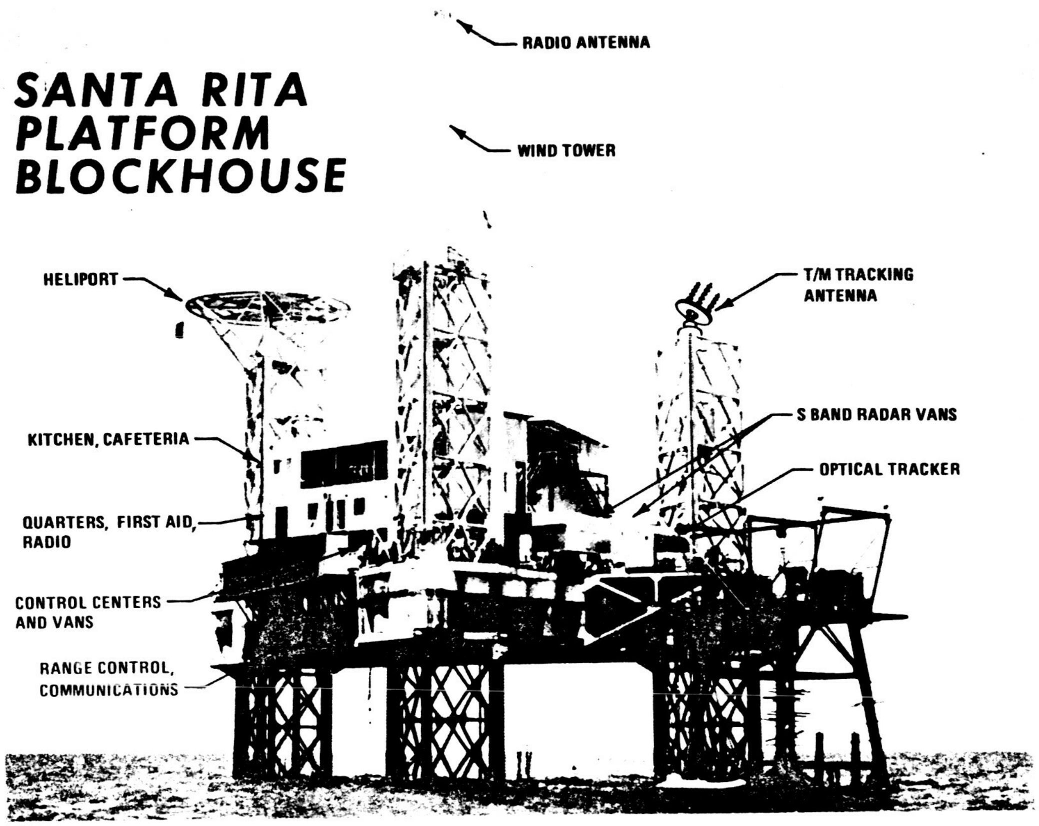


Figure 20.- Equatorial launch complex showing platform blockhouse.

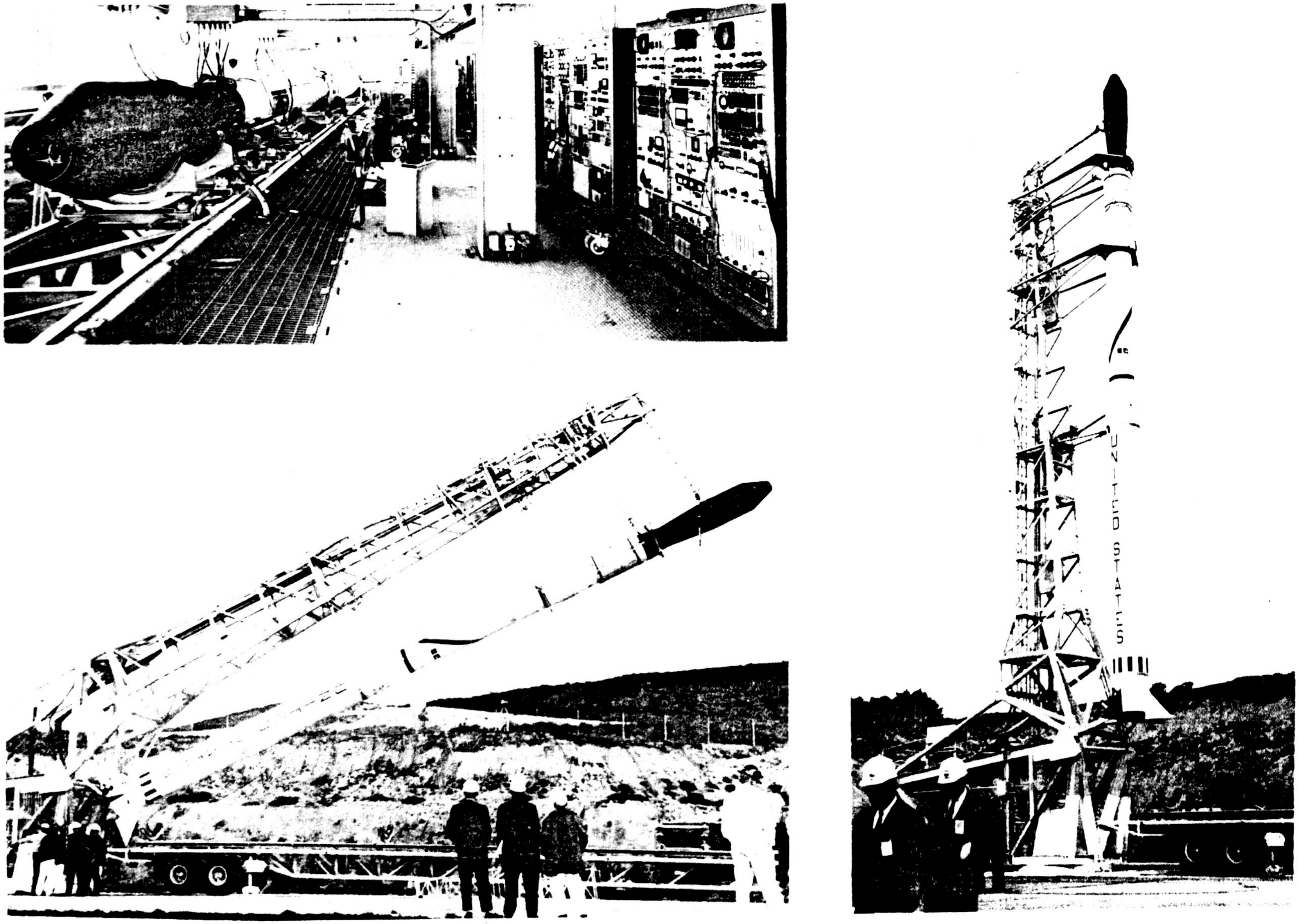
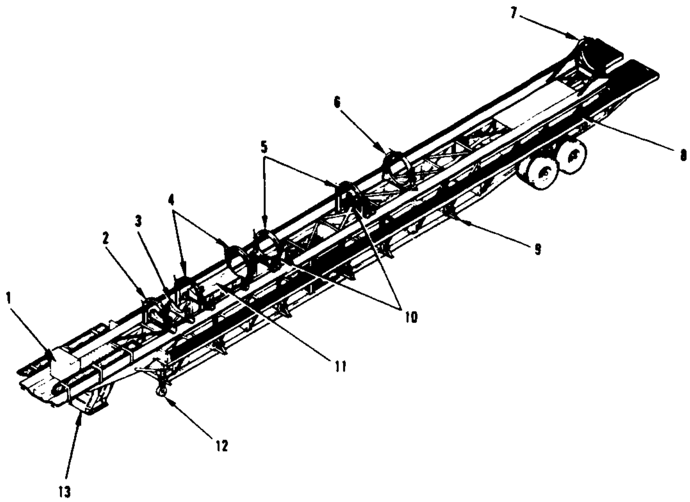
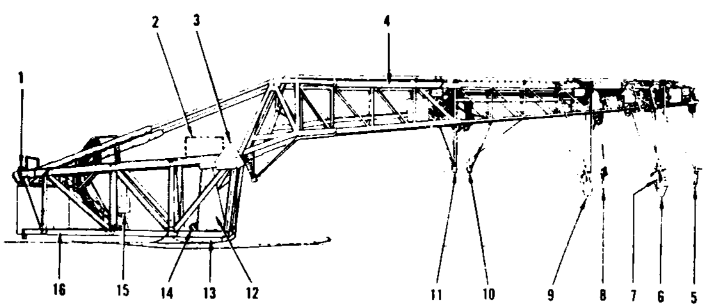


Figure 21.- Mark II Launcher and Transporter.

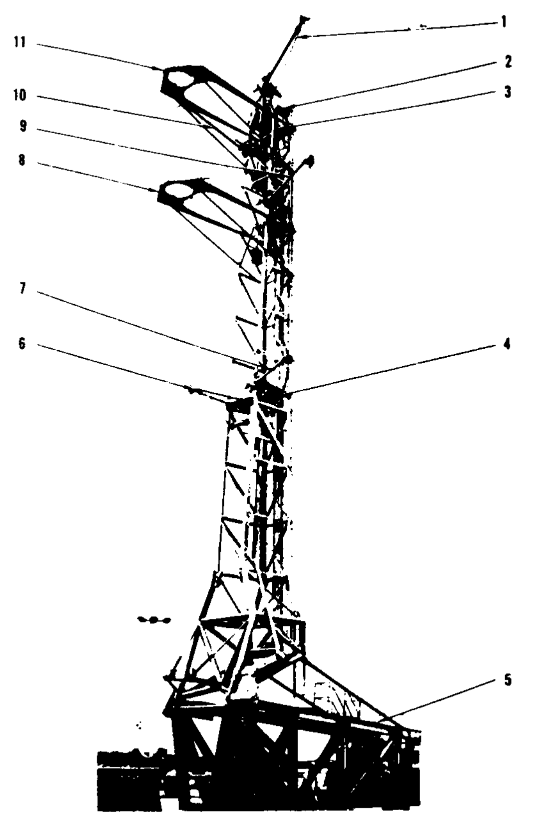


1. DISPLAY CONSOLE (REF. ONLY)
2. ALTAIR RESTRAINT RING
3. FOURTH STAGE CRADLE
4. ANTARES RESTRAINT RINGS
5. CASTOR RESTRAINT RINGS
6. ALGOL FWD RESTRAINT RINGS
7. ALGOL AFT RESTRAINT RING
8. WORK PLATFORM
9. SHORING JACK ASSEMBLY 10 REQ. (5 PLACES EACH SIDE)
10. SECOND STAGE CRADLE
11. THIRD STAGE CRADLE
12. LANDING GEAR
13. JOCKEY KING PIN



1. PITCH DRIVE ASSEMBLY
2. LAUNCHER CONTROL PANEL - AFWTR ONLY (SEE SHEET 2)
3. LUG ASSEMBLIES
4. BEAM ASSEMBLY
5. PAYLOAD FLYAWAY ARM
6. D SECTION SUPPORT ARMS
7. D SECTION FLYAWAY ARM
8. C SECTION UMBILICAL ARM
9. C SECTION SUPPORT ARMS
10. B SECTION UMBILICAL ARM
11. LAUNCH ARMS
12. SHIELD ASSEMBLY
13. BEARING ASSEMBLY
14. AZIMUTH DRIVE ASSEMBLY
15. LAUNCHER CONTROL PANEL - W.I. ONLY (SEE SHEET 3)
16. BASE STRUCTURE

Launch Complex



1. PAYLOAD FLYAWAY ARM
2. PAYLOAD COOLING
3. D SECTION COOLING
4. LAUNCH ARMS NITROGEN BOTTLE
5. PITCH SPEED CONTROL
6. LAUNCH ARMS
7. B SECTION UMBILICAL ARM
8. C SECTION SUPPORT ARMS
9. C SECTION UMBILICAL ARM
10. D SECTION FLYAWAY ARM
11. D SECTION SUPPORT ARMS

Figure 22.- Mark II Launcher and Transporter, continued

An electromechanical system is provided for erecting the vehicle to the vertical attitude. Erection acceleration is limited so that critical loads will not be imposed on the Scout vehicle and mission.

Of the three Scout launch sites, Wallops Island represents a mean performance of the Scout capability of the two remaining Scout launch sites. Generally speaking, the Wallops facility has been used for circular and elliptical orbit work for inclinations 82 degrees to 22 degrees, reentry missions and probes.[1] Polar orbits are launched from Vandenberg Air Force Base, California, with an inclination range of 144 degrees to 34 degeees. San Marco launch platform, located off the east coast of Kenya, permits missions which require inclinations from 79.5 degrees to 0.0 degree.

The launch sites and inclination angles for the Phase VI Scout vehicles are as follows:

Scout Vehicle	Launch Site [2]	Inclination
178C	VAFB (43)	90.20
179CR	VAFB (50)	99.88
180C	WI (34)	50.16
181C	VAFB (42)	97.20
182C	VAFB (40)	90.13
183C	VAFB (39)	83.00
184C	WI (36)	37.69
185C	VAFB (42)	91.10
186C	VAFB (46)	97.20
187C	S.M. (7)	2.86
188C	VAFB (44)	98.40
189C	VAFB (47)	98.04
190C	S.M. (6)	2.90
191C	VAFB (45)	89.78
192C	VAFB (55)	90.15

The San Marco facility is operated by the Centro Ricerche Aerospaziali of Italy. The capability of the Scout vehicle is enhanced by utilizing the San Marco facility due to its geographic location. San Marco performance data was presented in figures 10 and 13.

(1) Phase VI did not include any probe or reentry missions.
(2) Designates the number of the Scout launch from each site.

CHAPTER II - SCOUT LAUNCH VEHICLE HARDWARE

With the heat shield in place, the Scout-D is typically some 76 feet in length with a launch weight of 48,600 pounds. Actual lift-off weights for Phase VI are listed below: (shown in pounds.)

Vehicle No.	L.O. WT. LBS	Vehicle No.	L.O. WT. LBS	Vehicle No.	L.O. WT. LBS
178	39,499.14	183	39,721.60	188	47,580.73
179	39,694.34	184	47,732.22	189	47,534.45
180	39,726.46	185	47,514.10	190	47,724.91
181	47,408.69	186	47,684.23	191	47,671.81
182	39,701.55	187	39,936.89	192	47,777.99

Vehicle S-191 was a five-stage configuration, Scout-E.[1] All other Phase VI vehicles were four-stage configurations. Figure 23 is a sketch of the Scout vehicle showing primary dimensions. Figure 24 shows the inboard profile of the Scout vehicle. The motors are connected by transition sections. Table III lists the Scout stages. The air frame, base, and transition section composition are outlined in table IV. Figure 25 shows the various station locations.

Structure Assemblies

Base A section (figure 25) is an aluminum, semi-monocoque cylindrical shell bolted to the rocket motor and enclosing the motor nozzle to form the aft end of the rocket vehicle. Incorporated in base A are four fixed fins equipped with movable control surfaces, a hydraulic system to operate the control surfaces, amplifiers for signals from the guidance system to the hydraulic actuators and telemetering components. The movable fin tip and a jet vane, immersed in the first-stage rocket motor exhaust area, are attached to each fin by means of a common torque tube. The torque tube, and consequently the attached fin and jet vane, is positioned by a servo actuator installed in each fin. Each servo actuator is powered by the hydraulic system and controlled through the guidance system to provide vehicle stabilization and guidance during lift off and first-stage motor firing.

Transition B (figure 25) consists of upper B and lower B assemblies. Lower B forms the primary load path between the first and second stages of the vehicle. First stage to second stage structural mating is accomplished by utilizing the inner threaded surfaces of lower B and the second-stage motor nozzle. A threaded diaphragm is inserted into the threaded portion of lower B and then in turn into the motor nozzle. The first-stage motor is then mated to the aft end of lower B. Lower B contains the first-stage headcap pressure switch and the telemetry first-stage headcap pressure transducer. Removable panels provide access to the components.

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(1) "G" section was used with the five-stage Scout vehicles.

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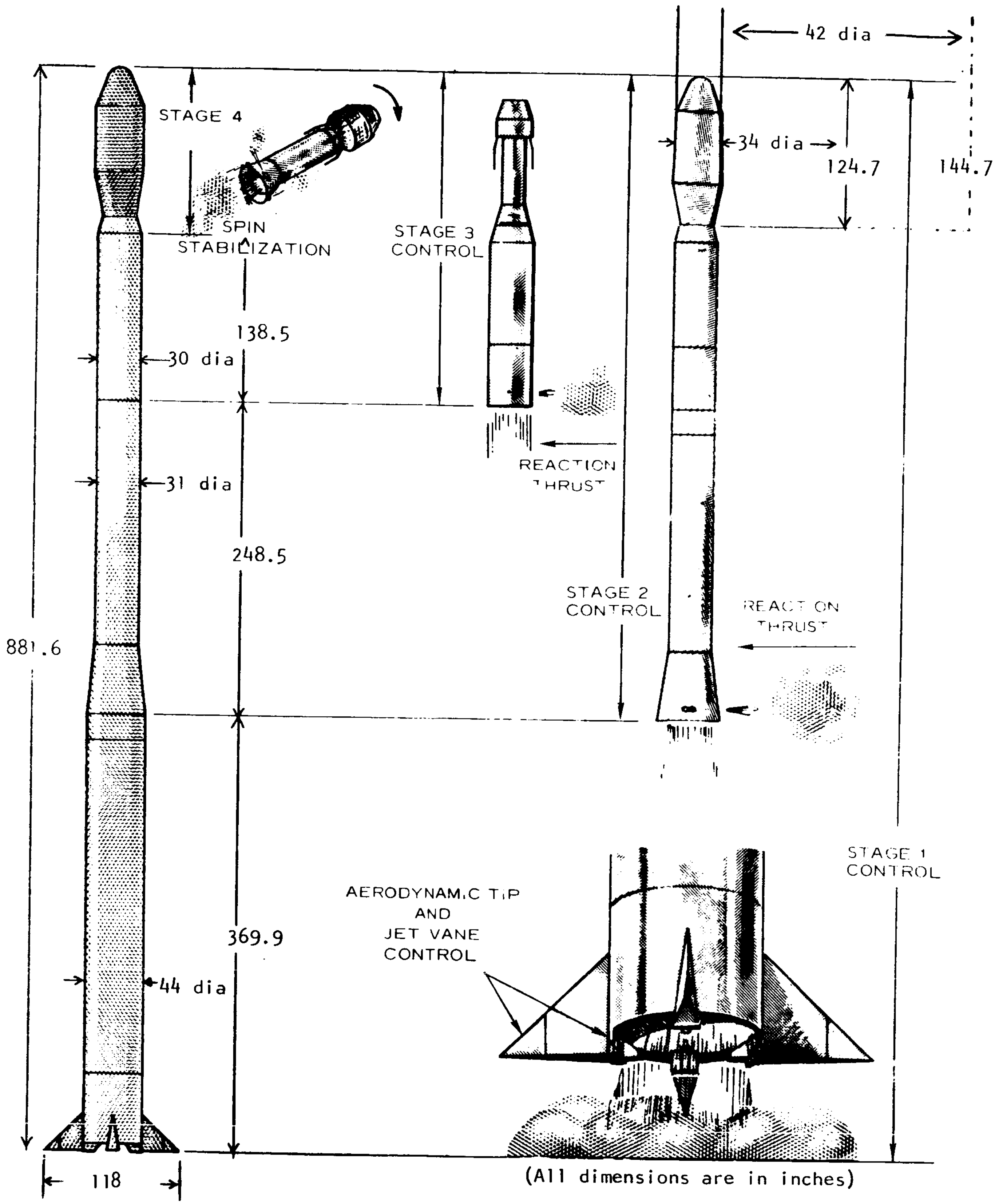

Figure 23.- Sketch of Scout vehicle (Scout D-1).

TABLE III - SCOUT STAGES

SCOUT A-1, A-2, B-1, B-2, D-1 AND F-1 [1]

Stage	Assembly
1	Base A Section (includes fins and jet vanes) Algol IIC Rocket Motor (A-1 and B-1) Algol IIIA Rocket Motor (D-1 and F-1) Transition B - Lower (includes blowout diaphragm)
2	Transition B - Upper Castor IIA Rocket Motor (all configurations) Transition C - Lower (includes blowout diaphragm)
3	Transition C - Upper Antares IIA Rocket Motor (A-1, B-1, and D-1) Antares IIB Rocket Motor (A-2, B-2, and F-1) Transition D - Lower Transition D - Center (includes spin bearing and separation system)
4	Transition D - Upper Altair II Rocket Motor (A-1 and A-2) Altait IIIA Rocket Motor (B-1, B-2, D-1, and F-1) Heat Shield Transition E (includes cold separation system)
5	Payload Assembly (may be used as part of fourth stage)

SCOUT E-1

Stage	Assembly
1	Base A Section (includes fins and jet vanes) Algol IIIA Rocket Motor Transition B - Lower (includes blowout diaphragm)
2	Transition B - Upper Castor IIA Rocket Motor Transition C - Lower (includes blowout diaphragm)
3	Transition C - Upper Antares IIB Rocket Motor Transition D - Lower Transition D - Center (includes spin bearing and separation system)
4	Transition D - Upper Altair IIIA Rocket Motor Transition F - Lower Heat Shield
5	Transition F - Upper Alcyone IA Transition G (includes payload separation system)
6	Payload Assembly (may be used as part of fifth stage)

[1] Not used in Phase VI.

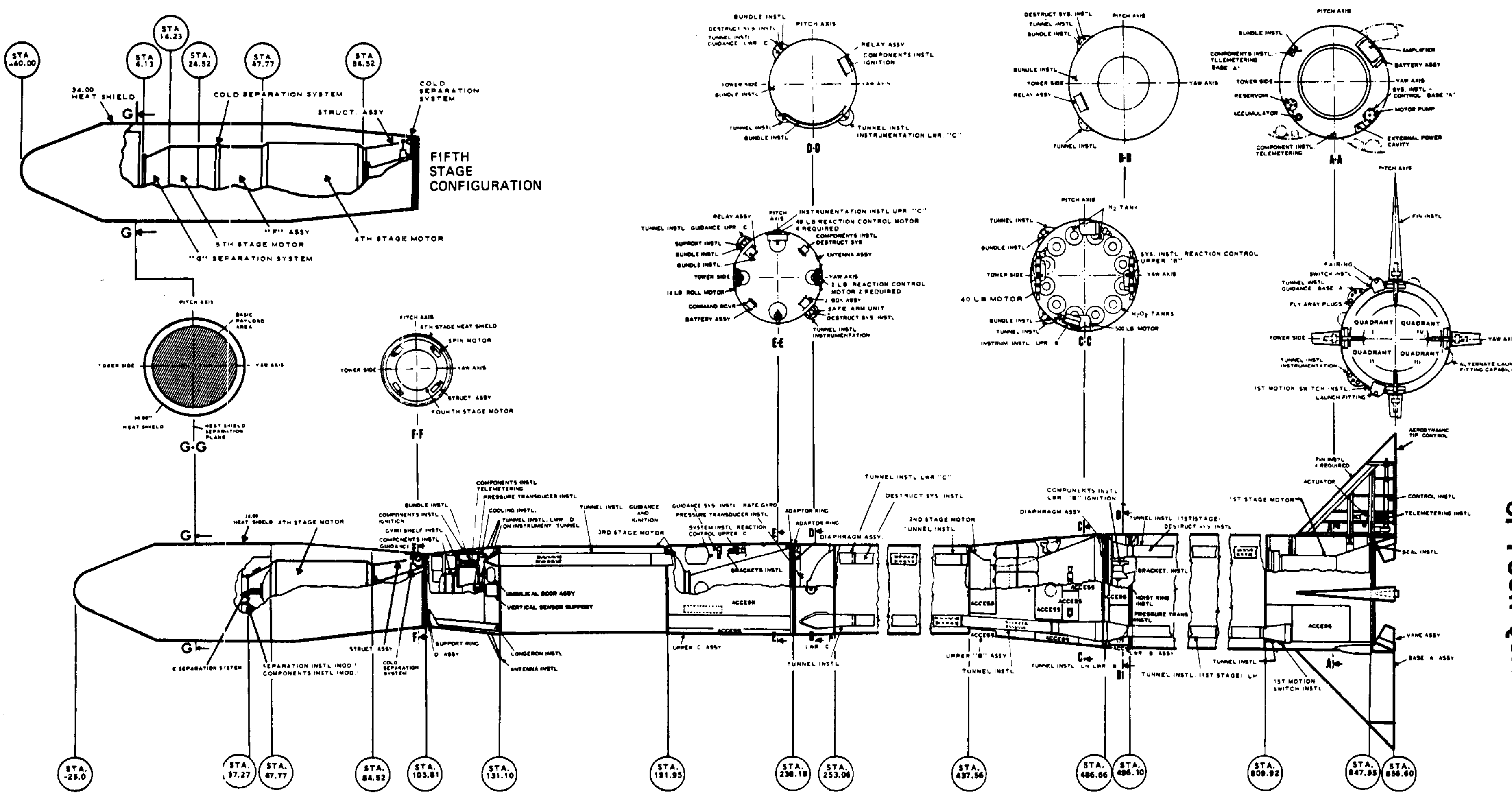

Figure 24.- Scout inboard profile.

TABLE IV - BASE AND TRANSITION SECTION COMPOSITION.

SECTION	
BASE A	Aluminum semi-monocoque structure with steel fins and tip controls and 85/15 tungsten/molybdenum jet vanes through Phase VI and copper infiltrated tungsten beginning with Phase VII.
LOWER B	Aluminum semi-monocoque structure.
UPPER B	Laminated glass cloth with phenolic resin (not primary structure.
LOWER C	Laminated glass cloth with phenolic resin (monocoque structure.
UPPER C	Laminated glass cloth with phenolic resin (semi-monocoque structure.
LOWER D	Steel and aluminum semi-monocoque structure.
MIDDLE D	Aluminum monocoque structure.
UPPER D	Magnesium monocoque structure.
BASIC E	Magnesium casting.
SERIES 200 E	Magnesium casting.
SERIES 25 E	Magnesium monocoque structure.
LOWER F	Magnesium.(1)
UPPER F	Magnesium.(1)
G	Magnesium.(1)
HEAT SHIELD	Laminated glass honeycomb with phenolic resin and Inconel nose cap.

$\left.\begin{array}{l}\text{LOWER F}\\ \text{UPPER F}\\ \text{G}\end{array}\right\}$ (1) Not used in Phase VI.

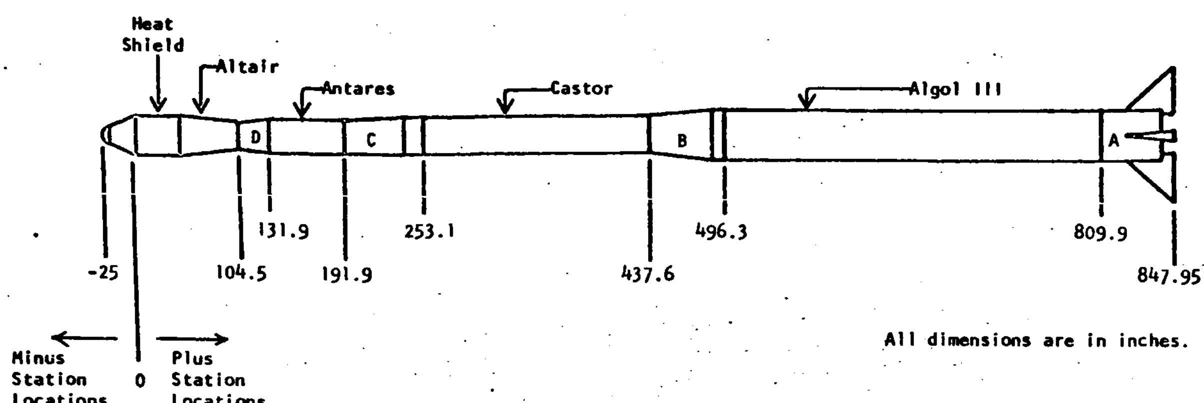

Figure 25.- Various Station Locations Along the Scout Vehicle.

Upper B is constructed of two glass-laminated clamshell sections which bolt to the second-stage rocket motor and enclose the motor nozzle. Upper B contains four 40-pound roll motors, four 500-pound pitch-and-yaw motors, a hydrogen peroxide supply for activating the motors, a nitrogen supply for pressurizing the hydrogen peroxide, and telemetry components. Removable panels provide access to components.

Transition C (figure 25) is divided into upper C and lower C at the frangible diaphragm. The aft end of lower C bolts to the forward end of the second-stage rocket motor. The forward end connects to the aft end of upper C by means of the frangible diaphragm to provide stage separation at third-stage motor ignition. Lower C contains an ignition arming relay, second-stage headcap pressure switch, and the telemetry second-stage headcap pressure transducer. Removable panels provide access to the interior components.

Upper C is a slightly tapered cylindrical structure having an aluminum and phenolic glass framework covered with phenolic glass. The forward end bolts to the aft end of the third-stage rocket motor case and the inside aft end is threaded and connects to lower C by means of the frangible diaphragm. Upper C contains ignition batteries, guidance rate gyros, diode unit, reaction control fuel and motor system, command destruct receiving and initiating system, and telemetering components. Removable panels provide access to interior components.

Transition D (figure 25) is divided into upper D and lower D at the spin bearing. The aft end of lower D bolts to the third-stage rocket motor and the forward end supports the spin bearing. Lower-D section contains ignition, guidance and telemetering components, including such components as a guidance programer, inertial reference package, poppet valve electronics, intervalometer, inverter, telemetering package, F/M transmitter, and radar beacon. The inner surfaces of the section are coated with mirror-like gold finish to provide emissivity for thermal protection of the components. Removable panels provide access to components.

Upper D is divided into two sections at the mating plane of the third and fourth stages and is held together by an explosive bolt-secured clamp which provides stage separation. The lower section contains four rocket spin motors and its aft end is attached to the spin bearing. The upper section bolts to the fourth-stage rocket motor. The upper section has an optional system for measurement of vehicle fourth-stage performance and a complete dualized separation system. Upper D is covered by the heat shield when the vehicle is assembled.

Four standard payload-to-vehicle adapter sections, Section "E," Series 200 "E," Series 25 "E,"(1) and Section "E-G"(1) are available for mating a payload to the fourth-stage motor. The selection of a standard adapter is contingent on

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(1) Not used on Phase VI vehicles.

payload weight and center-of-gravity location. It should be noted that the weight capability of the adapter section includes the weight of both the adapter section and the spacecraft. The rated load-carrying capability of each adapter section is based on structural load tests. Figure 26 shows the payload weight capability for each standard adapter when the payload center of gravity is located at vehicle station 24. The payload weight capabilities of the adapter section at other center-of-gravity locations are shown in figure 27.

The basic adapter assembly consists of a conical adapter, a payload support ring and a payload separation clamp. The adapter base is bolted directly to the final-stage motor forward flange. The payload support ring provides threaded holes for attachment to the payload and machined surfaces for mating to top of adapter. The payload separation clamp is a two-piece assembly. When bolted together, this clamp holds payload support ring and adapter together. The clamp configuration allows removal of the payload from the vehicle. The separation system springs provide sufficient energy to impart a relative separation velocity of 3.4 feet per second to a 200-pound spacecraft.

The standard adapter sections are designed to provide a separation system when required and to satisfy a mandatory requirement for access to the final-stage motor igniters. In general, the design of the standard adapter/separation system is basically the same for all sections.

Transition "E-G" is available, as an option, to attach the payload to the fourth-stage motor and to provide for payload separation. The "E-G" section is used for light weight payloads. Transition "E-G" incorporates the aft ring of transition "E" and the forward ring of transition "G." (Not used in Phase VI.)

Transition "F" includes the fifth-stage separation system and is used only when a fifth stage is required.

Transition "G," which will include the payload separation system, is used with five-stage vehicles only.

The heat shield (figures 28 and 29) covers the payload, fourth-stage motor, and upper-D section, and is designed to maintain the enclosed components within specified temperature limits. The Scout vehicle has used heat shields having a diameter of 20 inches, 21.5 inches, 25.7 inches, 34 inches, and 42 inches, with only the 34-inch and 42-inch diameter heat shield now available. Figure 28 shows a typical heat shield and the heat-shield history through Phase VI. Heat shields are fabricated from two fiber glass honeycomb half-shells. The 34-inch diameter heat shield has a stainless steel nose cap and the 42-inch diameter heat shield has a cork-covered aluminum nose cap. The nose cap attaches to one half-shell and butts against the other half-shell. The 34-inch heat shield has a body section outside diameter of 34 inches, tapers to 25.7 inches at the aft end and extends to forward nose station -25 or -40. A 22-degree conical section supports the 7.71-inch radius nose cap. The 42-inch

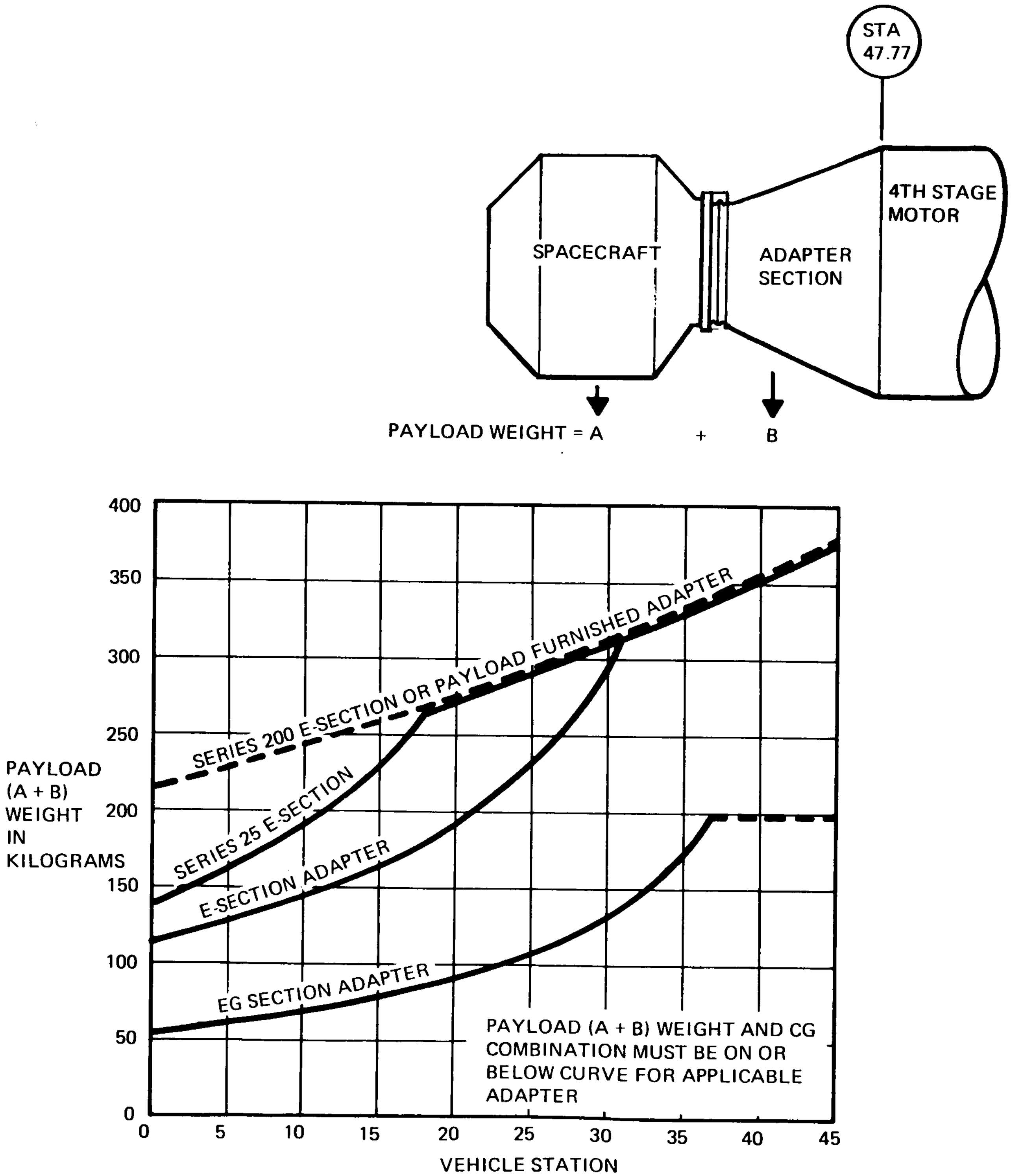


Figure 26.- Allowable payload weight and C.G. location.

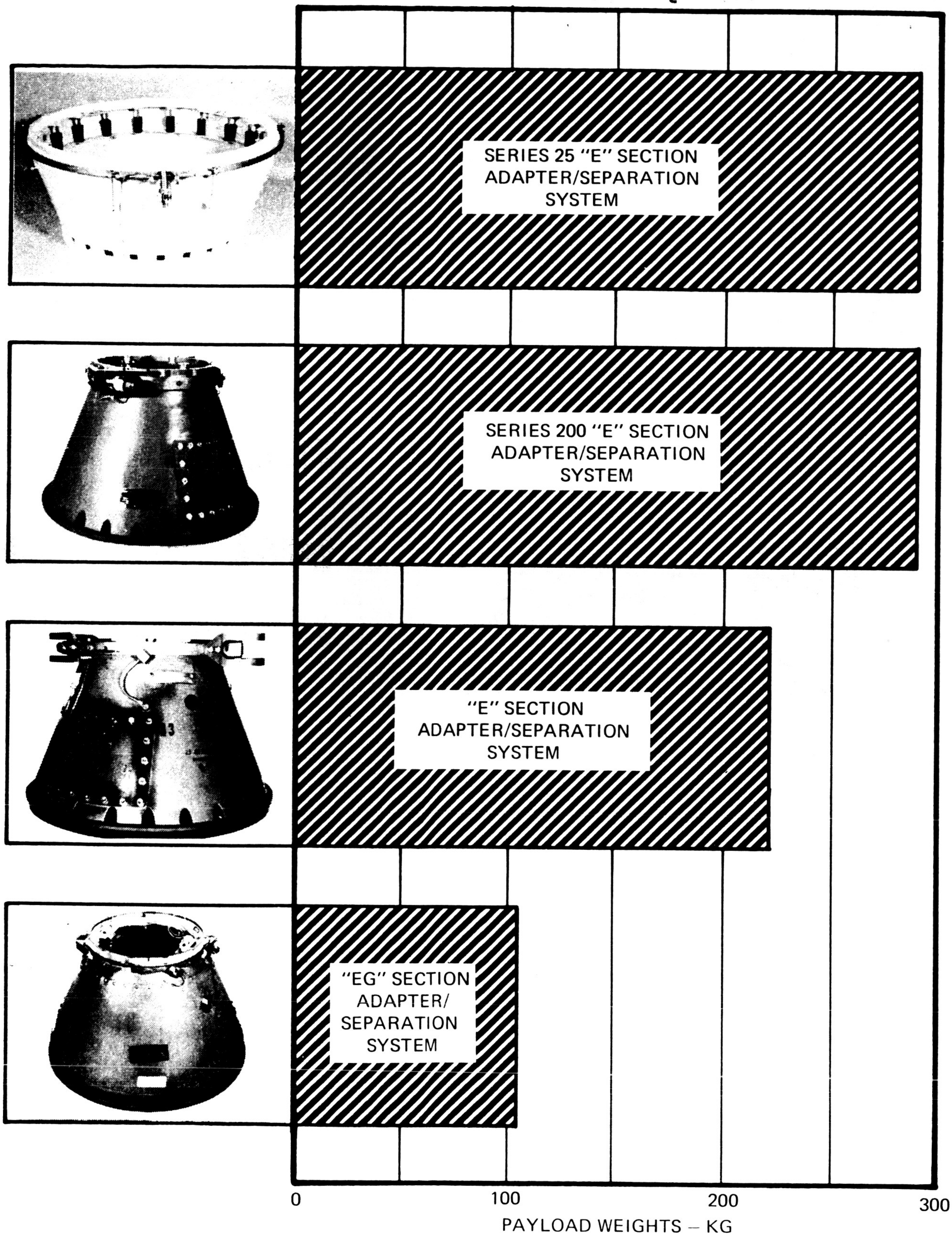
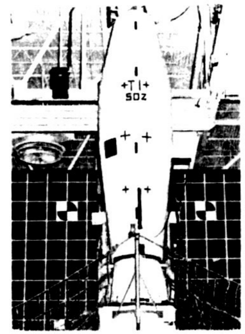


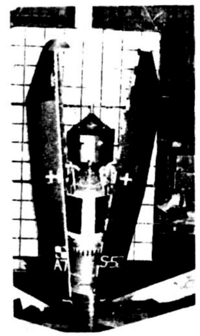
Figure 27.- Payload Weight Capability of Adapter Sections.

Phase	Vehicle	Serial Number	Style	Diameter (Inches)	Length (Inches)	Forward Station (Inches)
	X		A	20	98.5	+4.8
PHASE I	ST-1		A	20	98.5	+4.8
	ST-2		A	20	98.5	+4.8
	ST-3		A	20	98.5	+4.8
	ST-4		A	20.7	98.5	+4.8
	ST-5		C	25.7	90.7	+13
	ST-6		B	25.7	98.7	+5
	ST-7		D	21.5	113.7	-10
	ST-8		D	21.5	113.7	-10
	ST-9		D	21.5	113.7	-10
PHASE II	110	114	G	34	128.7	-25
	111	111	E	34	113.7	-10
	112	112	F	25.7	108.7	-5
	113	A-4	G	34	128.7	-25
	114	110	H	25.7	118.7	-15
	115	113	E	34	113.7	-10
	116	A-5	G	34	128.7	-25
	117	117	F	25.7	108.7	-5
	118	116	G	34	128.7	-25
	119	A-1	G	34	128.7	-25
	120	A-3	G	34	128.7	-25
	121	121	F	25.7	108.7	-5
	122R	A-13	G	34	128.7	-25
	123RR	A-2	G	34	128.7	-25
PHASE III	124R	129	E	34	113.7	-10
	125R	A-8	G	34	128.7	-25
	126	126	F	25.7	108.7	-5
	127R	A-7	G	34	128.7	-25
	128R	A-11	G	34	128.7	-25
	129R	A-6	G	34	128.7	-25
	130R	A-12	G	34	128.7	-25
	131R	A-27	G	34	128.7	-25
	132	C-1	I	25.7	113.7	-10
	133R	124	E	34	113.7	-10
	134R	A-9	G	34	128.7	-25
	135R	A-21	G	34	128.7	-25
	136R	A-23	G	34	128.7	-25
	137R	A-15	G	34	128.7	-25
PHASE IV	138R	A-26	G	34	128.7	-25
	139R	A-28	G	34	128.7	-25
	140C	A-14	G	34	128.7	-25
	141C	A-24	G	34	128.7	-25
	142C	A-22	G	34	128.7	-25
	143C	A-31	G	34	128.7	-25
	144CR	A-502	K	42	148.7	-45
	145C	A-29	G	34	128.7	-25
	146C	A-32	G	34	128.7	-25
	147C	A-30	G	34	128.7	-25
	148C	A-33	G	34	128.7	-25
	149C	A-34	G	34	128.7	-25
	150C	A-35	G	34	128.7	-25
	151C	A-36	G	34	128.7	-25
	152C	A-40	G	34	128.7	-25
	153C	A-43	G	34	128.7	-25
	154C	A-37	G	34	128.7	-25
	155C	A-41	G	34	128.7	-25
	156C	A-39	G	34	128.7	-25
	157C	A-42R	G	34	128.7	-25
	158C	A-38	G	34	128.7	-25
	159C	A-25	G	34	128.7	-25
	160C	A-46	G	34	128.7	-25
	161C	A-49	G	34	128.7	-25
	162C	A-44	G	34	128.7	-25
PHASE V	163CR	A-400	J	34	128.7	-40
	164C	None	-	-	-	-
	165C	A-47	G	34	128.7	-25
	166C	A-58	G	34	128.7	-25
	167C	A-45	G	34	128.7	-25
	168C	A-48	G	34	128.7	-25
	169C	A-53	G	34	128.7	-25
	170C	A-401	J	34	128.7	-40
	171C	A-62	G	34	128.7	-25
	172C	A-56	G	34	128.7	-25
	173C	A-54	G	34	128.7	-25
	174C	A-57	G	34	128.7	-25
	175C	A-61	G	34	128.7	-25
	176C	A-55	G	34	128.7	-25
	177C	A-59	G	34	128.7	-25
PHASE VI	178C	A-50	G	34	128.7	-25
	179C	A-409	G	34	128.7	-25
	180C	A-60	G	34	128.7	-25
	181C	A504	K	42	148.7	-45
	182C	A-404	J	34	143.7	-40
	183C	A-63	G	34	128.7	-25
	184C	A-402	J	34	143.7	-40
	185C	A-403	J	34	143.7	-40
	186C	A-507	K	42	148.7	-45
	187C	A-505	K	42	148.7	-45
	188C	A-506	K	42	142.7	-45
	189C	A-406	J	34	143.7	-40
	190C	A-66	G	34	128.7	-25
	191C	A-405	J	34	143.7	-40
	192C	A-414	J	34	143.7	-40
PHASE VII	193C	A-503	K	42	148.7	-45
	194C	A-508	K	42	148.7	-45
	195C	A-407	J	34	143.7	-40
	196C	A-509	K	42	148.7	-45
	197C	A-408	J	34	143.7	-40
	198C	A-510	K	42	148.7	-45
	199C	A-52	G	34	128.7	-25 Planned
	200C	A-410	J	34	143.7	-40
	201C	A-511	K	42	148.7	-45
	202C	A-513	K	42	148.7	-45
	203C	A-412	J	34	143.7	-40
	204C	A-51	G	34	128.7	-25 Planned
	205C	A-416	J	34	143.7	-40 Planned
	206C	A-512	K	42	148.7	-45 Planned
	207C	A-68	G	34	128.7	-25 Planned

NOTE: Base of H/S at Veh. Sta. 103.69.



Fit and ejection drop test (zero G) of 42-inch diameter heat shield.



Fit and ejection test without drop test (zero G) of Scout heat shield No. A-7 (34-inch diameter) and S-52 payload.

SCOUT HEAT SHIELDS

	Diameter (Inches)	Forward Station
A -	20	+4.8
B -	25.7	+5
C -	25.7	+13
D -	21.5	-10
E -	34	-10
F -	25.7	-5
G -	34	-25
H -	25.7	-15
I -	25.7	-10
J -	34	-40
K -	42	-45

Figure 28.- Scout Heat Shield Data.

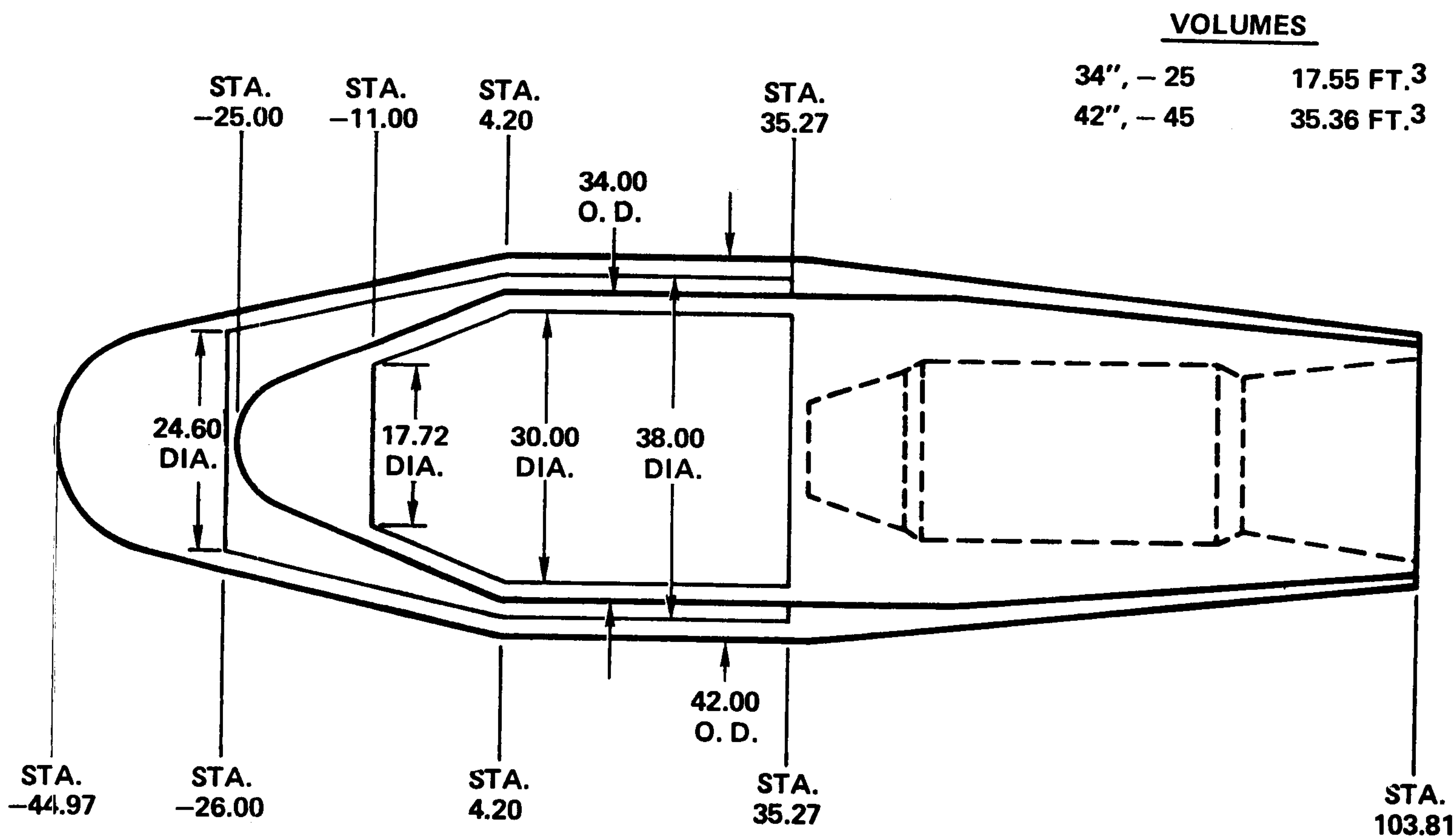


Figure 29.- Scout Heat Shield Comparison.

heat shield has a body section outside diameter of 42 inches, tapers to 28.2 inches at the aft end and extends forward to nose station -45. Figure 29 illustrates the comparison of the 34-inch and 42-inch heat shields. A 12.5-degree conical section supports a 12.28-inch spherical radium nose cap. Figure 30 shows an explosion view of Scout.

WEIGHT

The Scout D-1 vehicle has a nominal lift-off weight of approximately twenty-five tons. Nominal weight summaries for Scout configurations are given in tables V-VIII. Appendix B gives a more detailed weight breakdown. The stage weights shown include those parts of the transition section which remain attached to the stage upon separation from the previous stage. The consumed weights shown for the second and third stages include nominal amounts of hydrogen peroxide used by the reaction control system. The final weight of the vehicle is dependent upon the weight of the payload. Figure 31 shows Scout vehicle S-192C ready for launch.

LOADS

The largest transverse flight loads on a vertically-rising launch vehicle structure are produced by horizontal wind and gusts. Vehicle flight loads are shown in figure 32. Scout S-133 was instrumented as shown in figure 33 for the purpose of measuring these winds, gusts, and control commands. The measured wind and gust profiles were used as disturbances in an analytical simulation program to calculate the vehicle motions and loads.[1] This is typical of the testing and research accomplished on all Scout systems. Vehicle ground handling loads are shown in figure 34.

Typical flight loads for a four-stage Scout launched from Wallops Flight Center into a 300-nautical mile easterly circular orbit with a 377-pound payload has maximum axial acceleration of 9.5 g's at about 130 seconds, 166 seconds, and 620 seconds consecutively after first-stage ignition. The axial acceleration also peaks to 417 g's at about 55 seconds after ignition.

The second peak of 166 seconds complements the velocity which also peaks at 166 seconds which coincides with third-stage burnout. The inertial velocity, at this point, reaches 3,240 nautical miles per second.

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[1] Scout vehicle flight loads were presented to the AIAA structural dynamics and aeroelasticity conference by K. G. Pratt and H. C. Lester.

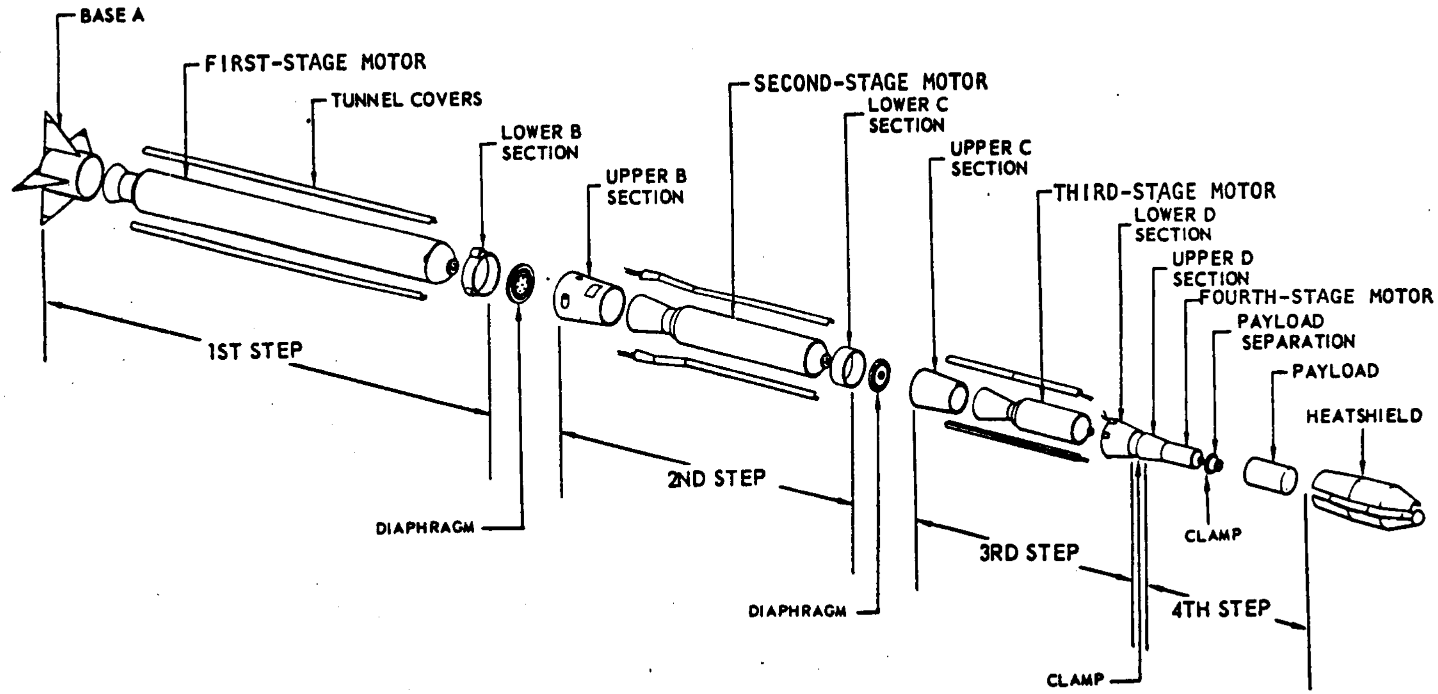

Figure 30.- Scout F-1 vehicle - exploded view.

TABLE V - NOMINAL VEHICLE WEIGHTS

SCOUT A-1

Algol IIC/Castor IIA/Antares IIA/Altair IIA

EVENT	WEIGHT, POUNDS		
	42-45 Heatshield	34-40 Heatshield	34-25 Heatshield
Payload	0.00	0.00	0.00
4th Inert	102.99	102.99	102.99
4th Burn-out	102.99	101.99	102.99
4th Consumed	510.04	510.04	510.04
4th Ignition	613.03	613.03	613.03
3rd Inert	749.33	749.33	749.33
3rd Burn-out	1362.36	1362.36	1362.36
3rd Consumed	2593.81	2593.81	2593.81
3rd Ignition	3956.17	3956.17	3956.17
2nd Inert Less Heatshield	2052.68	2052.68	2052.68
2nd Inert	2404.26	2348.51	2312.26
2nd Burn-out	6360.43	6304.68	6268.43
2nd Consumed	8307.42	8307.42	8307.42
2nd Ignition	14667.85	14612.10	14575.85
1st Inert	3425.34	3391.50	3391.50
1st Burn-out	18093.19	18003.60	17967.35
1st Consumed	21385.00	21385.00	21385.00
1st Ignition	39478.19	39388.60	39352.35

TABLE VI - NOMINAL VEHICLE WEIGHTS

SCOUT B-1

Algol IIC/Castor IIA/Antares IIA/Altair IIA

EVENT	WEIGHT, POUNDS		
	42-45 Heatshield	34-40 Heatshield	34-25 Heatshield
Payload	0.00	0.00	0.00
4th Inert	94.35	94.35	94.35
4th Burn-out	94.35	94.35	94.35
4th Consumed	604.44	604.44	604.44
4th Ignition	698.79	698.79	698.79
3rd Inert	749.33	749.33	749.33
3rd Burn-out	1448.12	1448.12	1448.12
3rd Consumed	2593.81	2593.81	2593.81
3rd Ignition	4041.93	4041.93	4041.93
2nd Inert Less Heatshield	2052.68	2052.68	2052.68
2nd Inert	2404.26	2348.51	2312.26
2nd Burn-out	6446.19	6390.44	6354.19
2nd Consumed	8307.42	8307.42	8307.42
2nd Ignition	14753.61	14697.86	14661.61
1st Inert	3425.34	3391.50	3391.50
1st Burn-out	18178.95	18089.36	18053.11
1st Consumed	21385.00	21385.00	21385.00
1st Ignition	39563.95	39474.33	39438.11

TABLE VII - NOMINAL VEHICLE WEIGHTS

SCOUT D-1

Algol IIIA/Castor IIA/Antares IIA/Altair IIIA

EVENT	WEIGHT, POUNDS		
	42-45 Heatshileld	34-40 Heatshield	34-25 Heatshield
Payload	0.00	0.00	0.00
4th Inert	94.35	94.35	94.35
4th Burn-out	94.35	94.35	94.35
4th Consumed	604.44	604.44	604.44
4th Ignition	698.79	698.79	698.79
3rd Inert	749.33	749.33	749.33
3rd Burn-out	1448.12	1448.12	1448.12
3rd Consumed	2593.81	2593.81	2593.81
3rd Ignition	4041.93	4041.93	4041.93
2nd Inert Less Heatshield	2052.68	2052.68	2052.68
2nd Inert	2404.26	2348.51	2312.26
2nd Burn-out	6446.19	6390.44	6354.19
2nd Consumed	8307.42	8307.42	8307.42
2nd Ignition	14753.61	14753.61	14753.61
1st Inert	4260.54	4226.70	4226.70
1st Burn-out	19013.70	18979.86	18979.86
1st Consumed	28181.13	28181.13	28181.13
1st Ignition	47194.83	47160.99	47160.99

TABLE VIII - NOMINAL VEHICLE WEIGHTS

SCOUT E-1

Algol IIIA/Castor IIA/Antares IIB/Altair IIIA/Alcyone IA

EVENT	WEIGHT, POUNDS		
	42-45 Heatshield	34-40 Heatshield	34-25 Heatshield
Payload	0.00	0.00	0.00
5th Inert	32.92	32.92	32.92
5th Burn-out	32.92	32.92	32.92
5th Consumed	194.42	194.42	194.42
5th Ignition	227.34	227.34	227.34
4th Inert	103.34	103.34	103.34
4th Burn-out	330.68	330.68	330.68
4th Consumed	604.44	604.44	604.44
4th Ignition	935.12	935.12	935.12
3rd Inert	753.07	753.07	753.07
3rd Burn-out	1688.19	1688.19	1688.19
3rd Consumed	2579.37	2579.37	2579.37
3rd Ignition	4267.56	4267.56	4267.56
2nd Inert Less Heatshield	2052.68	2052.68	2052.68
2nd Inert	2404.26	2348.51	2312.26
2nd Burn-out	6671.82	6616.07	6579.82
2nd Consumed	8307.42	8307.42	8307.42
2nd Ignition	14979.24	14923.49	14887.24
1st Inert	4260.54	4260.54	4260.54
1st Burn-out	19239.78	19184.03	19147.78
1st Consumed	28181.13	28181.13	28181.13
1st Ignition	47420.91	47365.16	47328.91

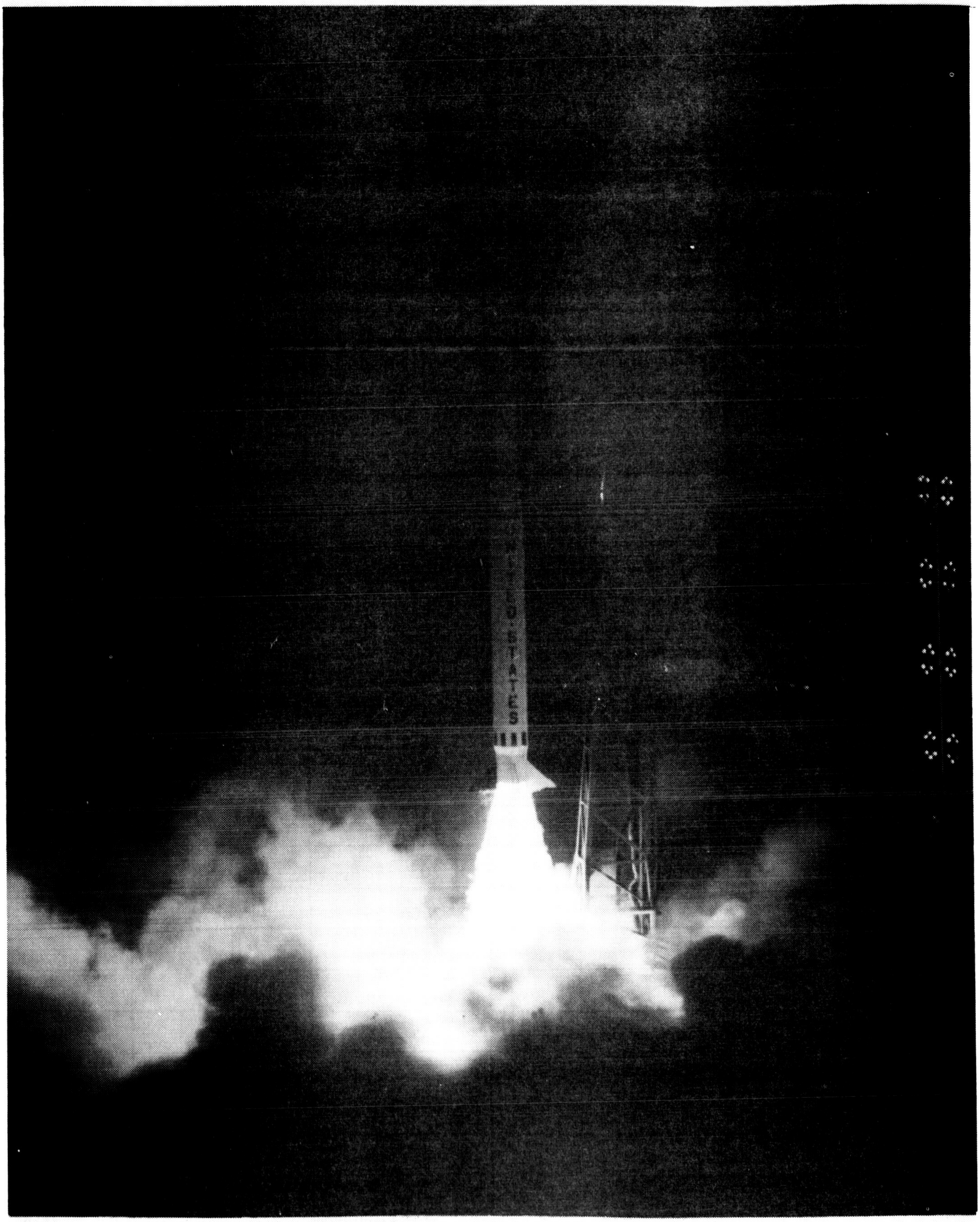

Figure 31.- Launch of S-192 from WTR.

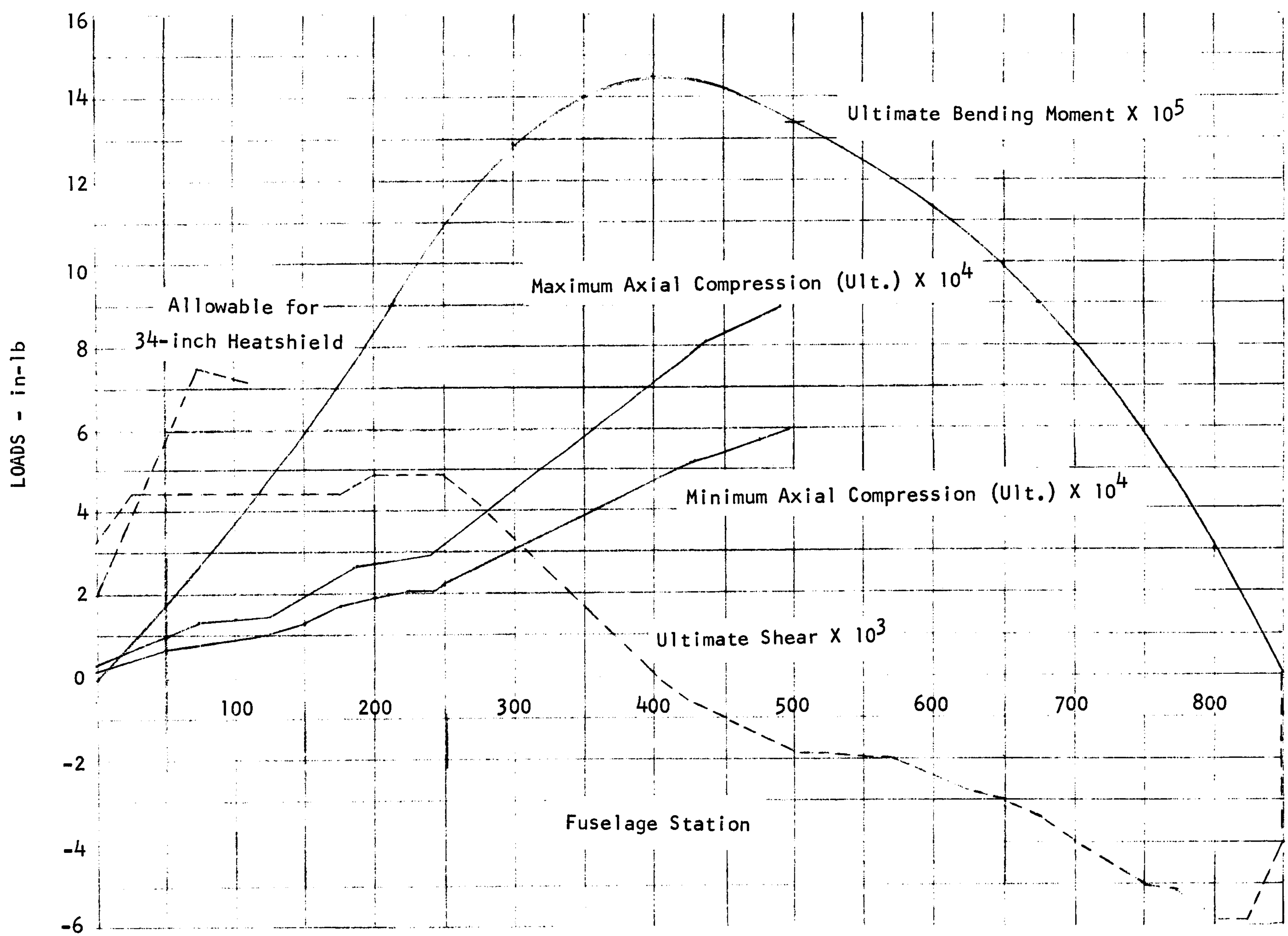

Figure 32.- Vehicle Flight Loads Ultimate.

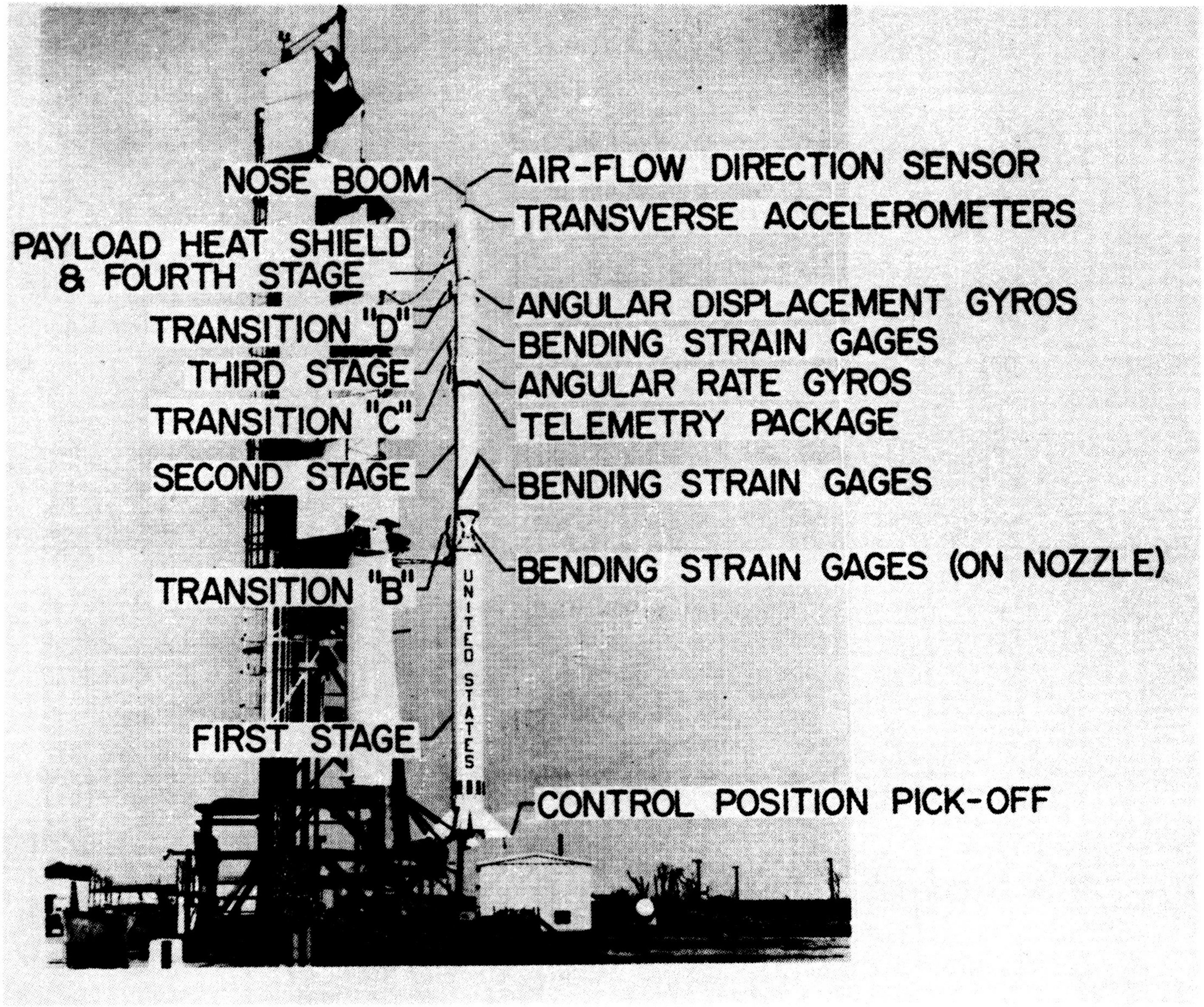

Figure 33.- Onboard instrumentation for loads experiment on vehicle S-133R.

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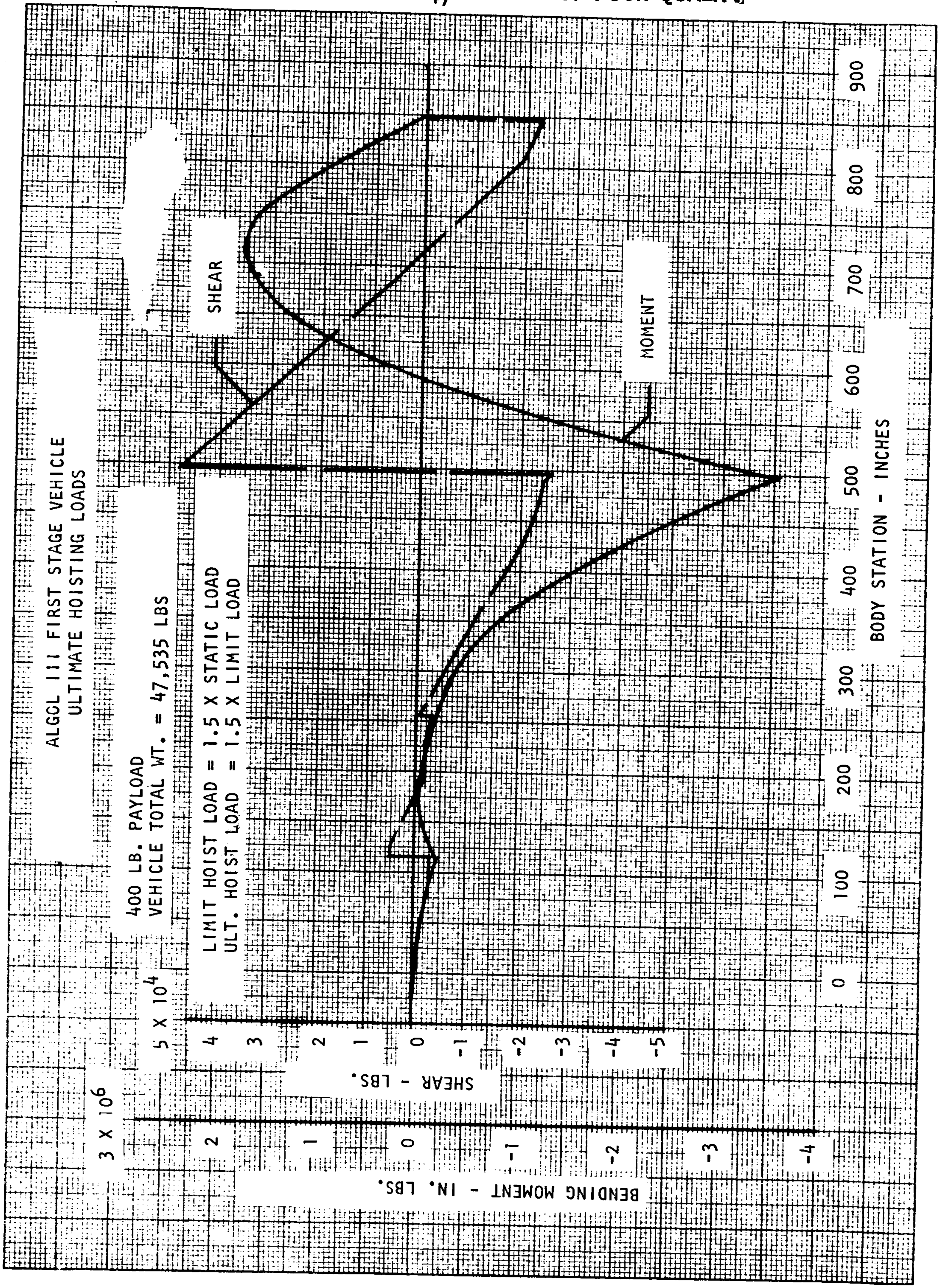


Figure 34.- Vehicle ground handling loads (ultimate).

CHAPTER III - PROPULSION

The physical data of the rocket motors are itemized in table IX.

TABLE IX - ROCKET MOTOR PHYSICAL DATA

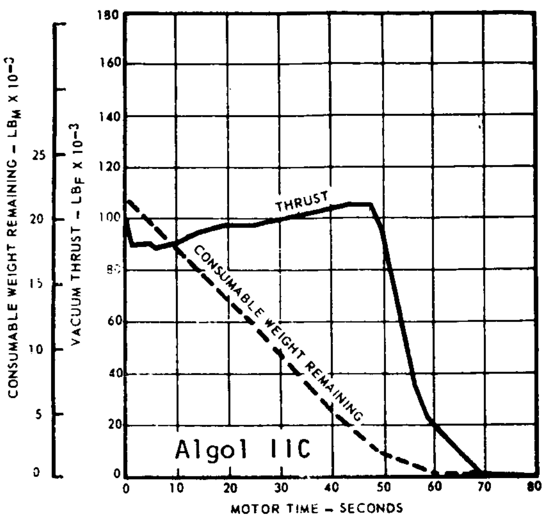
Stage	Motor	Diameter, In.	Weight, Lb.
First	Algol IIC	40	23,674
First	Algol IIIA	44	31,271
Second	Castor IIA	31	9,760
Third	Antares IIA	30	2,800
Third	Antares IIB	30	2,789
Third	Antares IIIA	30	3,072
Fourth	Altair IIA	18	577
Fourth	Altair IIIA	20	662
Fifth	Alcyone	18.25	216

Nominal motor data for the four rocket motors of Scout B are shown in figure 35 and table X which show vacuum thrust and consumable weight as functions of burning time. Preflight trajectory calculations are made using motor data predictions based on specific vehicle motors. The deviation in performance resulting from the use of actual instead of nominal motor data is not expected to exceed ± 5 pounds of payload.

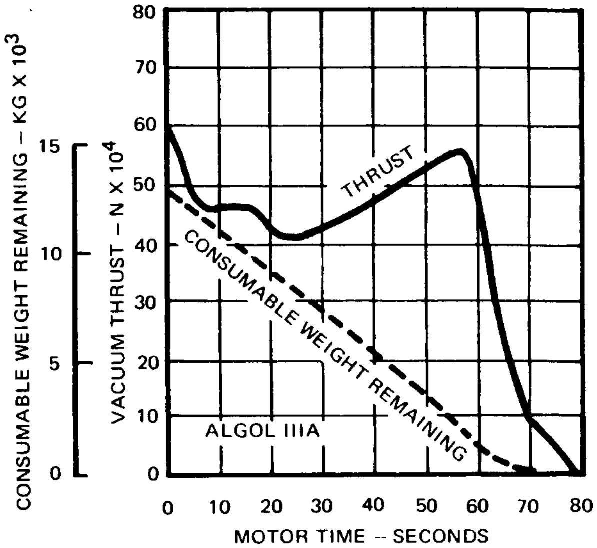
The Algol IIB or Algol IIC Scout first-stage propulsion unit was produced by the Aerojet General Corporation, Sacramento, California. The Algol IIC has an improved nozzle. The original Scout vehicles used an Algol ID for the first stage. The Algol IIA was incorporated into the Scout system in February 1963 and the Algol IIB was first used in the Scout system in October 1964, The Algol III was developed by United Technology Center at Sunnyvale, California, and is the current standard first stage. The first launch of this motor was November 16, 1972.

Below is the major Scout Algol motor history.

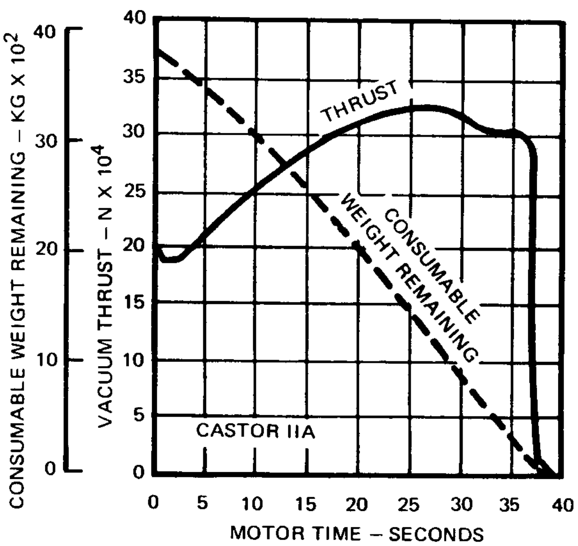
- Program initiated in 1957 under NASA contract
- First Algol I launch on Scout - 4-18-60
- First Algol I Scout launch on ST-1 7-1-60
- Changed propellant, designated Algol IIA - 1962
- Failure of IIA nozzle, vehicle S-110 7-20-63
- Nozzle redesign, designated Algol IIB - 1964
- First Algol IIB launch on ST-140C - 12-12-65
- Thirty-six successful flights with Algol IIB configuration
- Nozzle anomaly on vehicle S-160 - 1968
- Edler nozzle rework program - 1968-1969
- Propellant igniter development - 1969
- Qualified vertical batch mix - 1969
- Extended shelf life to four years - 1970
- Qualified ablative Algol IIC nozzle - 1970
- Five successful flights with Algol IIC configuration
- Extended shelf life to five years - 1970
- First launch Algol IIC on S-166 - 9-20-71



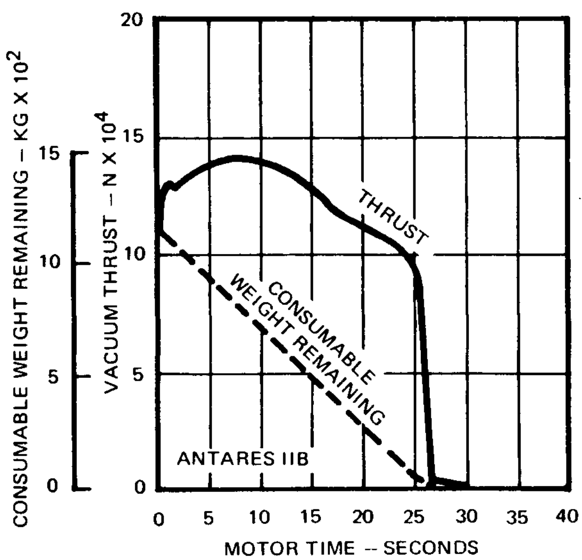
FIRST STAGE MOTOR



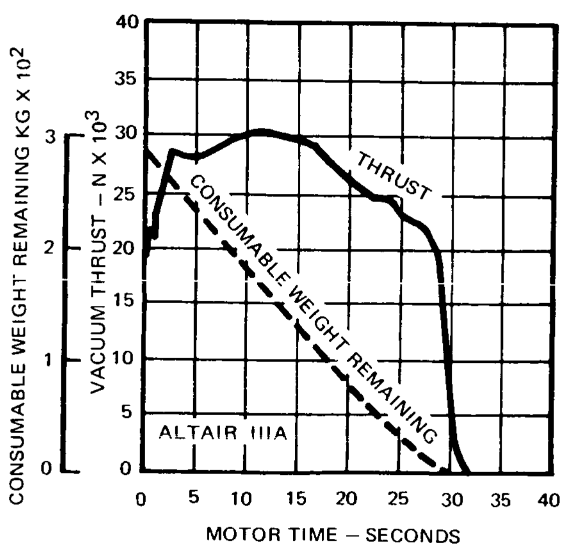
FIRST STAGE MOTOR



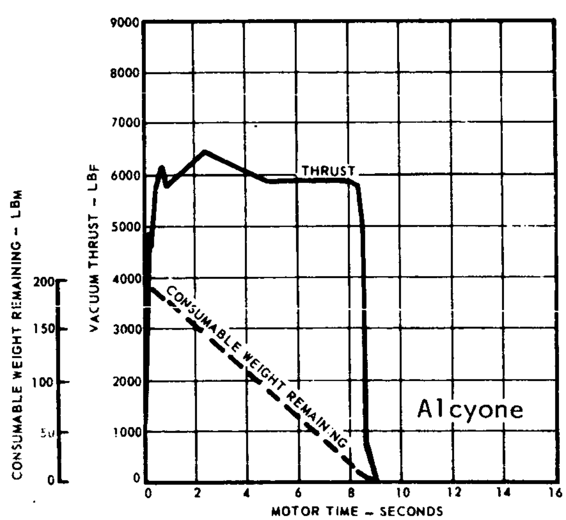
SECOND STAGE MOTOR



THIRD STAGE MOTOR



FOURTH STAGE MOTOR



FIFTH STAGE MOTOR

TABLE X — MOTOR PERFORMANCE DATA

Motor	Total Impulse lb-sec-vacuum	Specific Impulse lb-sec/lb - vac.	Burning Time -Total - sec	Thrust - Avg - web-lb-vacuum	Weight-Fuel - lb (W_p)	Mass Ratio W_p/W_T	Nozzle Expansion Ratio	Weight Consumed lb	Nozzle Exit Area - ft^2
Algol ID	4,077,800	241.4	41.29	108,830	18,998	0.838	4.64	19,084.0	5.65
Algol IIB	5,472,350	258.88	80.00	100,944	21,139	0.890	7.36	21,355.0	5.67
Algol III	7,210,000	260.289	70.00	113,207	27,700	89.02	6.49	27,932.0	5.634
Castor I	2,000,097	273.20	46.00	64,340	7,321	0.825	15.80	7,452.0	8.11
Castor IIA	2,317,000	282.20	39.29	60,764	8,210	0.843	21.2	8,261.0	8.11
Antares I	533,760	256.0	38.10	14,000	2,085	0.920	27.10	2,115.0	4.59
Antares II	719,540	281.40	34.90	20,924	2,557	0.920	17.50	2,582.0	4.35
Antares IIB	731,222	285.76	28.90	29,005	2,558	0.917	22.54	2,575.0	4.35
Altair I	116,044	255.04	41.40	3,000	455	0.883	25.80	465.0	1.30
Altair II	140,500	279.80	23.20	6,414	502	0.872	26.00	503.6	1.41
Altair III	172,122	284.5	31.50	5,746	605	0.916	50.30	608.0	1.50
BE-3A	52,800	276.0	8.90	5,900	191	0.893	16.74	194.5	0.809
Antares III	34,834	294.36	47.94	22,565	2,834	0.922	42.83	2,860.0	4.481

manufactured at the Bacchus Works of Hercules Incorporated in Magna, Utah. The original Scout used an X-254 rocket motor also designed for Scout by scaling down an X-248. Below is the major Scout X-259 Motor history:

- Program initiated in 1961 under Navy contract
- First X-259 launch on Scout ST-9 in 1962
- Squib SD60E0 replaced SD55A3
- Shelf life extended to 43 months in 1966
- Igniter configuration improved
- Changed from Epirez/Epicure case-bond system to Epon 946
- Vehicle S-152 failure in 1967 due to case burn-through (X-259 with Epirez/Epicure)
- Shelf life reduced to 17 months in 1967
- Thirty-six successful flights with Epon 946 bond system since vehicle S-152 failure
- Shelf life increased to 24 months in 1968
- Shelf life extended to 36 months in 1969
- Shelf-life program initiated in 1970 - increased to 41 and 44 months, igniter extended to 72 months in 1971
- Shelf life extended to 60 months
- New production motors changed to high pressure operation incorporating lightweight igniter, new nozzle throat material, and SBASI initiator (replacing SD60E0). A quality assurance motor was fired at simulated altitude conditions and demonstrated a 1.5 percent improvement in delivered specific impulse and total impulse (Figure 36.)
- Shelf life of motors extended to 84 months, conventional igniters to 86 months in 1973
- First flight of X-259B4 (high pressure) motor on Scout vehicle S-191 in 1974 (figure 7 shows Scout S-191 ready for launch)
- First demonstration of Trident program propellant in X-259 motor resulted in nozzle failure in 1974. Nozzle design was modified for second demonstration test
- Motor shelf life extended to 96 months in 1975
- Shelf life program to continue - goal is ten years
- Two successful launches with high pressure X-259B4 motors were Scout vehicle S-191 in 1974 and S-194 in 1975
- Last launch of high pressure X-259B4 on Scout vehicle S-196 on December 1975 resulted in a nozzle burn through
- Motor shelf life extended to 108 months in 1977

The Antares IIIA rocket motor (TEM-762) was developed and qualified and is in production by the Thiokol Corporation, Elkton Division, Elkton, Maryland. The motor was incorporated into the Scout system in 1978 to be interchangeable with the Antares II. It was originally planned to provide a 40-pound payload improvement but the qualified design provided 57 pounds payload gain in 300 nautical mile orbit launched east from Wallops Flight Center. Below is major Scout Antares IIIA motor list.

- Design, development, qualification during 1977-1979, shelf life established at 60 months
- First Antares IIIA launch on S-203 in 1979 using new nozzle throat material (4-D carbon/carbon) being flown for first time on any rocket motor.

- First launch Algol III on S-184C - 8-13-72
- Burst test Algol III - 1973
- Three-year shelf life for Algol III verified in 1974; shelf life program continuing - goal 10 years
- Extended shelf life to sixty-six months - 1975
- Program initiated to extend shelf life of Algol IIC to nine years - ultimate goal is ten years - 1975
- Severe degradation of the motor bond system was experienced after nine years. A subsequent decision was made not to fly Algol IIC motors on Scout

United Technology Center was awarded contract in 1969 to produce Algol III motors (45-inch diameter compared to 40-inch diameter Algol I and II). Development and qualification consisted of five static firings. Twenty Algol III's have been launched and have performed successfully in flight. The twentieth was S-192, the last Phase VI launch. Figure 31 shows Scout vehicle S-192, the fifteenth and last Phase VI vehicle.

The Castor II rocket motor, present second-stage Scout propulsion unit, is manufactured by Thiokol Chemical Corporation, Redstone Division, Huntsville, Alabama. The original Scout vehicles used a Castor I for the second stage. The Castor IIA was incorporated in the Scout system in August 1965 as shown in figure 4. Below is the major Scout Castor motor history.

- Castor I program initiated in 1957 under Army contract
- First Castor I launch on Scout ST-1 in 1960
- Castor II program initiated in 1963 under NASA contract
- First Castor II launch on Scout S-131 in 1965
- Propellant changes in 1966 to improve physical properties
- Pyrogen case changed from glass to steel in 1969 - simplicity and cost advantage
- Shelf life study in 1969 - increased to 36 months
- Shelf life program in 1970 - increased to 48 months
- Shelf life extended to 60 months in 1972
- Aging tests in 1974 of Thixon AB-894 primer coat for bonding insulator to Castor IIA case confirmed no degradation after two years; 4-year tests were conducted in 1976
- Shelf life extended to 72 months in 1975
- Shelf life program expanded to extend to 84 months; ultimate goal is ten years
- Current Castor IIA motor shelf life is 108 months (9 years) - 1981

Currently (1981) there are ten Algol IIIA motors in production, scheduled for completion in January 1982. This will add to the five Algol IIIA's already in Scout inventory for a total of fifteen Algol IIIA's.

The Antares rocket motor (X-259) was designed specially for the NASA Scout third stage by Hercules Powder Company at their Allegany Ballistics Laboratory, Cumberland, Maryland. The Antares X-259 is an improved version of the X-254 which was used on the original Scout vehicles. The X-259 was incorporated into the Scout system in March 1962 as shown in figure 4. This motor was

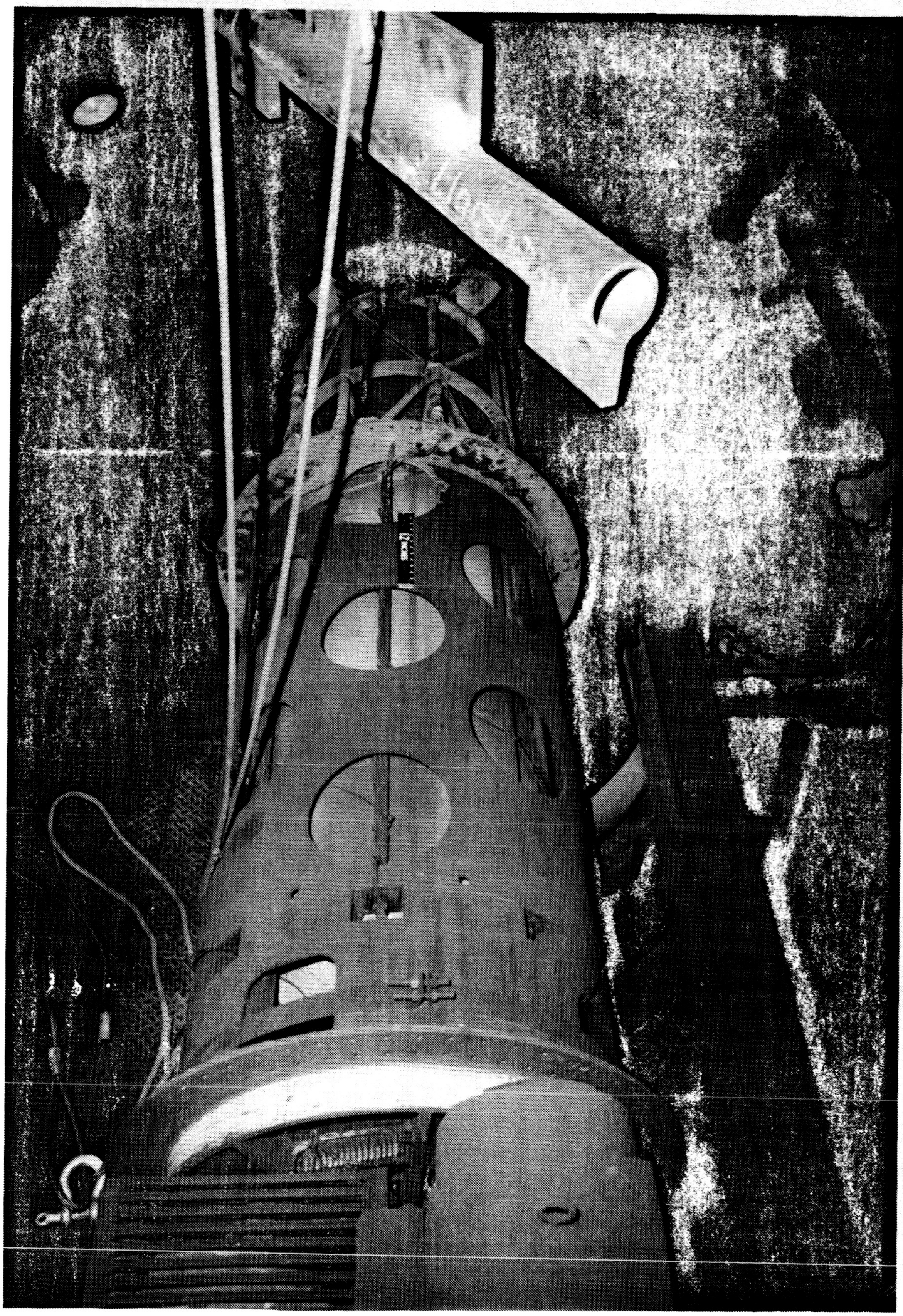


Figure 36.- Antares rocket motor in test chamber.

- First production motor delivered in 1980
- Second Antares IIIA launch on S-192 in 1981

The Altair II rocket motor (X-258), Scout system upper-stage propulsion unit, is manufactured at the Allegany Ballistics Laboratory. This motor has replaced the Altair I (X-248) which was used on the original Scouts. The X-258 was incorporated in February 1963 as shown in figure 4. The X-258 has been phased out on all NASA missions and has been replaced by the Altair III (FW-4S).

Below is the major Scout X-258 motor history.

- Program initiated in 1961 under Navy contract
- First X-258 launch on vehicle S-113 in 1963
- Reinforced rod and cusp incorporated into igniter design due to inability to properly ignite X-258 motor
- Shelf life extended to 15 months in 1966
- Squib SD60A1 replaced SD60A0
- Shelf life extended to 17 months in 1967
- Nozzle fabrication improved by use of Raybestos/Manhattan phenolic ring molding
- Shelf life extended to 24 and 36 months in 1969
- Igniter shelf-life program initiated in 1970
- Shelf life of motor extended to 48 and 60 months in 1971
- Shelf life of igniter extended to 60 months in 1971
- Shelf life of igniter extended to 72 months in 1972
- Shelf life of motor extended to 72 months in 1973
- Shelf life of igniter extended to 90 months in 1973
- Shelf life of motor extended to 84 months in 1974
- Shelf life of Motor extended to 108 months and igniter to 120 months in 1977

The Altair III rocket motor (FW-4S) was first used as a fourth-stage motor in August 1965 as shown in figure 4. This DOD-developed rocket motor is produced by the United Technology Center at Sunnyvale, California. It has replaced the Altair II on all missions until replaced by the (TEM-640) Altair IIIA qualified and manufactured by the Thiokol Corporation, Elkton Division, Elkton, Maryland. Below is the major Scout FW-4S motor history.

- Program initiated in 1964 under Air Force contract
- First FW-4S launch on Burner I in 1965
- First Scout launch on vehicle S-131 in 1965
- Interspersed filament winding of case implemented in 1966
- Vehicle S-151 in 1967 failed due to nozzle problem
- Nozzle redesigned with backed-up ATJ throat
- Four remaining 1967 launches successful with ATJ
- Nozzle further improved with Graphitite G manufactured in 1963
- Shelf life program initiated in 1969 - increased motor shelf life to 17 months and igniter shelf life to 22 months
- Shelf life increased to 36 months in 1970 for both motor and igniter.
- Motor shelf life extended to 42 months and igniter shelf life to 60 months in 1971

- Motor shelf life extended to 60 months in 1972
- New contract for Altair IIIA (TEM 640) was awarded to Thiokol's Elkton Division. A demonstration motor was successfully fired by Thiokol in 1972 (Figure 37 shows the launch of Scout vehicle S-189 which flew the first (TEM 640)
- Thiokol experienced three qualification motor failures in 1973
- UTC was awarded back-up contract for FW-4S flight motors because of Thiokol problems; UTC quality assurance FW-4S motor exceeded safe operating temperature in simulated altitude test; UTC contract was canceled.
- Thiokol fired two successful static test motors and two successful quality assurance motors in 1974; fourteen Thiokol TEM 640 motors have been successfully flown on Scout
- Thiokol successfully demonstrated advanced higher energy propellant in Altair IIIA configuration in 1974
- UTC and Thiokol demonstrated use of SBASI as initiator for Altair in 1974
- UTC has unsuccessfully demonstrated an advanced high energy propellant in Altair IIIA configuration
- Thiokol continued an advanced propellant program in 1975
- Shelf life for TEM-640 (Altair IIIA) established in 1972 at 72 months, with a supporting program; ultimate goal is 10 years

The Alcyone rocket motor (BE3-A9) was developed as a fifth stage for the Scout vehicle and was manufactured by the Bacchus Works of Hercules Incorporated in Magna, Utah. Below is the major Scout Alcyone motor history:

- Shelf life of BE3-A9 was established at 36 months in 1968
- Shelf life extended to 96 months in 1973
- The first and only flight BE3-A9 was flown on Scout S-191 in 1974 and performed successfully

Table XI is a summary of the Scout motor shelf life. Table XII lists the serial numbers and configurations of the Scout vehicle rocket motors launched in Phases VI and VII. Table XV lists the inventory remaining for Phases VII and VIII. The heat shield covering the top stage motors and the E-Sections are also listed in these tables.

The technical data for the above listed propulsion systems are detailed in figures 38 through 46. Tables XVI through XXV itemize the history of each motor stage. Designated is the serial number, the contract that the motors were purchased on, and the use made of the motor; such as used for testing or launched with vehicle number...The tables are divided as follows:

XVI - Algols I and Algols II
XVII - Algol III
XVIII - Castor I
XIX - Castor II
XX - Castor IIA
XXI - Antares IIA and IIB
XXII - Antares IIIA
XXIII - Altair II and Alcyone
XXIV - Altair III
XXV - Altair IIIA

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TABLE XI - MOTOR SHELF LIFE SUMMARY

MOTOR	SHELF LIFE (YRS) PRESENT	SHELF LIFE (YRS) TARGET	REMARKS
ALGOL II	8	10	All inventory over age.
ALGOL III	5	10	Lab testing continuing on periodic basis.
CASTOR II	9	10	Annual specimen testing.
X-258	9	10	No flight motors in inventory.
ANTARES IIA	9	9	None.
ANTARES IIB	9	10	None.
ANTARES IIIA	5	10	Annual lab testing and test fire motor at 4 or 5 years.
BE-3	8	10	None.
ALTAIR IIIA	6	10	Sample testing in 1982 at $8\frac{1}{2}$ years. Igniter tests in 1983 of 1975 loads.

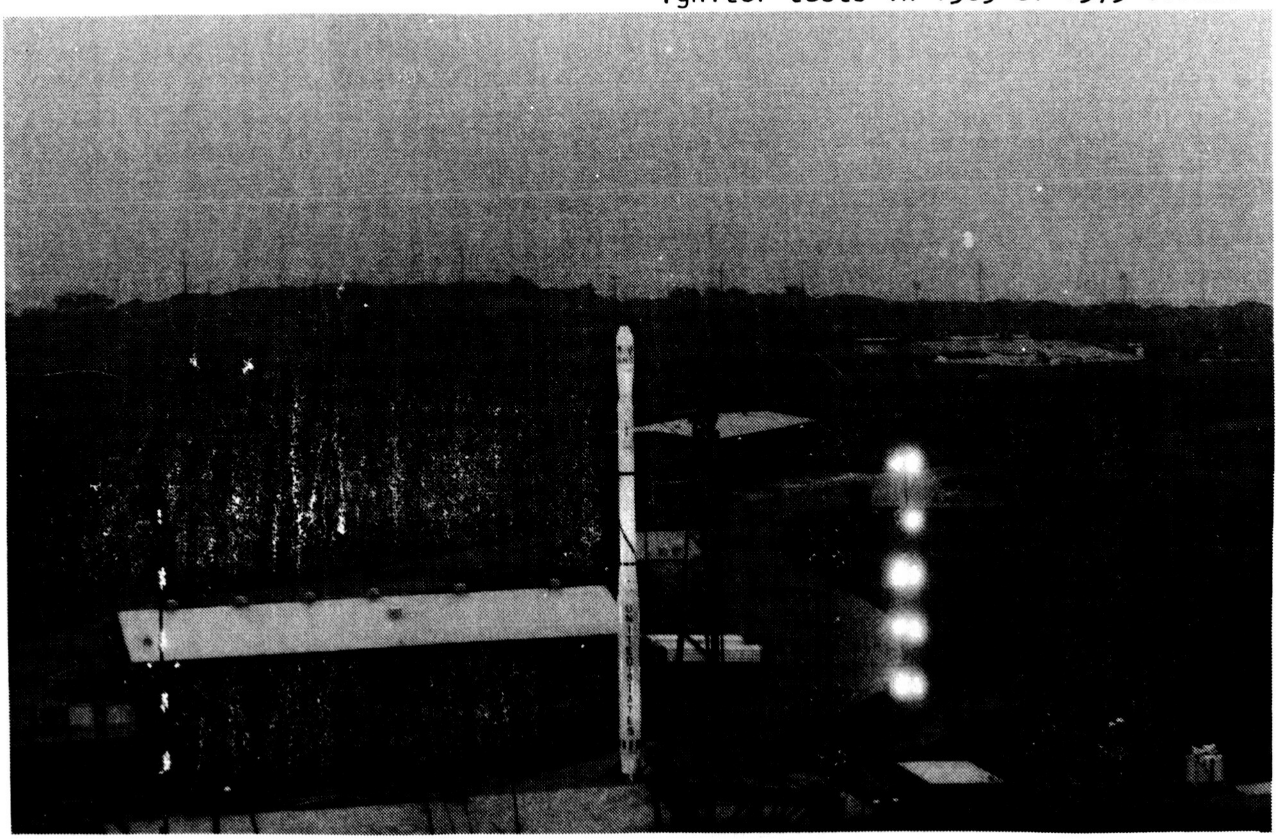

Figure 37.- ANS-A mission on S-189 showing the Scout complex at WTR.

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TABLE XII- HISTORY OF MOTORS AND HEAT SHIELDS USED ON SCOUT
PHASES I, II, III

PHASE	Vehicle	First Stage	Second Stage	Third Stage	Fourth Stage	Shield
I	X	1A3	Dummy	X254A1YS29	None	X
	ST1	1B6	XM33E5-77	X254A1YS30	X248A5SV83	1
	ST2	1B9	XM33E5-82	X254A1YS41	X248A5SV93	2
	ST3	1B7	XM33E5-83	X254A1YS48	X248A5SV86	3
	ST4	1C23	XM33E5-92	X254A1YS50	X248A5SV118	4
	ST5	1B10	XM33E5-326	X254A1YS59	X248A5SV112	5
	ST6	1C11	XM33E5-108	X254A1YS47	X248A5SV178	6
	ST7	1C24	XM33E5-124	X254A1YS63	X248A5BSB51	7
	ST8	1C26	XM33E5-125	X254A1YS67	X248A5SV190	8
	ST9	1C27	XM33E5-128	X259A3HPC17	X248A5BSB214	9
II	110	11A14 (1)	XM33E5-155	X259A3HPC110A	X248A6BSB439	114
	111	1D29	XM33E5-147	X259A3HPC16	X248A5BSB217	111
	112	1D-AF-1	AFXM33E5-175	X259A3HPC25	M2	112
	113	11A13	XM33E5-143	X259A3HPC128	X258B1RH48	A4
	114	11A5	XM33E5-149	X259A3HPC105	X248A5BSB255	110
	115	11A6	XM33E5-153	X259A4HPC119	X248A5BSB256	113
	116	11A8	XM33E5-181	X259A3HPC106	X248A6BSB423	A5
	117	1D-AF-2	AFXM33E5-176	X259A3HPC24	M2	117
	118	11A4	XM33E5-150	X259A3HPC108	X248A5BSB240	116
	119	11A7	XM33E5-154	X259A3HPC117	AFX248A5BSB223	A1
	120	11A12	XM33E5-148	X259A3HPC122	X248A5BSB254	A3
	121	1D-AF-3	AFXM33E5-177	X259A3HPC26A	M2	121
	122	11A21 (1)	XM33E5-152	X259A3HPC134	X258B1RH61	A13
	123	11B29	XM33E5-184A	X259A3HPC143	X258C1RH72	A2
III	124	11B26	XM33E5-252	X259A3HPC130	X258C1RH64	129
	125	11A24	XM33E5-182	X259A3HPC146	X258C1RH55	A8
	126	11A9	XM33E5-158	X259A3HPC112	M2	126
	127	11A16 (1)	XM33E5-183	X259A3HPC109C	X248A5BSB407A	A7
	128	11A22	XM33E5-180	X259A3HPC132	X258C1RH66	A11
	129	11B27	XM33E5-159	X259A3HPC136A	X258C1RH70	A6
	130	11B30	XM33E5-422	X259A3HPC157	None	A12
	131	11B36	TX354-11A-23	X259A3HPC160	FW4S-20038	A27 (2)
	132	1D33	XM33E5-160	X259A4HPC118	X258B1RH53	C1
	133	11B32	XM33E5-179	X259A3HPC139	X258C2RH73	124
	134	11B25	XM33E5-188	X259A3HPC145	X258C1RH68	A9
	135	11B33	XM33E5-423	X259A3HPC159	X258C2RH74	A21
	136	11B28	XM33E5-185A	X259A3HPC166	X258C3RH81	A23
	137	11B34	XM33E5-161	X259A3HPC167	X258C1RH75	A15

CONTRACTS - MOTORS

First Stage - NAS5-53, NAS1-585, NAS1-1330, NAS1-3833
Second Stage - L55931, L77203, L93419, L2061, NAS1-5034
Third Stage - S1010, L89844, L86693, L93985, L3420, NAS1-3493
Fourth Stage - S1000, L72505, L89844, L93985, L2570, L6990, NAS1-3664, NAS1-3698

(1)Hard core Algol.
(2)Only payload separation system supplied by Scout-n

TABLE XIII - HISTORY OF MOTORS AND HEAT SHIELDS USED ON SCOUT PHASES IV AND V

PHASE	VEHICLE	FIRST STAGE	SECOND STAGE	THIRD STAGE	FOURTH STAGE	SHIELD	P/L SEP. SYSTEM
	138	11B35	XM33E5-178	X249A3HPC154	X258E6RH125	A-26	E2P
	139	11B37	XM33E5-189	X259A3HPC165	X258E6RH126	A-28	None
	140	11B38	TX354-11A-24	X259A3HPC173	X258E6RH129	A-14	N
	141	11B40	XM33E5-190	X259A3HPC172	X258E6RH117	A-24	None
	142	11B44	TX354-11A-17	X259A3HPC169	X258E6RH116	A-22	N
	143	11B41	TX354-11A-16	X259A4HPC170	X258E6RH118	A-31	N
	144	11B77	TX354-11A-185	X259B3H1B225	FW4S2223-8	A-502	E29
	145	11B43	TX354-11A-20	X259A3HPC174	FW4S20031A	A-29	E7
	146	11B45	TX354-11A-18	X259A3HPC164	X258E8RH110	A-32	N
	147	11B50	TX354-11A-19	X259A3HPC161	FW4S20039	A-30	E8
	148	11B39	TX354-11A-21	X259A3HPC183	FW4S30105	A-33	E9
IV	149	11B48	TX354-11A-25	X259A3HPC177	X258E6RH136	A-34	N
	150	11B47	TX354-11A-27	X259A3HPC181	FW4S30201	A-35	E10
	151	11B42	TX354-11A-29	X259A3HPC184	FW4S30204	A-36	E11
	152	11B49	TX354-11A-26	X259A3HPC151	FW4S30206	A-40	E18
	153	11B46	TX354-11A-28	X259A3HPC182	FW4S30202	A-43	SM
	154	11B51	TX354-11A-98	X259A3HPC163	X258E6RH134	A-37	N
	155	11B52	TX354-11A-100	X259A3H1B202	X258E6ABL143	A-41	E4
	156	11B56	TX354-11A-102	X259A3H1B201	X258E6ABL139	A-39	N
	157	11B53	TX354-11A-96	X259A3H1B220	X258E6RH135	A-42R	N
	158	11B57	TX354-11A-105	X259A3HPC212	FW4S30210	A-38	E20
	159	11B54	TX354-11A-101	X259B3H1B205	FW4S30207	A-25	None
	160	11B62	TX354-11A-97	X259B3H1B206	FW4S2218-8	A-46	E17
	161	11B59	TX354-11A-103	X259B3H1B207	FW4S2218-10	A-49	E22
	162	11B58	TX354-11A-170	X259B3H1B213	X258E5ABL145	A-44	N
	163	11B69	TX354-11A-178	X259B3H1B305	FW4S2223-16	A-400	EG4
	164	11B65	TX354-11A-174	X259B3H1B209	NONE	Non-Std.	None
	165	11B73	TX354-11A-172	X259B3H1B215	FW4S2223-4	A-47	E16
	166	11C71	TX354-11A-183	X259B3H1B301	FW4S2223-11	A-58	None
	167	11B64	TX354-11A-173	X259B3H1B216	FW4S2223-1	A-45	E19
	168	11B60	TX354-11A-104	X259B3H1B210	FW4S2223-2	A-48	None
	169	11B67	TX354-11A-171	X259B3H1B217	FW4S2223-5	A-53	E21
V	170	111-5502-1	TX354-11A-195	X259B3H1B304	FW4S2376-5	A-401	GR
	171	11B72	TX354-11A-176	X259B3H1B221	FW4S2223-9	A-62	SAS
	172	11B63	TX354-11A-179	X259B3H1B214	FW4S2223-6	A-56	E34
	173	11B74	TX354-11A-182	X259B3H1B224	FW4S2223-14	A-54	SM
	174	11B68	TX354-11A-175	X259B3H1B218	FW4S2223-3	A-57	E35
	175	11B66	TX354-11A-180	X259B3H1B226	FW4S2223-10	A-61	SAS
	176	11B75	TX354-11A-184	X259B3H1B219	X258E5ABL149	A-55	N
	177	11B76	TX354-11A-181	X259B3H1B223	FW4S2223-7	A-59	E37

CONTRACTS

First Stage - NAS1-3833, NAS1-5610
Second Stage - NAS1-5034, NAS1-5883, NAS1-5610
Third Stage - NAS1-3493, NAS1-5883, NAS1-5610
Fourth Stage - NAS1-3698, NAS1-5883, NAS1-5610

TABLE XIV - MOTORS ASSIGNED TO PHASES VI AND VII

PHASE	VEHICLE	FIRST STAGE	SECOND STAGE	THIRD STAGE	FOURTH STAGE	HEAT SHIELD	P/L SEP. SYSTEM
	178	11C86	TX354-11A-194	X259B3H1310	X258E5ABL150	A50	N
	179	11C83	TX354-11A-193	X259B3H1404	TEM640-E21	A409	N
	180	11C78	TX354-11A-186	X259B3H1314	FW4S2223-15	A60	E36
	181	111-5502-3	TX354-11A-191	X259B3H1313	FW4S2376-2	A504	E46
	182	11C84	TX354-11A-197	X259B3H1311	FW4S2376-1	A404	N
	183	11C89	TX354-11A-192	X259B3H1302	FW4S2223-12	A63	E31
	184	111-5502-2	TX354-11A-187	X259B3H1303	FW4S2376-8	A402	MTS
VI	185	111-5502-4	TX354-11A-188	X259B3H1312	FW4S2223-13	A403	E45
	186	111-5502-9	TX354-11A-200	X259B3H1315	FW4S2376-6	A507	E49
	187	11C79	TX354-11A-189	X259B3H1307	TEM640-013	A505	E204
	188	111-5502-7	TX354-11A-198	X259B3H1308	FW4S2376-7	A506	E48
	189	111-5502-10	TX354-11A-201	X259B3H1316	TEM640-014	A406	E206
	190	111-5502-6	TX354-11A-190	X259B3H1306	FW4S2376-4	A66	SM
	191	111-5502-8	TX354-11A-199	X259B4H1401	FW4S2376-3(1)	A405	G102
	192	111-5504-5P21	TX354-11A-385	X259E2	TCC-E25	A411	N
	193	111-5502-15	TX354-11A-392	X259B4H1405	TEM640-E19	A503	E252
	194	111-5502-11	TX354-11A-390	X259B4H1407	TEM640-E16	A508	SAS
	195	111-5502-12	TX354-11A-382	X259B4H1309	TEM640-E15	A407	N
	196	111-5502-13	TX354-11A-383	X259B4H1406	TEM640-E18	A509	E154
VII	197	111-5502-16	TX354-11A-196	X259B4H1404	TEM640-E17	A408	N
	198	111-5504-2P18	TX354-11A-394	X259B4H1409	TCC-E029	A510	E207
	200	111-5504-1P17	TX354-11A-393	X259B4H1408	TEM640-020	A410	E57
	201	111-5504-4P20	TX354-11A-395	X259B4H1411	TEM640-E23	A511	E259
	202	111-5504-6P22	TX354-11A-384	X259B4H1412	TCC-E027	A513	
	203	111-5504-7P23	TX354-11A-387	TCC-111A-1			

TABLE XV - INVENTORY FOR BALANCE OF PHASE VII AND PHASE VIII(2)

199	111-5504-8P24	TX354-11A-391	X259E3	TCC-E31	A-52	E261
204	111-5504-9P25	TX354-11A-386	X259E4	TCC-E32	A-51	E262
205	111-5504-10P26	TX354-11A-808	X259E5	TCC-E33	A-416	E263
206	111-5504-11P27	TX354-11A-809	X259E6	TCC-E34	A-512	E264
207	111-5504-12P28	TX354-11A-810	X259E7	TCC-E35	A-68	E265
(3)208	111-5505-1(3)	TX354-11A-811	BH1410	TCC-E37	A-71	E266
209	111-5505-2	TX354-11A-812	BH1413	TCC-E38	A-72	E212
210	111-5505-3	TX354-11A-813	B4H1414	TCC-E39(3)	A-73	EG6
211	111-5505-4	TX354-11A-814	B4H1415	TCC-E40	A-74	G6
212	111-5505-5	TX354-11A-815	X259E8(3)	TCC-E41	A-413	
213	111-5505-6	TX354-11A-816	X259E9	TCC-E42	A-415	
214	111-5505-7	TX354-11A-817	X259E10	TCC-E43	A-416	
215	111-5505-8	(3)TX354-11A-818	X259E11	TCC-E44	A-417	
216	111-5505-9	TX354-11A-819	X259E12	TCC-E45	A-418	
217	111-5505-10	TX354-11A-820	X259E13	TCC-E46	A-512	
		TX354-11A-821	X259E14		A-514	
			X259E15		A-515	
					A-516	
					A-517	
					A-518	
					A-519	

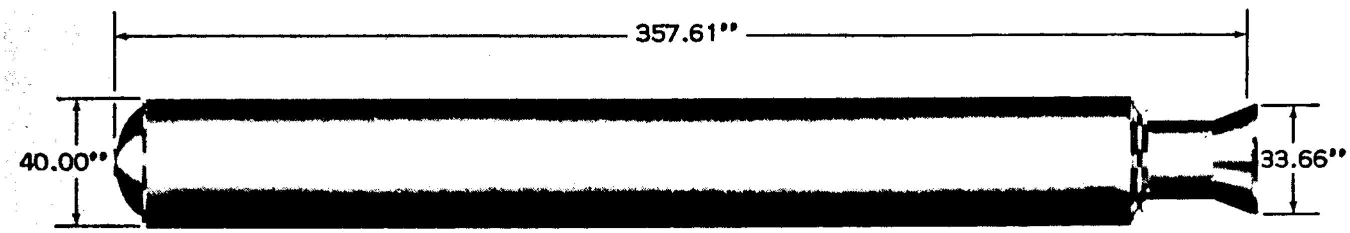
C-2

(1)Fifth Stage BE3-003.
(2)Inventory at time of publication (only flightworthy hardware listed).
(3)Vehicle and motor listed and subsequent are being manufactured. Assignments are subject to change.

PROPULSION SYSTEM

ALGOL IIC MOTOR DATA

The Algol IIC, Scout first-stage propulsion unit, is being produced by the Aerojet General Corporation, Sacramento, California. The Algol motor incorporates a steel case and a lightweight reinforced plastic nozzle. The propellant grain is a tapered core, four-point star, internal burning configuration. The grain is a cast-in-case aluminized composite propellant with a polyurethane binder. The igniter is a pelletized flame-producing rocket motor type, with dual squib initiators. This motor is being phased out in favor of Algol IIA.

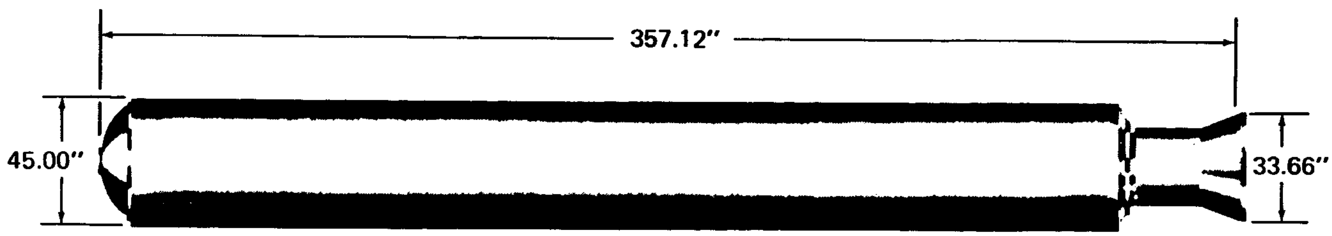


Total Impulse - Lb. - Sec. - Vacuum	5,481,859.
Specific Impulse - Lb. - Sec./lb. - Vacuum	258.88
Burning Time - Total - Sec.	76.08
Thrust - Avg. Web - Lbs. - Vacuum	98,147.
Weight - Total - Lbs. (W_t)	23,799.
Weight - Fuel - Lbs. (W_p)	21,176.
Mass Ratio - W_p/W_t	0.89
Nozzle Expansion Ratio	7.36
Weight Consumed - Lbs.	21,392.
Nozzle Exit Area - $Ft.^2$	5.67

Figure 38.- First-stage propulsion unit used on Scouts A and B.

PROPULSION SYSTEM

The Algol IIIA optional first-stage propulsion unit, is manufactured by United Technology Center (UTC), a division of United Aircraft Corp., Sunnyvale, California. The Algol IIIA combines a steel motor case with a lightweight reinforced plastic nozzle. The propellant grain is a tapered core, four-point star, internal burning configuration. The grain is a cast-in-case aluminized composite propellant with a polybutadiene acrylic nitrile binder. The igniter is a flame producing rocket motor type, with dual squib initiators. This motor had only been previously launched once in Phase V (S-170).

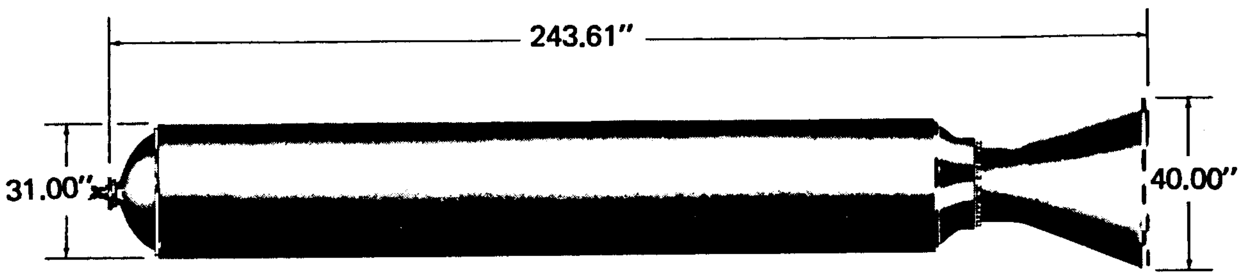


Total Impulse - Lb. - Sec. - Vacuum	7,200,000.
Specific Impulse - Lb. - Sec./lb. - Vacuum	258.2
Burning Time - Total - Sec.	78.0
Thrust - Avg. Web - Lbs. - Vacuum	107,168.
Weight - Total - Lbs. (W_t)	31,165.
Weight - Fuel - Lbs. (W_p)	27,885.
Mass Ratio - W_p/W_t	0.895
Nozzle Expansion Ratio	6.48
Weight Consumed - Lbs.	28,135.
Nozzle Exit Area - Ft.^{2}	5.67

Figure 39.- First-stage propulsion unit used on Scouts D and E.

CASTOR II MOTOR DATA

The Castor IIA rocket motor (TX-543-3) is the Scout second stage propulsion unit and is manufactured by the Thiokol Chemical Corporation, Huntsville Division, Huntsville, Alabama. The motor uses a steel case and an internally insulated steel nozzle. The nozzle and case serve as a structural member on the assembled Scout vehicle. The propellant charge is a polybutadiene acrylic acid (PBAA) binder system. The grain configuration consists of a cylindrical part with two radial slots. The igniter is a rocket motor type (pyrogen) with dual squib initiators. This replaced the Castor I that was used on S-138, 139, and 141.

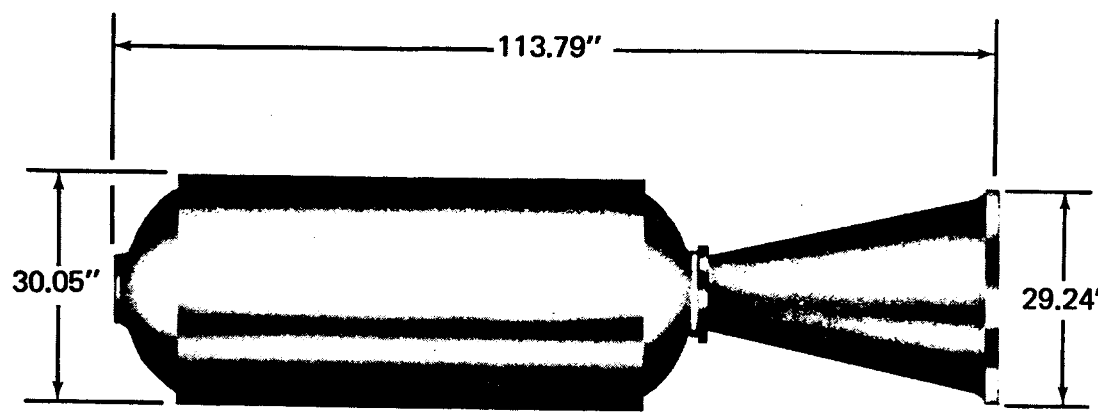


Total Impulse - Lb. - Sec. - Vacuum	2,315,115.
Specific Impulse - Lb. - Sec./Lb. - Vacuum	281.91
Burning Time - Total - Sec.	38.97
Thrust - Avg. Web - Lbs. - Vacuum	61,839.
Weight - Total - Lbs. (W_t)	9,760.
Weight - Fuel - Lbs. (W_p)	8,212.
Mass Ratio - W_p/W_t	0.84
Nozzle Expansion Ratio	20.95
Weight Consumed - Lbs.	8,267.
Nozzle Exit Area - Ft.^{2}	8.11

Figure 40.- Scout second stage propulsion unit.

ANTARES IIA **MOTOR DATA**

The Antares IIA rocket motor, one of the Scout third stage propulsion units, is manufactured by Allegany Ballistics Laboratory (ABL), Hercules Powder Company, Cumberland, Maryland. The motor case and nozzle are fabricated from reinforced plastics. The composite modified double base propellant is a case-bonded slotted-cylinder grain configuration. Ignition is accomplished by a dual squib rocket motor type igniter.

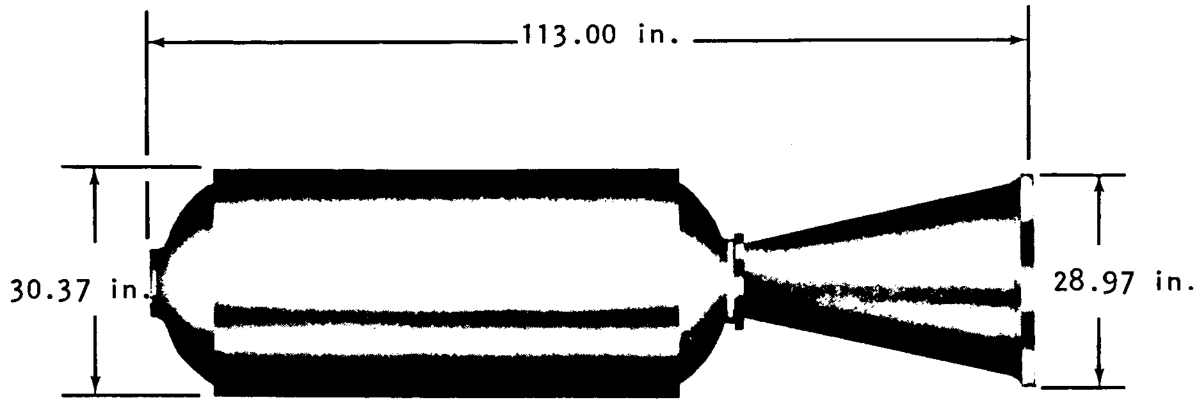


Total Impulse - Lb. - Sec. - Vacuum	724,673.
Specific Impulse - Lb. - Sec./Lb. - Vacuum	281.40
Burning Time - Total - Sec.	35.90
Thrust - Avg. Web - Lbs. - Vacuum	20,931.
Weight - Total - Lbs. (W_t)	2,812.
Weight - Fuel - Lbs. (W_p)	2,575.
Mass Ratio - W_p/W_t	0.91
Nozzle Expansion Ratio	17.50
Weight Consumed - Lbs.	2,600.
Nozzle Exit Area - Ft.^{2}	4.35

Figure 41.- Scout third stage.

ANTARES IIIA MOTOR DATA

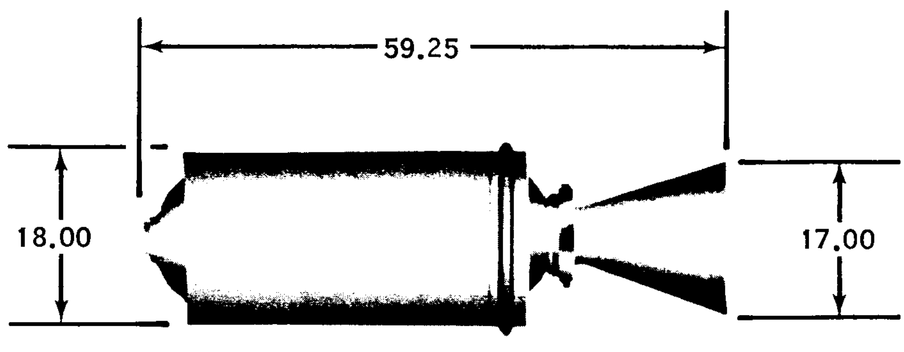
The Antares IIIA rocket motor, an optional Scout third stage propulsion unit, is manufactured by Thiokol Corporation, Elkton, Maryland. The Antares IIIA is an improved version of the Antares IIA. The motor case and nozzle are fabricated from reinforced plastics. The HTPB propellant is a case-bonded slotted-cylinder grain configuration. Ignition is accomplished by a dual bridge pyrogen type igniter.



Total Impulse - Lb. - Sec. - Vacuum	840,200.
Specific Impulse - Lb. - Sec./lb. - Vacuum	296.47
Burning Time - Total - Sec.	46.0
Thrust - Avg. Web - Lbs. - Vacuum	18,490.
Weight - Total - Lbs. (W_t)	3,072.
Weight - Fuel - Lbs. (W_p)	2,834.
Mass Ratio - W_p/W_t	0.922
Nozzle Expansion Ratio	42.83
Weight Consumed - Lbs.	2,860.
Nozzle Exit Area - Ft.^{2}	4.48

Figure 42.- Alternate Third Stage.

The Altair IIA rocket motor (X-258), Scout System upper-stage propulsion unit, is manufactured by Allegany Ballistics Laboratory (ABL), a U.S. Navy BuOrd facility operated by Hercules Powder Company, Cumberland, Maryland. Only three more Altair IIA rocket motors will be used on Scout and then the Altair IIIA will be used permanently.



ALTAIR X258

	Altair X258-B1
Total Impulse - Lb. - Sec. Vacuum	139,294
Specific Impulse - Lb. - Sec. / Lb. Vacuum	278.1
Burning Time - Total - Sec.	24.0
Thrust - Avg.- Web - Lbs. – Vac.	6,176
Weight - Total - Lbs.	573
Weight - Fuel - Lbs.	500.8
Mass Ratio - W_p/W_t	.874
Nozzle Expansion Ratio	25.08
Weight Consumed - Lbs.	507.2

Figure 43.- Scout-A fourth stage.

ALTAIR IIA - PERFORMANCE-VACUUM

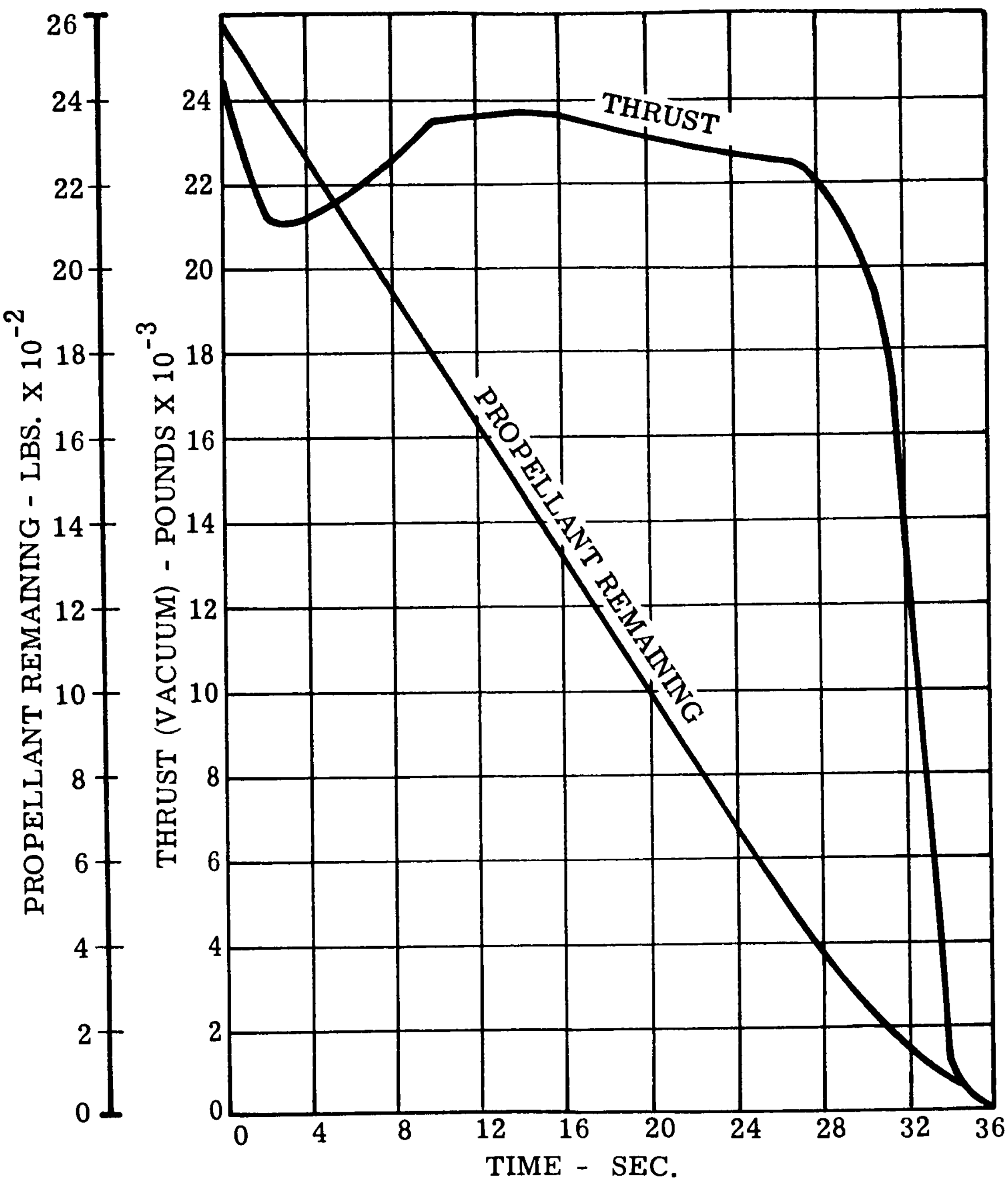
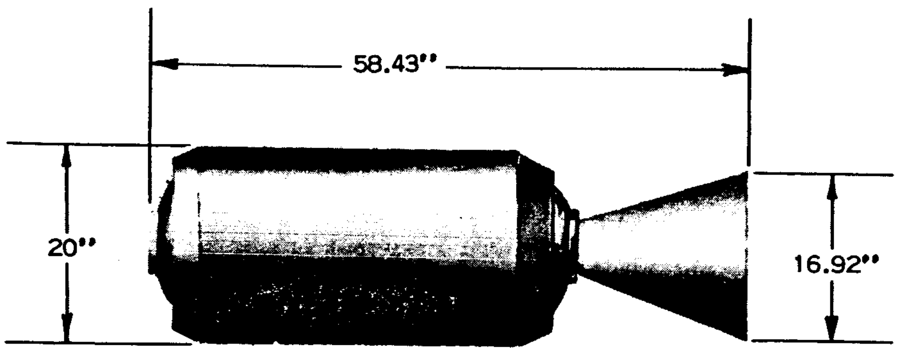


Figure 44.- X-258 rocket motor data.

FW-4S MOTOR DATA

The Altair IIIA rocket motor (FW-4S), Scout fourth-stage propulsion unit, is manufactured by United Technology Center (UTC), Sunnyvale, California, a division of United Aircraft Corp. The motor case is filament wound of fiberglass. The PBAN (polybutadiene acrylic acid - Acrilonitrile) composite propellant grain configuration is a case bonded circular perforation with one transverse slot. Ignition is accomplished by a dual squib rocket motor-type igniter. This motor replaced the Altair IIA.

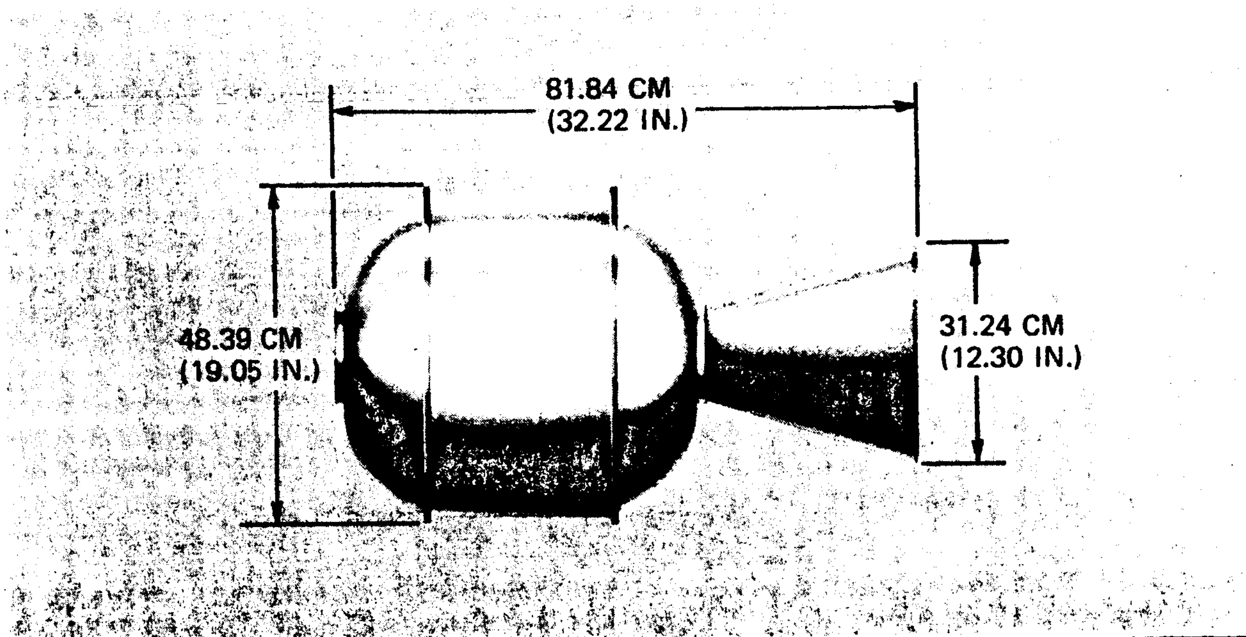


Total Impulse - Lb. - Sec. - Vacuum	172,243
Specific Impulse - Lb. - Sec./Lbs. - Vacuum	284.07
Burning Time - Total - Sec.	31.47
Thrust - Avg. Web - Lbs. - Vacuum	5,857
Weight - Total - Lbs. (W_t)	664.3
Weight - Fuel - Lbs. (W_p)	606.3
Mass Ratio - W_p/W_t	0.91
Nozzle Expansion Ratio (Initial)	52.8
Weight Consumed - Lbs.	611.3
Nozzle Exit Area - $Ft.^2$	1.5

Figure 45.- Scouts B thru G fourth-stage propulsion unit.

ALCYONE IA MOTOR DATA [a]

The Alcyone IA rocket motor, Scout standard fifth stage propulsion unit is manufactured by the Hercules Powder Company, Magna, Utah. The motor case is filament wound of fiberglass. The modified double base propellant is a case bonded cylindrical perforation with longitudinal fins in the aft region. The igniter is a basket type containing $BKNO_3$ pellets with dual initiators.



Total Impulse – N-Sec. – Vacuum	236,013.
Specific Impulse – N-Sec./Kg – Vacuum	2,710.3
Burning Time – Web – Sec.	8.42
Thrust – Avg. Web – N-Vacuum	27,491.
Weight – Total – Kg (W_t)	98.2
Weight – Fuel – Kg (W_p)	87.1
Mass Ratio – W_p/W_t	0.887
Nozzle Expansion Ratio	18.6
Weight Consumed – Kg	88.2
Nozzle Exit Area – M^2	0.075

Figure 46.- Scout fifth-stage propulsion unit.

[a] Figure 47 shows the Alcyone in the fifth-stage payload envelope.

PAYLOAD INTERFACE

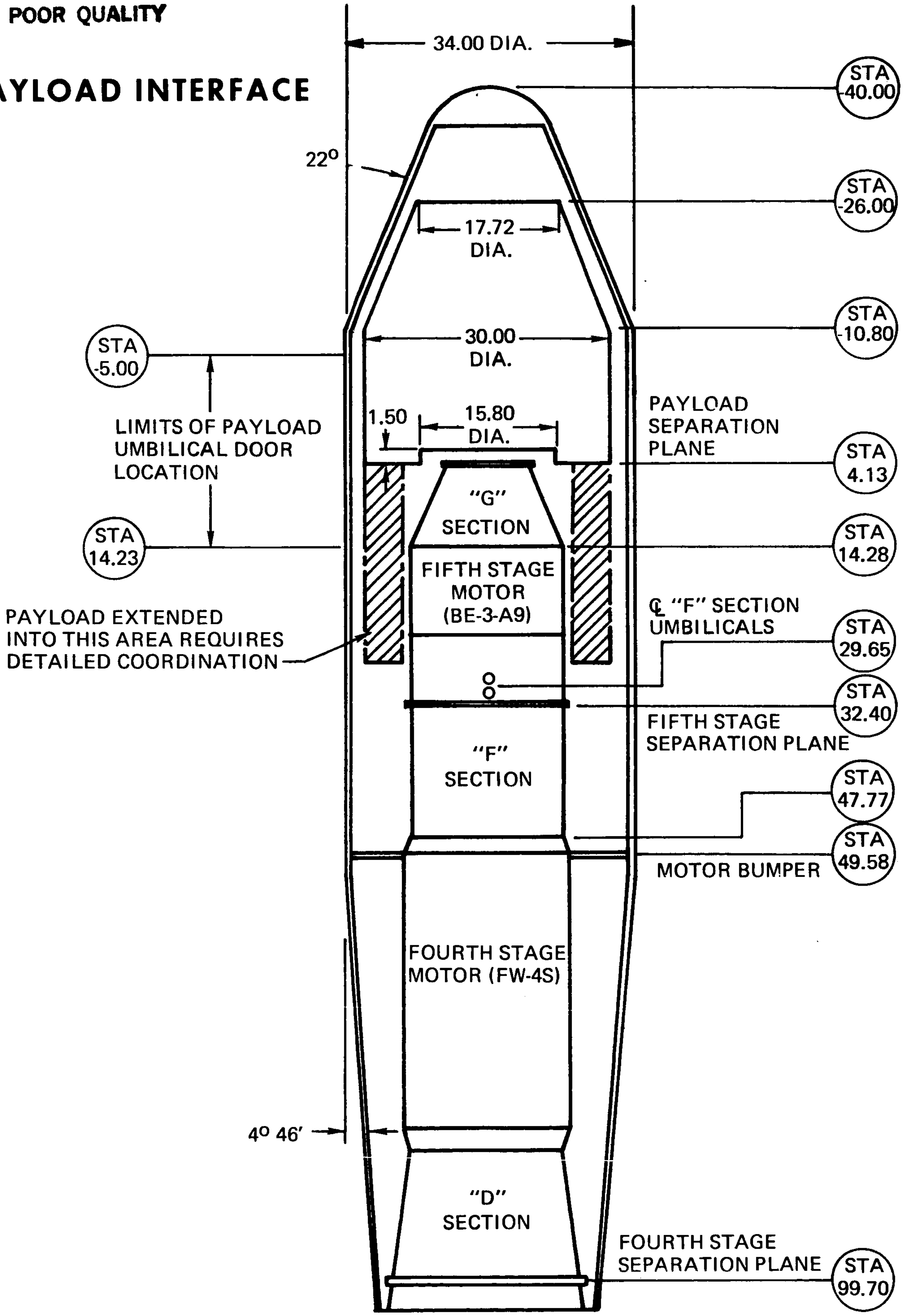


Figure 47.- FIVE-STAGE SCOUT PAYLOAD ENVELOPE

TABLE XVI - AEROJET MOTOR HISTORY.

ALGOLS I AND II

Number	Contract	Use	Number	Contract	Use
IA-1	NAS5-53	Test	IIA-10	NAS1-1330	Test
IA-2	NAS5-53	Test	IIA-11	NAS1-1330	Test
IA-3	NAS5-53	STX	IIA-12	NAS1-1330	S-120
*IA-4	NAS5-53	Storage-W	IIA-13	NAS1-1330	S-113
IB-5	NAS5-53	Test	IIA-14	NAS1-1330-1	S-110
IB-6	NAS5-53	ST-1	IIB-15	NAS1-1330-1	Test
IB-7	NAS5-53	ST-3	IIA-16	NAS1-1330-1	S-127
IB-8	NAS5-53	Reject-Navy (Hydro)	IIA-17	NAS1-1330-1	Test-HC (Case, LRC)
IB-9	NAS5-53	ST-2	IIA-18	NAS1-1330-1	Test
IB-10	NAS5-53	ST-5	IIA-19	NAS1-1330-1	Test
IC-11	NAS5-53	ST-6	IIA-20	NAS1-1330-1	Assgnd. SRT-HC
IC-12	NAS5-53	Test (Case S-144)	IIA-21	NAS1-1330-1	S-122
IC-13	NAS1-585	Test	IIA-22	NAS1-1330-1	S-128
IC-14	NAS1-585	Air Force D-3	IIA-23	NAS1-1330-1	Storage
IC-15	NAS1-585	Air Force D-4	IIA-24	NAS1-1330-1	S-125
IC-16	NAS1-585	Reject	IIB-25	NAS1-1330-1	S-134
IC-17	NAS1-585	Reject	IIB-26	NAS1-1330-1	S-124
IC-18	NAS1-585	Air Force D-5	IIB-27	NAS1-1330-8	S-129
IC-19	NAS1-585	Air Force D-6	IIB-28	NAS1-1330-8	S-136
IC-20	NAS1-585	Air Force D-8	IIB-29	NAS1-1330-8	S-123
IC-21	NAS1-585	Reject (Repl/25)	IIB-30	NAS1-1330-14	S-130
*IC-22	NAS1-585	Storage-W	IIB-31	NAS1-3833 (CR-66551)	Test
IC-23	NAS1-585	ST-4	IIB-32	NAS1-3833	S-133
IC-24	NAS1-585	ST-7	IIB-33	NAS1-3833	S-135
IC-25	NAS1-585-3	Air Force D-7	IIB-34	NAS1-3833	S-137
IC-26	NAS1-1330	ST-8	IIB-35	NAS1-3833	S-138
IC-27	NAS1-1330	ST-9	IIB-36	NAS1-3833	S-131
ID-28	NAS1-1330	Test	IIB-37	NAS1-3833	S-139
ID-29	NAS1-1330	S-111	IIB-38	NAS1-3833	S-140
ID-30	NAS1-1330	MSC	IIB-39	NAS1-3833	S-148
ID-31	NAS1-1330	MSC	IIB-40	NAS1-3833	S-141
ID-32	NAS1-1330	MSC	IIB-41	NAS1-3833	S-143
*ID-33	NAS1-1330	S-132	IIB-42	NAS1-3833	S-151
ID-34	NAS1-1330	MSC	IIB-43	NAS1-3833	S-145
ID-AF-1	Air Force	S-112	IIB-44	NAS1-3833	S-142
ID-AF-2	Air Force	S-117	IIB-45	NAS1-3833	S-146
ID-AF-3	Air Force	S-121	IIB-46	NAS1-3833	S-153
*ID-AF-4	Air Force	MSC	IIB-47	NAS1-3833	S-150
IIA-1	NAS1-1330	Test	IIB-48	NAS1-3833	S-149
IIA-2	NAS1-1330	Test	IIB-49	NAS1-3833	S-152
IIA-2R	NAS1-1330	Test	IIB-50	NAS1-3833	S-147
IIA-3	NAS1-1330	Test	IIB-51	NAS1-3833	S-154
IIA-3R	NAS1-1330	Test	IIB-52	NAS1-3833	S-155
IIA-4	NAS1-1330	S-118	IIB-53	NAS1-3833	S-157
IIA-5	NAS1-1330	S-114	IIB-54	NAS1-3833	S-159
IIA-6	NAS1-1330	S-115	IIB-55	NAS1-3833	Static Tests
IIA-7	NAS1-1330	S-119	IIB-56	NAS1-3833	S-156
IIA-8	NAS1-1330	S-116	IIB-57	NAS1-3833	S-158
**IIA-9	NAS1-1330	S-126	IIB-58	NAS1-3833	S-162

*Traded with Air Force (IA-4 AF property).
**Sold to Air Force (63-27).
MSC-transferred to MSC.

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE XVI Concluded - AEROJET MOTOR HISTORY.

ALGOLS I AND II

Number	Contract	Use	Number	Contract	Use
IIB-59	NAS1-5610	S-161	IIB-76	NAS1-7199	S-177
IIB-60	NAS1-5610	S-168	IIC-77	NAS1-7199	S-144
IIB-61	NAS1-5610	Test	IIC-78	NAS1-7199	S-180
IIB-62	NAS1-5610	S-160	IIC-79	NAS1-7199	S-187
IIB-63	NAS1-5610	S-172	IIC-80	NAS1-7199	Unassigned
IIB-64	NAS1-5610	S-167	IIC-81	NAS1-7199	Unassigned
IIB-65	NAS1-5610	S-164	IIC-82	NAS1-7199	Unassigned
IIB-66	NAS1-5610	S-175	IIC-83	NAS1-7199	S-179
IIB-67	NAS1-5610	S-169	IIC-84	NAS1-7199	S-182
IIB-68	NAS1-5610	S-174	IIC-85	NAS1-7199	Reject
IIB-69	NAS1-5610	S-163	IIC-86	NAS1-7199	S-178
IIB-70	NAS1-5610	Storage-Sh.Lf.Stdy.	IIC-87	NAS1-7199	Unassigned
IIB-71	NAS1-5610	S-166	IIC-88	NAS1-7199	Unassigned
IIB-72	NAS1-5610	S-171	IIC-89	NAS1-7199	S-183
IIB-73	NAS1-5610	S-165	IIC-90	NAS1-7199	Unassigned
IIB-74	NAS1-5610	S-173	IIC-91	NAS1-7199	Unassigned
IIB-75	NAS1-5610	S-176	IIC-92	NAS1-7199	Unassigned
			IIC-93	NAS1-7199	Unassigned

TABLE XVII - UNITED TECHNOLOGY MOTOR HISTORY, ALGOL III

Number	Contract	Use	Number	Contract	Use
5502-III-1	NAS1-9258	S-170	5504-III-4P20	NAS1-13100	S-201
5502-III-2	NAS1-9258	S-184	5504-III-5P21	NAS1-13100	S-192
5502-III-3	NAS1-9258	S-181	5504-III-6P22	NAS1-13100	S-202
5502-III-4	NAS1-9258	S-185	5504-III-7P23	NAS1-13100	S-203
5502-III-5	NAS1-9258	Test	5504-III-8P24	NAS1-13100-13	Assigned S-199
5502-III-6	NAS1-9258	S-190	5504-III-9P25	NAS1-13100-13	Unassigned
5502-III-7	NAS1-9258	S-188	5504-III-10P26	NAS1-13100-13	Unassigned
5502-III-8	NAS1-9258	S-191	5504-III-11P27	NAS1-13100-13	Unassigned
5502-III-9	NAS1-9258	S-186	5504-III-12P28	NAS1-13100-13	Unassigned
5502-III-10	NAS1-9258	S-189	5505-III-1	NAS1-14200-10	Unassigned
5502-III-11	NAS1-9258	S-194	5505-III-2	NAS1-14200-10	Unassigned
5502-III-12	NAS1-9258	S-195	5505-III-3	NAS1-14200-10	Unassigned
5502-III-13	NAS1-9258	S-196	5505-III-4	NAS1-14200-10	Unassigned
5502-III-15	NAS1-9258	S-193	5505-III-5	NAS1-14200-10	Unassigned
5502-III-16	NAS1-9258	S-197	5505-III-6	NAS1-14200-10	Unassigned
5504-III-1P17	NAS1-13100	S-200	5505-III-7	NAS1-14200-10	Unassigned
5504-III-2P18	NAS1-13100	S-198	5505-III-8	NAS1-14200-10	Unassigned
5504-III-3P19	NAS1-13100	Test	5505-III-9	NAS1-14200-10	Unassigned
			5505-III-10	NAS1-14200-10	Unassigned

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TABLE XVIII - THIOKOL MOTOR HISTORY, CASTOR I

Castor I (XM-33)

Number	Contract	Use	Number	Contract	Use
IE5-62	L-55931-3	Test	IE5-176	AF Contract	S-117
IE5-77	L-55931-3	ST-1	IE5-177	AF Contract	S-121
IE5-82	L-55931-3	ST-2	**IE5-178	AF Contract	S-138
IE5-83	L-55931-3	ST-3	IE5-179	L-2061	S-133
IE5-92	L-55931-3	ST-4	IE5-180	L-2061	S-128
IE5-93	L-55931-3	Test	IE5-181	L-2061	S-116
IE5-94	L-55931-3	Air Force	IE5-182	L-2061	S-125
IE5-95	L-55931-3	Air Force	IE5-183	L-2061	S-127
IE5-102	L-77203-5	Air Force	IE5-184A	L-2061	S-123
IE5-103	L-77203-5	Air Force	IE5-185A	L-2061	S-136
IE5-104	L-77203-5	Air Force	IE5-186	L-2061	Reject
IE5-107	L-77203	Air Force	IE5-187	L-2061	Reject
***IE5-108	L-77203	ST-6	IE5-188	L-2061	S-134
IE5-109	L-77203	Air Force	IE5-189	L-2061	S-139
IE5-110	L-77203	Test	IE5-190	L-2061	S-141
IE5-111	L-77203	Air Force	IE7-191	L-2061	AF B.S.J.
IE5-112	L-77203	Air Force	IE7-192	L-2061	AF B.S.J.
IE5-113	L-77203	Air Force	IE7-193	L-2061	AF B.S.J.
IE5-114	L-77203-5	Reject	IE7-194	L-2061	Reject
IE5-124	L-89845	ST-7	IE7-195	L-2061	AF Beanstalk
IE5-125	L-89845	ST-8	IE7-196	L-2061	AF Beanstalk
IE5-126	L-89845	Reject	IE7-197	L-2061	AF Beanstalk
*IE5-128	L-67666	ST-9	IE7-198	L-2061	AF Beanstalk
IE5-143	L-77203-6	S-113	IE7-199	L-2061	AF Beanstalk
IE5-147	L-93419	S-111	IE5-252	L-93419-8	S-124
IE5-148	L-93419	S-120	IE7-253	L-6992	AF B.S.J.
IE5-149	L-93419	S-114	IE7-254	L-6992	AF B.S.J.
IE5-150	L-93419	S-118	IE7-255	L-6992	AF B.S.J.
***IE5-151	L-93419	Air Force	IE7-257	L-6992-2	AF B.S.J.
IE5-152	L-93419	S-122	IE7-258	L-6992-2	AF B.S.J.
IE5-153	L-93419	S-115	IE7-259	L-6992-2	AF B.S.J.
IE5-154	L-93419	S-119	IE7-260	L-6992-2	AF B.S.J.
IE5-155	L-93419	S-110	IE7-261	L-6992-2	AF B.S.J.
IE5-156	L-93419	Test	IE7-262	L-6992-2	AF B.S.J.
*IE5-157	L-93419	Exch. for IE5-128	IE7-303	L-2061-8	AF B.S.J.
**IE5-158	L-93419	S-126	IE5-326	L-77203	ST-5
IE5-159	L-93419	S-129	IE5-371	Unknown	(Case S-144)
IE5-160	L-93419	S-132	IE5-422	L-2061-9	S-130
IE5-161	L-93419	S-137	IE5-423	L-2061-9	S-135
IE5-175	AF Contract	S-112	IE5-534	NAS1-5034	Storage
			IE5-535	NAS1-5034	Storage

*128 borrowed from LRC, returned #157.
**Lent AF, recd. #178 in return.
***Borrowed 108 from 609A Program, replaced by 151.

TABLE XIX - THIOKOL MOTOR HISTORY, CASTOR II (TX354-3)

Number	Contract	Use	Number	Contract	Use
IIA-1	L15993	Test	IIA-185	NAS1-7199	S-144
IIA-2	L15993	Reject	IIA-186	NAS1-7199	S-180
IIA-3	L15993	Test	IIA-187	NAS1-7199	S-184
IIA-4	L15993	Test	IIA-188	NAS1-7199	S-185
IIA-5	L15993	Test	IIA-189	NAS1-7199	S-187
IIA-6	L15993	Test	IIA-190	NAS1-7199	S-190
IIA-7	L15993	Test	IIA-191	NAS1-7199	S-181
IIA-16	NAS1-5034	S-143	IIA-192	NAS1-7199	S-183
IIA-17	NAS1-5034	S-142	IIA-193	NAS1-7199	S-179
IIA-18	NAS1-5034	S-146	IIA-194	NAS1-7199	S-178
IIA-19	NAS1-5034	S-147	IIA-195	NAS1-7199	S-170
IIA-20	NAS1-5034	S-145	IIA-196	NAS1-7199	S-197
IIA-21	NAS1-5034	S-148	IIA-197	NAS1-7199	S-182
IIA-22	L15993	Test	IIA-198	NAS1-7199	S-188
IIA-23	NAS1-5034	S-131	IIA-199	NAS1-7199	S-191
IIA-24	NAS1-5034	S-140	IIA-200	NAS1-7199	S-186
IIA-25	NAS1-5034	S-149	IIA-201	NAS1-7199	S-189
IIA-26	NAS1-5034	S-152	IIA-325	Sandia	Test Reject
IIA-27	NAS1-5034	S-150	IIA-326	Sandia	Shelf Life
IIA-28	NAS1-5034	S-153	IIA-328	Sandia	Shelf Life
IIA-29	NAS1-5034	S-151	IIA-382	NAS1-11400	S-195
IIA-96	NAS1-5883	S-157	IIA-383	NAS1-11400	S-196
IIA-97	NAS1-5883	S-160	IIA-384	Sandia-Ret'd	S-202
IIA-98	NAS1-5883	S-154	IIA-385	Sandia-Ret'd	S-192
IIA-99	NAS1-5883	Test (Case to LRC Show)			
IIA-100	NAS1-5883	S-155	IIA-386	Sandia-Ret'd	Unassigned
IIA-101	NAS1-5883	S-159	IIA-387	Sandia-Ret'd	S-203
IIA-102	NAS1-5883	S-156	IIA-390	NAS1-11400	S-194
IIA-103	NAS1-5883	S-161	IIA-391	NAS1-11400	S-192
IIA-104	NAS1-5883	S-168	IIA-392	NAS1-11400	S-193
IIA-105	NAS1-5883	S-158	IIA-393	NAS1-11400	S-200
IIA-170	NAS1-5610	S-162	IIA-394	NAS1-11400	S-198
IIA-171	NAS1-5610	S-169	IIA-395	NAS1-11400	S-201
IIA-172	NAS1-5610	S-165	IIA-808	NAS1-14200-6	Unassigned
IIA-173	NAS1-5610	S-167	IIA-809	NAS1-14200-6	Unassigned
IIA-174	NAS1-5610	S-145	IIA-810	NAS1-14200-6	Assigned S-199
IIA-175	NAS1-5610	S-174	IIA-811	NAS1-14200-6	Unassigned
IIA-176	NAS1-5610	S-171	IIA-812	NAS1-14200-6	Unassigned
IIA-177	NAS1-5610	Test	IIA-813	NAS1-14200-6	Unassigned
IIA-178	NAS1-5610	S-163	IIA-814	NAS1-14200-6	Unassigned
IIA-179	NAS1-5610	S-172	IIA-815	NAS1-14200-6	Unassigned
IIA-180	NAS1-5610	S-175	IIA-816	NAS1-14200-6	Unassigned
IIA-181	NAS1-5610	S-177	IIA-817	NAS1-14200-6	Unassigned
IIA-182	NAS1-5610	S-173	IIA-818	NAS1-14200-14	Unassigned
IIA-183	NAS1-5610	S-166	IIA-819	NAS1-14200-14	Unassigned
IIA-184	NAS1-5610	S-176	IIA-820	NAS1-14200-14	Unassigned
			IIA-821	NAS1-14200-14	Unassigned

TABLE XX - HERCULES MOTOR HISTORY, ANTARES IIA.

Number	Contract	Use
A1-1	NOrd 16640(3-138)**	Test
A1-2	NOrd 16640(3-138)**	Test
A1-3	NOrd 16640(3-138)**	Test
A1-4	NOrd 16640(3-138)**	Test
A1-5	NOrd 16640(3-138)**	Test
A1-6	NOrd 16640(3-138)**	Test
A1-7	NOrd 16640(3-138)**	Test
A1-9	NOrd 16640(3-138)**	Test
A1-11	NOrd 16640(3-138)**	Test
A3-16	L-93985	S-111
A3-17	L-93985	ST-9
A2-18	NOrd 16640(3-138)**	Test
A2-19	NOrd 16640(3-138)**	Test
A2-20	NOrd 16640(3-138)**	Test
A2-21	NOrd 16640(3-138)**	Test
A2-22	NOrd 16640(3-138)**	Test
A2-23	NOrd 16640(3-138)**	Test
A3-24	L-93985	S-117
A3-25	L-93985	S-112
A3-26A	L-93985	S-121
A2-100	L-93985	USNAP-Crane Test
A2-101	L-93985	Test
A2-102	L-3920	Test
A2-103A	L-93985	Test
A3-104	L-3920	Reject
A3-105	L-93985	S-114
A3-106	L-3920	S-116
A2-107A	L-93985	Test-fire
A3-108	L-93985	S-118
A3-109C	L-3920	S-127
A3-110A	L-93985-3	S-110
A2-111	L-93985	Test
A3-112	L-93985-3	S-126
A2-113	L-3920	Test
A2-114	L-3920	Test
A2-115	L-3920	Test
A2-116	L-3920	Burst Test
A3-117	L-3920	S-119
A4-118	L-3920	S-132
A4-119	L-3920	S-115
A3-120	L-3920	Reject-Test
A3-122	L-3920	S-120
A4-123	L-3920	Air Force
A3-124	L-3920	Air Force(ETR)
A2-126A	L-3920	Test - SRT
A2-127	L-3920-9	Test
A2-128	L-3920	S-113
A3-129	L-3920	Reject-AMPD
A3-130	L-3920	S-124
A3-132	L-3920-2	S-128
A4-133	L-3920	Air Force
A3-134	L-3920	S-122
A3-135	L-3920	Air Force (ETR)
A3-136A	L-3920	S-129
A2-137	NAS1-3493	Q.A. Test
A3-139	L-3920	S-133
A3-140	L-3920	Air Force
A3-141	L-3920	Air Force
A2-142	L-3920	H-Assigned Test
A3-143	L-3920	S-123
A5-144	L-3920	Fire
A3-145	L-3920-4	S-134
A3-146	L-3920-4	S-125
A3-148	L-3920	Reject-Navy
A2-150	L-3920-4	ABL-Nozzle Test
A3-151	L-93985-12	S-152
A3-152	L-3920	Air Force
A3-153	L-3920	Air Force
A3-154	L-3920	S-138
A3-155	L-3920	Air Force
A3-156	L-3920	Air Force
A3-157	L-3920	S-130
A5-158	L-93985-12	Fire
A3-159	NAS1-3493	S-135
A3-160	NAS1-3493	S-131
A3-161	NAS1-3493	S-147
A3-162	NAS1-3493	Reject-case
A3-163	NAS1-3493	S-154
A3-164	NAS1-3493	S-146
A3-165	NAS1-3493	S-139
A3-166	NAS1-3493	S-136
A3-167	NAS1-3493	S-137
A3-168	NAS1-3493	Demolished
A3-169	NAS1-3493	S-142
A3-170	NAS1-3493	S-143
A3-171	NAS1-3493	Q.A. Test(S-144 case)
A3-172	NAS1-3493	S-141
A3-173	NAS1-3493	S-140
A3-174	NAS1-3493	S-145
A6-175	NAS1-3493	Air Force (WS)
A6-176	NAS1-3493	Air Force (WS)
*A3-177	NAS1-3493	S-149
A3-178	NAS1-3493	QA5883
A2-179	NAS1-3493	Wasp (SPARTA)
A3-180	NAS1-3493	Air Force
A3-181	NAS1-3493	S-150
A3-182	NAS1-3493	S-153
A3-183	NAS1-3493	S-148
A3-184	NAS1-3493	S-151
A2-185	NAS1-3493	Wasp
*A3-186A	NAS1-3493	Reject-Storage

*Wasp motor transferred to Scout.
**Direct by OSSA-Hqs.

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TABLE XXI - THIOKOL MOTOR HISTORY

ANTARES IIA

Number	Contract	Use	Number	Contract	Use
*A3-187	NAS1-3493	Case Test-SRT	B3-301	NAS1-7199	S-166
*A3-201	NAS1-3493/5883	S-156	B3-302	NAS1-7199	S-183
*A3-202	NAS1-3493/5883	S-155	B3-303	NAS1-7199	S-184
*A3-203	NAS1-3493/5883	Test-AEDC#	B3-304	NAS1-7199	S-170
A3-204	NAS1-5883	Reject** (W.I.)	B3-305	NAS1-7199	S-163
B3-205	NAS1-5883	S-159	B3-306	NAS1-7199	S-190
B3-206	NAS1-5883	S-160	B3-307	NAS1-7199	S-187
B3-207	NAS1-5883	S-161	B3-308	NAS1-7199	S-188
B3-208	NAS1-5883	(Test)Grain Mis-oriented	B3-309	NAS1-7199	S-195
B3-209	NAS1-5883	S-164	B3-310	NAS1-7199	S-178
B3-210	NAS1-5883	S-168	B3-311	NAS1-7199	S-182
B3-211	NAS1-5883/5610	Dropped - Reject	B3-312	NAS1-7199	S-185
B3-212	NAS1-5883/5610	S-158	B3-313	NAS1-7199	S-181
B3-213	NAS1-5610	S-162	B3-314	NAS1-7199	S-180
B3-214	NAS1-5610	S-172	B3-315	NAS1-7199	S-186
B3-215	NAS1-5610	S-165	B3-316	NAS1-7199	S-189
B3-216	NAS1-5610	S-167	B3-	NAS1-5883	Replaced B3-208
B3-217	NAS1-5610	S-169	B4-402	NAS1-11400	S-179
B3-218	NAS1-5610	S-174	B4-404	NAS1-11400	S-197
B3-219	NAS1-5610	S-176	B4-405	NAS1-11400	S-193
B3-220	NAS1-5610	S-157	B4-408	NAS1-11400	S-200
B3-221	NAS1-5610	S-171	B4-409	NAS1-11400	S-198
B3-222	NAS1-5610	Assigned Test-S.L.	B4-410	NAS1-14200	Unassigned
B3-223	NAS1-5610	S-177	B4-411	NAS1-14200	S-201
B3-224	NAS1-5610	S-173	B4-412	NAS1-14200	S-202
B3-225	NAS1-5610	S-144	B4-413	NAS1-14200	Unassigned
B3-226	NAS1-5610	S-175	B4-414	NAS1-14200	Unassigned
			B4-415	NAS1-14200	Assigned S-199

ANTARES IIB

Number	Contract	Use
B4-401	NAS1-11400	S-191
B4-403	NAS1-11400	AEDC Test
B4-406	NAS1-11400	S-196
B4-407	NAS1-11400	S-194
B4-416	NAS1-11400	Destroyed in Hydrotest
B4-417	NAS1-11400	H.E. Test
B4-418	NAS1-11400	H.E. Test

TABLE XXII - ANTARES IIIA

Number	Contract	Use	Number	Contract	Use
D-1	NAS1-15100-R44	Test	E-5	NAS1-14200-5	Unassigned
D-2	NAS1-15100-R44	Test	E-6	NAS1-14200-5	Unassigned
D-3	NAS1-15100-R44	Test	E-7	NAS1-14200-5	Unassigned
Q-1	NAS1-15100-R44	Test	E-8	NAS1-14200-5	Unassigned
Q-2	NAS1-15100-R44	Test	E-9	NAS1-14200-5	Unassigned
Q-3	NAS1-15100-R44	Test	E-10	NAS1-14200-5	Unassigned
E-1	NAS1-15100-R44	S-203	E-11	NAS1-14200-5	Unassigned
E-2	NAS1-14200-5	S-192	E-12	NAS1-14200-5	Unassigned
E-3	NAS1-14200-5	Unassigned	E-13	NAS1-14200-5	Unassigned
E-4	NAS1-14200-5	Unassigned	E-14	NAS1-14200-5	Unassigned

*HPC. #Case to LRC Show. **Replacement due.

TABLE XXIII(a) - HERCULES MOTOR HISTORY, ALTAIR II.

Altair II (RH-X-258) History

Number	Contract	Use	Number	Contract	Use
A1-1	NASA Hq.	Test	**C2-73-D	NAS1-3698	S-133
A1-2	NASA Hq.	Test	C2-74	NAS1-3698	S-135
A1-3	NASA Hq.	Test	C1-75	NAS1-3698	S-137
A1-4	NASA Hq.	Test	C2-76	NAS1-3698	Air Force
A1-5	NASA Hq.	Test	C2-77	NAS1-3698	Delta
A1-6	NASA Hq.	Test	C4-78	NAS1-3698-3	Delta
A1-7	NASA Hq.	Test	C4-79	NAS1-3698-3	Delta
A1-9	NASA Hq.	Test	C4-80	NAS1-3698-3	Delta
A1-10	NASA Hq.	Test	*C3-81-D	NAS1-3698-3	S-136
A1-13	NASA Hq.	Test	C4-82	NAS1-3698-6	Aging test-1968
A1-15	NASA Hq.	Test	C4-83	NAS1-3698-6	Delta
A2-18	NASA Hq.	Test	C4-84	NAS1-3698-6	Delta
A1-19	NASA Hq.	Test	C4-85	NAS1-3698-6	Air Force
A2-20	NASA Hq.	Test	C2-86	NAS1-3698-3	Delta
A2-21	NASA Hq.	Test	C4-87	NAS1-3698-6	Delta
A2-22	NASA Hq.	Test	C4-88	NAS1-3698-9	Delta
B1-23	NASA Hq.	Test	C4-89	NAS1-3698-9	Delta
B1-24	NASA Hq.	Test	C4-90	NAS1-3698-9	Delta
B1-25	NASA Hq.	Test	C4-91	NAS1-3698-9	Delta
B1-28	NASA Hq.	Test	C4-92	NAS1-3698-9	Delta
B1-30	NASA Hq.	Test	E2-100	NAS1-3698	Test
B1-32	L-8735	Test	E4-101	NAS1-3698	Reject-case
B1-34	L-8735	Test	E4-102	NAS1-3698	Reject-case
B1-35	L-6990	Test	E4-103	NAS1-3698	Reject-case
B1-36	L-6990	Test	E4-104	NAS1-3698	Empty case
B1-37	L-6990	Test	E4-105	NAS1-3698	Test
B1-39	L-8735	Test	E4-106	NAS1-3698	Test
B1-40	L-8735	Test	E4-107	NAS1-3698	Reject-Ins.
B1-41	L-8735	Test	E10-108	NAS1-3698	Test
B1-42	L-8735	Test	E4-109	NAS1-3698	Air Force
B1-45	L-6990	Test	E8-110	NAS1-3698	S-146
B1-46	L-6990-2	Test	E4-111	NAS1-3698	Reject-test
B1-47	L-6990-4	Test	E4-112	NAS1-3698	Reject-case
B1-48	L-6990-3	S-113	E10-113	NAS1-3698	Air Force
B1-49	L-6990-3	Test	E4-114	NAS1-3698	Reject-Ins.
B1-50	L-6990	Test	E4-115	NAS1-3698	Mock-up
B1-53	L-6990-4	S-132	E6-116	NAS1-3698	S-142
B1-54	L-6990-3	Reject	E6-117	NAS1-3698	S-141
C1-55-L	NAS1-3664	S-125	E6-118	NAS1-3698	S-143
C1-56-D	NAS1-3664	Test	E6-119	NAS1-3698	Air Force-Satar
C2-58-L	NAS1-3664	Delta-test	E6-120	NAS1-3698	Reject-case
*B2-60	L-6990-5	Delta-IMP	E4-121	NAS1-3698	Delta
B1-61	L-6990-5	S-122	E6-122	NAS1-3698	Test-case
**X2-63-J	NAS1-3664	Delta-test	E6-123	NAS1-3698	Test
C1-64-N	NAS1-3664	S-124	E6-124	NAS1-3698	Test
C1-65-N	NAS1-3664	Javelin	E6-125	NAS1-3698	S-138
C1-66-N	NAS1-3664	S-128	E6-126	NAS1-3698	S-139
B2-67-D	NAS1-3664	Delta	E6-127	NAS1-3698	Test
C1-68	NAS1-3698	S-134	E6-128	NAS1-3698	Test
C2-69	NAS1-3698	Delta	E6-129	NAS1-3698	S-140
C1-70	NAS1-3698	S-129	E6-130	NAS1-3698	Test-Shelf Life
C2-71	NAS1-3698	Delta-test	E6-131	NAS1-3698	Air Force-Satar
C1-72	NAS1-3698	S-123	***E6-132	NAS1-3698	Air Force-Satar
			****E6-133	NAS1-3698	Delta-Air Force

*On loan to Delta, recd. 81 in return.
**On loan to Delta, recd. 73 in return.
***Delta on loan to Air Force.
****Traded Air Force for FW-4S 20033.

TABLE XXIII(a) Concluded - HERCULES INCORPORATED.
Altair II (X-258) History

NUMBER	CONTRACT	USE
RHE6-134	NAS1-3698	S-154
RHE6-135	NAS1-3698	S-157
RHE6-136	NAS1-3698	S-149
RHE6-137	NAS1-3698	Air Force-Satar
E6-138	NAS1-5883	Air Force-Satar
E6-139	NAS1-5883	S-156
E6-140	NAS1-5883	Delta-18
E6-141	NAS1-5883	Delta-19
E6-142	NAS1-5883	Reject (Repl. w/161) Igniter Test
E6-143	NAS1-5883	S-155
E5-144	NAS1-5883-3	Reject
E5-145	NAS1-5883-3	S-162
E5-146	NAS1-5883-3	Rejected
E5-147	NAS1-5883-3	Shelf Life Test
E5-148	NAS1-5883-3	Inventory
E5-149	NAS1-5883-3	S-176
E5-150	NAS1-5883-3	S-178
E5-151	NAS1-5883-3	Canceled
E5-152	NAS1-5883-3	Unassigned (no Igniter)
E5-153	NAS1-5883-5	Canceled
E6-156	NAS1-5883-5	Canceled
E5-157	NAS1-5883-5	Canceled
E5-158	NAS1-5883-5	Canceled
E5-159	NAS1-5883-5	Canceled
E5-160	NAS1-5883-3	(Repl. E5-144)(Cancel) Case Tested
E6-161	NAS1-5883	Unassigned (Repl. E6-142)

TABLE XXIII(b) - HERCULES INCORPORATED
Alcyone (BE3-A9)

NUMBER	CONTRACT	USE
AN09/003	NAS1-7102	S-191
AN09/005	NAS1-7102	Test/Shelf Life
AN09/006	NAS1-7102	Air Force
AN09/008	NAS1-7102	Air Force
AN09/010	NAS1-7102	Germany

TABLE XXIV - UNITED TECHNOLOGY MOTOR HISTORY, ALTAIR IIIA,

Altair III (FW4S) History

NUMBER	CONTRACT	USE	NUMBER	CONTRACT	USE
20002	AF04(695)-588	Test-AEDC	30201	NAS1-5883	S-150
20003	AF04(695)-588	Test-AEDC	30202	NAS1-5883	S-153
20004	AF04(695)-588	Test-AEDC	30203	NAS1-5883	Reject
20005	AF04(695)-588	Test	30204	NAS1-5883	S-151
20006	AF04(695)-588	Reject	30205	NAS1-5883	Test-LRC
20007	AF04(695)-588	Test	30206	NAS1-5883	S-152
20008	AF04(695)-588	Test	30207	NAS1-5883	S-159
20009	AF04(695)-588	Reject	30208	NAS1-5883	Test
20010	AF04(695)-588	Reject	30209	NAS1-5883	Reject***
20011	AF04(695)-588	Reject	30210	NAS1-5883	S-158
20012	AF04(695)-588	Reject	30211	NAS1-5883	Case Rejected
20013	AF04(695)-588	Reject	30212	NAS1-5883	Case Rejected
20014	AF04(695)-588	Case-Test	30213	NAS1-5883	Case Rejected
20015	AF04(695)-588	Test-Loads	2218-8(30214)	NAS1-5883	S-160
20016	AF04(695)-588	Test	2218-9(30301)	NAS1-5883	Test-AEDC
20017	AF04(695)-588	Test	2218-10(30302)	NAS1-5883	S-161***
20018	AF04(695)-588	Test	2223-1	NAS1-5610	S-167
20019	AF04(695)-588	Test	2223-2	NAS1-5610	S-168
20020	AF04(695)-588	Test	2223-3	NAS1-5610	S-174
20021	AF04(695)-588	Air Force	2223-4	NAS1-5610	S-165
20022	AF04(695)-588	Reject	2223-5	NAS1-5610	S-169
20023	AF04(695)-588	Reject	2223-6	NAS1-5610	S-172
20024	AF04(695)-588	Test-AEDC	2223-7	NAS1-5610	S-177
20030	AF04(695)-588	Test-AEDC	2223-8	NAS1-5610	S-144
20031A	AF04(695)-588	S-145	2223-9	NAS1-5610	S-171
20032	AF04(695)-588	Air Force	2223-10	NAS1-5610	S-175
**20033	AF04(695)-588	Delta	2223-11	NAS1-5610	S-166
20034	AF04(695)-588	Air Force	2223-12	NAS1-5610	S-183
20035	AF04(695)-588	Test-AEDC	2223-13	NAS1-5610	S-185
20036	AF04(695)-588	Air Force	2223-14	NAS1-5610	S-173
20037	AF04(695)-588	Reject	2223-15	NAS1-5610	S-180
20038	AF04(695)-588	S-131	2223-16	NAS1-5610	S-163
20039	AF04(695)-588	S-147	2376-1	NAS1-7199	S-182
B1	AF04(695)-588	Case-Test	2376-2	NAS1-7199	S-181
30101	AF04(695)-588	Hydroburst	2376-3	NAS1-7199	S-191
30102	AF04(695)-588	Hydroburst	2376-4	NAS1-7199	S-190
30103	AF04(695)-588	Test-Loads	2376-5	NAS1-7199	S-170
30104	AF04(695)-588	*Test-AEDC	2376-6	NAS1-7199	S-186
30105	AF04(695)-588	S-148	2376-7	NAS1-7199	S-188
			2376-8	NAS1-7199	S-184

*30104 Empty Case to S-144.
**Traded for X258E6-133.
***Replace 30209 with 2218-10(30302).

TABLE XXV - THIOKOL (ELKTON) TEM640 ALTAIR IIIA HISTORY

Number	Contract	Use	Number	Contract	Use
TCC-E-00	NAS1-11400	TCC Test	TCC-E-27	NAS1-14200	S-202
TCC-E-01	NAS1-11400	AEDC Test (Failed)	TCC-E-28	NAS1-14200	AEDC Test
TCC-E-02	NAS1-11400	AEDC Test (Failed)	TCC-E-29	NAS1-14200-2	S-198
TCC-E-03	NAS1-11400	Reject-Tested	TCC-E-30	NAS1-14200-2	NRL
TCC-E-04	NAS1-11400	Reject	TCC-E-31	NAS1-14200-2	Unassigned
TCC-E-05	NAS1-11400	Reject-NDT	TCC-E-32	NAS1-14200-4	Assigned S-199
TCC-E-06	NAS1-11400	Reject-NDT	TCC-E-33	NAS1-14200-4	Unassigned
TCC-E-07	NAS1-11400	Test-F Demo	TCC-E-34	NAS1-14200-4	Unassigned
TCC-E-08	NAS1-11400	Test-Demo	TCC-E-35	NAS1-14200-4	Unassigned
TCC-E-09	NAS1-11400	Qual. Test	TCC-E-36	NAS1-14200-4	NRL
TCC-E-10	NAS1-11400	Reject	TCC-E-37	NAS1-14200-4	NRL
TCC-E-11	NAS1-11400	Test (AEDC)	TCC-E-38	NAS1-14200-7	Unassigned
TCC-E-12	NAS1-11400	Test (RPL)	TCC-E-39	NAS1-14200-15	Unassigned
TCC-E-13	NAS1-11400	S-187	TCC-E-40	NAS1-14200-15	Unassigned
TCC-E-14	NAS1-11400	S-189	TCC-E-41	NAS1-14200-15	Unassigned
TCC-E-15	NAS1-11400	S-195	TCC-E-42	NAS1-14200-15	Unassigned
TCC-E-16	NAS1-11400	S-194	TCC-E-43	NAS1-14200-15	NRL
TCC-E-17	NAS1-11400	S-197	TCC-E-44	NAS1-14200-15	NRL
TCC-E-18	NAS1-11400	S-196	TCC-E-45	NAS1-14200-15	NRL
TCC-E-19	NAS1-11400	S-193	TCC-E-46	NAS1-14200-15	Unassigned
TCC-E-20	NAS1-11400	S-200	TCC-E-47	NAS1-14200-15	Unassigned
TCC-E-21	NAS1-11400	S-179	TCC-E-48	NAS1-14200-15	Unassigned
TCC-E-22	NAS1-11400	HE Test	TCC-E-49	NAS1-14200-15	Unassigned
TCC-E-23	NAS1-14200	S-201	TCC-E-50	NAS1-14200-15	Unassigned
TCC-E-24	NAS1-14200	NRL	TCC-E-51	NAS1-14200-15	Test
TCC-E-25	NAS1-14200	S-192	TCC-E-52	NAS1-14200-15	NRL
TCC-E-26	NAS1-14200	S-203	TCC-E-53	NAS1-14200-15	NRL
			TCC-E-54	NAS1-14200-21	Unassigned

CHAPTER IV - SCOUT VEHICLE SYSTEMS

GUIDANCE AND CONTROL

The guidance and control system provides an attitude reference and the resultant control signals and forces necessary for stabilization of a vehicle in its three orthogonal axes corresponding to pitch, yaw, and roll during vertical probe, reentry, or orbital flight programs. Figure 48 illustrates the guidance and control systems.

The roll axis is maintained at the launch reference while the pitch axis is programmed through a preselected angle corresponding to the desired vehicle zero-lift trajectory. The yaw axis may remain at launch reference or may be programmed through a preselected angle corresponding to the desired orbit inclination angle. Miniature integrating rate gyros contained within the inertial reference package detect any angular deviation about the vehicle programmed path and generate proportional error signals. These error signals are then summed with corresponding rate signals and are transmitted to the appropriate control subsystem such that the vehicle is continuously programmed to the gyro reference axis.

In addition to the "strapped down" gyro sensors, the system contains a relay unit for power and ignition switching, an intervalometer to provide precise scheduling of events during flight, a programmer to provide torquing voltages to the pitch or yaw gyro, an electronic signal conditioner to convert the gyro outputs to proper control signals, and the associated 400-cycle inverter and D-C batteries. An optional roll and yaw compensation unit that reduces flight path errors in the roll and yaw plane is available. Figure 49 illustrates the location of the controls.

A fourth-stage attitude and control system was flown on Scout-E with the Hawkeye mission.

FIRST-STAGE CONTROLS

In the lift-off configuration, the vehicle is aerodynamically stable. A proportional control system featuring a combination of jet vanes and aerodynamic tip control surfaces operated by hydraulic servo actuators is used to control the vehicle throughout the entire first-stage burning period. The jet vanes provide the majority of the control force during the thrusting phase. The aerodynamic tip controls provide all the control force during the coasting phase following burnout of the first stage.

SECOND- AND THIRD-STAGE CONTROLS

Second- and third-stage control systems as sketched in figure 50 are based on the same concept of operations as the first stage but differ in the method used to generate the control force. The control forces for these two stages are provided by hydrogen peroxide reaction jet motors which are operated as an "on-off" system. The motors are so placed that moments are set up about each of the three axes: pitch, yaw, and roll. The motors are mono-propellant and utilize 90 percent hydrogen peroxide (H_2O_2). Propellant pressurization is provided by compressed nitrogen (N_2) gas. Design characteristics of the thrust motors and H_2O_2 tankage capacity are shown in table XXVI.

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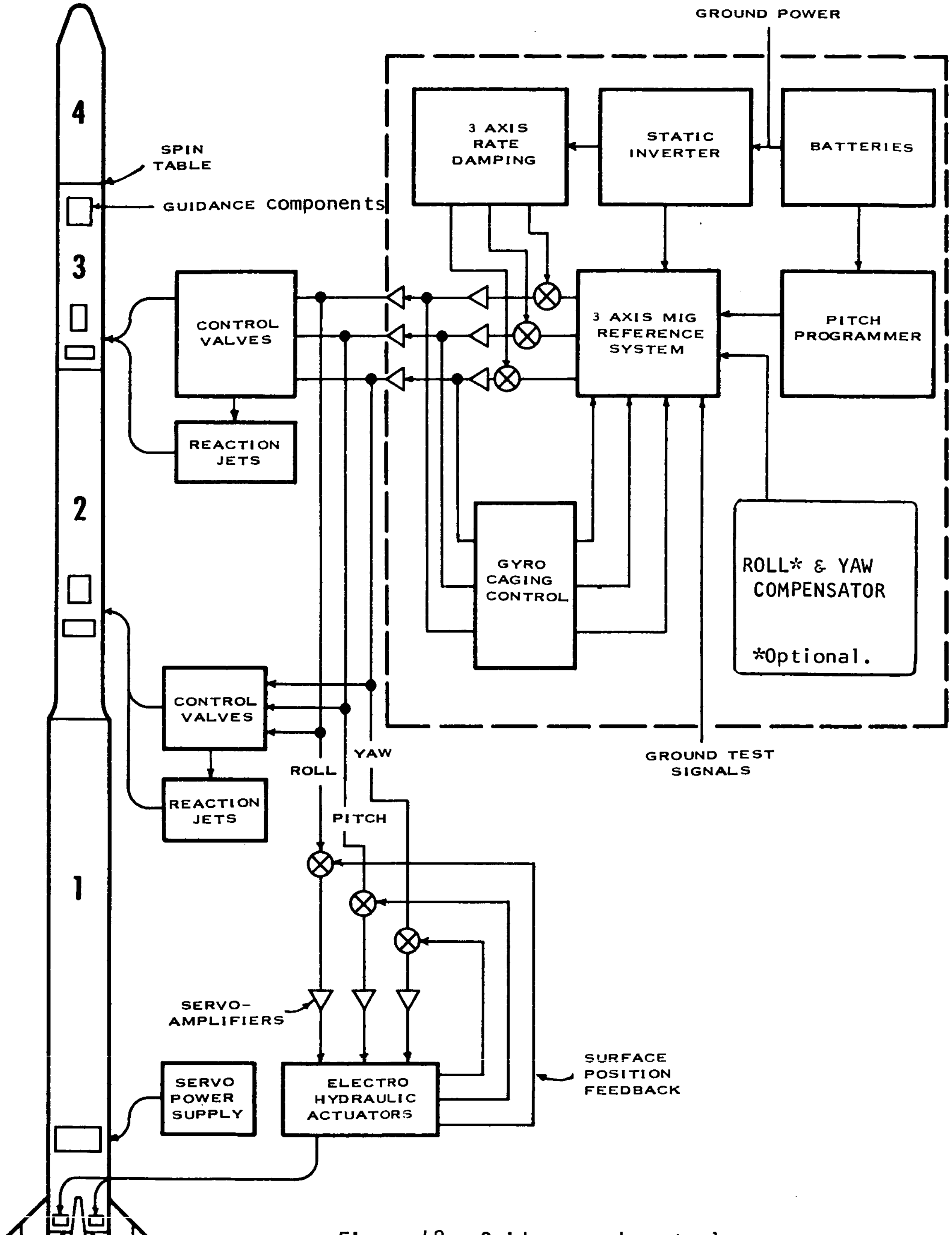


Figure 48.- Guidance and control systems.

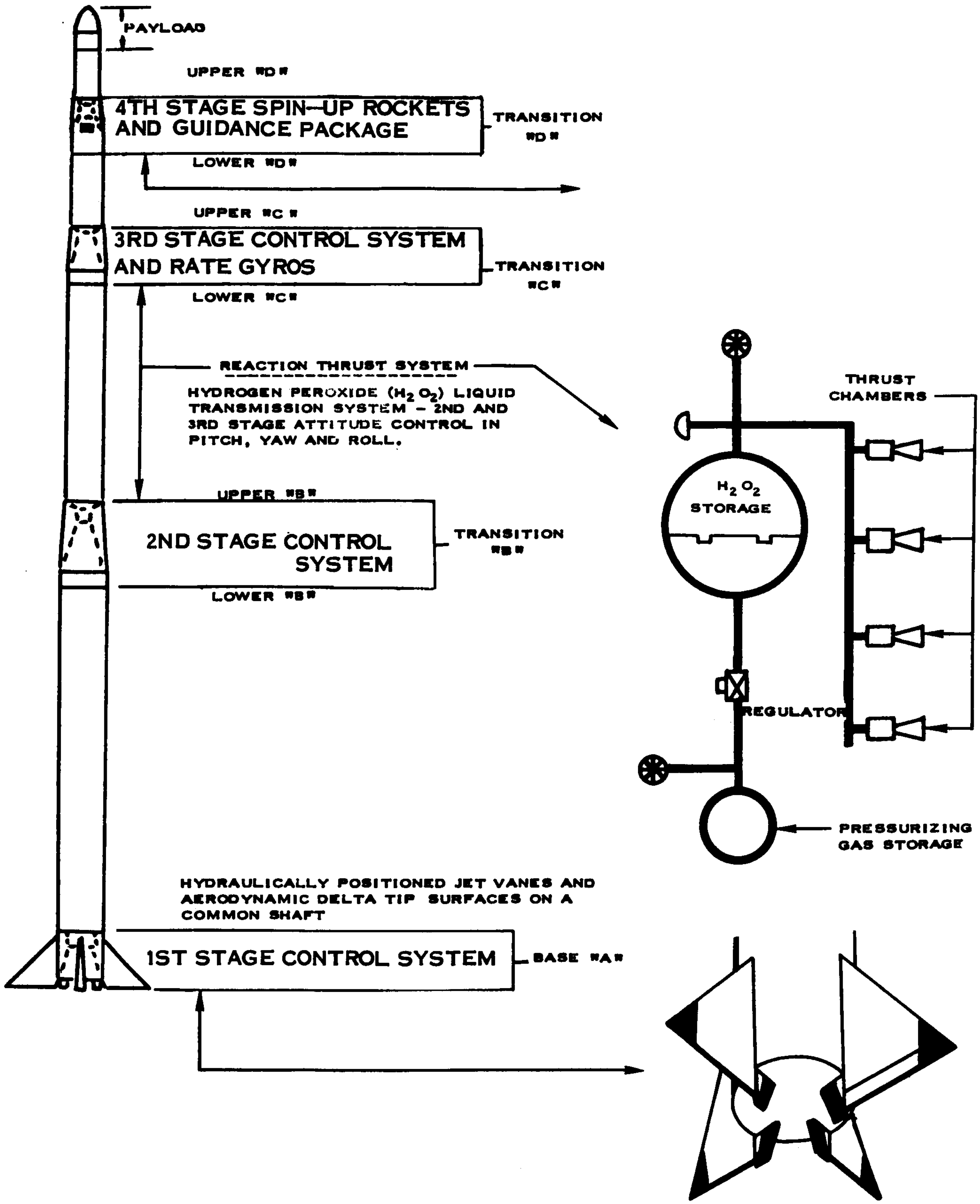


Figure 40.- Location of controls.

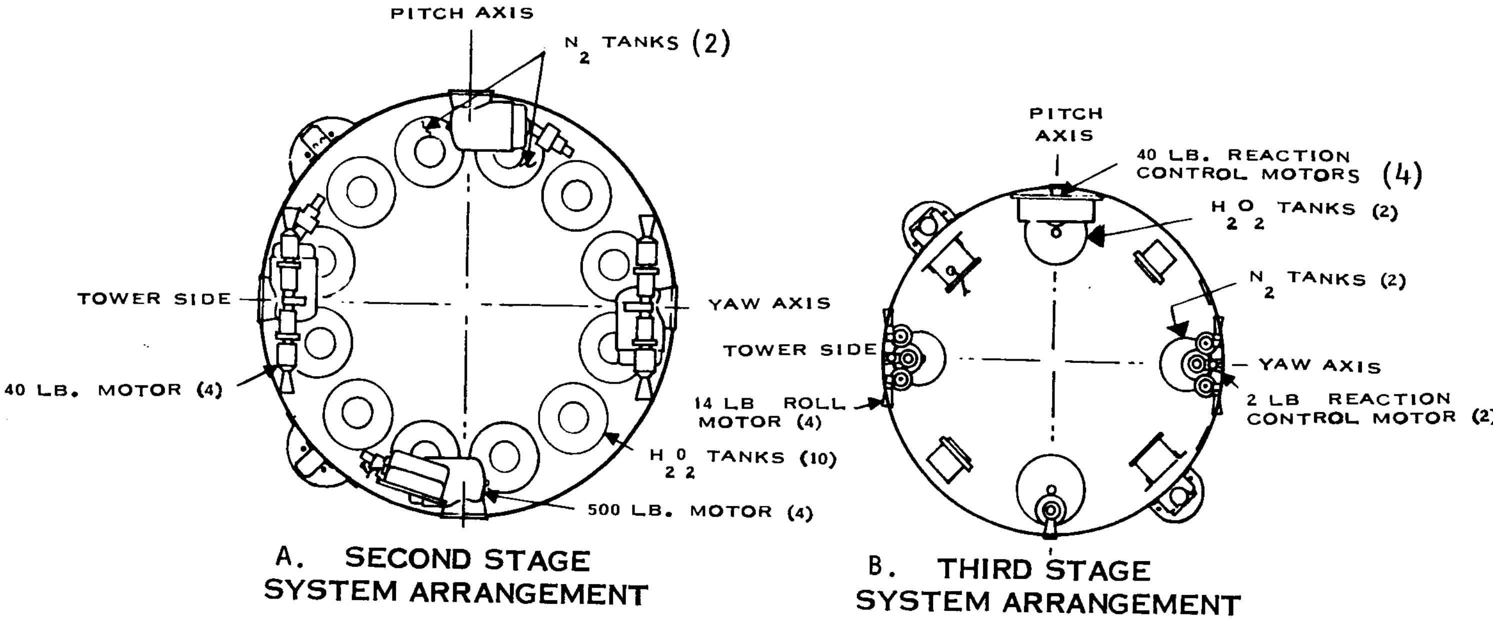
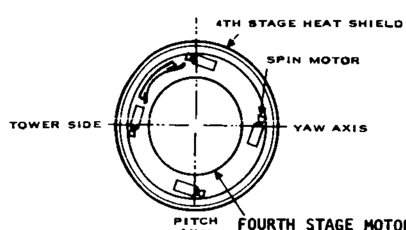


Figure 50.- Second and third-stage controls.

FOURTH-STAGE SPIN-UP SYSTEM

The fourth stage which includes the payload, receives the proper spatial orientation from the control exerted by the first three stages after which it is spin-stabilized by a combination of four impulse spin motors. The miniaturized rocket spin motors are mounted tangentially in the skirt at the base of the fourth stage. Spin up begins approximately 6 seconds prior to fourth-stage ignition. Spin motor arrangement and characteristics are shown in figure 51. Spin rate at fourth-stage ignition and burnout for various roll moments of inertia are given in figure 52. This figure gives the spin rate with two motors. The spin rate for four spin motors of the same size is double the spin rate for the two, and the spin rate of four motors of two difference sizes is the sum of the spin rate for the different motors. (See example in figure 52.)



SPIN MOTOR CHARACTERISTICS									
	OPERATING TEMPERATURE								
	20° F			70° F			130° F		
	.6KS40-HA	1KS40-HA	1KS75-HA	.6KS40-HA	1KS40-HA	1KS75-HA	.6KS40-HA	1KS40-HA	1KS75-HA
Thrust Vacuum, Pounds	42.7	46.0	67.0	42.3	45.2	70.0	50.8	52.0	73.0
Burning Time, Seconds	0.70	1.06	1.03	0.69	1.08	1.0	0.659	0.96	0.98
Total Impulse Vacuum, lb-sec	29.9	52.0	75.0	29.2	48.9	75.4	30.0	53.0	75.8

Figure 51.- Spin Motor Arrangement and Characteristics.

TABLE XXVI - GUIDANCE AND CONTROLS.

Design Characteristics	Second Stage	Third Stage
ROCKET MOTORS Thrust Levels	500-lb. Motor 510 ± 30 lbs. △ 490 ± 30 lbs. △△ 40-lb. Motor 46 ± 6 lbs. △ 44 ± 4 lbs. △△	60-lb. Motor 60^{+4}_{-3} 14-lb. Motor $14^{+(2.5)}_{-(1.4)}$ lbs.* 3 ± 1.0 lb.** 2-lb. Motor $2.2^{+(0.8)}_{-(0.4)}$
Total Impulse Required 100% Duty Cycle Intermittent	 25,560 lbs.-sec. 21,300 lbs.-sec.	 2,560 lbs.-sec. 2,240 lbs.-sec.
Specific Impulse(Steady) $\frac{lb_f - sec}{lb_m}$	500 # - 155 40 # - 166	60 # - 160 14 # - 168 2 # - 161
Coast Time	Probe Orbital 5 sec. Re-entry 250 sec.	Probe Re-entry 20 sec. Orbital 600 sec.
Weight - lbs.	500 # - 15.5 lbs. max. ea. 40 # - 2.3 lbs. max. ea.	60 # - 2.78 lbs. max. ea. 14 # - 1.88 lbs. max. ea. 2 # - 1.50 lbs. max. ea.
HYDROGEN PEROXIDE TANKAGE CAPACITY Weight Hydrogen Peroxide - lbs.	182	18.2
Volume Hydrogen Peroxide Tankage cu. in.	3,840	384

△ Condition No. 1. One 500 lb. motor and two 40 lb. motors firing.
△△ Condition No. 2. Two 500 lb. motors and two 40 lb. motors firing.
* Roll motor thrust control level during main stage engine burning.
** Roll or yaw motor thrust control during vehicle coast.

ITEMS		(SLUG-FT^2)
FW–4S		
FOURTH STAGE MOTOR	=	7.10
UPPER 'D' SECTION	=	.40
SPIN TABLE	=	.90
STANDARD 'E' SECTION SEPARATION SYSTEM	=	.16
TOTAL LESS PAYLOAD	=	8.56
PAYLOAD		+(____)
FOURTH STAGE SPIN-UP ITEMS		(____)

NOTES: 1. RADIUS OF SPIN MOTOR THRUST = 11.16 INCHES
2. MAXIMUM FORCE: A. 1KS40 AND 0.6KS40 = 75 LBS.
B. 1KS75 = 91 LBS.

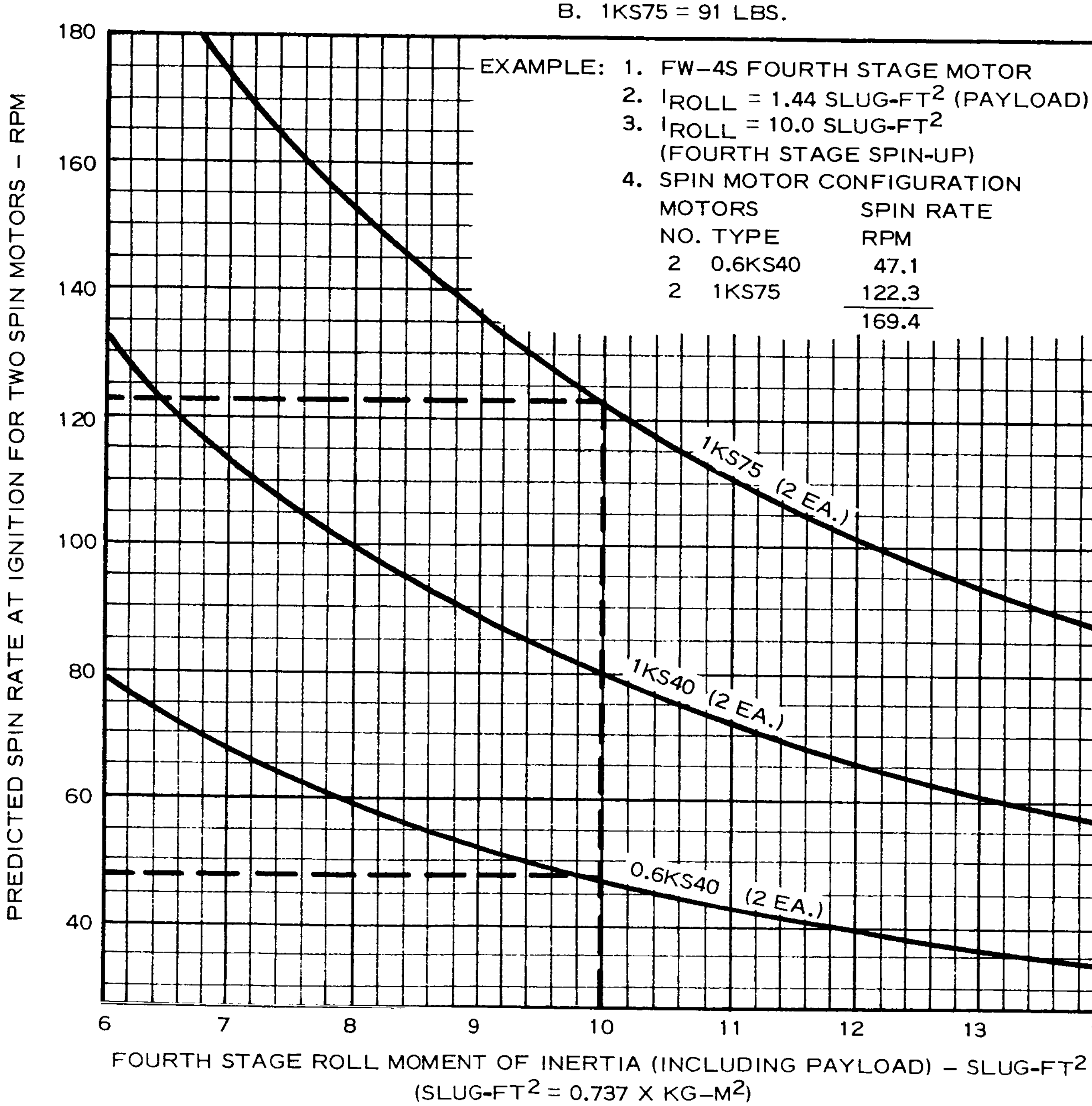


Figure 52.- Spin rate at fourth-stage ignition and burnout for various roll moments of inertia

STAGE SEPARATION SYSTEM

The Scout vehicle four solid-propellant rocket motors are joined by interstage structures referred to as "transition sections" as described in table IV. Each transition section is divided into upper and lower portions at the stage-separation plane. Frangible "blow-out" diaphragms (figure 53) join the first and second, and the second and third stages. The diaphragm forms an internal clamp by the threaded periphery that engages two structural threaded rings at the separation plane. Blast pressure of the upstage motor ruptures the diaphragm, disengaging the periphery and allows the stage to separate. The third and fourth stages are joined by a "cold-separation" arrangement of springs held compressed by a securing clamp (figure 53). Explosive bolts release the clamps, effecting separation by this method also. The fourth-to-fifth stage separation system is of similar design in the five-stage Scout configuration. Note the position of the separation systems in figure 24.

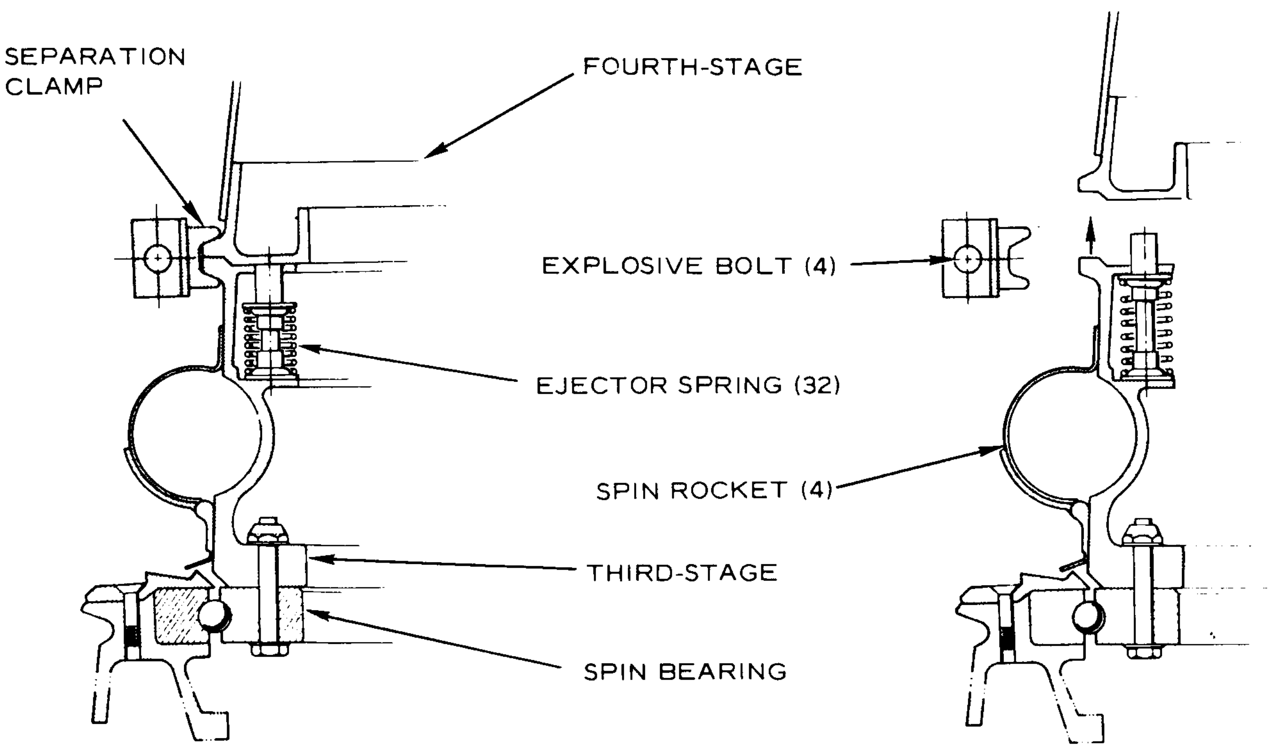


Figure 53.- Spring ejection separation system.

ELECTRICAL POWER AND IGNITION SYSTEM

To achieve reliability, dualized ignition systems have been employed as illustrated in figure 54. Safety features have been designated into the systems to prevent accidental or premature firing of the rocket motors. Dual squibs are used in all igniters, where each one of the squibs is in a separate circuit and is connected to a separate battery so that an electrical component failure will affect only one circuit. Ignition of the first-stage motor is accomplished by a direct electrical signal provided by launch blockhouse command. Second-, third-, and fourth-stage ignitions are controlled by the guidance program timer. The system provides for the following firing sequence: first-stage ignition from blockhouse command, second-stage ignition, payload heat-shield ejection, third-stage ignition, spin motors, fourth-stage squib ignition, and fourth-stage separation. The same primary power source is utilized by the ignition and the destruct systems. Fifth-stage ignition (when applicable) is controlled by a single independent ignition system.

The ignition system contains automatically-activated silver-cell battery packs, timer-actuated control relays, and safe-arm latching relays for arming the heat shield; spin motors; separation bolts; and motor igniter circuits. Squibs for all stages are insertable through removable side panels on the vehicle.

The 23-003793 initiator (figure 55) was used in the Algol II, Algol IIA, and Castor II rocket motors. The initiator has a steel case containing the bridgewire, electrical pins, ceramic seal, insulators, primer explosive charge, main explosive charge and moisture closures. A bridgewire is attached to pins A-B. The pins and ceramic assembly are bonded into the case. The primer charge is molded around the bridgewire inside an insulator cup. The main explosive charge is insulated from the case and primer charge and sealed with Mylar. The case is sealed with another closure and crimped and bonded into place.

The Antares (250) rocket motor igniter squib, Hercules Powder SD60E0 is shown in figure 56. This unit has the explosive train enclosed in a bronze case crimped within the main steel body. The bronze case contains the bridgewires and detonation charge, delay fuse (1.5 to 1.7 seconds), main charge, and weather closure.

The Altair II (X258) and Altair III (FW-4S) rocket motors use the Hercules Powder SD60A1 initiator (figure 56). This unit is similar to the SD60E0 except that the steel exterior case is much longer to accommodate a longer delay fuse (5.5 to 7.24 seconds).

DESTRUCT SYSTEM

Radio command destruct, PAM/FM/FM telemetry and radar tracking comprises the Scout vehicle R/F systems. The UHF radio command destruct system provides capabilities for positive thrust termination of the first three stages to avoid a live uncontrolled vehicle impacting on or near the ground launch facilities or in a populated area. The destruct system is designed to comply

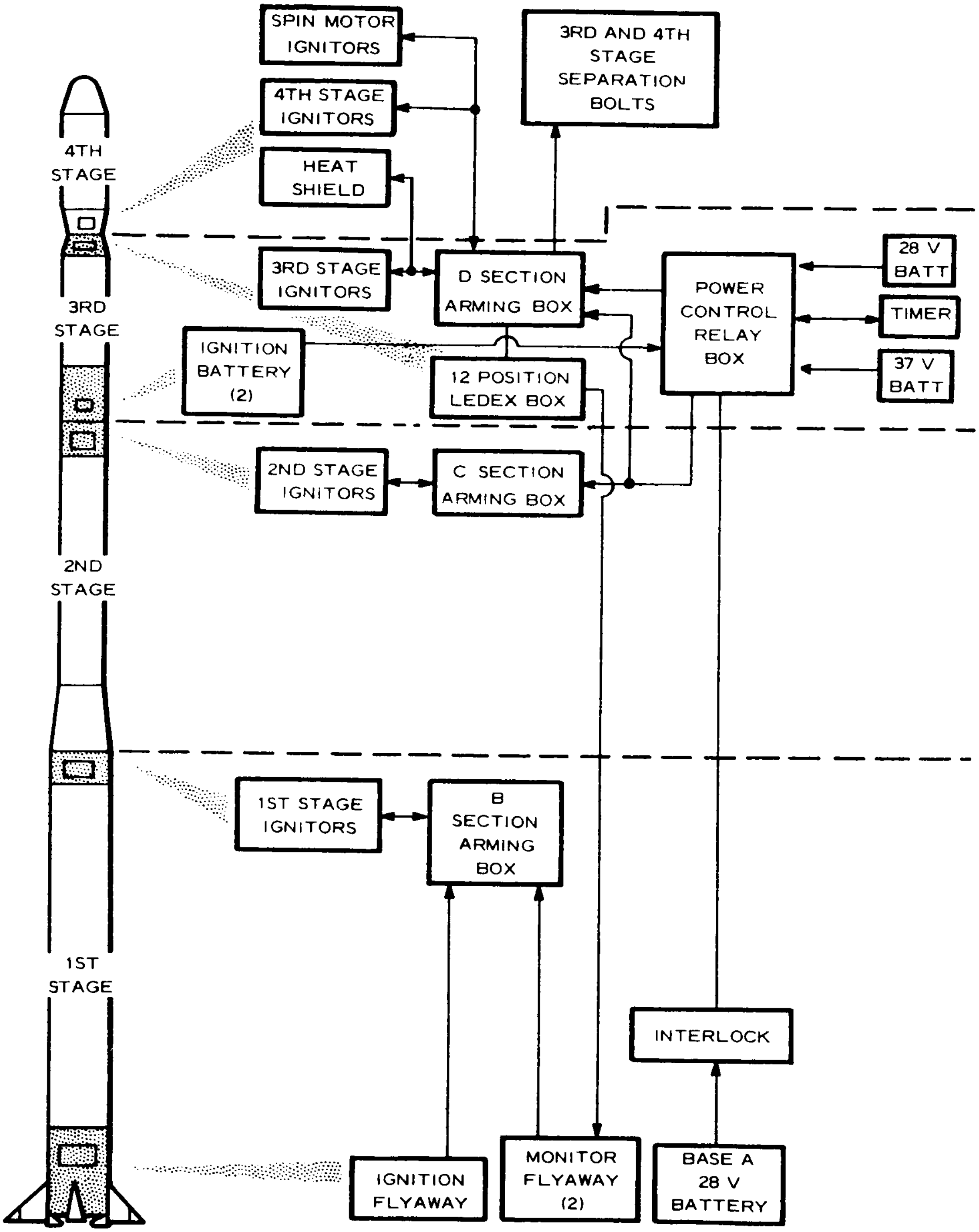


Figure 54.- Ignition system block diagram.

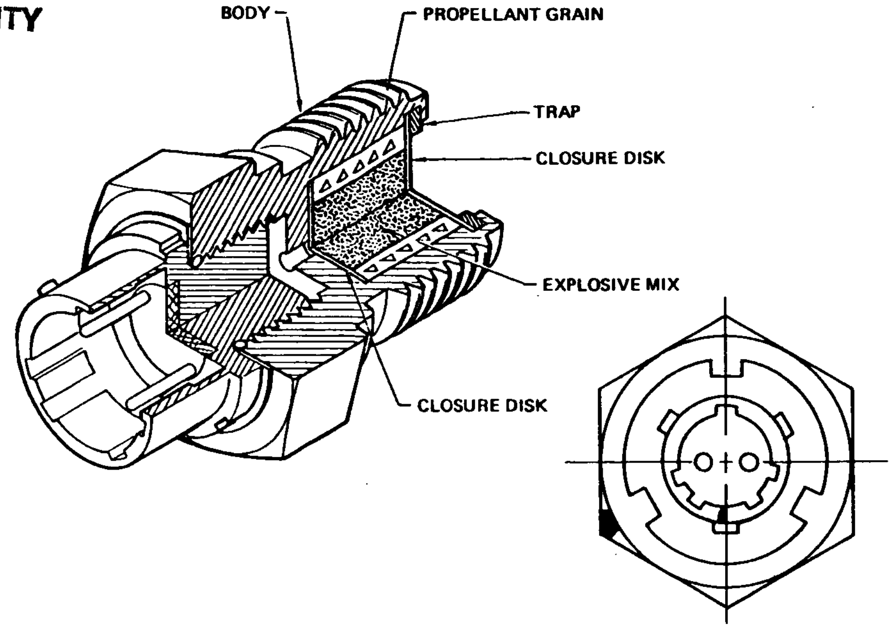


Figure 55.- 23-003793 Initiator Assembly.

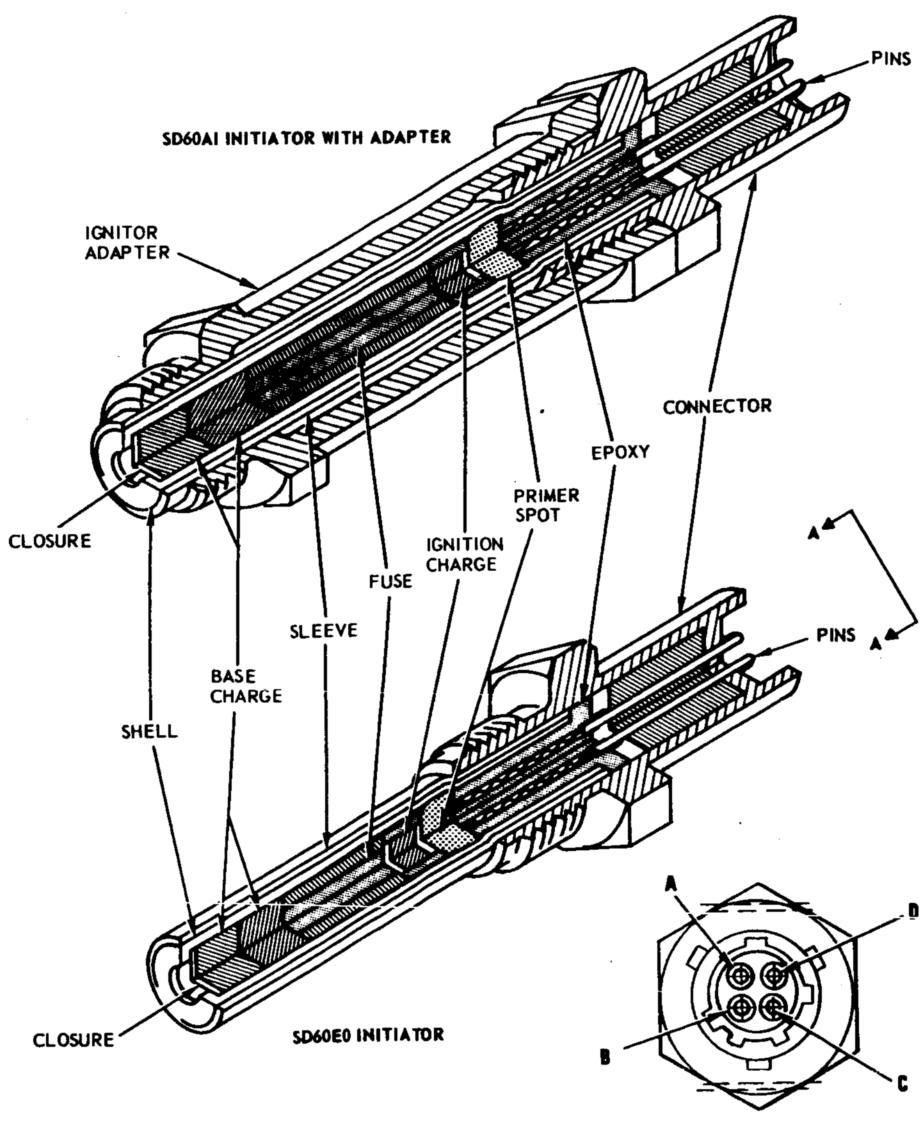


Figure 56.- Hercules Initiator Assembly Details.

with the requirements of both the Wallops Station and Western Test Range. The system provides two methods of destruct; the command method operated by R/F link, and the automatic method utilizing lanyard and pressure-actuated switches. The vehicle has two completely independent destruct systems consisting of antennas, power supplies, command receivers, and pyrotechnics. Each system has a pair of flush-mounted "bow-tie" antennas diametrically opposed on transition "C" section. These are connected through a coaxial cable and a tee divider to a Motorola MCR-151 four-channel command receiver with an integral decoder. The output of the decoder is connected through a J-box to the destruct relay box and then to the stage pyrotechnic devices. The system is compatible with the AN/FRW-1 transmitter which has a nominal R/F power output of 500 watts. A 10-kw power amplifier and directional antenna of 14-db gain are available at the WTR and Wallops Station launch sites. Throughout the portion of the flight where command destruct is required, the Range Safety transmitter (AN/FRW-2) is required to transmit continuously and the carrier frequency modulated by one IRIG channel. In the vehicle, the particular decoder relay associated with that channel is monitored by the instrumentation system. Command destruct may be initiated at any time after launch as the pyrotechnics are armed by hard line prior to launch. The actual destruct command requires the AN/FRW-2 transmitter be modulated by three IRIG channels in the proper sequence, thus reducing the probability of an inadvertent destruct command, as well as the probability of extraneous signals causing destruct.

Electrical and mechanical safing is provided for ground operation. Destruct of the vehicle may be accomplished by R/F link at the discretion of the range safety officer or by the automatic system if the vehicle were to "break up" during flight. Destruct capabilities for the payload can be incorporated if desired. New receivers were incorporated into the Scout vehicle in early 1973. The new receiver was a Motorola MCR-151-M, four-channel, narrow bandwidth with an integral decoder. A simplified diagram of the system is depicted in figure 57. Figure 58 shows Scout vehicle S-110 a few seconds after takeoff. This vehicle was destructed due to first-stage nozzle failure and is shown as photographed by the tracking camera.

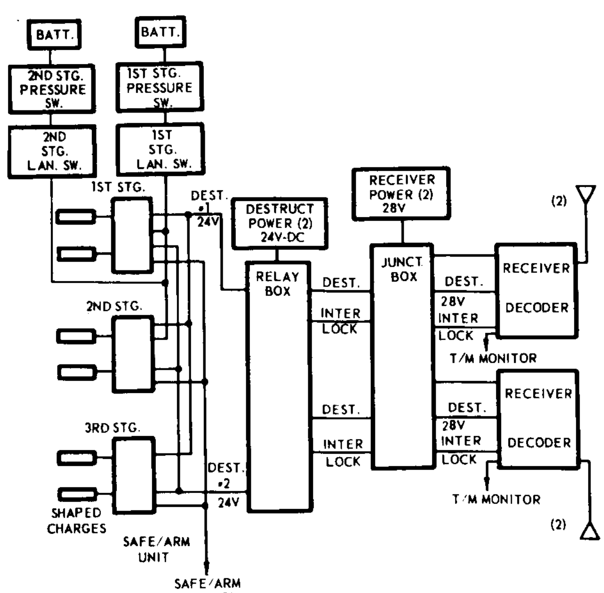


Figure 57.- Destruct system.

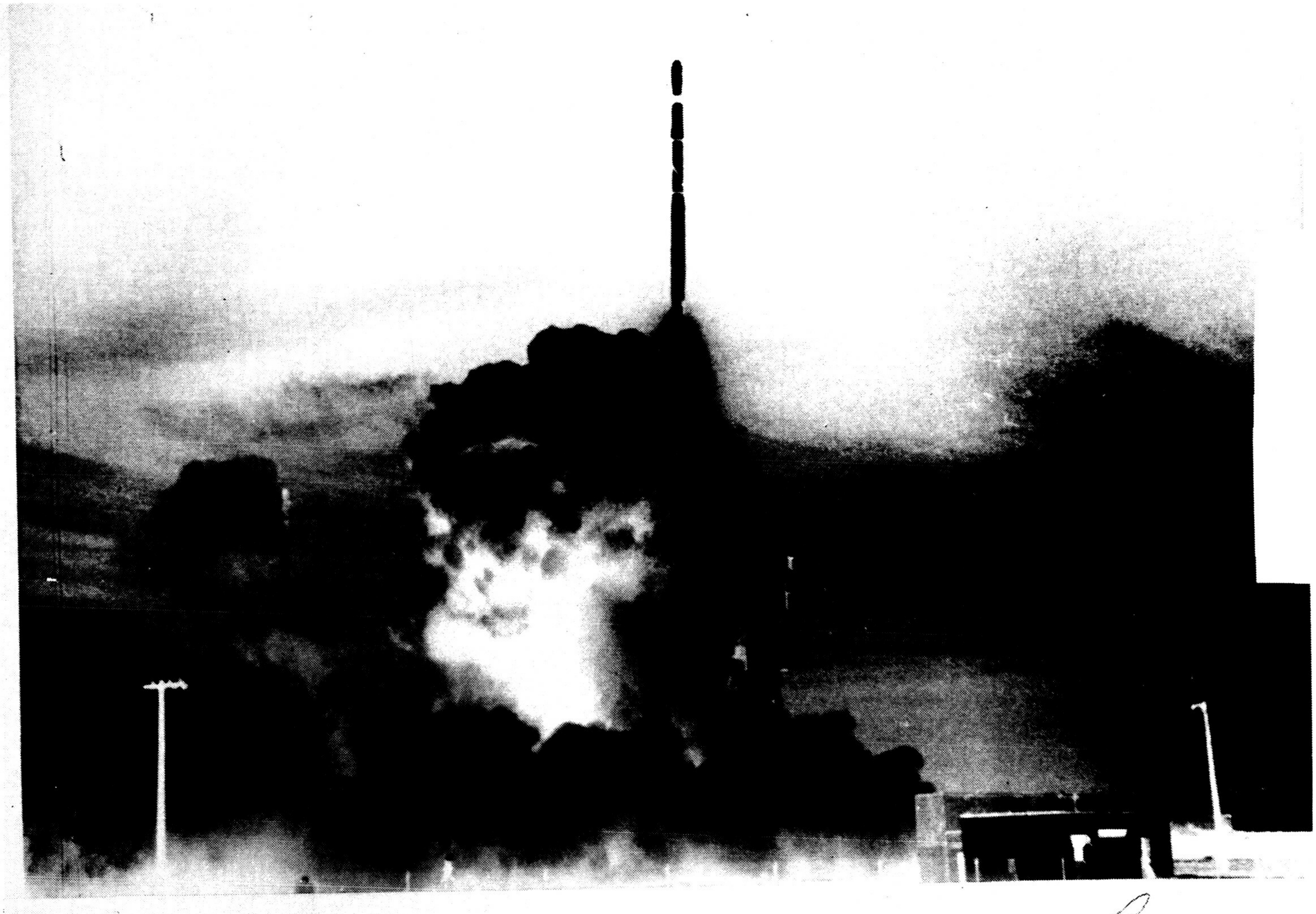


Figure 58.- Scout vehicle 110 at 4.7 seconds after takeoff.

INSTRUMENTATION

The instrumentation system for the Scout vehicle includes vehicle-borne equipment required to provide ground monitoring of subsystems during prelaunch checkout and countdown, telemetry monitoring of the flight performance of all four stages, radar beacon tracking, and command destruct electronics for receiving and decoding of command destruct information. The telemetry system for the first three stages of the Scout vehicle is a standard IRIG PAM/FM/FM system capable of handling 20 standard IRIG subcarrier channels. The vehicle telemetry transmitter is a Conic CTM/UHF 305-LTV operating at 2230.5 megahertz. The nominal R/F power output is 5 watts delivered to three equally spaced externally mounted swept back blades on lower "D" section. Signal voltages for a number of measurements, both analog and ON-OFF types, are derived directly from basic components such as the guidance system, control system, and the destruct system. A simplified diagram of the system is depicted in figure 59. The telemetry system for the fourth stage of the Scout vehicle is a standard IRIG FM/FM system capable of handling 12 standard IRIG subcarrier channels. The transmitter is a Vector T-105S operating at 2210.5 megahertz. The nominal R/F power output is 5 watts delivered to a wraparound antenna externally mounted on upper "D" section. Signal voltages for the analog measurements are derived directly from basic components.

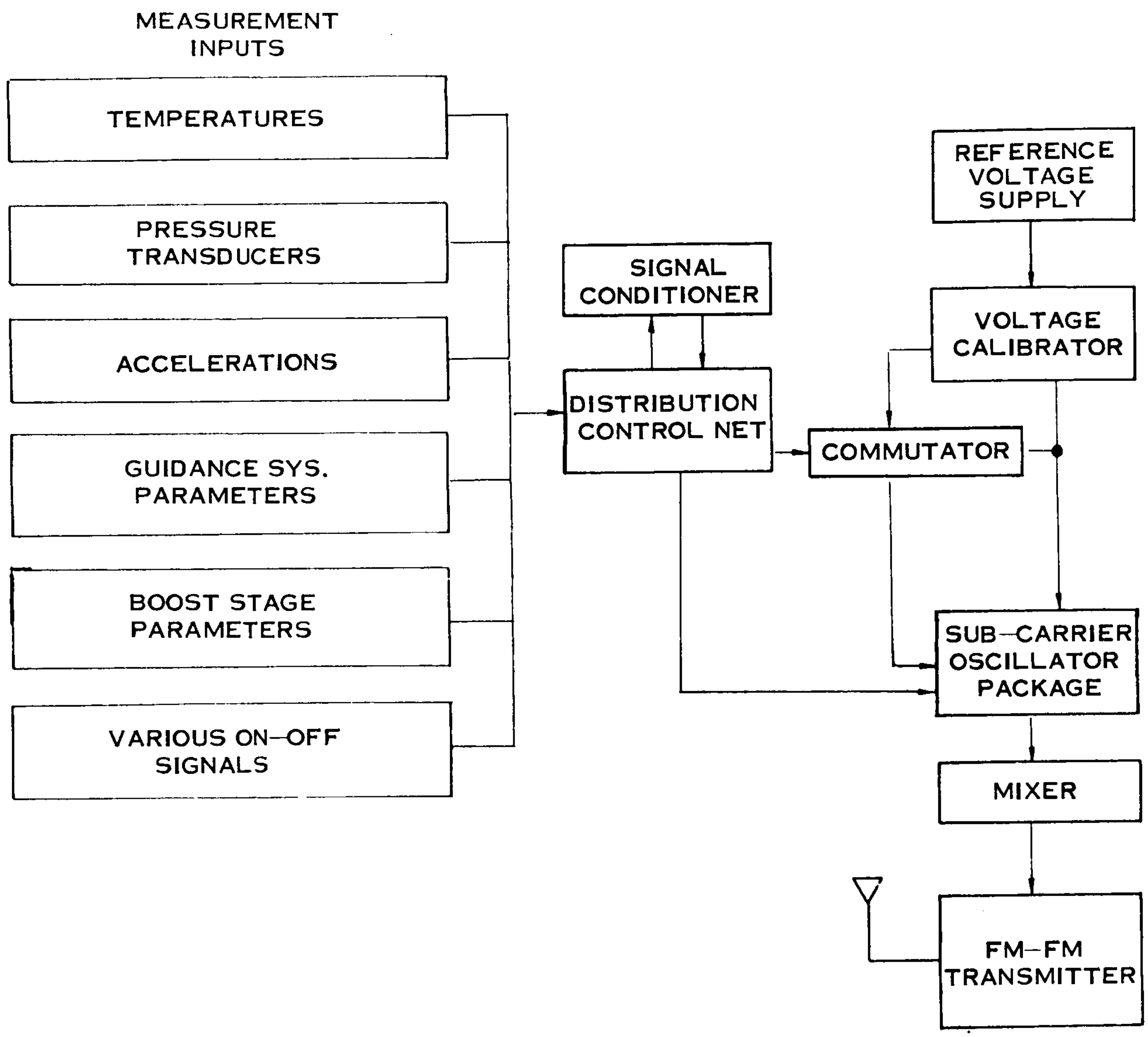


Figure 59.- Simplified diagram of instrumentation system.

RADAR TRACKING BEACON SYSTEM

The radar beacon employed on the Scout vehicle has been changed from the Vega Precision Laboratories, Inc., Model 302C-2A-2 to the Motorola SST-171C radar beacon. The beacon has a nominal peak R/F power output of 500 watts, single pulse. The beacon antenna has been changed from an H-plane sectoral horn to the Vega Precision Laboratories, Inc., model D400241G blade antenna. The antenna is mounted externally on lower "D" section. The main lobe of the radiation is aft along the vehicle roll axis so that tracking by the Range AN/FPS-17 instrumentation radar operating in the beacon mode is limited to within a few degrees aft of the vehicle along the flight path. The radar tracking data are generally available up to ignition of the fourth stage at all ranges. Technical data on all Scout systems have been published on the following subjects.

(A) Aerodynamic design data
  (1) Stability and performance analysis data
  (2) Structural design data
(B) Performance trajectory
(C) Stress analysis
(D) Loads and Dynamics
(E) Guidance system analysis
(F) First-stage control system analysis
(G) Weights
(H) Thermal protection analysis
(I) Reaction thrust systems
(J) Destruct system
(K) Procurement, environmental, and acceptance test specifications and revisions.
(L) User's Manual
(M) Historical summary
(N) Standardization and configuration control operating procedures
(O) Rocket motor and pyrotechnics manual
(P) Feasibility study of a Scout central ordnance complex
(Q) Development of electrostatic sensors
(R) Tracking radar data
(S) Vehicle performance telemetry records
(T) Vehicle log book
(U) Quality and reliability documentation
(V) Vehicle vibration data
(W) Instrumentation calibration summary
(X) Spares report
(Y) Final flight trajectory

CHAPTER 5 - SCOUT RELIABILITY AND QUALITY ASSURANCE PROVISIONS

PURPOSE

The purpose of the Scout Reliability and Quality Assurance Programs is to assure attainment of specified inherent reliability goals for the vehicle system and to further assure that operational reliability is maintained throughout the Scout program. The vehicle system's flight reliability objective is 0.95 as defined by the Flight Success Ratio. Figure 60 is a photograph of flight S-122 which was the first launch upon completion of the development and prototype programs and the beginning of the production recertification program that elevated the success ratio above 0.94[(1)]. Figure 61 is a photograph of flight S-187 which extended the world record for consecutive successful launches of a major missile system to 35 in a row. This was the sixty-fourth successful launch out of sixty-seven attempts since the receritification program. The thirty-sixth and thirty-seventh continuous successes in a row were Phase VII vehicles.

PLANS

The Scout Project Office, through periodic reports prepared by the Contractor, by maintaining continuous review of reported equipment malfunctions, and continuous design review, assesses the Scout system reliability. In order to provide the necessary information to enable the Scout Project Office to maintain this close surveillance, the items listed below are necessary and available.

PRINCIPAL ELEMENTS

(A) Reliability Program Plan
(B) Quality Program Plan
(C) Reliability Analysis of:
  (1) Ignition System
  (2) Destruct System
  (3) Guidance and First-stage Control System
  (4) Reaction Control System
  (5) T/M System
  (6) Heat Shields
  (7) Hydraulic Control System
  (8) Radar Beacon
  (9) Separation System
  (10) Propulsion Systems
  (11) Structure
(D) Quarterly Reliability Status Reports
(E) Environmental Test Program
(F) Environmental Test Reports
(G) Reliability Review Meetings
(H) Qualification Status Report (Summary of Status and History Files)
(I) Reliability Data Reporting (Malfunction Reporting System)
(J) Continuous Design Review
(K) Continuous Monitoring by NASA (including review of budget, schedule, and effort to be accomplished on each identifiable task).

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(1) Details in Chapter 5. page 113.

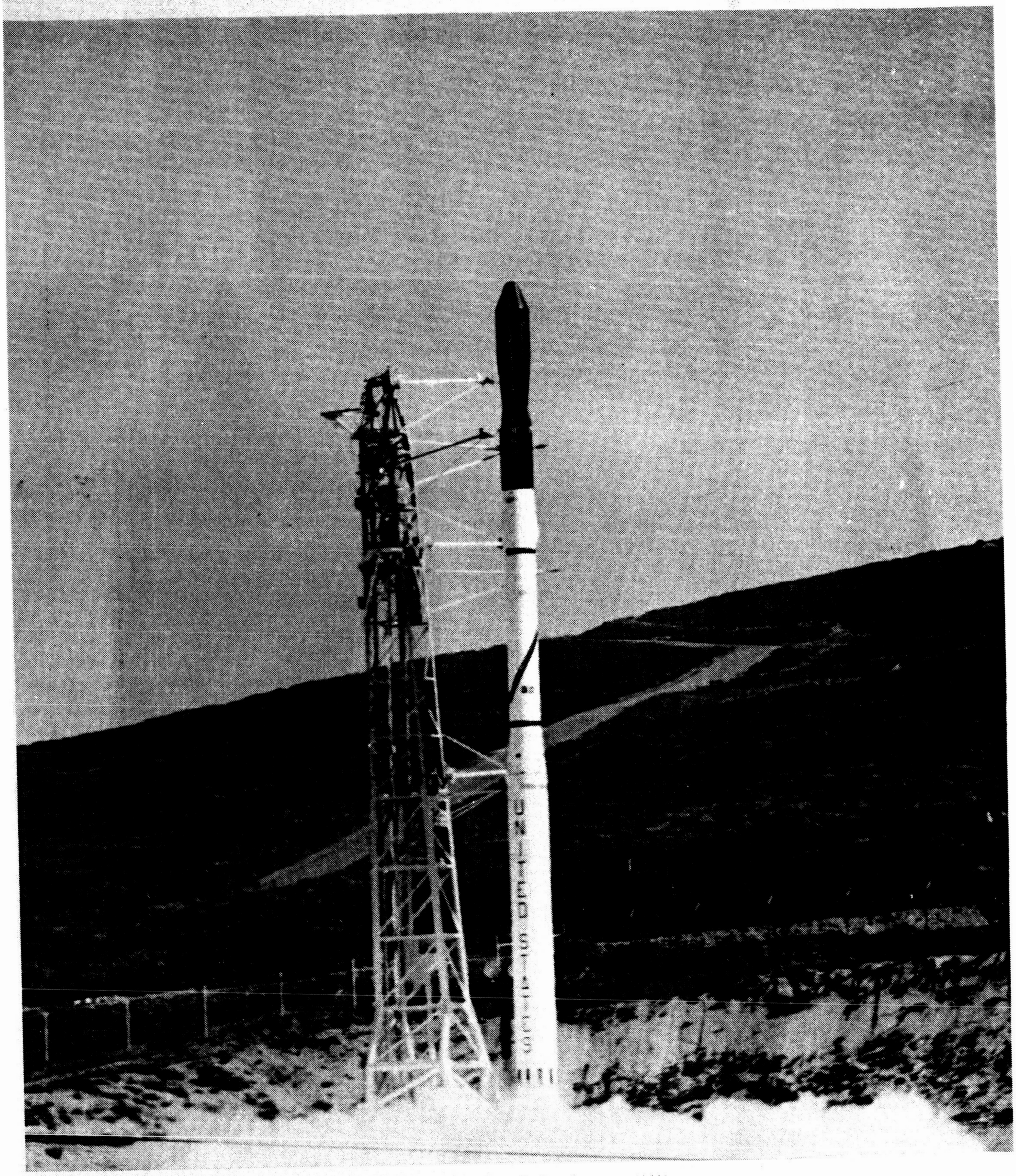

Figure 60.- Launch of Explorer XIX

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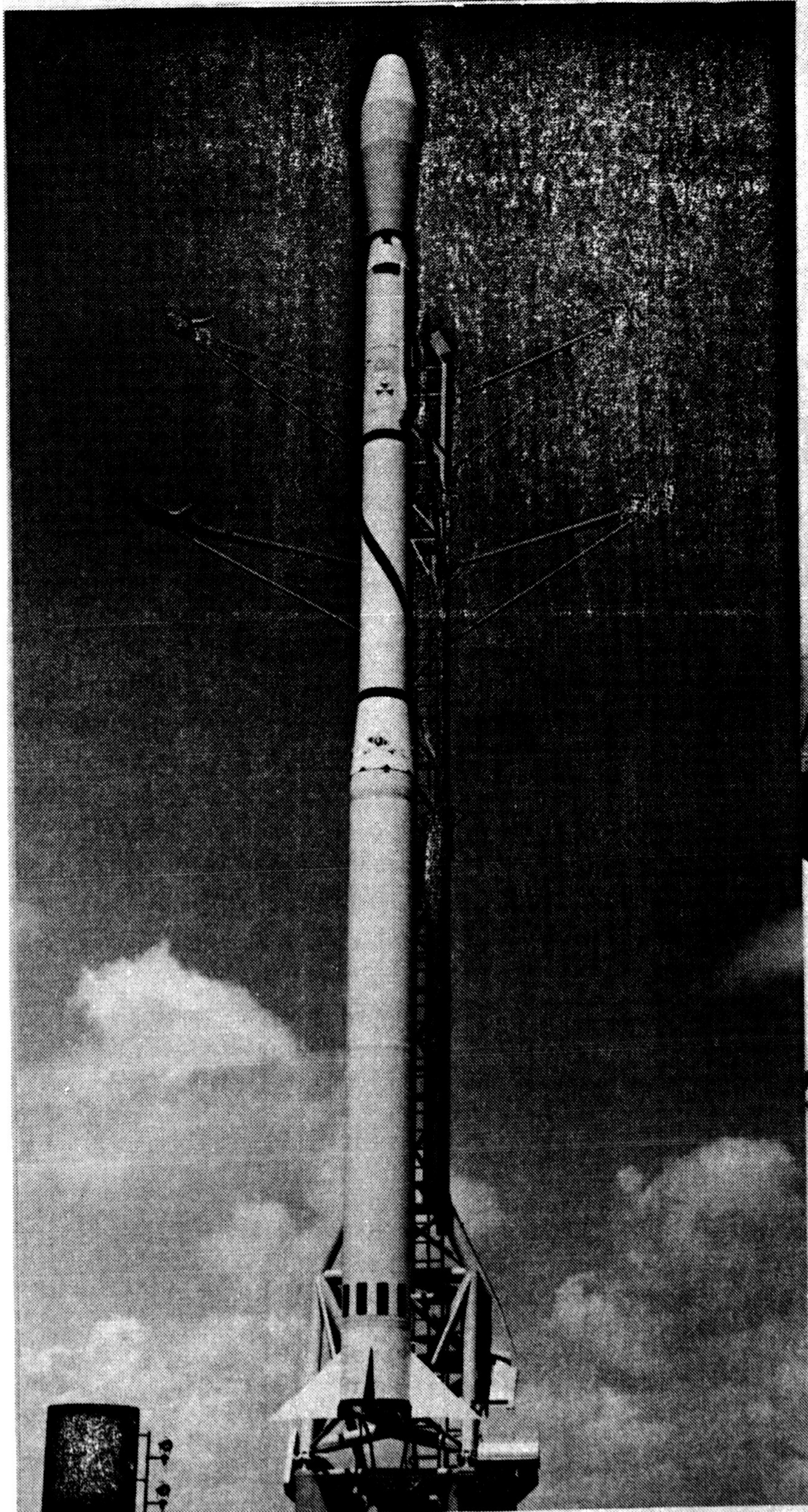

Figure 61(a).- UK-5 ready for launch at San Marco on October 14, 1974.

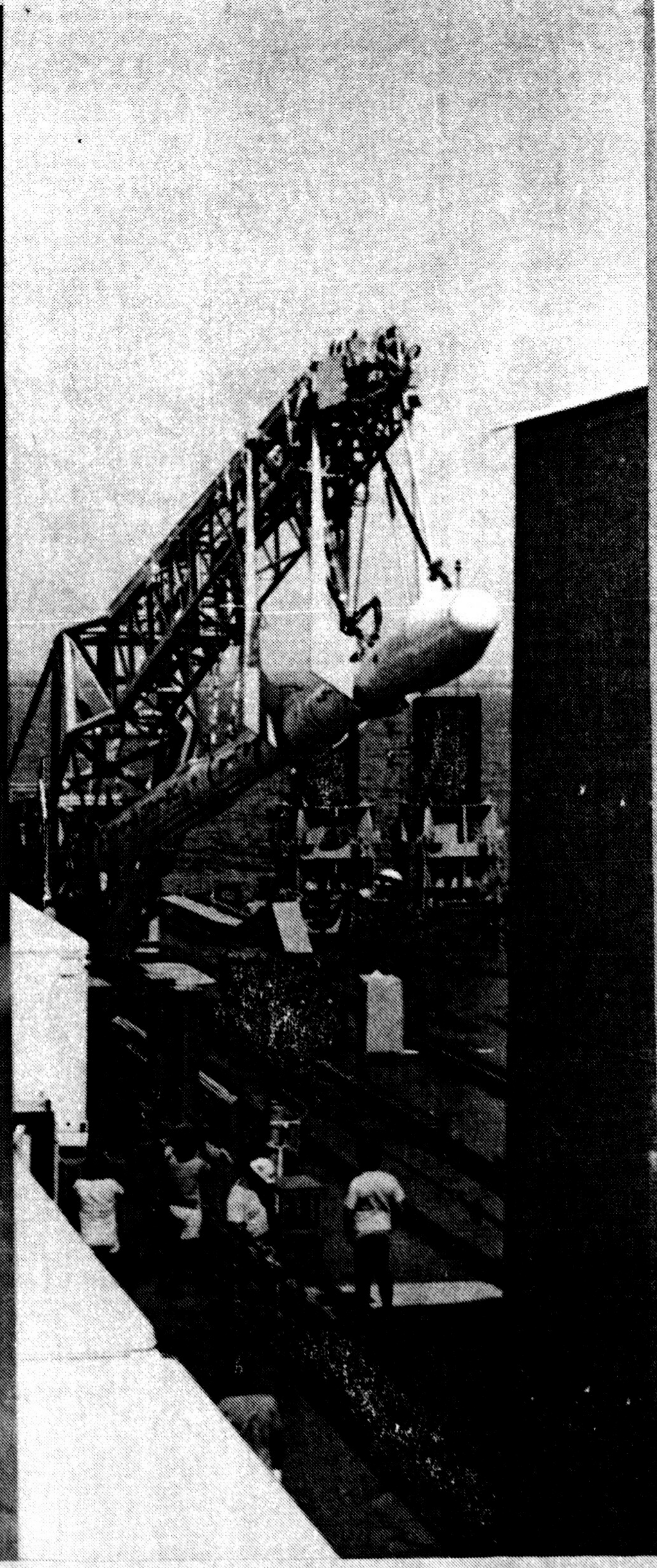

Figure 61(b).- S-187 with UK-5 payload on the launcher at San Marco.

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(L) Reliability Audits
(M) Equipment Logs
(N) Malfunction Reporting System (including Failed Parts Analysis Reports)
(O) Field Quality Plan
(P) Semi-Monthly Narrative Status Reports

APPLICATION

The quality assurance, reliability, and environmental test programs that are currently programed with the vehicle prime contractor evolved from Amendment 18 of contract NAS1-1295, which in turn had replaced the temporary reliability program of contract NAS1-900. Since then the program has continued under NAS1-4664, NAS1-6020, NAS1-7256, NAS1-10000, NAS1-12500, NAS1-15000, and projected to NAS1-16200. The assessed design goals for the Scout systems are itemized in table XXVII. The reliability practices and activities accomplished under the reliability program, include the following.

PROGRAM COORDINATION

Reliability program coordination is provided to fulfill the requirements of the Reliability Program Plan, to assure that the required inherent reliability is designed into the vehicle system, and that operational reliability is maintained. This is accomplished by monitoring and reporting progress of the reliability program and other pertinent data for timely NASA and LTV management decisions. Periodic reliability progress review meetings are held as scheduled by the NASA Scout Project Office for the purpose of establishing the progress and status of the Reliability Program, and for the review and initiation of corrective action on existing and potential reliability problems. Vought submits quarterly Reliability Status Reports to NASA Scout Project Office. These reports provide information relative to the reliability status of the Scout vehicle and summarize the progress of the Scout Reliability Program during the preceding quarter.

RELIABILITY ANALYSIS AND DESIGN REVIEW

Quantitative reliability analyses are, or have been, performed on the following:

(A) Ignition System
(B) Destruct System
(C) Guidance and First-stage Control System
(D) Reaction Control System
(E) T/M System
(F) Heat Shields
(G) Hydraulic Control System
(H) Radar Beacon System
(I) Separation System
(J) Propulsion
(K) Structure
(L) GFP (monitoring and liaison only)

Scope of Analysis - Failure mode effects and criticality analyses are revised and up-dated as necessary on all systems listed above. Frequency of

TABLE XXVII - ASSESSED DESIGN GOALS FOR SCOUT SYSTEMS

System	Reliability Design Goals				
	First Stage	Second Stage	Third Stage	Fourth Stage	System Stage
Propulsion					0.9792
Algol	0.9960				
Castor		0.9950			
Antares			0.9940		
Altair II				0.9940	
Ignition	0.99995	0.99995	0.99995	0.99995	0.9998
Destruct	0.9999	0.9999	0.9999		0.9997*
Mechanical					0.9987
Fins & Jet Vanes	0.9996				
Stage Separation		0.9999	0.9999	0.9999	
Diaphragm					
Spin Separation				0.9994	
Structural	0.9997	0.9999	0.9999	0.9999	0.9994
Guidance (including first-stage control)	0.9861	0.9985	0.9982		0.9928
Control		0.9980	0.9867		0.9847
Instrumentation					0.9975
Ground Systems					0.99

Vehicle Reliability

$$R_V = R_1R_2R_3R_4R_5R_6R_7R_8$$

$$R_V = (.9792)(.9998)(.9987)\ (.9994)(.9928)(.9847)(.9975)(.9975)$$

R_V = 0.9504 (Propability of successful Scout flight.)

*Probability of successful destruct of first three stages.

functional failure analyses are performed on parts of systems deemed either to be marginal, or highly sensitive to this method of analysis, or whenever a need for detailed analysis is indicated.

Design Review - In order to assist in attaining apportioned reliability goals, reliability engineers review all new and revised designs, drawings, specifications, and field/in-plant checkout procedures in coordination with design, manufacturing, checkout, and field operational groups. Basic design review activities to be performed as required to assure that reliability goals are met include:

(A) Informal Design Reviews
(B) Formal Design Reviews
(C) Reliability Trade Studies
(D) Component Application Analysis

Single Failure Point Analysis - The Scout Single Failure Point Investigation Program was conducted to analyze flight-critical systems of the Scout vehicle in 1973 to identify single failure point sources and determine the adequacy of the associated prelaunch testing and ground support equipoment. A single failure point source is defined as any single piece of hardware which could fail and cause loss of a Scout vehicle in flight. As a result of this investigation, 343 single failure point sources were identified for flight-critical systems. No single failure point sources were found which exhibited deficiencies that would require mandatory design corrective action. Some potential problem areas were disclosed in the adequacy of test procedures and ground support area. All potential problem areas have been investigated and the necessary corrective action implemented. (See Appendix B.)

RELIABILITY DATA REPORTING

Reliability data is accumulated, evaluated, and reported by implementation of the following:

Malfunction Reporting System - The malfunction reporting system provides for reporting of all malfunctions that occur on the Scout Program at the then LTVAC/Vought Systems Division; at the field sites (Wallops Flight Center and Air Force Western Test Range); and on vendor-performed flight acceptance test results. The system further provides a controlled closed-loop corrective action mechanism. Data are processed by a coding and Automatic Data Processing System to assure complete histories in the evaluation of any given Scout component and/or system. Detail failure analyses are performed on failed components and equipment whenever an analysis is deemed necessary or advisable. This analysis results in identification of all deficiencies of the involved item. Positive corrective action is taken on all failures reported. Following completion of the failure analysis, and/or determination of the cause of failure, the required corrective action is accomplished.

Reliability Status Report - In order to provide a periodic report of reliability status of the Scout vehicle systems, a status report is submitted quarterly.

RELIABILITY STUDIES

Reliability Assessments - Early in the NASA Scout design program, the reliability of the Scout vehicle and the vehicle systems was assessed. The purposes of these assessments were first, to establish the feasibility of designing a vehicle of satisfactory reliability; and second, to establish the required reliability for each system and flight stage necessary to attain a desirable vehicle reliability. Reliability programing endeavors to assist in attaining and exceeding the established goals. In assessing system reliability and establishing design goals, realistic appraisal of design feasibility considerations includes these factors:

(A) Proposed system design characteristics
(B) System complexity
(C) Hardware state of the art
(D) Operating environments
(E) Past experience with similar equipment and system
(F) De-rating factor
(G) Flight duration
(H) Redundancy features
(I) Ease of operation
(J) Accessibility and maintainability

Reliability assessments of Scout systems yield a vehicle reliability of approximately 95 percent.

Design Review in a Reliability Program - A reliability design review is an integral part of an overall reliability control program. The design review is an audit or evaluation of the logic and practicability of the basic design of equipment . It was conducted on the initial design concept and on all changes thereto. The design review is a planned, continuous monitoring of the capability of the equipment to meet the expressed performance and reliability requirements of the equipment during operational use.

ENVIRONMENTAL TEST PROGRAM

The Environmental Test Program reflects Scout systems flight acceptance test criteria and test program plans. The environmental criteria is based on actual flight environment and is up-dated as additional data becomes available.

TEST REQUIREMENTS

Component Functional Tests are performed on the items of table XXVIII and receive functional testing in accordance with the applicable Vought acceptance test specification. Data and reports for these items are maintained.

Component Flight Acceptance Tests are performed on such safety-of-flight items as are listed in table XXIX. Scout Standard Environmental Tests are performed on safety-of-flight items after which the requirements are reviewed with the NASA Scout Project Office for possible modification of component test requirements based on performance in the test program and in flight.

TABLE XXVIII - COMPONENT DATA

Code No.	Name	Source	Part Number	Procurement Spec. No.	Location in Vehicle	No. per Vehicle
001	Electronic Inverter	M-H	DSG30E1	304-579	D Lower	1
002	Diode Unit	M-H	DDG93B1	304-580	C Upper	2
003	Poppet Valve Electronics	M-H	DEG211F2	304-582	D Lower	1
004	Servo Amplifier	M-H	DEG233D1	304-583	A	2
005	Programer	M-H	DRG87J1	304-616	D Lower	1
006	Intervalometer	T-I	439900-3	304-613	D Lower	1
007	Guidance Unit Assembly	M-H	DGG122F3	304-617	D Lower	1
008	Rate Gyro Unit	M-H	DGG188E1	304-585	C Upper	1
009	Power Switching Relay Unit	M-H	DRG95B1	304-581	A	1
010	Hydraulic Servo Actuator	M-H	DMG109E1	304-618	A	4
011	Power Control Relay Box	VSD	23-004170	-	D Lower	1
012	Radar Beacon	VEGA	SST-171C	304-853	D Lower	1
013	Radio Command Receiver	Motorola	MCR-151M	304-828	C Upper	2
014	Ignition Relay Assembly	VSD	23-004160	-	D Lower	1
015	Ignition Relay Assembly	VSD	23-002068	-	C Lower	1
016	Destruct Relay Assembly	VSD	23-004127	-	C Upper	1
017	Solenoid Operated Rotary Switch	Ledex	23-002069	304-639	D Lower	1
018	FM/FM Transmitter	CTM	23-003825	304-783	D Lower	1
019	Relay Junction Box Transition C	VSD	401-10018-11	-	C Upper	1
020	Telemetry Package Mixer Amplifier PAM Commutator Switch Subcarrier Oscillators DC Regulated Power Supply	TDI	1799A	304-785	D Lower	1
021	Resistor Box	VSD	23-002562	-	Heat Shield	1
022	Resistor Box	VSD	23-003448	-	D Upper	2
023	Roll and Yaw Compensator	VSD	23-003760	-	D Lower	1
024	Body Bending Filter	M-H	DAG69C1	304-622	D Lower	1

TABLE XXIX - COMPONENT FLIGHT ACCEPTANCE TEST

Environments and Vehicle Effectivity

Component	Component Code Number (see table XIX)	FAT Requirements (see environmental code below)	Vehicle Effectivity
Electronic Inverter	001	3	193 - 207
Diode Unit	002	3	↑
Poppet Valve Electronics	003	3	
Servo Amplifier	004	3	
Programer	005	3	
Intervalometer	006	3	
Guidance Unit Assembly	007	3	
Rate Gyro Unit	008	3	
Power Switching Relay Unit	009	8	
Hydraulic Servo Actuator	010	8	
Power Control Relay Box	011	3	
Radar Beacon	012	5	
Radio Command Receiver	013	5	
Ignition Relay Assembly	014	7	
Ignition Relay Assembly	015	7	
Destruct Relay Assembly	016	7	
Solenoid Operated Rotary Switch	017	7	
FM/FM Transmitter	018	2	
Relay Junction Box Transition C	019	7	
Resistor Box	020	6	
Resistor Box	021	6	
Roll & Yaw Compensator	022	3	↓
Body Bending Filter	023	3	193 - 207

Environmental Test Code: The above components shall be tested to the environments as specified below:

1 Low temperature, temperature shock, temperature-altitude, shock, and vibration.
2 High temperature, temperature-altitude, shock, and vibration.
3 Temperature-altitude, temperature shock, and vibration.
4 High temperature, shock, and vibration.
5 Temperature-altitude, shock, and vibration.
6 Temperature shock, shock, and vibration.
7 Shock and vibration.
8 Vibration.

PERFORMANCE CRITERIA

Pre-environmental Tests for each component or subsystem (i.e., test specimen) are subjected to a comprehensive evaluation of operating performance characteristics under standard conditions and a visual examination.

Environmental Tests are performed on test specimens in a mode similar to that in which it is during the exposure of the component or subsystem to the actual environment of flight.

Post-environmental Tests are always made. The performance evaluation tests performed as designated in the preceding paragraphs are repeated and the data taken must compare satisfactorily to that previously obtained. The visual examination is repeated and an internal examination is performed as practicable.

FAILURE, CORRECTIVE ACTION, AND RETEST

Failure - Components or subsystems failing tests are rejected and corrective action is taken.

Corrective Action - An analysis of the failure is made to determine the cause of failure. The failed part analysis consists of a detailed test, disassembly, examination, and evaluation of the part. The analysis results in identification of deficiencies in the part which could have caused, or did cause, the reported malfunction. Repair usually consists of replacing a defective part and/or taking quality control measures to prevent recurrence.

Retest - After the repair of failed components, the component is again subjected to the original test requirements.

SCOUT RELIABILITY INDOCTRINATION AND TRAINING

A Scout Reliability Indoctrination and Training Program has been established by the Contractor for the purpose of motivating Scout personnel to provide and maintain the desired level of reliability in the Scout system. Fundamentals of reliability theory and use of Scout "case histories" are included in the training program.

ROCKET MOTORS

The solid propellant rocket motors used on Scout vehicles were purchased through the prime contractor, Vought Corporation. The rocket motors are manufactured under a quality assurance program utilizing the NASA NHB-5300.4 series quality guidelines administered by Vought Corporation. The prime contractor has assigned a Quality Control Representative to each motor manufacturer's plant for the length of the manufacturing contract. A Vought Rocket Motor Review Board recommends action on all major deviations of the NASA/Vought-procured motors. A NASA Resident Engineer is chairman of the Vought Motor Review Board and a voting member.

The quality assurance program for the Scout motors is divided into several phases.

(A) The first phase consists of final inspection at the manufacturer's plant, acceptance by the prime contractor's representative, and acceptance by the designated Government representative. All reported deviations prior to shipment of the motors are reviewed by the Vought Propulsion Group and by the NASA/SPO Propulsion and Quality Units. The Vought Motor Review Board recommends action on all major deviations to the NASA who retains approval rights in such instances.

(B) The second phase of the motor acceptance program consists of a complete receiving inspection and preassembly inspection at the launch sites. Quality requirements are outlined in such manuals as:

(1) Standard Operating Procedures Volume III - Rocket Motors and Pyrotechnics
(2) Standard Operating Procedures Volume III - Field Disposition Criteria
(3) Manufacturer Testing and Inspection Procedures
(4) Materials and Specification Lists
(5) Processing Procedures and Specifications
(6) Motor Performance Manuals
(7) Complete Drawings and Documentation Control
(8) Surveys and Audits
(9) Quality Control Program Plan (QCPP-0-012)

ACCURACY

The accuracy of the Scout vehicle has been continuously investigated and improved. The methods used to improve the Scout accuracy are as follows:

(A) Velocity Meter
(B) Motor Performance Prediction Study
(C) Orbital Inclination Study
(D) Operational Performance and Dispersion Computer Program
(E) Initial Launching Azimuth Errors
(F) Error Analysis of the Orbital Results of all the Launches
(G) Guidance Roll Compensation Study
(H) Motor Propellant Studies
(I) Inertial Guidance Availability Investigation
(J) Azimuth Alinement
(K) Fourth-stage Attitude Correction and Control System (Figure 62.)

Completion of the motor performance prediction study (B) indicated motor performance variations were significantly less than anticipated. Flight with the velocity meter developed under the velocity control program (A) confirmed the ground motor data and predictions. It was clearly shown that the performance of the first three stages was extremely accurate. The fourth-stage impulse was less accurate but showed a variability consistent with tunnel test data. However, the performance accuracy of the Scout vehicle is still less than

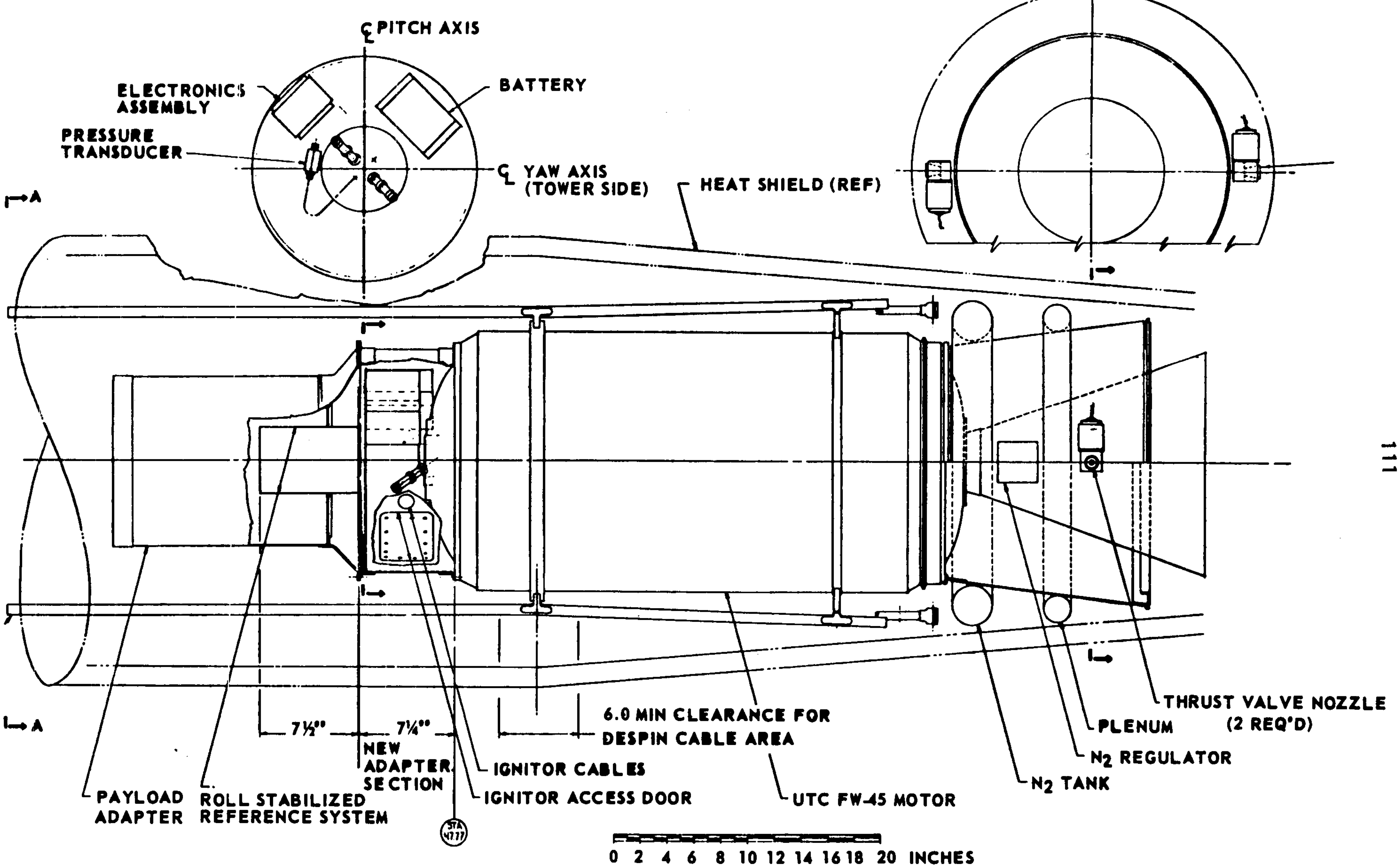

Figure 62.- Scout Fourth-Stage Control Concept.

desired. In view of this, a new comprehensive vehicle error analysis (F) was initiated in an effort to clearly identify the major error sources. While the motor errors are large, they are not large enough in combination with the other evaluated errors to account for the flight performance accuracy level.

Item (D), Scout trajectory optimization and linearized pitch computer program (TOLIP), obtained from the Lockheed Missile and Space Company under contract NAS1-5106, was designed to perform the trajectory-related calculations necessary in mission planning and preflight analysis with a large reduction in computer time. It uses a closed-loop steepest descent optimization procedure to obtain flight trajectories that maximize payload, inertial or aerodynamic velocity, or altitude at fourth-stage burnout. Following optimization, the pitch program is automatically linearized to enable its mechanization in the autopilot system. Control system and body dynamics effects are included in the simulation. A large number of constraints on the trajectory and pitch program can be included in the optimization and linearization solutions, so that a great deal of flexibility as well as recognition of vehicle limitations are possible in the use of the program.

Following the solution for the optimum trajectory and pitch program, the computer program can proceed, by option, directly into calculation of: (1) radar tracking coordinate histories for up to twenty stations; (2) the locus of nominal impact points of the spent stages; (3) nominal dispersion envelopes; and (4) failure-mode hard-over turns. Finally, for planning purposes, first order performance exchange ratios for several vehicle/motor characteristics are calculated.

Particular attention had been devoted during program development to computing speed. The convergence scheme, the general program arrangement, and the subroutines have been selected with this in mind. In some cases, standard subroutines have been modified to provide significant increases in speed for special applications.

IMPROVEMENT

(A) A stronger Vought Project organization was created. The Vought Project organization provided additional Scout-experienced, systems-oriented personnel, who had demonstrated specialized technical capability in their respective areas, and who would be responsible only to the program.

(B) A new engineering support contract was initiated. This system's engineering contract was started in May 1964(NAS1-4664). This type of contract utilized the strengthened Vought Project organization as the technically cognizant group responsible for the total Scout system including rocket motors and operations. A more efficient Systems' Management contract was initiated in November 1968 (NAS1-7256). This contract expired in October 1970, and similar contracts (NAS1-10000, NAS1-12500, NAS1-15000, and NAS1-16200) replaced NAS1-7256 and the latter is presently in effect.

(C) Integrated and Streamlined In-plant and Field Operations were part of this major improvement. A program for developing standardized procedures and configuration control was initially developed in October 1963 under the Wallops field support contract; and it was further augmented by the systems' management contract in conjunction with the initial vehicle recertification program, whereby all vehicles were returned to the factory and revalidated for flight. Table XXX outlines the Quality and Reliability Program.

The objectives and elements of the standardization program are itemized as follows:

(A) To maximize reliability and stabilize vehicle operations.
(1) Deliver a standard flight-ready vehicle with proper documentation.
(2) Maintain system integrity after delivery.
(3) Minimize handling, processing, repetitive testing, and human error.
(4) Apply total experience and training to timely solution of technical problems.

(B) To establish total system capability for sustained increased launch rate (two per month per site).

(C) To improve cost effectiveness by increased reliability. The elements of the standardization program are block-standards for vehicles and spares, identical equipment at all sites, and an integrated approach to vehicle processing.
(1) In-plant checks and documentation to assure systems readiness.
(2) Field checks to monitor deviations in significant measurements.
(3) Field capability consistent with emergency readjustments.
(4) Standard Procedures for processing.
(5) Program surveillance and configuration control.

Any changes required to SOP's or GSE to complete vehicle processing are submitted through the Scout configuration control system for Contractor and Government review prior to incorporation. The November 1973 through April 1975 film progress report details the procedures for maintaining standardization. The Standard Procedures Manuals consist of seven volumes as follows:

Volume I	Administration and Vehicle
Volume II	Ground Support Equipment
Volume III	Rocket Motors and Pyrotechnics
Volume IV	Receiving, Bench, and Transition Tests
Volume V	Vehicle Assembly and Tests
Volume VI	Launch Operations
Volume VII	Countdown

Figure 63 shows the Standard Operating Procedures as contracted for in contract NAS1-6935, task order 32.

(D) A resident representative was established at Vought Corporation, in Dallas, Texas. A training and familiarization program was undertaken for approximately six months and the resident representative was on site at the Contractor's plant in January 1964. He was involved initially in the vehicle recertification effort. This office was expanded to three residents and currently has two residents. This office has proved to be a great asset to the Scout Project.

TABLE XXX - SCOUT FIELD QUALITY & RELIABILITY PROGRAM.

FIELD QUALITY & RELIABILITY

CONTROL

- **QCEB - PP - 011**
  - **PURPOSE**
    ESTABLISH Q.C. POLICIES AND PROCEDURES
  - **OBJECTIVES**
    - MONITORING AND DOCUMENTATION OF ALL TESTING
    - INSURE COMPLIANCE TO SCOUT CRITERIA
    - INSPECTION AND TESTING
    - PROVIDE Q.C. FIELD LIAISON WITH MSD-T
- **FIELD QUALITY CONTROL MANUAL**
  - **PURPOSE**
    - DEFINE Q.C. POLICY AND PROCEDURE REQUIREMENTS
  - **PROCEDURES**
    - CONFIGURATION CONTROL
    - INSPECTION AND CHECKOUT
    - CALIBRATION
    - NON - CONFORMING MATERIAL
    - DOCUMENTATION

LIAISON

- ***MEETINGS***
  FIELD RELIABILITY & QUALITY MEETING
  RELIABILITY & ENGINEERING REVIEW MEETING
  PERIODIC FIELD VISITS
  SPECIAL MEETING - INDOCTRINATION & FAMILIARIZATION
- ***REVIEWS***
  FIELD LOGBOOK REVIEW
  QCTIR REVIEW
  CONFIGURATION CONTROL
- ***DOCUMENTATION EXCHANGE***
  BI-MONTHLY REL. STATUS REPORT
  VEHICLE END NARRATIVE REPORT
  MALFUNCTION REPORTS
  FAILED PARTS ANALYSIS REPORTS
- ***TRAINING AND CERTIFICATION***
  ON-THE-JOB TRAINING
  TRAINING AND CERTIFICATION
  - SOLDERING
  - ELECTRICAL CONNECTORS
  - H_2O_2 SERVICE
  - PNEUMATIC SERVICE

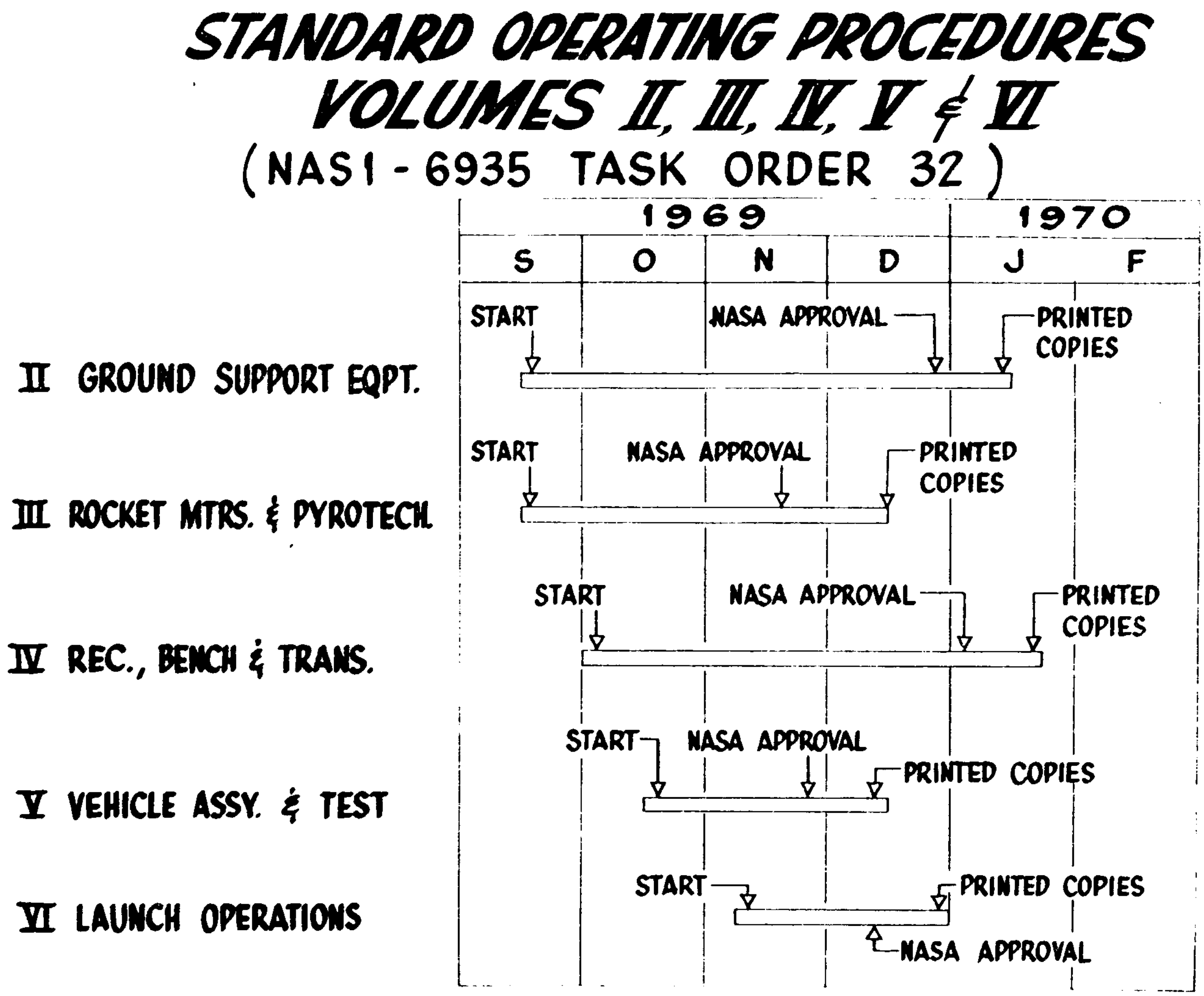

Figure 63.- Standard Operating Procedures.

(E) The NASA ad hoc review committee recommendations for improving Scout reliability were implemented.

(1) A reassessment of the Scout environment by study of flight and ground records was initiated by independent, formally established contractor and Langley Research Center design review committees. A three-month effort by the Contractor's design interface review formed the basis for the Langley review. Both efforts supplemented an earlier design review conducted by the Contractor after the Scout-114 ignition system failure. Each penetrated the areas of controls, electrical systems, airframe and motor hardware, environment, quality and reliability, and structures. Test and acceptance specifications were reviewed to establish whether adequate design margins and acceptance criteria exist for components as well as systems.

(2) The ad hoc review committee recommendation to increase vendor surveillance was implemented internally by the Contractor. Provisions of the NASA Quality Control 200-series and the Reliability 250-1 series documents were added to existing and follow-on contracts.

(3) Status of the recommendation to deliver a completely checked-out vehicle from the factory was discussed above under paragraph (C).

(F) A Reliability Motivation Program was established. The program adopted an awards contract that penetrated to the internal Vought and subcontractor project organizations and has proved to be very successful.

(G) The Scout Evaluation Vehicle (SEV)

Vehicle S-131R was used to demonstrate and flight-test a group of new Scout improvements which included:

(1) Fourth-stage interchangeability
(2) Air-transport demonstration
(3) Castor IIA
(4) Altair III (FW-4S)
(5) 75KS spin motors
(6) Vega beacon
(7) Autodestruct module
(8) Dogleg
(9) Transition "E"
(10) Ignition monitor
(11) Electrostatic potential measurement

This vehicle (the first configuration B) had three independent instrumentation systems and a U.S. Army SECOR payload. The flight was a complete success. All the new items were incorporated into the standard Scout.

(H) R & D Improvements

Vought Corporation contracts NAS1-5592, NAS1-6935, NAS1-10000, NAS1-10500, NAS1-12500, NAS1-15000, and NAS1-15100 included new research and development improvements. Contract NAS1-16200 will include future improvements. Table XXXI itemizes many of these improvements.

The major improvements to the original Scout vehicle are detailed in Table XXXI.

TABLE XXXI - MAJOR R & D IMPROVEMENTS TO ORIGINAL SCOUT (1)

FIRST STAGE
Algol Pyrogen Igniter
Improved Algol IIB Nozzle
Composite Material Nozzle
Modified Jet Vanes and Fin Tips
Algol IIIA Rocket Motor
Shelf life Extension, Algol IIC Motor
Single Bridge Apollo Standard Initiator
New Safe Arm
New Electrical Connectors
Factory-sealed Hydraulic System

SECOND STAGE
Castor IIA Rocket Motor
New H_2O_2 Relief Valve
New 500-Pound Motor Valve Filter
New Quick Disconnects
Modified 40-Pound Motor Valve
New Safe Arm
Autodestruct Module
New Electrical Connectors
Single Bridge Apollo Std. Initiator

THIRD STAGE
New Light Weight Beacon
New H_2O_2 Relief Valve
New Quick Disconnects
New Safe Ar,
Modified 2-Pound Motor Valve
Modified 14-Pound Motor Valve
Modified 48-Pound Motor Valve
New T/M Antenna System
New Power Control Relay Box
New Head Cap Pressure Transducer
Improved Rate Gyro
Modified 37-V Guidance Battery
New Bearing
Revised Structure
Simplified Wiring
New Electrical Connectors
New Command/Destruct Receiver
New Telemetry System
60-Pound Reaction Control Motor
Yaw Torquing
Redesigned "D" Section
Redesigned Lower "D" Section for S-Band T/M
Shelf Life Extension for Antares IIA
Roll-Yaw Compensation Unit
Destruct Receiver Power Switching
Antares IIB Rocket Motor (Used on S-191)
Antares IIIA Rocket Motor (Used on S-192)
Single Bridge Apollo Std. Initiator

FOURTH STAGE
New Electrical Connectors
Payload Separation Timers
Telemetry/Separation System Module
Series-25 "E" Section
Series-200 "E" Section
Single Bridge Apollo Std. Initiator
E-G Separation System (not used in Phase VI)
42-inch Diameter Heat Shield
34-inch Diameter Heat Shield
Shelf Life Extension, Altair IIA and IIIA Rocket Motors

FIFTH STAGE
Single Bridge Apollo Std. Initiator
Shelf Life Extension, Alcyone IA Rocket Motors

(1) Figures 39 through 42 plus 45 & 46 illustrate the new motors. Figure 64 shows a few of the improvements.

(I) The Office of the Director of the Langley Research Center established and authorized the Langley Research Center Scout Program Review Committee in 1972 to make an investigation of and recommendations for the Scout Program to assure its continued success. The Committee was composed of an independent group of experts from the LaRC Directorates, with members from Lewis, Goddard, Wallops Flight Center, Headquarters, and the Air Force.[1]

At the time the Committee was formed the Scout had 23 consecutive successes. The Committee was to recommend actions that would aid the Scout Program in achieving 50 consecutive successes.[2]

The Committee addressed the problems of reliability of existing vehicles, reliability of future vehicles, margins of safety as the vehicle is modified and upgraded, vehicle systems integration, ground support equipment, and technical management.

The recommendations of the Committee resulted in the following actions:

(1) Action was taken to insure that the plant, field, and NASA/SPO operations contain reasonable numbers of qualified, experienced personnel for the life of the program.

(2) The NASA Resident Engineering and Management Office (REMO) at Dallas was strengthened.

(3) The vendor plant representative system was changed to increase visibility during production phases. The function and authority of the rocket motor representatives were better defined.

(4) The environmental storage conditions of the vehicle, such as temperature, humidity, shock and handling, were improved. Documentation was improved to insure that the health of the vehicle or component in storage is known.

(5) A number of tests and inspections of Scout vehicle, components and GSE were changed as a result of the review; such as standardize electrical pin retention tests, reduce number of hydrogen peroxide motor hot firings, shelf life study of fifth stage (BE-3-A9) rocket motor initiated and the GSE maintenance and modification program improved.

Summary data presented by the Office of Space and Science and Applications for all small and medium class launch vehicles indicated that many strings of successes had been interrupted in the 20 to 25 range. It was because of this cyclic pattern that the committee was proposed. Since the purpose was to

(1) The committee was designated the Donley Committee and Philip Donley was named Chairman. Additional information is available in Vought Report 23.548.

(2) Thirty-seven consecutive successes were achieved setting a World's record.

prevent the Scout Program from falling victim to this historical cycle, the committee had achieved its purpose. Although 37 was less than the goal of 50 it did set a new World's record and only the Scout S-196 failure interrupted the achievement of this goal. To date 8 additional successful launches have been added to Scout's historical excellence.

To achieve the above goal and the five recommendations, the committee included in its review the LTV Dallas production facility and management, Langley Research Center on-site activities, all launch site activity, organizational interfaces, advanced planning, and the general program operations. In addition to the previously mentioned actions, the recommendations included the spectrum of personnel motivation.

(J) Scout S-189C, carrying the Netherlands ANS-A satellite (Fig. 37), launched from Vandenberg Air Force Base, California, on August 30, 1974, at 7:07:40 a.m. Pacific Time. An elliptical orbit had been attained rather than the near circular orbit that had been planned. Langley Research Center, with the concurrence of the Space Vehicle Office of the Office of Space Sciences, established a review committee on September 3, 1974, to review and determine the cause of the anomaly and to recommend appropriate corrective action.

(1) Vehicle Anomalies.- Three vehicle anomalies were uncovered during the review: 1, the third of ten programed adjustments to the pitch attitude rate was absent resulting in an excessive nose-down attitude at the end of the third "step" which persisted throughout the remainder of the launch trajectory and led to the off-nominal orbit; 2, the "retro" or braking thrust was applied to the spent third stage 7.68 seconds later than planned - this had no detrimental effect upon the launch but did provide evidence as to the cause of the first anomaly; and 3, the roll rate gyro malfunctioned during high longitudinal acceleration portions of second- and third-stage motor operation.

(2) Findings.- The committee, after review, analysis, and consideration of the evidence bearing on the S-189C anomaly concluded:

(a) The anomalous orbit was caused by the failure of Scout to execute the planned pitch rate program during the ascent trajectory. Specifically, the third, and only the third, of ten pitch program steps was not executed.

(b) Both the absent pitch program step and the late operation of the third-stage "retro" function were probably caused by a partially shorted diode.

(c) The roll rate gyro indicated a fallacious high roll rate during periods of high longitudinal acceleration. This anomaly was probably caused by the loss of pickoff rotor-to-stator clearance induced by the acceleration.

(3) Recommendations and Responses.- The Scout Project Office responses, which were made to the recommendations, are listed below for each recommendation.

(a) Long Term Recommendations -

-1- The intervalometer diodes should be replaced with a modern, proven-type procured from a reliable manufacturer. The use of the suspect diodes in other Scout systems should be examined and judgments made as to their replacement.

The Texas Instruments' cell-type diodes (suspect type) were replaced by SEMTECH JAN TXV IN645-1 diodes in all systems of the hardware presently on hand. The ITT IN645 diodes in the available intervalometers were retained. Action was taken to limit future procurements to the use of the SEMTECH diode only, in applications where it is usable.

-2- Flight acceptance test procedures should be devised for checking all intervalometer diodes which might be used in the flight profile. Similar test procedures should be devised for checking all diodes in flight-critical systems.[a]

-3- The intervalometer and the programer should be subjected to a modified flight acceptance test (workmanship test) after wiring of the flight profile.[a]

-4- The electronic shop procedures should be reviewed to insure that established procedures are being followed.[a]

-5- The roll rate gyro screening tests should include exposure to a steady longitudinal acceleration with gyro package in proper orientation.

-6- The Scout Project Office should actively participate in the response to pertinent GIDEP failure ALERTS.[a]

(K) Other Studies and Developments included a fourth-stage attitude correction system, evaluation of nondestructive testing techniques for solid propellant rocket motors, evaluation of rocket nozzle materials, trajectory reconstruction, and a single point failure analysis of the Scout vehicle.[b]

(1) Fourth-Stage Attitude Correction System.- The fourth-stage attitude correction system was a requirement for the Scout S-191 payload. The Van Allen (Hawkeye) payload had the requirement of changing the attitude of the spinning upper stages of Scout through a preprogramed maneuver after fourth-stage burnout and prior to fifth-stage ignition. In order to provide this capability a means of controlling the upper stages had to be implemented.

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[a]All recommendations were accomplished.

[b]Detailed in appendix B.

The addition of an Attitude Correction System (ACS) in the fourth stage provided this means. The system consisted of the following elements: an attitude reference subsystem, a control electronics package, a control subsystem, and an electrical power source. All sensors, control electronics circuitry, battery, and other electrical/electronic components were integral to existing Scout structure and were mounted in a module and on a modified fourth-stage T/M ring. The module which contained the sensor (platform) was located forward of the fourth-stage motor and beneath the F-transition section. The other end components including control subsystem tankage, etc., was installed/attached to the modified T/M ring. The weight of the complete ACS was approximately 30 pounds exclusive of new structure.

The development of this capability included the study, design, selection and procurement, vehicle integration and testing and storage of a flight-qualified system for the Hawkeye mission. The associated activities are noted below.

(a) Under Task R-6 of Contract NAS1-10000 the following activities were performed:

-1- Developed preliminary layout for the location of the ACS in the Scout upper stages.

-2- Developed Math model and computer flow diagram for Scout fourth-stage control system study.

-3- Estimated mass properties for the fourth-stage-at-ignition and burnout for this mission.

-4- Defined the modification to the NEMAR program to provide the capability for simulating the ACS.

-5- Defined the loads and dynamics considerations; fourth stage pointing errors, expected fifth-stage tip-off; maximum expected fifth-stage coning, expected boost vibration environment for the ACS, axial and torsional bending modes for the fourth stage with the Hawkeye spacecraft, and effects of body flexibility on the motion at the ACS sensor location.

-6- Developed two digital computer routines for simulating spinning body control.

-7- Conducted mission accuracy analysis.

-8- Developed overall preliminary requirements for the ACS.

(b) Under Task Order No. 3 of Contract NAS1-10500 the following activity was performed:

-1- Developed final ACS requirements.

-2- Procured one set of ACS hardware.

-3- Conducted mission thermal analysis to define thermal control for the T/M, ACS, and RCS systems.

-4- Electrically and structurally modified the Scout upper stages, and installed the ACS.

-5- Performed modifications to the computer program to accept the selected vendor math model, and performed fourth-stage accuracy analysis and a mission accuracy analysis.

-6- Fabricated portable suitcase-type test equipment and associated cables required to support testing.

-7- Conducted ACS bench tests, and simulated flight acceptance tests including temperature-altitude, shock and vibration.

-8- Conducted systems and final acceptance tests with the ACS installed in flight sections.

-9- Disassembled flight hardware and placed in Government Bonded Stores.

-10- Specified mission reorientation angle and calibrated the system to provide the angle.

-11- Supported as necessary a Government design review to review the detail design and installation concepts.

(c) Under Task R-62 of Contract NAS1-10000 the following activity was performed:

-1- Removed existing fifth-stage telesponder components from GFE supplied fifth-stage hardware.

-2- Installed the ACS performance telemetry components in the GFE fifth stage (F-Section).

-3- Removed existing GFE F-Section despin system.

-4- Modified existing fifth-stage wiring for payload interface and telemetry and ignition requirements.

-5- Evaluated the fifth-stage modifications to determine the effects upon balance and weight distribution.

Figure 64 shows the detail schedule for the fourth-stage ACS.

		1973									
	STATUS	J	F	M	A	M	J	J	A	S	O
• CONTRACT GO-AHEAD	REC'VD MARCH 1972										
• ESTABLISH SYSTEM REQUIREMENTS	COMP APRIL 1972										
• ACS & TANK PROCUREMENT			X								
• CONDUCT THERMAL ANALYSIS	COMP AUG 1972										
• VEHICLE HARDWARE:											
STRUCTURAL MODS		X									
ELECTRICAL MODS			X		X						
FLIGHT UNIT ASSEMBLY			X				X				
SYSTEM EVALUATION	COMP SEPT 1972										
• TESTING				X						X	
• GFE STORAGE										X	
• DETERMINE REORIENTATION ANGLE	COMP DEC 1972										
• DESIGN REVIEW SUPPORT											X
• FINAL REPORT										X	

Figure 64.- Detail Schedule - Fourth-Stage ACS

(2) Solid Rocket Motor Nondestructive Testing Study.- Under contract NAS1-8994 a study to review the advanced rocket motor NDT inspection techniques then in use was conducted. The purpose of this study was directed at maintaining and improving the high reliability of the Scout rocket motors. The results of the study indicated a need to perform an additional detailed investigation of certain advanced techniques to determine their applicability and effectiveness on Scout motors. Contract NAS1-11867 was funded for that purpose.

The study was conducted by the General Electric Company of Philadelphia, Pennsylvania. The primary effort included the investigation of such techniques as filmless automatic bonding inspection system (FABIS), acoustic resonance and improved magnetic particle penetrometer, ultrasonics, and radiography techniques. In addition, the study determined the value of constructing a centralized NDT facility which would house the recommended test equipment and which would provide inspection for all motors used on the Scout program.

(3) Evaluation of Rocket Nozzle Materials.- Material studies have indicated that solid rocket nozzle throat inserts made of certain ceramic materials should have an advantage in thermal shock resistance and erosion over graphite billets and ablatives used in Scout motors. The objective of this effort was to determine whether these potential advantages could be realized in a practical Scout motor upgraded nozzle in the various motor stages. This would eliminate two disadvantages of Scout throat inserts being used at the time, (a) the inherent uncertainty in graphite billet properties and (b) the nozzle performance inefficiency associated with ablating throats.

Techniques for hot pressing small scale rocket nozzle inserts have been developed. Small scale inserts have been fabricated from the hafnium oxide-tungsten-rhenium fiber composition which has demonstrated the best thermal shock resistance in earlier studies. Inserts were tested in small scale solid propellant rocket motor firings at Hercules Incorporated, Allegany Ballistics Laboratory. The erosion and thermal shock characteristics of the composite insert were evaluated in the motor firings. Analytical and experimental investigations were broadened to study the ceramic-metal fiber interface and the thermal shock characteristics of the material on the microstructural level. Theories relating the measured microscopic properties to crack sizes and crack densities were developed. Successful functioning of the inserts in the motor tests led to consideration of incorporating them into a fourth-stage Scout nozzle for further motor testing. The evaluation was performed by N.C. State and completed July 1974.

(4) Trajectory Reconstruction.- The Scout trajectory reconstruction program, SPEAR (Scout Performance Evaluation and Ascent Reconstruction) was developed for the Scout Project Office, Langley Research Center by Lockheed Missiles and Space Company. Instructions for the utilization of SPEAR are contained in two manuals, LMSC/D030984 "User's Manual - SPEAR" and LMSC/D030985 "Programmer's Manual - SPEAR." These were provided as fulfillment of Part V.A.2 of the NASA contract NAS1-9204.

The SPEAR program was designed to reconstruct a Scout vehicle trajectory for postflight analysis. The program consisted of three phases: Phase 1 was to obtain the best estimate of a Scout trajectory; phase 2 was to obtain the best estimate of Scout vehicle characteristics (thrust, weight, aerodynamics, etc.); and phase 3 was to obtain the best estimate of the trajectory and vehicle parameters for spin-stabilized stages.

The work was conducted under the direction of the Scout Project Office. Technical monitor for the initial period of development was Donald G. Eide. This responsibility was assumed by Joseph W. Drewry for the latter period of the contract.

The SPEAR computer program is a Scout trajectory reconstruction program for use on the NASA Langley Research Center CDC 6400/6600 computing system. The basic fitting technique employed had been developed by Lockheed Missiles and Space Company (LMSC) and existed in operational postflight programs for its in-house activities. The corresponding programming for this application required only the modifications to insure compatibility with the specifications of the Langley CDC 6400/6600 system. The contract work concerned primarily the mathematical simulation of the Scout vehicle, the derivation of the partial derivatives required in the fitting process, and the implementation of the theoretical development into a computer program operational at the Langley Research Center.

Included under contract scope was the development of necessary data conditioning functions. It was early recognized that these capabilities would best be provided as auxiliary programs to avoid additional complexities in the main analysis program. Documentation of the data conditioning programs was included in the contract report.

Development was performed on a UNIVAC 1108 computer in the LMSC Central Computing Facility. Program design and coding stressed independence of computing machine and observed the specifications supplied by NASA for the Langley CDC 6400/6600 system. A similar, though not identical, system at a Control Data Corporation Data Center was used for final checkout prior to installation of the programs on the Langley computing system dated Feburary 1, 1971.

The end product was a powerful tool for determining trajectories and analyzing the Scout vehicle performance. The main program has the code name SPEAR. The trajectory reconstruction is a general capability for any vehicle for which triaxial accelerometer and body attitude rate data are available. The performance evaluation capability was restricted to vehicles with propulsion and control systems similar to those modeled for the Scout vehicle. The first of the auxiliary programs is SPFLTR (SPEAR Filter) and provides data conditioning (including wild point rejection, data replacement, data synchronization, smoothing and differentiating) for any data tape with up to 30 variables per time point. The second is TPGEN (Tape Processor and Generator), reflecting its use in processing data tapes and generating tapes in the standard format expected by SPEAR. The third is PLØT20, the output of which is input to the CalComp plotter.

(a) Theoretical Development.- The basis for computer program SPEAR was the Kalman filter. This technique as applied to the extraction of information for discrete measurements contaminated by random errors has proved very successful in the reconstruction of powered ascent trajectories and the evaluation of vehicle performance. In SPEAR, the two main problems of trajectory reconstruction and performance evaluation are solved in sequence. In phase 1 the launch trajectory is fit to the radar. The best estimate trajectory obtained from phase 1 is then input data for phase 2 in which the vehicle performance is evaluated. The Kalman technique is applied in both phases.

The following is a somewhat idealized but accurate motivation for using the Kalman filtering technique for postflight analysis.

The design of a missile usually starts with the definition of a mission, the mission being specified by injection or orbit parameters with their desired tolerances. A design team is called upon to translate these objectives into hardware design parameters and their allowed tolerances. A preflight error analysis is performed to check the compatibility of the hardware design with the mission.

The manufacturing group uses the design specifications and builds the hardware. At this time the hardware parameters become statistical random variables with means and variances. Quality control is employed to insure that the statistics of these parameters are compatible with the design specifications.

The preflight knowledge at this point is not the actual hardware values but a measure of their statistics. When the vehicle is launched, telemetry is employed to monitor vehicle hardware performance and radar is employed to monitor vehicle trajectory performance.

The postflight team must ascertain whether the actual vehicle hardware and mission parameters were within tolerance. The team begins by reconstructing the trajectory and encounters the first obstacle. It becomes clear that all the data sources are statistical random variables with means and variances (the vehicle hardware parameters by virtue of manufacturing techniques and the telemetry and radar data by virtue of communication equipment noise and other random disturbances). The data reduction personnel are called upon to supply the uncertainties of the telemetry and radar data. At this point one could say that the most likely values of the parameters would be the smoothed value obtained from the noisy data. A closer analysis would reveal that conflicts arise in this fashion. The following question would be asked - What is the "size" of the uncertainty on motor head cap pressure relative to the "size" of uncertainty on radar range azimuth and elevation? The analyst must answer these types of questions before selecting the most accurate source for a particular parameter. But even by doing this he is ignoring some information (even though less accurate) that should contribute, to a lesser extent, to the value of the parameter.

At this point the postflight group was confronted by two main questions. First, how can one compare all the data sources with their assigned uncertainties? Second, what was the most likely value of these parameters and to what accuracy, given all the data? It is within this setting that the Kalman fitting problem was posed. The first question was answered by the definition of a model and the second by use of Kalman's fitting equations.

(b) Role of the model.- As hinted above, the purpose of the model was to provide a method of comparing all the data sources to be used and their respective variances. The demands on the model are that there must be fitting parameters which can be adjusted to explain the discrepancies between the various data sources except for those caused by random noise.

CHAPTER VI - SCOUT PROCUREMENT PROGRAM

In May 1958 contract L-55931(G) was awarded Thiokol Corporation for second stage Castor motors. In April 1959 contract NAS1-249 was the first Scout contract awarded to Chance Vought Corporation(1). The procurement requirements for Scout expanded as shown in publication LWP-804, pages 253 through 256, and publication TM X-72628, pages 313 through 316, which included 14 years through 1971.

The Scout contracts include the following hardware, systems, and software of the Scout program: vehicle procurement, motor procurement, spares procurement, systems management, launch site requirements, research and development, launch services, and anomalies and failure investigations.

Each of the above was contracted for in each phase of the Scout program. Table XXXII details the quantity of vehicles funded, contracted, and launched through Phase VI. It shows the number of vehicles by agency and fiscal year funds. Figure 65 illustrates a typical Scout Systems Management contract and shows NAS1-10000 which started during Phase V and ended November 1973 during Phase VI. Transition from one contract to another for Scout systems management was always accomplished very smoothly. The Prime Contractor and NASA worked diligently together to accomplish excellent and economical transitions in each phase and contract.

Table XXXIII lists the major contracts, specifies the phase they cover, and designates the type of contract and the contractor. It also lists the planned follow-on contracts. NASA publication LWP-804 itemizes 134 contracts through FY 1965, and TM X-72628 itemizes 51 contracts through November 1971. Table XXXIV(a) itemizes an additional 49 contracts through 1979. The contracts designated with an asterisk are detailed in subsequent pages. Scout Phase VII hardware procurement and manufacturing period coincides with the Scout Phase VI assembly and launch period, therefore any Phase VII contracts prior to December 1979 are also listed. Prior contracts that include Phase VI hardware or software are listed in table XXXIV(b). A historical layout of the Scout contracts for the Scout program is shown in figure 66. The Langley Research Center was responsible for all Scout contracts. Table XXXIII shows which contracts were firm fixed price (FFP), fixed price incentive (FPI), and all the other types as designated. Phase VI management contract (NAS1-10000) was fixed price incentive/award research development (FPIA) with special cost-reimbursable (CPFF) and fixed price (FFP) provisions. Phase VI was extended to contract NAS1-12500 which was similar to NAS1-10000 in structure. Many other contracts involved aspects of the Phase VI program including NAS1-7256 and NAS1-15000. However, NAS1-7199, NAS1-10000, and NAS1-12500 contracts constitute most of the effort for Phase VI. All Scout contracts were technically monitored by the LaRC Scout Project Office. The Prime Contractor, Vought Corporation (formerly LTVAC/Vought Systems Division) was contractually responsible for all Scout systems and hardware. A typical polar orbit with an international payload (UK-4) is shown in figure 67 (vehicle S-183).

(1)The Contractor made several name changes during the Scout Program from Chance Vought Corporation, such as Ling-Temco-Vought, LTV Aerospace, LTV Missiles and Space, LTV Aeronautics, LTV Systems Division, and at present and henceforward Vought Corporation.

(2)"User" refers to the spacecraft owner.

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TABLE XXXII - SCOUT VEHICLE PROCUREMENTS (Phases I through VI)

	FY FUNDED	NASA	NAVY	AIR FORCE	OTHERS (AEC) (ESRO) (UK) (AEROS)	TOTAL
Phase I (Dev.)		9	0	0	0	9
Phase II	(FY62)	3	5[1]	2	0	10
Phase III (Recertified)						
	(FY62)	2[2]	1	1	0	4
	(FY63)	3	0	0	1	4
	(FY64)	5	0	0	0	5
	(SEV)	1	0	0	0	1
Phase III Total		11	1	1	1	14
Phase IV (Incentive)	(FY62)	0	3	2	0	5
	(FY63)	1	0	0	0	1
	(FY64)	1	2	2	0	5
	(FY65)	0	1	1	0	2
	(FY66)	4	1	1	0	6
	(FY67)	1	2	0	0	3
	(FY69)	1	0	0	0	1
	(FY70)	2	0	0	0	2
Phase IV Total		10	9	6	0	25
Phase V (Fixed Price, Award)						
	(FY67)	3	1	0	0	4
	(FY68)	3	0	0	0	3
	(FY69)	2	0	0	0	2
	(FY70)	2	0	0	1	3
	(FY71)	2	0	0	0	2
	(FY72)	0	0	0	0	0
	(FY73)	1	0	0	0	1
Phase V Total		13	1	0	1	15
Phase VI (Fixed Price, Award)						
	(FY67)	0	3	0	0	3
	(FY68)	0	0	0	0	0
	(FY70)	0	0	0	0	0
	(FY72)	2	0	0	0	2
	(FY73)	3	0	0	2	5
	(FY74)	2	0	0	1	3
	(FY75)	0	0	0	0	0
	(FY76)	0	0	1	0	1
	(FY79)	1	0	0	0	1
Phase VI Total		8	3	1	3	15
Special A.F.[3]	FY62)	0	0	4	0	4
TOTAL		54	19	14	5	92[4]

(1) One AEC with Navy-supplied Scout.

(2) Recertification.

(3) Direct D.O.D. procurement from LTV (not NASA Scouts).

(4) In addition to the 92 Scouts through Phase VI, 10 Phase VII Scouts were launched prior to the last Phase VI launch.

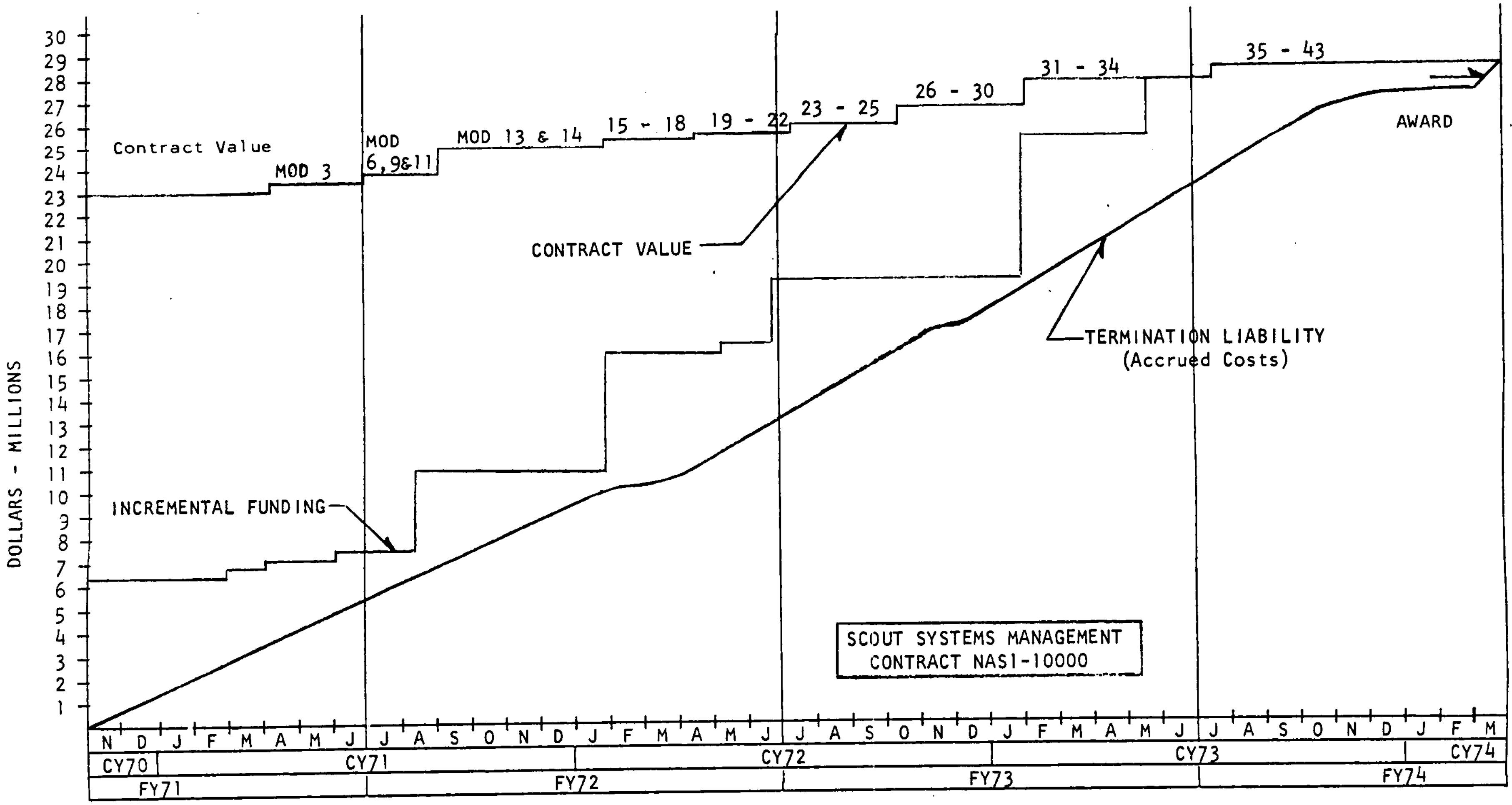

Figure 65.- Typical Scout Systems Management Contract (NAS1-10000).

TABLE XXXIII - SUMMARY OF SCOUT CONTRACTS

1. VEHICLE PROCUREMENT

		CONTRACTOR	TYPE
Phase I	NAS1-249 & NAS1-900	LTV	FFP & CPFF
Phase II	NAS1-1295	LTV	CPFF
Phase II & IV	NAS1-1295 & NAS1-3589	LTV	CPFF
Phase IV	NAS1-2650	LTV	FPI
Phase V	NAS1-5610	LTV	FFP
Phase VI	NAS1-7199	LTV	FFP
Phase VII	NAS1-11000	LTV	FFP
Phase VIII	NAS1-15000	LTV	FP

2. MOTOR PROCUREMENT

Phase I	NAS5-53	First Stage (Algol I)	Aerojet	CPFF
	L55931	Second Stage (Castor I)	Thiokol	CPFF
	S-1010G	Third Stage (X-254)	ABL	CPFF
	S-100G	Fourth Stage (X-248)	ABL	CPFF
Phase II & III	NAS1-1330	First Stage (Algol I & II)	Aerojet	CPFF
Phase II	L93419	Second Stage (Castor I)	Thiokol	CPFF
Phase II	L93985	Third & Fourth Stages (X-248) (and X-259)	ABL	CPFF
Phase III	L2061	Second Stage (Castor I)	Thiokol	CPFF
	L03829	Third Stage (X-259)	ABL	CPFF
	NAS1-3664	Fourth Stage (X-258)	ABL	CPFF
Phase IV	NAS1-3822	First Stage (Algol II)	Aerojet	FFP
	NAS1-5034	Second Stage (Castor II)	Thiokol	FFP
	NAS1-3493	Third Stage (X-259)	Hercules	CPFF
	NAS1-3698	Fourth Stage (X-258)	Hercules	FFP
	NAS1-5883	Second, Third, & Fourth Stages (Castor, X-258, X-259, and FW4S)	LTV	FFP
Phase V	NAS1-5610	All Motors	LTV	FFP
Phase VI	NAS1-7199	Four Stages (Algol II, Castor II, X-259, FW4S)	LTV	FFP
	NAS1-6935-40	Algol IIB Nozzles	LTV	FP
VI,VII,VIII	NAS1-9258	First Stage (Algol III)	LTV	FFP
Phase VII	NAS1-11400	Castor IIA, Antares II, and Altair IIIA	LTV	FFP
	NAS1-13100	Algol III	LTV	FP
Phase VII,VIII	NAS1-14200	Second, Third, & Fourth Stages	LTV	FP

3. SYSTEMS MANAGEMENT

Phase III	NAS1-3657	LTV	CPFF
Phase IV	NAS1-4664	LTV	CPIF
Phase IV & V	NAS1-6020	LTV	FPI
Phase V	NAS1-7256	LTV	FPIA
Phase V & VI	NAS1-10000	LTV	FPIA
Phase VI & VII	NAS1-12500	LTV	FPIA
Phase VII,VIII	NAS1-15000, NAS1-15100	LTV	FPIA
Phase VII,VIII	NAS1-16200	LTV	FPIA & CPFF

TABLE XXXIII - SUMMARY OF SCOUT CONTRACTS Continued

4. SPARES

			CONTRACTOR	TYPE
FY 1963	NAS1-1970		LTV	CPFF
FY 1964	NAS1-3420		LTV	CPFF
FY 1965-66	NAS1-4664		LTV	FFP
FY 1967-68	NAS1-6020		LTV	FFP
FY 1969-70	NAS1-7256		LTV	FP
FY 1971-73	NAS1-10000		LTV	FP
FY 1973-76	NAS1-12500		LTV	FP
FY 1977-79	NAS1-15100		LTV	CPAF
FY 1979-81	NAS1-15000		LTV	FPIA & CPFF
FY 1981-	NAS1-16200		LTV	FPIA & CPFF

5. LAUNCH SITES

East Coast	NAS1-2455		LTV	CPFF
West Coast	NAS1-1481		LTV	CPFF
Africa	NAS1-4899, NAS1-10000-J, NAS1-12500-J, NAS1-15100-J, NAS1-15000-J, NAS1-16200-J		LTV (Italy)	FP,CPFF

6. RESEARCH AND DEVELOPMENT

FY 1959	NAS1-249	Original Scout Development	LTV	FFP
FY 1961	NAS1-1330	First Stage Motor (Algol II)	Aerojet	CPFF
FY 1963	L-15993	Second Stg.Motor(Castor II)	Thiokol	CPFF
FY 1959	NORD 16640	Third & Fourth Stages (X-259 and X-258)	Hercules	CPFF
FY 1962-63	NAS1-1928	Product Improvement	LTV	CPFF
FY 1964-65	NAS1-3899	Product Improvement	LTV	CPFF
Phase III	NAS1-4794	Algol Studies	Aerojet	FFP
FY 1965	NAS1-4793	Castor Studies	Thiokol	FFP
FY 1965-66	NAS1-4795	X-258 and X-259 Studies	Hercules	FFP
FY 1964-65	NAS1-5106	Studies - TOLIP	Lockheed	FFP
FY 1966-67	NAS1-6692	Product Improvement	LTV	CPIF
FY 1968-70	NAS1-6868	Fifth Stage	LTV	CPIF
FY 1967	NAS1-6935	Product Improvement	LTV	CPIF, FPI,FP,CPFF
FY 1967	NAS1-6935-5	Roll Yaw	LTV	FFP
FY 1967	NAS1-6935-10-13	S-Band	LTV	CPFF
FY 1967	NAS1-6935-34	Jet Vane Studies	LTV	FFP
FY 1967	NAS1-6935-41	Larger Heat Shield	LTV	CPIF
FY 1967	NAS1-6935-44	Fourth Stage S-Band	LTV	CPIF
FY 1967	NAS1-6969	Studies - Error Analysis	TRW	FFP
FY 1967-69	NAS1-7102	Fifth Stage Motor (BE-3)	Hercules	FFP
FY 1969	NAS1-8541	Studies, Instrument Response	AVCO	CPFF
FY 1969	NAS1-8994	N.D.T.T.	GE	CPFF
FY 1969-70	NAS1-9204	Studies - SPEAR	Lockheed	FFP
FY 1969-74	NAS1-9258	ALGOL III - First Stage	LTV	FFP

TABLE XXXIII - SUMMARY OF SCOUT CONTRACTS Concluded

6. RESEARCH AND DEVELOPMENT Continued

			CONTRACTOR	TYPE
Phase V & VI	NAS1-10000-R	Small Product Improvements	LTV	CPFF
Phase VI	NAS1-10481	X-258 Studies	Hercules/B	CPFF
Phase VI	NAS1-10482	Castor Studies	Thiokol	CPFF
Phase VI	NAS1-10483	X-259 Studies	Hercules/B	CPFF
Phase VI	NAS1-10484	Algol III and FW4S Studies and Improvements	UTC	CPFF
FY 1971-72	NAS1-10500	Product Improvements	LTV	CPFF, CPIF,FPI,FP
Phase VII	NAS1-10504	Improved Guidance Study	Martin Marietta	FP
Phase VI & VII	NAS1-12500-R	Product Improvements	LTV	CPFF
Phase VII & VIII	NAS1-15100-R	Product Improvements	LTV	CPAF
Phase VII	NAS1-14619	Algol III Study	UTC	CPFF
Phase VIII	NAS1-14500	Guidance Development	LTV(Teledyne)	CPFF
Phase VI & VIII	NAS1-15000	Product Improvements	LTV	CPFF
Phase VIII	NAS1-15423	Antares III Study	SAI	CPFF
Phase VII & VIII	NAS1-15650	Third-Stage Nozzle	SAI	CPFF

7. LAUNCH SERVICES

Phase I	NAS1-900	LTV	CPFF
Phase II	NAS1-1295	LTV	CPFF
Phase III	NAS1-2189 thru February 1, 1964	LTV	CPFF
Phase III	NAS1-3615 thru October 1, 1965	LTV	CPFF
Phase IV	NAS1-4664 (7-1-66 thru 11-1-66)	LTV	CPIF
Phase IV & V	NAS1-6020 (11-1-66 thru 11-1-68)	LTV	FPI
Phase V	NAS1-7256 (11-1-68 thru 11-1-70)	LTV	FPIA
Phase V & VI	NAS1-10000 (11-1-70 thru 11-1-73)	LTV	FPIA
Phase VI & VII	NAS1-12500 (11-1-73 thru 11-1-76)	LTV	FPIA
Phase VII	NAS1-15000 (11-1-76 thru 11-1-81)	LTV	FPIA
Phase VII & VIII	NAS1-16200 (Effective 11-1-81)	LTV	FPIA,CPFF

8. RANGE OPERATIONS

				MPE
Phase V	L-52073	FY71 Operations & Maintenance	SAMTEC	Gov't.
Phase V	L-64709	FY72 Operations & Maintenance	SAMTEC	Gov't.
Phase VI	L-24697A	FY75 Operations & Maintenance	SAMTEC	Gov't.
Phase VI	L-75052	FY73 Operations & Maintenance	SAMTEC	Gov't.
Phase VI	L-7930A	AEROS & ANS (FY75 Ops.&Maint.)	SAMTEC	Gov't.
Phase VI	L-88316	OUINTRON (FY76 Comm., Ops.& Mt.)	SAMTEC	Gov't.
Phase VI & VII	L-5098A	FY75 Communications, Ops, & Main.)	SAMTEC	Gov't.
Phase VI & VII	L-29075A	FY75 Range Services	SAMTEC	Gov't.
Phase VII	L-22387A	FY76 & 7T Com.,Ops.& Maint.	SAMTEC	Gov't.
Phase VII	L-27381A	FY76 Launch Services DAD/S-196	SAMTEC	Gov't.
Phase VI	L-29062A	Fac. Mod. & Refurb. Stearns-Rog.	SAMSO	Gov't.
Phase VII	L-4616A	UK-X4 Range Costs, S-188	SAMTEC	Gov't.
Phase VII	L-50725A	FY77 VAFB Utilities Costs	4392 ATG	Gov't.
Phase VII	L-50692A	FY7T Range Services, S-197	SAMTEC	Gov't.
Phase VII	L-52306A	FY77 Communications, Ops.,& Maint.	SAMTEC	Gov't.
Phase VII	L-50696A	FY77 Range Services, S-200	SAMTEC	Gov't.
Phase VII	L-68201A	FY78 Range Services for NASA	SAMTEC	Gov't.
Phase VII	L-68202A	FY78 Range Services, S-201	SAMTEC	Gov't.
Phase VII	L-68209A	FY78 VAFB Utilities	SAMTEC	Gov't.
Phase VII	L-69148A	FY78 Communications, Ops. & Maint.	SAMTEC	Gov't.
Phase VII	L-68200A	FY79-82 Range Services	SAMTEC	Gov't.
Phase VII	L-86492A	FY79-80 Scout Range Services	SAMTEC	Gov't.
Phase VII	L-86493A	Range Services for MAGSAT	SAMTEC	Gov't.
Phase VII	L-93196	Mod. Spin Balance Machine, VAFB	SAMSO	Gov't.

TABLE XXXIV(a)- SUMMARY OF SCOUT CONTRACTS (1972-1979)

Contract Date	Contract Number	Contractor	Amount
*Mar 1972	NAS1-11400	LTV Aerospace Corporation (HTC)	$ 3,611,860
Mar 1972	L-55240	U.S. Army Munitions Command	92,000
May 1972	NAS1-11000	LTV Aerospace Corp. - Phase VII	10,488,925
Jul 1972	L-75052	USAF (SAMTEC)	11,500
Sep 1972	NAS1-11867	General Electric Company	173,363
Nov 1972	NAS1-11859	Thiokol Chemical Corporation	145,302
Nov 1972	NAS1-11972	Scientific Atlanta	245,500
Mar 1973	L-88316	USAF (SAMTEC)	127,844
Apr 1973	NAS1-10172	LTV-Custodian of Govt. Property	0
Jun 1973	L-84253	U.S. Navy Ammunition Depot	42,968
Jun 1973	L-93196	AF-WTR Spin Facility	100,000
*Nov 1973	NAS1-12500	LTV-Systems Mgt.(11-1-72/11-1-76)	30,125,802
Dec 1973	L-12904	A.F. Rkt.Prop.Lab-Fire 2 Altair II's	40,000
Apr 1974	L-5908A	USAF (SAMTEC)	147,154
Jun 1974	L-7930A	USAF (SAMTEC)	692,282
*Sep 1974	NAS1-13100	VC - Algol III Motors (HTC)	3,849,245
Mar 1975	L-22387A	USAF (SAMTEC)	75,000
Apr 1975	L-24697A	USAF (SAMTEC)	779,465
May 1975	L-27381A	USAF (SAMTEC)	124,815
*Jul 1975	NAS1-14200	VC - Phase VII & VIII Mtrs.,S-192	10,635,981
Oct 1975	L-29062A	USAF (SAMSO)	425,000
Nov 1975	L-29075A	USAF (SAMTEC)	170,154
May 1976	NAS1-14388	VC - Igniters (3rd Stage)	183,656
Sep 1976	L-4616A	USAF (SAMTEC)	829,897
Sep 1976	L-50692A	USAF (SAMTEC)	31,800
Oct 1976	L-50696A	USAF (SAMTEC)	102,500
Oct 1976	L-51743A	U.S. Energy Res. & Dev. Admin.	25,200
Oct 1976	L-52306A	USAF (SAMTEC)	70,526
Oct 1976	NAS1-14619	UTC - Algol III	299,372
*Nov 1976	NAS1-15000	VC - Systems Mgt. (1976-1982)	62,247,425
Nov 1976	NAS1-15100	VC - Systems Technical Support	13,657,211
Feb 1977	NAS1-14500	VC - Advanced Guidance Sys. Dev.	4,046,237
Apr 1977	L-50710A	AEDC - Test Fire Star-30 Motors	53,320
Jun 1977	L-50725A	USAF - VAFB Utilities, Scout, FY77	7,500
Jul 1977	L-50700A	Science Applications - Army Analytical Support, Antares IIIA	50,000
Aug 1977	L-50723A	San Marco Invoices, Payment	8,322
Aug 1977	L-50726A	Motor Storage at NAD	60,000
Aug 1977	L-68202A	USAF (SAMTEC) - Range Services	89,553
Aug 1977	NAS1-14950(F)	LTV Revised FY78 Equipment Contract	0
Sep 1977	L-68200A	USAF (SAMTEC) - Range Services	715,300
Oct 1977	L-69148A	USAF (SAMTEC) - Quintron	77,500
Nov 1977	L-68201A	USAF (SAMTEC) - Range Services	30,905
Dec 1977	L-68209A	USAF - VAFB Utilities, Scout, FY78	11,553
Jan 1978	NAS1-15220	Ellis & Watts - WFC & WTR A/C Units	133,445
Nov 1978	L-68203A	U.S. Army - Motor Storage (HAAP)	118,471
Dec 1978	L-68208A	U.S. Army - Add. Mag. Mod. (HAAP)	84,963
Dec 1978	NAS1-15650	SAI - Scout Motor Support	240,840
Jul 1979	L-86492A	USAF - VAFB Range Services (1980)	59,755
Oct 1978	L-86493A	USAF - VAFB MAGSAT Range Services	174,152
Dec 1979	L-86494A	USAF - VAFB Utilities, FY1979-80	159,500

*Itemized elsewhere.

TABLE XXXIV(b)- SUMMARY OF SCOUT CONTRACTS INCLUDED IN PHASE VI
(Prior to 1972)

Contract Date	Contract Number	Contractor	Amount
*Aug 1966	NAS1-5610	LTV	$12,343,833
*Nov 1966	NAS1-6020	LTV	13,489,722
Jan 1967	NAS1-6935	LTV	5,048,879
May 1967	NAS1-6868	LTV	1,181,519
May 1967	NAS1-7102	Hercules	528,525
*Apr 1968	NAS1-7199	LTV	13,168,748
*Dec 1968	NAS1-7256	LTV	12,781,000
*Jun 1969	NAS1-9258	LTV	4,426,568
*Nov 1970	NAS1-10000	LTV	28,167,005
**Dec 1970	NAS1-10481	HI/ABL, Tech. Support-X258 Mtrs.	320,794
**Dec 1970	NAS1-10483	HI/Bacchus, Ditto to X259 Mtrs.	351,050
**Jan 1971	NAS1-10482	TCC, Ditto to Castor Motors	201,669
**Feb 1971	NAS1-10484	UTC, Ditto to Algols and FW4S	529,061
**Mar 1971	NAS1-10500	LTV	1,049,282

The contracts that include vehicles S-178 through S-192 are listed in table XXXV for each Phase VI Scout vehicle. The table includes statistics on payload, launch year, and vehicle contract listings for the hardware procurement, each motor stage, processing, and launch services. Table XXXVI lists the system engineering and software contracts for each Phase VI vehicle.

Scout contracts were not separated by phases. Even in the case of contract NAS1-7199, many motors manufactured on this contract were assigned to Scout vehicles other than Phase VI, even though all the fifteen sets of vehicle hardware of this contract were Phase VI. Tables XXXVII through XLIX outline details of the following major contracts:

NAS1-5610	Table XXXVII
NAS1-6020	Table XXXVIII
NAS1-7102	Table XXXIX
NAS1-7199	Table XL
NAS1-7256	Table XLI
NAS1-9258	Table XLII
NAS1-10000	Table XLIII
NAS1-11400	Table XLIV
NAS1-12500	Table XLV
NAS1-13100	Table XLVI
NAS1-14200	Table XLVII
NAS1-15000	Table XLVIII
NAS1-15100	Table XLIX

*Itemized in this chapter.
**Itemized in chapter 8.

TABLE XXXV - SUMMARY OF PHASE VI VEHICLE CONTRACTS

VEHICLE	PAYLOAD	LAUNCH YEAR	VEHICLE-CONTRACTS		SERVICES	MOTOR CONTRACT - STAGES			
			PRODUCTION	CERTIFIED		FIRST	SECOND	THIRD	FOURTH
178C	NAVY	73	NAS1-7199	NAS1-7256 NAS1-10000	NAS1-10000	NAS1-7199	NAS1-7199	NAS1-7199	NAS1-5883-3
179CRR	AIR FORCE	76R	NAS1-7199	NAS1-12500 NAS1-7256 NAS1-10000	NAS1-12500	NAS1-7199	NAS1-7199	NAS1-11400	NAS1-11400
180C	OA-I	71	NAS1-7199	NAS1-10000	NAS1-10000	NAS1-7199	NAS1-7199	NAS1-7199	NAS1-5610
181C	PA-I	72	NAS1-7199	NAS1-10000	NAS1-10000	NAS1-9258	NAS1-7199	NAS1-7199	NAS1-7199
182C	NAVY	72	NAS1-7199	NAS1-10000	NAS1-10000	NAS1-7199	NAS1-7199	NAS1-7199	NAS1-7199
183C	PA-I	71	NAS1-7199	NAS1-10000	NAS1-10000	NAS1-7199	NAS1-7199	NAS1-7199	NAS1-5610
184C	OAST	72	NAS1-7199	NAS1-10000	NAS1-10000	NAS1-9258	NAS1-7199	NAS1-7199	NAS1-7199
185C	ESRO	72	NAS1-7199	NAS1-10000	NAS1-10000	NAS1-9258	NAS1-7199	NAS1-7199	NAS1-5610
186C	GERMANY	74	NAS1-7199	NAS1-10000	NAS1-12500	NAS1-9258	NAS1-7199	NAS1-7199	NAS1-7199
187C	PA-I	74	NAS1-7199	NAS1-10000	NAS1-12500	NAS1-7199	NAS1-7199	NAS1-7199	NAS1-11400
188C	UK	74	NAS1-7199	NAS1-10000	NAS1-12500	NAS1-9258	NAS1-7199	NAS1-7199	NAS1-7199
189C	PA-I	74	NAS1-7199	NAS1-12500	NAS1-12500	NAS1-9258	NAS1-7199	NAS1-7199	NAS1-11400
190C	PA-I	74	NAS1-7199	NAS1-10000	NAS1-12500	NAS1-9258	NAS1-7199	NAS1-7199	NAS1-7199
191C(1)	PA	74	NAS1-7199	NAS1-10000 NAS1-12500	NAS1-12500	NAS1-9258	NAS1-7199	NAS1-11400	NAS1-7199
192C	NAVY	80R	NAS1-7199	NAS1-12500 NAS1-15000	NAS1-15000	NAS1-13100	NAS1-11400	NAS1-14200	NAS1-14200

(1)Fifth stage - NAS1-7102.

TABLE XXXVI - SUMMARY OF SOFTWARE CONTRACTS FOR EACH PHASE VI SCOUT VEHICLE(1)

Vehicle	Payload	Launch Year	Payload Coordination			Preflight Planning	Data Reduction	Systems Engineering	
			General(2)	Prelim.Traj.	Special Studies			Production	Certified
178C	Navy-16	73	10000-12500	-	-	10000	12500	6020	7256
179CRR	AIR FORCE	76	10000-12500	7256-12500	12500	10000-N 12500-A	1250	6020	7256-10000 12500
180C	CAS-A(EOLE)	71	6020 - 7256 10000	7256	6020	10000	10000	7256	10000
181CR	GRS-A2(AEROS)	72	7256-10000	7256	10000	10000	10000	7256	10000
182C	Navy-15	72	6020-7256 10000	-	-	10000	10000	7256	10000
183C	UK-4	71	7256-10000	7256	7256	10000	10000	7256	10000
181C	CAS-B	Canceled	10000	-	-	-	-	7256	-
-	MSS-A(P&FA)	Canceled	7256	7256	7256	-	-	-	-
184C	MTS-A	72	10000	10000	10000	10000	10000	7256	10000
185C	ESRO-IV	72	7256-10000	10000	10000 - 7256	10000	10000	7256	10000
186C	AEROS-B	74	10000-12500	12500	10000	12500	12500	7256	10000
187C	UK-5	74	10000-12500	10000	10000	12500	12500	7256	10000
188	UK-X4	74	10000-12500	10000	10000	12500	12500	7256	10000
189	ANS-A	74	10000-12500	10000	10000	12500	12500	7256	12500
190	SM-C2	74	10000-12500		7256	12500	12500	7256	10000
191	NPE-A	74	10000-12500	10000-12500	10000	12500	12500	7256	10000-12500
192	NAVY-20	81	15000	-	-	15000	15000	7256	12500-15000

(1)All contract numbers are preceded by "NAS1-."
(2)Includes General Coordination, interface drawings, and heat shield and umbilical designs.

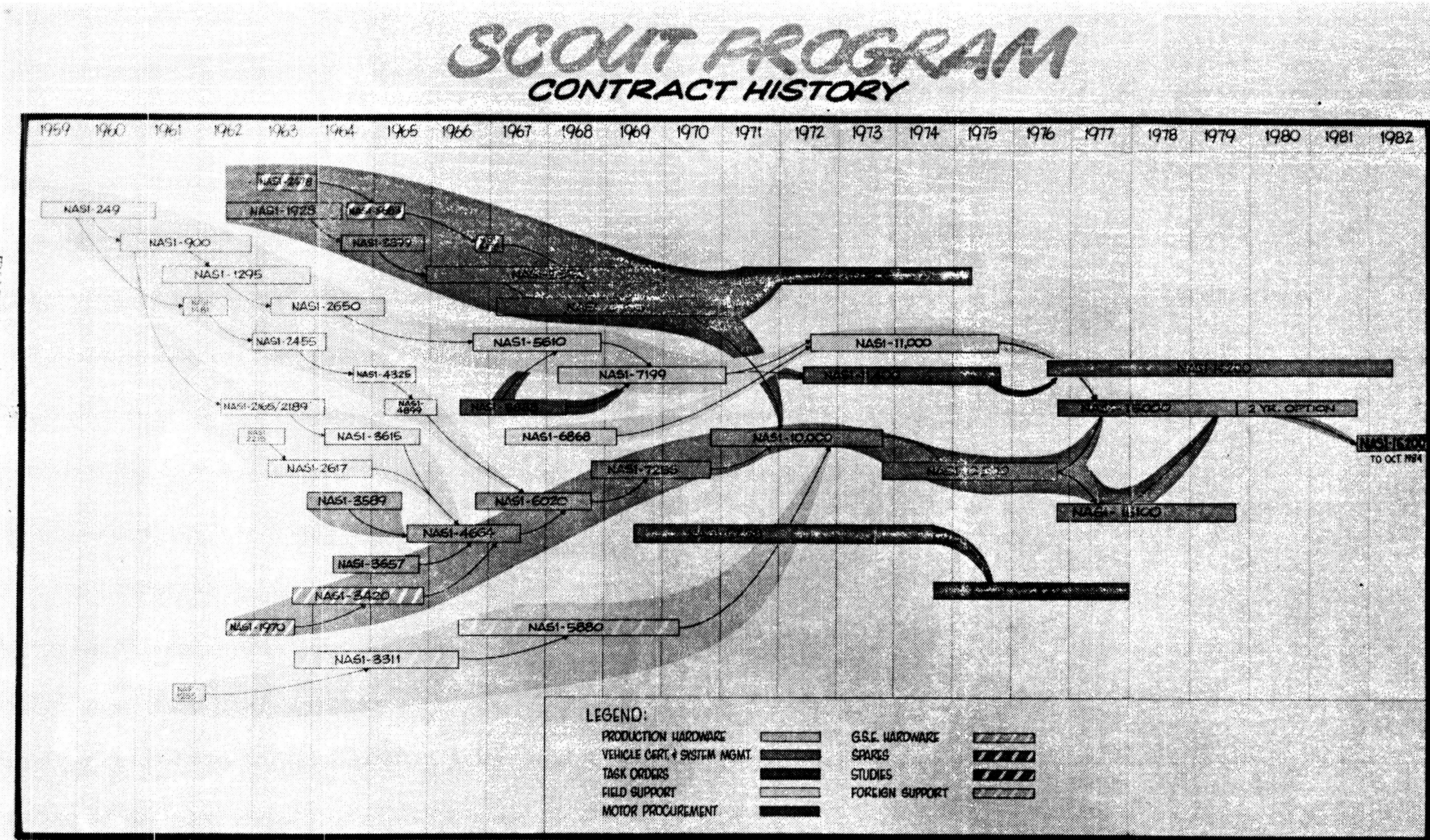

Figure 66.- Historical Layout of Scout Contracts.

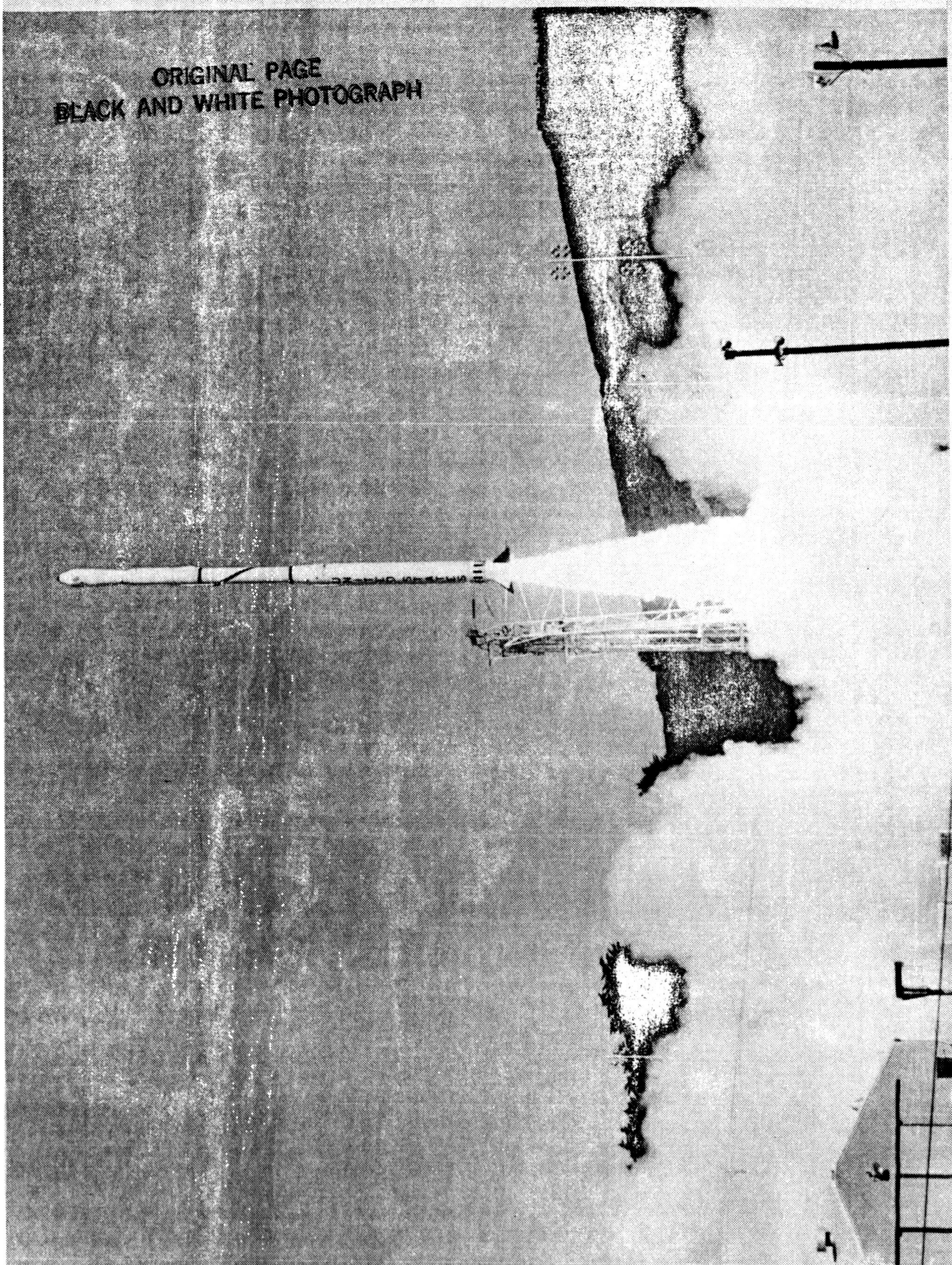

Figure 67.- Typical Orbit With International Payload (UK-4), S-183C.

TABLE XXXVII - SCOUT - NAS1-5610 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

Contract		TOTAL
	15 Scout Vehicles less Motors	$6,901,500
	Scout 163	
	Scout 164	
	Scout 165	
	Scout 166	
	Scout 167	
	Scout 168	
	Scout 169	
	Scout 170	
	Scout 171	
	Scout 172	
	Scout 173	
	Scout 174	
	Scout 175	
	Scout 176	
	Scout 177	
	1 Transition C Structure	18,350
	1 Transition Lower D Structure	6,655
	1 Heat Shield	16,500
	17 Algol Rocket Motors (1 Q.A.)	2,160,700
	IIB-59 Scout 161	
	IIB-60 Scout 168	
	IIB-61 Test	
	IIB-62 Scout 160	
	IIB-63 Scout 172	
	IIB-64 Scout 167	
	IIB-65 Scout 164	
	IIB-66 Scout 175	
	IIB-67 Scout 169	
	IIB-68 Scout 174	
	IIB-69 Scout 163	
	IIB-70 Shelf Life Study	
	IIB-71 Scout 166	
	IIB-72 Scout 171	
	IIB-73 Scout 165	
	IIB-74 Scout 173	
	IIB-75 Scout 176	
	3 Algol Nozzle Assemblies (Spare)	52,140
	4 Algol Igniter Assemblies (Spare)	3,340
	2 Algol Squib Retainers (Spare)	352
	2 Algol Nozzle Leak-Check Tooling	1,490

TABLE XXXVII Continued - SCOUT - NAS1-5610 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

Contract		TOTAL
15 Castor II Rocket Motors	$1,495,200	
170 Scout 162		
171 Scout 169		
172 Scout 165		
173 Scout 167		
174 Scout 164		
175 Scout 174		
176 Scout 171		
177 Test		
178 Scout 163		
179 Scout 172		
180 Scout 175		
181 Scout 177		
182 Scout 173		
183 Scout 166		
184 Scout 176		
1 Castor Pyrogen Igniter (Spare)	1,693	
16 Antares X-259 Motors	912,960	
B3-211 Reject - Test, AEDC		
B3-212 Scout 158		
B3-213 Scout 162		
B3-214 Scout 172		
B3-215 Scout 165		
B3-216 Scout 167		
B3-217 Scout 169		
B3-218 Scout 174		
B3-219 Scout 176		
B3-220 Scout 157		
B3-221 Scout 171		
B3-222 Test, AEDC		
B3-223 Scout 177		
B3-224 Scout 173		
B3-225 Scout 144		
B3-226 Scout 175		
16 FW-4S Motors	529,120	
2223-1 Scout 167		
2223-2 Scout 168		
2223-3 Scout 174		
2223-4 Scout 165		
2223-5 Scout 169		
2223-6 Scout 172		
2223-7 Scout 177		
2223-8 Scout 144		
2223-9 Scout 171		
2223-10 Scout 175		

TABLE XXXVII Concluded - SCOUT - NAS1-5610 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

Amendments			TOTAL
	Contract, Continued		
	16 FW-4S Motors - Continued		
	2223-11 Scout 166		
	2223-12 Scout 183		
	2223-13 Scout 185		
	2223-14 Scout 173		
	2223-15 Scout 180		
	2223-16 Scout 163		
			$12,100,000
M-1	(Funding Decrease)	-$1,000,000	
M-2	(Funding)	$3,100,000	$3,100,000
M-3		$ 34,695	$ 34,695
M-4	(CCN's 1, 2, 5)		
	CCN-1	$ -5,100	
	CCN-2	6,500	
	CCN-5	2,114	
			$ 3,514
M-5	Admin. Change	$ 0	$ 0
M-6	(CCN's 6, 8, 9) Deletion Initiators	$ 0	$ 0
M-7	(CCN's 3, 10)		
	CCN-3	$ 23,696	
	CCN-10	52,740	
			$ 76,436
M-8	(CCN's 7, 12, 13)		
	CCN-7	$ 9,500	
	CCN-12	2,400	
	CCN-13	11,950	
			$ 23,850
M-9	(CCN's 4, 14, 15)		
	CCN-4	$ 1,000	
	CCN-14	5,600	
	CCN-15	2,300	
			$ 8,900
M-10	(CCN's 16, 17)		
	CCN-16	$ 10,500	
	CCN-17	56,630	
			$ 67,130
M-11	(See M-15)	$ 0	$ 0
M-12	(See M-15)	$ 0	$ 0
M-13		$ 3,205	$ 3,205
M-14	Delivery Schedule Change	$ 0	$ 0
M-15	(M's 11, 12)	$ 1,257	$ 1,257
M-16		$ 24,846	$ 24,846
		TOTAL CONTRACT	$12,343,833
		TOTAL FUNDED	$12,343,833

TABLE XXXVIII - SCOUT - NAS1-6020 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

TASK	TARGET COST	TARGET PROFIT	TARGET PRICE
A. Administration	$1,885,272	$185,699	$2,070,971
B. Payload-02	200,039	19,704	219,743
C. Preflight Planning-02	268,077	26,406	294,483
D. Data Analysis-02	759,858	74,846	834,704
E. Systems Engineering-02	1,861,123	183,314	2,044,437
F. Reliability-02	1,235,272	121,675	1,356,947
G. Standardization-02	797,591	78,564	876,155
H. Support to Veh. Checkout (Phase IV)-01	394,574	38,866	433,440
J. Vehicle Modifications & Checkout-01	732,964	72,197	805,161
K. Vehicle Checkout (Phase V)-01	1,151,123	113,387	1,264,510
L. Logistics-01	459,907	45,301	505,208
M. Wallops Island Field Team-02	1,697,137	167,169	1,864,306
N. AFWTR Field Team-02	486,078	47,879	533,957
P. Langley Research Center Field Team-02	336,985	33,193	370,178
R. Vehicle Failure Investigation-03	0	0	0
S. Emergency Propulsion Sys. Support-01 or -02	0	0	0
T. Customer Responsibility Changes	0	0	0
TOTAL FUNDED ($6,737,100)	$12,266,000	$1,208,200	$13,474,200
Mod. 1 (Incentive Change)	0	0	0
Cork-Base A - Task J	3,969	390	
Deutsch Connectors - Task J	4,075	401	
Switching Relay Mod Kit - Task J	5,723	564	
Delete Magnetic Pick-ups - Task J	(3,482)	(342)	
Training - Task N	5,679	560	
Delete AFWTR Field Team - Task N	(481,694)	(47,447)	
Mod. 2 (Funding $511,604-)	$(465,730)	$(45,874)	$(511,604)
Mod. 3 Funding ($1,904,628)	0	0	0
Rework EGSE and MGSE - Task H			
Mod. 4	7,890	777	8,667
Return Crew to Dallas - Task M			
Mod. 5 Funding ($511,604)	79,086	0	79,086
Mods. to Standard Procedures - Task G	10,134	998	
Mods. to EGSE - Task H	18,249	1,797	
Mod. 6	$28,383	$2,795	$31,178
X-258 Off-site Rep. - Task E	74,681	8,145	
X-258 RMRB - Task E	9,265	124	
Update Spares Inventory - Task L	20,125	1,982	
Mod. 7	$104,071	$10,251	$114,322

TABLE XXXVIII Continued - SCOUT - NAS1-6020 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

	FIXED PRICE	TARGET COST	TARGET PROFIT	TARGET PRICE
Call No. 1 - Spares	$ 7,213			
Call No. 2 - Spares	1,930			
Call No. 3 - Spares	6,086			
Call No. 4 - Spares	24,768			
Call No. 6 - Spares	23,257			
Call No. 7 - Spares	35,970			
Call No. 8 - Spares	12,374			
Call No. 10- Spares	2,078			
Mod. 8 - Spares	TASK L			$113,676
Mod. 9 Funding ($4,320,868)		0	0	0
Off-site Quality Rep., FW4S - Task E		$ 26,218	$ 2,582	
Heat Shield Mods. and Fit Checks - Task J		13,400	1,319	
Applic. Cork, Base A Fins - Task K		5,745	565	
Mod. 10		$ 45,363	$ 4,466	$ 49,829
Call No. 5 - Spares	$ 99,396			
Call No. 9 - Spares	29,136			
Call No. 11- Spares	2,337			
Call No. 12- Spares	18,648			
Call No. 13- Spares	42,988			
Call No. 14- Spares	5,814			
Mod. 11 - Spares	TASK L			$198,319
Penalty - Task E (S-152 Failure)		$ 0	$-375,000	
Mod. 12			$-375,000	$ -375,000
Call No. 15 - Failure Invest., S-152 - Task R		$162,000	$15,957	
Call No. 16 - X-259 Tests, S-152 - Task R		77,000	7,585	
Mod. Filters - Task K		24,400	2,400	
Mod. 13		$263,400	$25,942	$289,342
Call No. 17 - Spares	$ 785			
Call No. 19 - Spares	9,717			
Call No. 24 - Spares	11,918			
Call No. 25 - Spares	1,450			
Call No. 26 - Spares	165			
Call No. 27 - Spares	1,287			
Call No. 29 - Spares	3,505			
Call No. 33 - Spares	734			
Mod. 14 - Spares	TASK L			$ 29,561

TABLE XXXVIII Continued - SCOUT - NAS1-6020 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

FIXED PRICE	TARGET COST	TARGET PROFIT	TARGET PRICE
CCN No. 5 - Change in P/L Assignments - Task J	$ 7,000	$ 690	
Call No. 22 - Tests Base A Sect., S-158C - Task R	1,210	119	
Call No. 32 - Replacement, Veh. Components - Task R	48,700	4,797	
Return Crew to Dallas - Task M	10,998	0	
Off-site Qual. Rep., X-258 - Task E	11,835	1,166	
Audit Subcontractor - Task F	4,898	482	
Adding NAS1-7199 Tool Maintenance - Task H	48,249	4,753	
Mod. 15	$132,890	$ 12,007	$144,897
Call No. 18 - Inspect 5 X-259 Motors - Task S	$ 18,882	$ 1,416	
Call No. 20 - Decontaminate Algol IIB-17 - Task S	534	40	
Call No. 21 - X-258-130 Stat. Fire (Prep.) Task S	17,573	1,338	
Call No. 23 - Igniters - Task S	9,328	681	
Call No. 30 - Change Nozzle on Algol IIB-20 - Task S	881	68	
Call No. 31 - Replace Algol IIB-53 on S-157 - Task S	2,970	190	
Call No. 34 - Rework Algol IIB-55 - Task S	1,988	155	
Call No. 35 - Modify 16 X-259 Nozzles - Task S	5,808	407	
Call No. 38 - Explosive Bolt Shelf Life - Task S	297	21	
Call No. 39 - Repair Castor Drill Jig - Task S	1,368	109	
Mod. 16	$ 59,629	$ 4,425	$ 64,054
CCN-4 - Rev. Scout Stand. Procedures - Task G	$ 10,500	$ 1,034	
Call No. 28 - Test Base A, S-157C - Task R	3,899	384	
Mod. 17	$ 14,399	$ 1,418	$ 15,817
CCN-6 - Base A Fairings, S-160-162 - Task J	$ 1,275	$ 120	
Mod. 18	$ 1,275	$ 120	$ 1,395
Call No. 36 - Prep. for Ship., X-259 Motor - Task S	$ 612	$ 45	
Call No. 37 - Aging Prgm. for X-258 Mtrs./Ign. -Task S	74,861	5,907	
Call No. 41 - Fourth-Stage Initiators - Task S	3,866	257	
Call No. 45 - Batch Test Motors - Task S	3,241	219	
Call No. 47 - Instru., FW-4S Rocket Mtr. - Task S	11,656	1,146	
Call No. 48 - Shelf Life Ext. M-125 Init. - Task S	684	52	
Call No. 49 - Rework Algol IIB-55 Ign. Sleeve - Task S	2,081	166	
Call No. 54 - Removal X-258 Nozzle - Task S	2,061	141	
Call No. 56 - Fab. Aft Insul. Mold, X-259 Mtrs.- Task S	10,558	752	
Call No. 57 - X-ray Castor Rocket Mtr. Noz. - Task S	979	63	
Mod. 19	$110,599	$ 8,748	$119,347

TABLE XXXVIII Continued - SCOUT - NAS1-6020 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

	FIXED PRICE	TARGET COST	TARGET PROFIT	TARGET PRICE
Call No. 40 - Spares	$ 2,125			
Call No. 42 - Spares	65,025			
Call No. 43 - Spares	6,771			
Call No. 44 - Spares	5,812			
Call No. 46 - Spares	1,767			
Call No. 50 - Spares	4,900			
Call No. 52 - Spares	1,606			
Call No. 53 - Spares	15,987			
Call No. 55 - Spares	4,549			
Call No. 58 - Spares	1,157			
Call No. 59 - Spares	2,305			
Mod. 20 - Spares	TASK L			$ 112,004
Mod. 21 (See Mod. 29) - Task K		$ 0	$ 0	$ 0
Mod. 22 (See Mod. 25) - Task K		$ 0	$ 0	$ 0
Mod. 23 (See Mod. 29) - Task K		$ 0	$ 0	$ 0
CCN-7 - Instrumentation for S-161 - Task K Mod. 24		$17,200	$ 1,700	$ 18,900
Mod. 25 (Cancel Mod. 22) - Task K		$ 0	$ 0	$ 0
Mod. 26 (See Mod. 37) - Task B		$ 0	$ 0	$ 0
Penalty - Task E (S-160 Failure) Mod. 27		$ 0	$ -375,000	$ -375,000
Call No. 60 - Spares	13,675			
Call No. 62 - Spares	5,302			
Call No. 63 - Spares	3,025			
Call No. 64 - Spares	4,470			
Call No. 65 - Spares	3,820			
Call No. 66 - Spares	8,375			
Call No. 67 - Spares	165			
Call No. 70 - Spares	1,749			
Mod. 28 - Spares	TASK L			$ 40,581
M-21 - Red. 1st & 2nd Stg. Hdcp. Pres.Tub. - Task K		$ 8,375	$ 835	
M-23 - Ext. Shelf Life EX-38 Pres.Cart. - Task K		1,715	175	
Mod. 29		$10,090	$1,010	$ 11,100

TABLE XXXVIII Continued - SCOUT - NAS1-6020 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

FIXED PRICE	TARGET COST	TARGET PROFIT	TARGET PRICE
Call No. 51 - S-160C Flight Anomaly Invest.-Task R	$674,000	$40,000	
Mod. 30			$ 714,000
Mod 31 - Off-site Quality Rep. at UTC - Task E	$ 6,752	$ 668	$ 7,420
Mod. 32 - Cancel. of Prep. for Ship. X-259 Chamb.-Task S	$ -612	$ -45	-657
Mod. 33 - Termination of 5 Vehicles-Tasks B, C, D, E, F, G, H, J, K, T	$ -769,095	$-60,000	$ -829,095
Mod. 34 - Termination of 5 Vehicles-Tasks B, C, D, E, F, G, H, J	$ 0	$ 0	$ 0
Call No. 61 - Radiography, Algol Nozzle - Task S	$ 2,330	$ 160	
Call No. 69 - Prep. of X-258 Motor for Shipment- Task S	3,137	220	
Call No. 73 - FW-4S Nozzle 30302 Leak Test - Task S	325	21	
Call No. 77 - Inspect. Castor IIA Nozzle Tool - Task S	364	27	
Mod. 35	$ 6,156	$ 428	$ 6,584
Mod. 20 (Revised) Spares $ -630			
Mod. 28 (Revised) Spares -888			
Call No. 65A - Spares 1,333			
Call No. 68 - Spares 22,448			
Call. No. 72 - Spares 13,510			
Call No. 74 - Spares 21,804			
Call No. 75 - Spares 459			
Call No. 76 - Spares 4,965			
Mod. 36 TASK L			$ 63,001
Mod. 22 - Dyn. Bal. Upper D Section - Task K	$ 1,500	$ 0	
Mod. 26 - P/L-to-Veh. Compatibility Analysis - Task B	4,700	450	
Mod. 37 - Canceling Mod. 22, Redes. 1st and 2nd Stg. Headcap Pressure Tubing - Tasks B, K	-1,530	0	
Mod. 37	$ 4,670	$ 450	$ 5,120
Mod. 38 - Retransfer Expenses of Personnel from Wallops Station - Task M	$-27,037	$ 0	$ -27,037
Mod. 39 - Incentive Fee, S-160C - Task E	$ 0	$250,000	$ 250,000

TABLE XXXVIII Concluded - SCOUT - NAS1-6020 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

FIXED PRICE	TARGET COST	TARGET PROFIT	TARGET PRICE
Mod. 40 - Change in Contractor's Division Name	$ 0	$ 0	$ 0
Mod. 41 - Underrun - Task E			
Asset Set Aside	$ 23,881	$ 2,352	
Employee Benefit Plan	97,045	0	
Workmanship Incentive	9,525	0	
Underrun	-579,397	0	
	$-448,495	$ 2,352	$ -446,143
Mod. 42 - Termination Sale Mat'l Credit-Task E	$ -142	0	-142
		TOTAL CONTRACT	$13,489,722

TABLE XXXIX - SCOUT - NAS1-7102 (CONTRACT HISTORY)
HERCULES INCORPORATED

Amendment	Item		Cost
Contract	Casting Powder (GFE)		$371,000
	1 BE3A9 Mockup	$11,300	
	1 BE3A9 Inert Motor	37,000	
	2 BE3 AEDC Test Motors	74,000	
	1 Balance Fixture	5,000	
	16 Spare Detonators	3,200	
	Documentation	18,500	
	6 BE3A9 Motors	222,000	
	AN09/001 Inert		
	AN09/003 Scout 191		
	AN09/005 Test/Shelf Life		
	AN09/006		
	AN09/008		
	AN09/010 Used by Germany on Firewheel Program		
M-1	(CCN 1, 2, 3) Design Improvements & Additional Tests		$101,875
M-2	Change in Government Furnished Property Clause		$ 0
M-3	BE-3-A1 Ignitor Mods. (CCN-1)		$ 54,200
M-4	Schedule Change		$ 0
M-5	Mods. to Test Fixtures, BE-3A-9 Test Program		$ 1,450
	TOTAL CONTRACT		$528,525

TABLE XL - SCOUT - NAS1-7199 (CONTRACT HISTORY)

LTV AEROSPACE CORPORATION

Contract		TOTAL
	*15 Scout B Vehicles(S-178-S-192)($6,639,540) (Funding $4,500,000)	$8,326,165
	2 Heatshields ($44,556) A-73, A-74	
	2 Castor Igniters ($6,414)	
	17 Castor II Motors (less initiators)($1,635,655)	
	185 Scout 144	
	186 Scout 180	
	187 Scout 184	
	188 Scout 185	
	189 Scout 187	
	190 Scout 190	
	191 Scout 181	
	192 Scout 183	
	193 Scout 179	
	194 Scout 178	
	195 Scout 170	
	196 Scout 197	
	197 Scout 182	
	198 Scout 188	
	199 Scout 191	
	200 Scout 186	
	201 Scout 189	
Amendments		
M-1(CCN-1)	16 X-259 Motors (Funding $400,000)	$1,187,002
	301 Scout 166	
	302 Scout 183	
	303 Scout 184	
	304 Scout 170	
	305 Scout 163	
	306 Scout 190	
	307 Scout 187	
	308 Scout 188	
	309 Scout 195	
	310 Scout 178	
	311 Scout 182	
	312 Scout 185	
	313 Scout 181	
	314 Scout 180	
	315 Scout 186	
	316 Scout 189	

*Includes heat shields A-58 through A-72.

TABLE XL Continued - SCOUT - NAS1-7199 (CONTRACT HISTORY)

LTV AEROSPACE CORPORATION

Amendments Continued		TOTAL
M-2	(Funding $1,900,000)	
M-3	Schedule Change	$0
M-4	2 Algol Igniters (Less Initiators)	$8,720
	1 Nozzle Housing	2,833
	17 Algol IIC Motors (Funding $700,000)	2,086,240
	76 Scout 177	
	77 Scout 144	
	78 Scout 180	
	79 Scout 187	
	80 Test	
	81 Unassigned	
	82 Unassigned	
	83 Scout 179	
	84 Scout 182	
	85 Reject - Replaced by 93	
	86 Scout 178	
	87 Unassigned	
	88 Unassigned	
	89 Scout 183	
	90 Unassigned	
	91 Unassigned	
	92 Unassigned	
	93 Unassigned	
M-5	Modification of 500-lb Reaction Control Motor/Valve Assy.	$6,690
M-6	(See M-15)	$0
M-7	Transfer of GFE Tooling	$0
M-8	(Funding $3,000,000)	
M-9	Radiographic Inspection of Castor II Nozzle Inserts	$7,025
M-10	(See M-11)	$0
M-11	Procurement of Additional Components (See M-14, No. 14)	$0
M-12	Procurement of the following:	$35,649
	Installation of Cork to Base A Fins — $11,200	
	Winterization Kits — 1,675	
	QCEPS-012 Revision — 21,350	
	X-259 Field Assembly Improvement — 1,424	

TABLE XL Continued - SCOUT - NAS1-7199 (CONTRACT HISTORY)

LTV AEROSPACE CORPORATION

Amendments Continued			TOTAL
M-13	(Funding $500,000)		$0
M-14	(Funding $1,485,324) Procurement of the following:		$825,000
	B Section T/M Junction Box Assys.	$ 32,000	
	C Section T/M Junction Box Assys.	41,200	
	Roll and Yaw Compensators	53,440	
	Ground Cooling Install. Compons.	2,325	
	Lower D Sect. Elec. Bundle Assy.	110,400	
	S-Band Antenna Sep. Compons.	17,152	
	S-Band Telemetry Transmitters	136,880	
	S-Band Telemetry Packages	369,435	
	Battery Adapter Plates	47,330	
	Coax Power Divider Brackets	1,428	
	Dummy Roll and Yaw Compensators	1,080	
	Vertical Shelf Gussets	4,950	
	Tunnel Harness Disconnect Bracketry	855	
	Lower D Sec. Elec. Harness Hardware	1,845	
	Special Bushings	4,680	
	(Includes Mods. to D Section Wiring Harness $8,700)		
M-15 (M-6)	Mods. for Compatibility with SBASI		$30,948
M-16	Procurement of 8 FW-4S Rocket Motors 2376 - 1 Scout 182 2376 - 2 Scout 181 2376 - 3 Scout 191 2376 - 4 Scout 190 2376 - 5 Scout 170 2376 - 6 Scout 186 2376 - 7 Scout 188 2376 - 8 Scout 184		$603,496
M-17	Winterization Kits		$-1,936
M-18	Repair 15 Algol II Handling Dollies		$13,450
M-19	Change in Government Furnished Equipment		$-4,487
M-20	Change in Delivery Schedule		$0
M-21	Change in Delivery Schedule		$0

TABLE XL Concluded - SCOUT - NAS1-7199 (CONTRACT HISTORY)

LTV AEROSPACE CORPORATION

Amendments Continued		TOTAL
M-22	3 Tires for Algol IIB Dolly	$277
M-23	Fabrication of Lower D Section Harnesses (SBASI)	$1,620
M-24	Vehicle Mods. to Accommodate Change from SBASI	$11,056
M-25	FW-4S Leak Test	$5,000
M-26	Correction Minor Admin. Errors on Schedule	$0
M-27	Change in Contractor's Division Name	$0
M-28	Algol IIC Storage at Aerojet General Corp.	$24,000
M-29	Change in Motor Delivery Schedule	$0
	TOTAL CONTRACT	$13,168,748

TABLE XLI - SCOUT - NAS1-7256 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

TASK	TARGET COST	TARGET PROFIT	TARGET PRICE
A. Program Management	$ 1,844,113	$126,909	$ 1,971,022
B. Payload Coordination	157,601	10,846	168,447
C. Preflight Planning	188,044	12,941	200,985
D. Data Reduction and Analysis	485,933	33,441	519,374
E. Systems Engineering	1,389,088	95,594	1,484,682
F. Reliability Program	1,273,269	87,624	1,360,893
G. Standardization & Configuration Control	823,039	56,640	879,679
H. Support to Vehicle Processing	202,637	13,945	216,582
# J. Vehicle Processing (Phases IV.a.(S-144RR) and V Vehicles)	1,136,035	78,180	1,214,215
K. Vehicle Processing (Phase VI Vehicles)	398,000	27,390	425,390
L. Logistics Support Management	429,547	29,561	459,108
M. Logistics Support Materials	500,000	0	500,000
N. Wallops Island Support	1,046,917	72,047	1,118,964
P. Langley Support	288,298	19,840	308,138
R. Failure Investigation	0	0	0
S. Emergency Support	0	0	0
T. Vehicle Processing Hardware	363,330	25,004	388,334
V. Tooling and GSE Maintenance	454,545	31,280	485,825
W. Certification Training	31,968	2,200	34,168
X. Training Film	22,636	1,558	24,194
TOTAL FUNDED ($4,710,000)	$11,035,000*	$725,000	$11,760,000

*Includes 500K cost reimbursable Task M.
**Fixed Price.
#Processed - 166P1, 170P2, 171P3, 172, 173, 174, 175, 176, 177, 178, 163, 179P3, 144P2, 180P1

TABLE XLI Continued - SCOUT - NAS1-7256 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

TASK		TARGET COST	TARGET PROFIT	TARGET PRICE
Mod. 1	S-166 D Section - Task J	$ 7,950	$ 750	$ 8,700
Mod. 2	Instrumented E-Section (See Mod. 6) - Task J	$ 0	$ 0	$ 0
Mod. 3	Install Cork to Base A Fins -Task K	$ 2,750	$ 260	$ 3,010
Call No. 1	- Shipping Material, S-163	$ 532		
Call No. 2	- Dwgs. and Specs. Emerg. Sup.	5,600		
Call No. 3	- Initiators and E-Sections	76,512		
Call No. 4	- San Marco Protective Barriers	4,797		
Mod. 4	(Funded)	Task S**		$ 87,441
Mod. 5	Funding ($3,190,000)			
Mod. 6	Instrumented E Section (Mod. 2) - Task J	$ 68,000	$ 6,600	$ 74,600
Mod. 7	Roll and Yaw Compensation S-176 - Task J	$44,000	$4,280	$ 48,280
Mod. 8	Incorp. Instrumentation for SBASI Flight Evaluation - Task J	$17,396	$1,675	$ 19,071
Mod. 9	Ignition Mods - Tasks J, K	$14,700	$1,400	$ 16,100
Mod. 10	D Section Mods - Task K	$28,900	$2,800	$ 31,700
Mod. 11	Spec. Change, S-144 - Task J	$ 0	$ 0	$ 0
Mod. 12	Heat Shield Mods - Task T	$ 6,975	$ 675	$ 7,650
Mod. 13	Statement of Work Change - Task J	$ 0	$ 0	$ 0
Call No. 5	- Retest S-169 Guidance Sys.	$ 8,858		
Call No. 6	- Mod. S-166 D Sect, P.L.Chng.	7,819		
Call No. 7	- Qual.Scout 4th-Stg.Lmt.Res.Box	6,524		
Call No. 8	- Elect.Eval.Tst.Scout Ign.Sep.Cir.	7,178		
Call No. 9	- Inspect.Castor II Rkt.Mtr.@ WTR	2,396		
Call No. 10	- Inspect.Castor II at WI	2,024		
Mod. 14	(Funded)	Task S**		$ 34,799

**Fixed Price.

TABLE XLI Continued - SCOUT - NAS1-7256 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

TASK		TARGET COST	TARGET PROFIT	TARGET PRICE
Mod. 15	Spec.Chg.to Inc.Proc.S-163CR - Task K	0	$ 0	$ 0
Mod. 16	Retrans.Exp.for WI Pers. from NAS1-6020 to NAS1-7256 - Task N	$27,037(Funded)	$ 0	$ 27,037
Mod. 17	Quality Rep. at UTC - Task F	$19,033	$ 1,665	$ 20,698
Mod. 18	Funding ($4,089,809)			
Mod. 19	E-Sect. Instrumentation (M-11,M-13)- Task J	$49,850	$ 4,800	$ 54,650
Call No. 12	- Fab. Scout Test Cables	$ 4,081		
Call No. 13	- Mods. S-166 and S-177 for GRP-A P/L Anten. Mount	1,519		
Call No. 15	- 10 Scout Base A Jet Vanes	19,600		
Call No. 17	- Inspect. Castor II Rckt. Mtr.	1,914		
Call No. 18	- Rework Scout Heat Shields	2,195		
Call No. 19	- X-258, X-259 Ign. Shelf-Life Vr.	10,195		
Mod. 20		Task S**		$ 39,504
Mod. 21	VAFB Launch Services 7-1-70 to 11-1-70 - Task N	$140,070	$11,556	$ 151,626
Mod. 22	Tooling and GSE Maint. - Task V	$ 41,692**		$ 41,692
Call No. 8	- Eval. Tests Scout Ign. System Circuits	$ -2,268		
Mod. 23		Task S		$ -2,268
Mod. 24	- Rev. Vol. III-Rocket Motor Manual (SOP)(See Mod. 30) - Task G	$ 0**		$ 0
Mod. 25	- Extension of Completion Date- Tasks C, D, F, G, K, M, T	$ 0	$ 0	$ 0
Mod. 26	- Tooling and GSE Maint. - Task V	$ 1,778		$ 1,778
Call No. 11	- Interim Pyrotechnics and GSE Requirements	$ 45,216		

**Fixed Price.

TABLE XLI Continued - SCOUT - NAS1-7256 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

TASK	TARGET COST	TARGET PROFIT	TARGET PRICE
Call No. 16 - Flight Instrumentation	33,500		
Call No. 21 - Services for BE3-A9 Motor	2,834		
Call No. 23 - Assign/Reassign X-259 Nozzles	203		
Call No. 24 - Heat Shield Neg.Press.Tests	12,534		
Call No. 25 - X-258 Igniter Shelf-Life Prog.	39,838		
Call No. 26 - Inspection S/N-55 Algol IIB Mot.	17,148		
Call No. 27 - T/M Signal Conditioning Unit, Roll & Yaw Comp. System (9)	26,627		
Call No. 28 - Extension Castor II Shelf-Life Program	75,065		
Call No. 29 - Inspect. Castor IIA Motor, S/N-184, at VAFB	2,427		
Call No. 30 - Algol III Test Components	1,607		
Call No. 32 - Crating Castor II Noz., 620-017	480		
Mod. 27	Task S**		$ 257,479
Mod. 28 - Mods. to Ignition Systems on Vehs. S-144, S-177, S-163, and S-175, and Incorp. GFE on Vehs. S-178 through S-181 - Task J	$ 2,700	$135	$ 2,835
Mod. 29 - Tech. at VAFB Sept. and Oct. 1970 - Task N	$ 4,558	$450	$ 5,008
Mod. 30 - Reconstructure SOP, Vol. III (Mod. 24) - Task G	$ 24,896	$2,427	$ 27,323
Mod. 31 - Contractor's Division Name Change			0
Mod. 32 - Change in Sched. of Mo. Bill. Prices			0
Call No. 14 - Inspection T/M Package and Transmitter	$ 2,172		
Call No. 20 - X-258 Igniter Shelf Life Verification Program	$ 10,312		
Call No. 22 - Algol IIB Motor Closure Assy.	$ 6,307		
Call No. 31 - Proc. 13 E-Sections	$ 93,340		
Call No. 33 - Fab. SOLRAD-C P/L Protective Shield	$ 2,448		
Call No. 34 - Prep. Transition Section D for 42-inch Static Load Test	$ 2,684		
Call No. 35 - Inspection Castor IIA Motor Nozzle Tool	$ 396		
Call No. 36 - Long Lead Time Components, S-144	$ 6,388		

** Fixed Price.

TABLE XLI Concluded - SCOUT - NAS1-7256 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

TASK			TARGET PRICE
Call No. 37 - S-144 Special Instrumentation	$ 17,554		
Call No. 38 - Reproduction of Documents	$ 408		
Mod. 20 Credit - Two X-258 Igniters	$ -1,400		
Mod. 33	Task S**		$ 140,609
Mod. 34 - Incentive Award			$ 425,000
Mod. 35 - Credit - Decrease in Scope			$ -589,669
Mod. 36 - Extension of Completion Date			$ 0
Mod. X - Funded Retransfer of Personnel			$ 27,037
Mod. 37 - Final Price Redetermination			
Task M - Spares Actual $487,953		$-12,047	
- Retransfer of Personnel $8,110		$-18,927	
Task S - Emergency Support $557,564		0	
Target Cost Adjustment $10,591,277 Overrun		$161,374	
Target Profit Adjustment 25% ($176,210)		$-44,053	
Task V - Tooling & GSE Maintenance (F.P.) $43,470		0	
			$ 86,347
		TOTAL CONTRACT	$12,781,000

TABLE XLII - SCOUT/NAS1-9258 (Contract History)

LTV AEROSPACE CORPORATION

Contract Funded ($1,300,000)			AMOUNT
Design and Develop Algol III			$2,300,000
Production Tooling			170,000
Engineering	11,642 hours	$183,015	
Manufacturing	8,111 hours	86,582	
Materials		46,235	
U.T.C. Subcontract		1,616,291	
Development - 2,300,000			
Tooling - 170,000			
Direct Charges		98,263	
G & A		301,716	
Profit		137,898	

OPTION NO. 1 (10 Motors) $1,300,550 (Not Accepted)

OPTION NO. 2 (15 Motors) $1,901,880 (Accepted)

OPTION NO. 3 (26 Motors) $3,225,300 (Not Accepted)

**Fixed Price.

TABLE XLII - SCOUT/NAS1-9258 (Contract History) Concluded

LTV AEROSPACE CORPORATION

Mod. 1	Administrative Change		$ 0	$ 0
Mod. 2	Funded ($668,000) SOP Mods			$ 61,200
Mod. 3	Case Test			$ 7,653
Mod. 4	Funded ($570,853)			$ 0
Mod. 5	Subcontractor Change			$ 0
Mod. 6	Change in Option Item, Statement of Work			$ 0
Mod. 7	Funded (OPTION NO. 2)			$1,901,880
	III-1	S-170		
	III-2	S-184		
	III-3	S-181		
	III-4	S-185		
	III-5	Test		
	III-6	S-190		
	III-7	S-188		
	III-8	S-191		
	III-9	S-186		
	III-10	S-189		
	III-11	S-194		
	III-12	S-195		
	III-13	S-196		
	III-14	Reject		
	III-15	S-193		
	III-16	S-197		
Mod. 8	Contract Name Change			$ 0
Mod. 9	Specification Change Scout Tooling			-2.500
Mod. 10	SNS - Waiver			-2,495
Mod. 11	Reduction in Unit Price for 2 Algol III Motors due to Extension of Period of Performance			-370
Mod. 12	Use of 2 GFE Algol III Motor Cases			-8,800
			TOTAL CONTRACT	$4,426,568

TABLE XLIII - SCOUT - NAS1-10000 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

TASK	TARGET COST	TARGET PROFIT	TARGET PRICE
A. Program Management	$ 3,847,000	$275,000	$ 4,122,000
B. Payload Coordination	300,520	21,480	322,000
C. Preflight Planning	382,650	27,350	410,000
D. Data Reduction and Analysis	878,220	62,780	941,000
E. Systems Engineering	3,018,250	215,750	3,234,000
F. Reliability Program	1,713,520	122,480	1,836,000
G. Standardization and Config. Control	1,150,740	82,260	1,233,000
H. Vehicle Process	1,517,530	108,470	1,626,000
J. San Marco Support	700,000	49,000	749,000
K. Certification Training	39,200	2,800	42,000
L. Logistics Support Management	969,690	69,310	1,039,000
M. Spares	500,000	0	500,000
N. Field Services Support	4,376,180	312,820	4,689,000
P. Langley Program	553,440	39,560	593,000
R. Special Programs	600,000	45,000	645,000
S. Program Support	0	0	0
T. Hardware	197,860	14,140	212,000
V. Tooling and GSE Maintenance	711,200	50,800	762,000
W. Failure Investigation	0	0	0
TOTAL FUNDED ($6,437,000)	$21,456,000	$1,499,000	$22,955,000
Retransfer of Personnel (N)	$ 158,976	$	$ 158,976

TABLE XLIII Continued - SCOUT - NAS1-10000 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

TASK	TARGET COST	TARGET PROFIT	TARGET PRICE
Mod. 1 Pricing Schedule Change	$ 0	$ 0	$ 0
Mod. 2 30 X-259 Initiators-RAS159 (1,606) Task T (Funded)	$ 23,319	$ 1,527	$ 24,846
Mod. 3 Jet Vanes and Fin Tips-RAS184,219 Task T (Funded)(64-Jet Vanes)(32 Fin Tips)	$ 231,454	$ 20,831	$ 252,285
Mod. 4 Contractor Name Change	$ 0	$ 0	$ 0
Mod. 5 See Mod. 11	$ 0	$ 0	0
Mod. 6 Algol III Flt. Hdwr. and GSE-RAS159 Task T	$ 114,016	$ 10,710	$ 124,726
Mod. 7 Funding ($200,000)-RAS196			
Mod 8 Processing Vehs. 187 through 191 at Wallops Island - Task H (Canceled by Mod. 18)	$ 0	$ 0	$ 0
Call No. 001 - Inspection Castor IIA Rocket Motor #'s 181,182,183	$ 2,686		
Call No. 002 - Inspect., Pkg. and Crating S-173	989		
Call No. 003 - Rework and Test San Marco Separation Systems	11,604		
Call No. 004 - Provisions 32 RMS Finish on FW-4S Motor Components	2,740		
Call No. 006 - Furnishing Long Lead Items for S-170	11,586		
Call No. 010 - Castor II Shelf Life Extens. Program and Aging Study	47,050		
Call No. 011 - Integration S/N 1 Fourth-Stg. S-Band & S/N 42 E-Section on 180**	3,431		
Call No. 012 - Purging and Vacuum Drying S-166 at Wallops	3,053		
Call No. 014 - Modification A-63 Heat Shield	532		
Mod. 9 (Funded)-RAS190	Task S*		$ $83,671

*Fixed Price **Later modified for UK-6.

TABLE XLIII Continued - SCOUT - NAS1-10000 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

TASK		TARGET COST	TARGET PROFIT	TARGET PRICE
Mod. 10	Installation Algol III Hardware Thermal Protection - Task H			$ 0
Mod. 11	(M5) Transportation to Support Launch Ops. at WTR-Task N (Funded $37,259)	$ 32,753	$ 2,300	$ 35,053
Mod. 12	Funding ($3,827,610)	$ 0	$ 0	$ 0
	F.P.I. - (2,966,610)			
	C.R. (861,999)			
Mod. 13	Task R Increase	$1,116,208		
	Task R Fee	83,716		
	TOTAL MOD. 13 - Task R			$1,199,924
Call No.	S-007 - GSE Mods. for SAS-B	$ 19,500		
Call No.	S-013 - FW-4S Motor Shelf Life	57,428		
Mod. 14	(Funded)	Task S*		$ 76,928
Mod. 15	Fourth-Stage Ignition and Telemetry Sys.-Task T	$ 413,132	$ 36,150	$ 449,282
Call No.	S-005 Furnishing Tool for Rocket Motor Igniters	11,203		
Call No.	S-008 Algol III Thermal Insul.	18,223		
Call No.	S-015 X-Ray X-259 Motor HIB-303	4,028		
Call No.	S-016 Inspection Castor II Rkt. Mtr.	2,240		
Call No.	S-017 Inspection Equip. Use Training	5,775		
Mod. 16	(Funded)	Task S*		$ 41,469
Mod. 17	Funding ($5,225,718)	$ 0	$ 0	$ 0
	F.P.I. - (4,179,794)			
	C.R. - (1,045,924)			
Mod. 18	Cancelation of Mod. 8 - Task H	$ 0	$ 0	$ 0
Call No.	S-009 Recertification of S-170	135,850		
Mod. 19	(Funded)	Task S*		$ 135,850

TABLE XLIII Continued - SCOUT - NAS1-10000 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

TASK		TARGET COST	TARGET PROFIT	TARGET PRICE
Mod. 20	Scout Hardware - Task T	$ 24,476	$ 2,325	$ 26,801
	Scout Tooling - Task V (Funded)	0	0	6,405
Mod. 21	Fabrication 4 E Sections Task T	$ 25,200	$ 2,300	$ 27,500
Mod. 22	Relocating Contractor Personnel (Definitized in Mod. 28) - Task P	$ 0	$ 0	$ 0
Mod. 23	Spares - Task M (Funded)	$ 250,000	$ 0	$ 250,000
Mod. 24	Funding ($2,600,000)			
Call No. S-018 - Refurb. Scout B Section		$ 9,315		
Call No. S-019 - Battery Cells		1,200		
Mod. 25	(Funded)	Task S*		$ 10,515
Mod. 26	Phase VII Production Support - Tasks E, F	$ 254,365	$ 58,893	$ 313,258
Mod. 27	San Marco Support Task J	$ 235,827	$ 16,508	$ 252,335
Mod. 28	(M22) Relocating Contractor Personnel - Task P	$ 4,445	$ 400	4,845
Call No. W-001 - Single Point Failure Investigation - Task W				
Mod. 29	(Funded)	$ 203,589	$ 15,269	$ 218,858
Mod. 30	Funding ($5,852,193.00) F.P.I. - (5,000,000) C.R. - (852,193)	$ 0	$ 0	$ 0
Mod. 31	Scout Tooling - Task V	$ -641	$ 0	$ -641

C-3

*Fixed price.

TABLE XLIII Continued - SCOUT - NAS1-10000 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

TASK			TARGET COST	TARGET PROFIT	TARGET PRICE
Call No. 020	Fab. Payload Protective Shield		$ 2,568		
Call No. 021	Ultrasonic Standards for Algol III Motor		6,341		
Call No. 022	Retuning Command Dest.Receivers		10,125		
Call No. 023	X-258 Motor, & Igniter Shelf Life Extension Program		40,979		
Mod. 32	(Funded)		Task S*		$ 60,013
Mod. 33	Task R Increase		$ 325,569		
	Task R Fee		24,431		
	TOTAL MOD. 33 - Task R				$ 350,000
Mod. 34	Funding (2,027,802)		$ 0	$ 0	$ 0
Mod. 35	San Marco Support-Task J		$ 228,970	$ 16,030	$ 245,000
Mod. 36	Task R Increase		$ 460,473		
	Task R Fee		34,527		
	TOTAL MOD. 36-Task R				$ 495,000
Call No. 024	Special Instrumentation Kits for X-259 Motors		$ 59,910		
Call No. 025	Mods. to Vehicle to Accommodate New Safe Arm Units		43,116		
Call No. 026	Launcher Base A Support Pins		8,525		
Call No. 027	Repair Algol III Motor Raceway Drill Fixture		7,469		
Call No. 028	Assembly Fourth-Stage Ignition		4,689		
Call No. 029	Furnish Long Lead Items		4,955		
Mod. 37	(Funded)		Task S*		$ 128,664
Mod. 38	Administration - Task R		$ 0	$ 0	$ 0

TABLE XLIII Concluded - SCOUT - NAS1-10000 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

TASK		TARGET COST	TARGET PROFIT	TARGET PRICE
Call No. S-030	GSE Changes	$ 44,359		
Call No. S-031	Incorp.GFE Ignition Kits	8,162		
Call No. S-032	Acceptance Testing GFE	6,192		
Call No. S-033	BE-3-A9 Shlf. Life Ext. Prog.	47,900		
Call No. S-034	Algol III Mod. Kits	29,490		
Call No. S-035	X-4 P/L Ignition Support	981		
Call No. S-036	Tone and Signal Generators	54,696		
Call No. S-037	4th Stg. Ign. and T/M Systems	1,301		
Call No. S-038	Thermistors	17,775		
Mod. 39	(Funded Task S)			$ 210,856
Mod. 40	Administrative Change	$ 0	$ 0	$ 0
Mod. 41	Revision - Task R	$ 0	$ 0	$ 0
Mod. 42	Schedule Change - Task S	$ -100	$ 0	$ -100
Mod. 43	Extension Completion Date	$ 0	$ 0	$ 0
Mod. 44	Transfer of Funds from Task R to Task J ($75,000)	$ 0	$ 0	$ 0
Mod. 45	Substitution of Veh. 179 for Vehicle 190-Task S	$ 0	$ 0	$ 0
Mod. 46	Schedule Change	$ 0	$ 0	$ 0
Mod. 47	Underrun	$ -194,031	$ -13,995	$ -208,026
	Award Fee			1,474,000
Mod. 48	Underrun - FPI	$-1,110,000	$ 277,500	$ -832,500
	Underrun - R	-260,000	0	-260,000
	(Retransfer Personnel - $157,000)			
	(Decrease in Task R - 103,000)			
Mod. 49	Redetermined:			$ -143,788
		TOTAL CONTRACT		$28,167,005

Summary:

TASKS A,B,C,D,E,F,G,H,K,L,N,P,T,Y (FPI) -	$21,242,650
W (Performance Award)	1,474,000
R (CPFF)	2,463,109 (-48,815)
J (CPFF)	1,300,387 (-30,101)
M (CPFF)	721,548 (-28,452)
Retransfer Field Personnel (FFP)	1,976
W (CPFF)	209,705
S (FFP)	747,866
V (FFP)	5,764
	$28,167,005

TABLE XLIV - SCOUT - NAS1-11400 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

TOTAL

Contract (Funding $2,819,000) $3,819,000

16 Castor IIA Motors ($1,565,952)

382 S-195		Case No. 899
383 S-196		Case No. 900
384 Sandia S-202		Case No. 901
385 S-192		Case No. 902
386 Sandia Unassigned		Case No. 903
387 Sandia S-203		Case No. 904
390 S-194		Case No. 905
391 Unassigned		Case No. 906
392 S-193		Case No. 907
393 S-200		Case No. 908
394 S-198		Case No. 909
395 S-201		Case No. 910
	(Not Loaded)	Case No. 911 (808 Unassigned)
	(Not Loaded)	Case No. 913 (809 Unassigned)
	(Not Loaded)	Case No. 914 (810 Unassigned)
	(Not Loaded)	Case No. 1399(811 Unassigned)

18 Antares II Motors ($1,158,840)

401 S-191	Case No. 199
402 S-179	Case No. 200
403 AEDC Test	Case No. 205
404 S-197	Case No. 203
405 S-193	Case No. 206
406 S-196	Case No. 201
407 S-194	Case No. 202
408 S-200	Case No. 207
409 S-198	Case No. 209

Case No. 204 Not Loaded	Motor No. 410 Unassigned
Case No. 208 Not Loaded (Mod 10)	Motor No. 411 S-201
Case No. 211 Not Loaded (Mod 10)	Motor No. 412 S-202
Case No. 212 Not Loaded (Mod 10)	Motor No. 413 Unassigned
Case No. 214 Not Loaded (Mod 10)	Motor No. 414 Unassigned
Case No. 215 Not Loaded (Mod 10)	Motor No. 415 Unassigned
Case No. 216 Not Loaded (Mod 10) Hydroburst (NAS1-12500 R44)	
Case No. 213 Not Loaded (Mod 10)	
Case No. 210 Not Loaded (Mod 10)	

16 Antares II Nozzles ($216,480)(One nozzle to 211 Test) Less Initiators

6 Antares IIB Retainer Rings

Goddard borrowed Case No. 912. All unloaded cases were GFP to contract NAS1-14200.

TABLE XLIV Continued - SCOUT - NAS1-11400 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

TOTAL

1 Altair IIIA Design Analysis and Demo Tests($300,205)

E01 Test-F (AEDC) 77^{o} Alt. Test Case No. 007
E02 Test-F (AEDC) 77^{o} Alt. Test Case No. 005
E03 Reject-Used for Analysis Deflection Case No. 001
E04 Reject-And Sectioned Case No. 002
E05 Reject-NDT-G.E. Case No. 004
E06 Reject-NDT-G.E. Case No. 006
E07 Test-F Demo-Sea Level 40^{o} FA T.C. (PQ-1) Case No. 017
E08 Test-Demo-Sea Level 77^{o} F (PQ-2) Case No. 022
E09 Qual. Test-Nozzle 013, Igniter 187-7 (SQ-1)
40^{o} sea level Case No. 018
E10 Reject-Droopy liner Case No. 019

19 Altair IIIA Motors ($572,166)
E11 77^{o} F Alt. test at T.C. Case No. 021
E12 Test-RPL-Qual. 77^{o} F Alt. Test at T.C. Case No. 016

E13 S-187	Case No. 008	Nozzle No. 006	Igniter No. 323-9		
E14 S-189	009	016	323-10		
E15 S-195	014	017	323-12		
E16 S-194	020	018	323-13		
E17 S-197	013	019	323-14		
E18 S-196	012	020	323-15		
E19 S-193	027	021	323-17		
E20 S-200	026	022	323-18		
E21 S-179	024	023	323-19		
E22 NRL	023	010	344-21		
UTC Test	010 (Case Only)(Mod 14)	E-26 (GFP to UTC.)			
UTC Test	011 (Case Only)(Mod 14)	E-27 (GFP to UTC.)			
H.E.P.	015A(Case Only)(Mod 14)	E-25 (H.E.P. Test, NAS1-12500)			
UTC Test	025 (Case Only)(Mod 14)	E-28 (GFP to UTC.)			
E29 S-198	028 (Case Only)(Mod 14)				
E30 NRL	029 (Case Only)(Mod 14)				
E31 Unassigned	030 (Case Only)(Mod 14)				

1 Altair IIIA Nozzle (004) ($5,357) - S-191

Amendments

M-1	New X-259 Retainer Rings	$	0
M-2	Administrative Change	$	0
M-3	Altair IIIA Tooling	$	2,100
M-4	Administrative Change	$	0
M-5(M1)	X-259 Hydrotests	$	7,858
M-6	(Funding $1,009,958)		

TABLE XLIV Continued - NAS1-11400 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

			TOTAL
M-7	Redirection X-259 Motors	(103,791)	$ 0
M-8	Adminstrative Change		$ 0
M-9	Delivery Schedule Change		$ 0
M-10	Change in Motor Quantities Ordered Cancel Loading Castor II No. 214 thru 217 Cancel Loading Antares II No. 410 thru 418 Cancel Loading Altair IIA Nos. 010, 011, 015A, 025, 028, 029, and 030	(-454,353)	$ 0
M-11	Change in Acceptance Schedule	(13,215)	$ 0
M-12	Algol Nozzle Mods and Schedule Change	(-3,199)	$ 0
M-13	Antares Nozzle Mods	(-4,968)	$ 0
M-14	Decrease in Loading of 20 Motors (M7,M10,M11,M12,M13) 4 Castors not Loaded 9 Antares II not Loaded 7 Altair III not Loaded	 (202,161) (120,713) (22,650)	$ -345,524
M-15	Finish 7 Altair III Nozzles		$ 0
M-16	Qual. Firing One Altair III at Vendor's Facility (Incl. in M-17)		$ 0
M-17	Test Firing Altair III Motor E-12	(23,000)	$ 0
M-18	(M15) Finish 7 Altair III Nozzles		$ 9,590
M-19	Altair III Case Requirement	(16,664)	$ 0
M-20	Inspection Altair III Test Motor	(4,600)	$ 0
M-21	Extension of Delivery Date		$ 0
M-22	Antares IIB Igniters (12)	(36,550)	$ 0
M-23	Addition of Igniter Hardware Components as Government Furnished Property	(17,103)	$ 0

TABLE XLIV Concluded - NAS1-11400 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

		TOTAL
M-24	(M16,17,19,20) Altair III Motor QUAL. Firing M16/17 Spec. Change M19 Inspect S/N 011 M20	$ 44,264
M-25	Change in Financial Reporting	$ 0
M-26	(M22,M23) Antares IIB and Altair III Igniters	$ 53,653
M-27	Altair III Motor Case, Aft Plate, and End Fittings (8) (1) Altair III Rocket Motor Less Igniter ($13,853) (GFE Nozzle and Igniter) (2) 8 Aft Plate ($2,944) (3) 8 End Fittings ($2,280)	$ 19,800
M-28	Inspection Antares IIB Igniters	$ 2,715
M-29	Inspection Antares IIB Igniters	$ -1,596
M-30	Name Change	$ 0
	TOTAL CONTRACT	$3,611,860

TABLE XLV - SCOUT - NAS1-12500 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

TASK	FUNDED	TARGET COST	TARGET PROFIT	TARGET PRICE
A. Program Management		$ 3,161,861	$ 221,108	$ 3,382,969
B. Mission Integration		376,480	26,328	402,808
C. Preflight Planning		158,216	11,064	169,280
D. Data Reduction and Analysis		282,836	19,779	302,615
E. Systems Engineering		1,979,540	138,429	2,117,969
F. Reliability Program		1,514,636	105,918	1,620,554
G. Standardization and Configuration Control		788,284	55,125	843,409
H. Vehicle Processing and Launching		1,903,092	133,083	2,036,175
J. San Marco Support		279,432	20,568	300,000
K. Certification Training		38,593	2,700	41,293
L. Logistics Support Management		293,902	20,553	314,455
M. Logistics Support (Spares)		465,721	34,279	500,000
N. Field Services Support (WFC/VAFB)		2,665,010	186,363	2,851,373
P. Langley Program		437,760	30,613	468,373
R. Special Programs		931,441	68,559	1,000,000

TABLE XLV Continued - SCOUT - NAS1-12500 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

TASK		FUNDED	TARGET COST	TARGET PROFIT	TARGET PRICE
T.	Vehicle Production Support		$ 213,599	$ 14,937	$ 228,536
V.	GSE and Tooling Maintenance		486,191	34,000	520,191
TOTAL		FP $4,600,000 CR 1,000,000	$15,976,594	$1,123,406	$17,100,000
MAXIMUM INCENTIVE AWARD				800,000	800,000
TOTAL				$1,923,406	$17,900,000
M-1	Adjustment Man-hours and Material Charges - Task J		$ 0	$ 0	$ 0
M-2	Administrative Change		$ 0	$ 0	$ 0
M-3	San Marco Support - Task J		$ 227,907	$ 17,093	$ 245,000
M-4	Funding - Tasks J, M & R C.R. $745,000	$745,000	$ 0	$ 0	$ 0
M-5	Adjustment Man-hours and Material Charges - Task R		$ 0	$ 0	$ 0
M-6	Administrative Change - Task R		$ 0	$ 0	$ 0
M-7	Special Programs - Task R		$ 930,194	$ 69,765	$ 999,959
M-8	Schedule Revision		$ 0	$ 0	$ 0
M-9	Adjustment Man-hours and Material Charges - Task M		$ 0	$ 0	$ 0
M-10	Logistics Support Materials - Task M		$ 467,290	$ 32,710	$ 500,000

TABLE XLV Continued - SCOUT - NAS1-12500 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

			FUNDED	TARGET COST	TARGET PROFIT	TARGET PRICE
M-11	Incorporation Mod. Kits, Launch Facilities - Task N			$ 0	$ 0	$ 0
M-12	Funding	FPI CR	$2,400,000 1,255,000	$ 0	$ 0	$ 0
M-13	Addition of Two Vehicle Processings - Task H			$ 707,394	$ 49,716	$ 757,110
M-14	Increase in San Marco Support - Task J			$ 460,465	$ 34,535	$ 495,000
M-15	SPEAR Program			$ 0	$ 0	$ 0
CCN S-001	Mod. S-189 to Accept Algol III			11,855		
CCN S-002	Explosive Bolts			37,125		
CCN S-003	North Atlantic Phase Angle Voltmeters			8,900		
CCN S-004	Ablative Cork for Scout Vehicles			6,944		
CCN S-005	Fab. and Repl. Scout Tooling			39,118		
M-16	(Funded) Task S		$ 103,942	$ 103,942		$ 103,942
M-17	Increase in Manhour Efforts Task R			$ 929,246	$ 69,693	$ 998,939
M-18	Funding	FPI CR	$4,250,000 1,000,000	$ 0	$ 0	$ 0
M-19	(M-11 and M-15) - Tasks H, N, P Performance Incentive			$ 492,635	$ 43,106 100,000	$ 535,741 100,000
M-20	Support to Algol III Procurement Under NAS1-13100 - Tasks E, F			$ 243,189	$ 22,617	$ 265,806
M-21	Increase in Manhour Effort - Task R			$ 2,093,023	$ 156,977	$ 2,250,000
M-22	Change in Financial Reporting					$ 0
M-23	Increase in San Marco Support - Task J			$ 1,000,000	$ 0	$ 1,000,000
M-24	Funding	FPI CR	$1,750,000 2,500,000	$ 0	$ 0	$ 0

TABLE XLV Continued - SCOUT - NAS1-12500 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

			FUNDED	TARGET COST	TARGET PROFIT	TARGET PRICE
M-25	Spares - Task M			$ 916,659	$ 55,255	$ 971,914
M-26	Schedule Change					$ 0
M-27	Performance Incentive			$ 601,578	$ 42,278 200,000	$ 643,856 200,000
	6 "200" Series E Sections			$ 84,426		
	6 "25" Series E Sections			84,426		
CCN	S-006			$ 168,852		
	9 Algol III Mod Kits			$ 486,846		
	62 Jet Vane/Assemblies			395,560		
	66 Fin Tips			38,742		
CCN	S-007			$ 921,148		
M-28	(Funded) Task S		$ 1,090,000	$ 1,090,000		$ 1,030,000
M-29	Option - 2 Processings Task H			$ 707,394	$ 49,716	$ 757,110
M-30	Increased Effort - Task R			$ 930,233	$ 67,442	$ 997,675
M-31	Administrative Change					$ 0
M-32	Funding	FPI CR	$ 3,250,000 1,800,000	$ 0	$ 0	$ 0
M-33	One Launch Option Performance Incentive			$ 300,789	$ 21,139 100,000	$ 321,928 100,000
M-34	Change from Mtls. to Labor in Task R					$ 0
M-35	Failure Investigation	CR	$ 394,421	$ 394,421		$ 394,421
M-36	Funding	FPI CR	$ 3,498,551 1,958,487	$ 0	$ 0	$ 0
	Performance Incentive Penalty for Vehicle 199			-33,000		$ -33,000
M-37	Decrease Task M Increase Task R			$ -319,098 316,306	$ -20,773 23,565	$ 0
M-38	Decrease Task M Increase Task R			$ -123,085 122,008	$ -8,024 9.101	$ 0

TABLE XLV Concluded - SCOUT - NAS1-12500 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

		FUNDED	TARGET COST	TARGET PROFIT	TARGET PRICE
M-39	Increase Effort - Task R	$ 959,792	$ 892,830	$ 66,962	$ 959,792
M-40	Reimbursable Manhours Change-Tasks J,M		0	0	0
M-41	Decreased Efforts - CR1	-1,692,000	-1,692,000		-1,692,000
M-42	Decrease in Traget Price	-140,948	-131,728	-9,220	-140,948
CCN S-008	Fab.& Repl. Scout Fin Tools		37,000		
M-43	(Funded) E7000V - Task S	37,000	$ 37,000		37,000
M-44	Redetermined				-633,443
TOTAL		$30,759,245	$27,642,186	$3,117,059	$30,125,802

(1)	TASKS A,B,C,D,E,F,G,H,K,L,N,P,T,V	$18,199,403	(FPI)
(2)	J	1,462,384	(CPFF)
(3)	M	1,350,244	(CPFF)
(4)	R	6,443,700	(CPFF)
(5)	W	413,129	(CPFF)
(6)	S	1,230,942	(FFP)
(7)	Performance Award	1,026,000	
TOTAL		$30,125,802	

TABLE XLVI - SCOUT NAS1-13100 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

	Funded		Total
Contract	$1,500,000		$2,961,430
2 Algol III Motors (GFP Cases)		($ 346,982)	
5504-1P17 - S-200 (Case 1013)			
5504-2P18 - S-198 (Case 1010)			
5 Algol III Motors		(1,430,735)	
(1)5504-3P19 - Test (Case 2001) (Case refurbished on NAS1-14200)			
5504-4P20 - S-201 (Case 2002)			
5504-5P21 - S-192 (Case 2003)			
5504-6P22 - S-202 (Case 2005)			
5504-7P23 - S-203 (Case 2004)			
10 Algol III Cases		(680,000)	
10 Algol III Nozzles		(470,070)	

Case #	Scout	Nozzle #
2001	S-205	22
2002	S-206	23
2003	S-207	24
2004	S-208	25
2005	S-210	26
2006	S-212	27
2007	S-214	28
2008	S-216	29
2009	S-218	30
2010	S-219	31

	Funded		Total
Igniter Components, etc.		(33,643)	
M-1 Spare Igniter (#0042)	$ 6,279		$ 6,279
M-2 Change in Financial Reporting			$ 0
M-3 Change in Propellant Requirements			$ 0
M-4 Clarification Contract Priority Rating			$ 0
M-5 Algol III Motor Tooling		(40,260)	
Decrease in Nozzle Materials		(-8,040)	
			$ 32,220
M-6 Funding	$1,000,000		$ 0
M-7 Algol III Rocket Motor Case Tunnel Tabs Corrections			$ 0

(1) Case refurbished on contract NAS1-14200.

TABLE XLVI Concluded - SCOUT NAS1-13100 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

Contract		Funded		Total
M-8	Reduction in Quantity of Completed Algol III Nozzles			$ 0
M-9	Funding	$ 340,220		$ 0
M-10	Adjustment for Tunnel Tabs Correction (M7)			$ -3,710
M-11	Administrative Change			$ 0
M-12	Funding	$ 149,720		
M-13	5 Algol III Motors		($750,840)	866,564
	5504-8P24 - Unassigned (Case 2012) 5504-9P25 - Unassigned (Case 2013) 5504-10P26 - Unassigned (Case 2015) 5504-11P27 - Unassigned (Case 2014) 5504-12P28 - Assigned S-199 (Standby)(Case 2016)			
	1 Algol III Motor Case		(60,064)	
	1 Lot Algol III Propellant		(55,660)	
M-14	Decrease in Contract Fixed Price	$ -11,179		-11,179
M-15	Administrative Change			0
M-16	Adjustment in Contract Price	$ -2,345		-2,345
	TOTAL	$3,849,259		$3,849,259

TABLE XLVII - SCOUT - NAS1-14200 (CONTRACT HISTORY)
VOUGHT CORPORATION

Contract for Scout Motors $1,163,000

1. Castor IIA (6-30-77 + 1 every three weeks)

   (a) 10 Cases (Uninsulated) $237,300
   Case #'s 1399
   1400
   1401
   1402
   1403
   1406
   1407
   587-08
   587-09
   587-10

   (b) 10 Nozzles (Forgings) $102,500
   Nozzle #'s:
   867-02
   867-03
   867-04
   867-06
   867-07
   867-08
   293-01
   293-02
   293-03
   293-04

2. Antares IIA (3-31-77 thru 8-31-77)

   5 Motors (Less Igniters, Initiators and nozzles) $258,075
   (1) Cases - GFP
   (2) Casting Powder - GFP
   (3) Cork Sheets, Silver Paint, Tunnel Tabs - GFP

   Motor #'s:
   410 S-205 (GFE Case 204)
   411 S-201 (GFE Case 205)
   412 S-202 (GFE Case 206)
   413 S-204 (GFE Case 212)
   414 Unassigned (GFE Case 214)

3. Altair IIIA (6-30-77 thru 12-31-77)

   (a) 6 Motors (Less Initiators) $558,690
   (1) Pole Fittings - GFP
   (2) 3 Cases - GFP (028, 029, 030)
   (3) Initiators - GFP

TABLE XLVII Continued - SCOUT - NAS1-14200 (CONTRACT HISTORY)
VOUGHT CORPORATION

3. continued
(a) continued
Motor #'s:
E23 S-201 (Case 032, Nozzle 103, Igniter 037)
E24 NRL (Case 033, Nozzle 104, Igniter 038)
E25 S-192 (Case 034, Nozzle 101, Igniter 039)
E29 S-198 (Case 028, Nozzle 107, Igniter 027)
E30 NRL (Case 029, Nozzle 108, Igniter 029)
E31 Unassigned (Case 030, Nozzle 109, Igniter 035)

(b) 3 Igniters $ 6,435

M-1 Antares IIA Motor $ 40,629

1 Motor (Less Igniters, Initiators and Nozzles)
415 Assigned S-199 (GFE Case 215)

M-2 Altair IIIA Motor $ 261,645

3 Motors with Nozzles and Igniters Less Initiators ($118,245)
E26 S-203 (Case 036, Nozzle 106, Igniter 032)
E27 S-202 (Case 037, Nozzle 105, Igniter 034)
E28 AEDC Test (Case 038, Nozzle 102, Igniter 036)

12 Exit Cone and Flange Assemblies, and 12 Nozzle Throat Insulators ($134,400)

M-3 2 Core Covers, Repair of 1 Core Cover (Antares II) $ 1,080

M-4 Altair IIIA Motors $ 683,734
2 Motors with Igniters and GFE Nozzles Less Initiators ($149,052)
E32 Assigned 199 (Standby)
(Case 039, Nozzle 110, Igniter 041
E33 Unassigned (Case 040, Nozzle 111, Igniter 043)
4 Motors with Nozzles and Igniters
E34 NRL (Case 044, Nozzle 014, Igniter 046)
E36 NRL (Case 043, Nozzle 004, Igniter 048)
E37 NRL (Case 042, Nozzle 113, Igniter 045)
E38 Unassigned (Case 041, Nozzle 112, Igniter 112)

M-5 11 Antares III Motors $1,865,783
(a) 11 Antares III Motors Less Initiators ($1,540,374)
(b) 4 Antares III Cases ($ 159,716)
(c) 4 Antares III Nozzles ($ 142,736)
(d) Antares III Igniter Hardware ($ 15,055)
(e) Antares III Igniter, Less Initiators ($ 7,902)

TABLE XLVII Continued - SCOUT - NAS1-14200 (CONTRACT HISTORY)
VOUGHT CORPORATION

M-5 Continued			
	Motor #'s:		
	E-2 Unassigned (Case 014)(S-192)		
	E-3 Unassigned (Case 016)		
	E-4 Unassigned (Case 017)		
	E-5 Assigned Phase VIII (Case 018)		
	E-6 Assigned Phase VIII (Case 020)		
	E-7 Assigned Phase VIII (Case 021)		
	E-8 Assigned Phase VIII (Case 022)		
	E-9 Assigned Phase VIII (Case 023)		
	E-10 Assigned Phase VIII (Case 019)		
	E-11 Assigned Phase VIII (Case 024)		
	E-12 Assigned Phase VIII (Case 015)		
M-6	10 Castor IIA Motors		$1,456,423
	4 Castor IIA Motors with Igniters Less Initiators, with Case and Nozzle	($488,328)	
	6 Castor IIA Motors with Igniters Less Initiators, with Case and Nozzle Forging	($913,080)	
	1 Castor IIA Shelf-Life Program and Report	($ 55,015)	
	Motor #'s:		
	808 Unassigned (GFP Case 911)		
	809 Unassigned (GFP Case 913)		
	810 Assigned S-199 (Standby)(GFP Case 914)		
	811 Assigned Phase VIII (Case 1399)		
	812 Assigned Phase VIII (Case 1400)		
	813 Assigned Phase VIII (Case 1401)		
	814 Assigned Phase VIII (Case 1402)		
	815 Assigned Phase VIII (Case 1403)		
	816 Assigned Phase VIII (Case 1406)		
	817 Assigned Phase VIII (Case 1407)		
M-7	Altair III Rocket Motor with Igniter and Government-furnished Nozzle (Line Loss Motor)		$ 40,559
	Motor # E35 (Case 046, Nozzle 114, Igniter 047)		
M-8	Castor IIA Tests (See Mod. 13)		
M-9	Additional Testing & Inspection for Castor IIA Motor Production(See Mod. 13)		
M-10	10 Algol IIIA Motors (Cases GFP)		$2,216,445
	(a) 2 Algol IIIA Motors Less Initiators with Case, Nozzle, and Polymer	($443,312)	
	S/N 5505-1 (Case GFP 0001)		
	S/N 5505-2 (Case GFP 2001)		
	(b) 3 Algol IIIA Motors with Case, Igniter, Nozzle, and Polymer, Less Initiators	($608,127)	
	S/N 5505-3 (Case GFP 0005)		
	S/N 5505-4 (CASE GFP 1001)		
	S/N 5505-5 (Case GFP 2007)		

TABLE XLVII Continued - SCOUT - NAS1-14200 (CONTRACT HISTORY)
VOUGHT CORPORATION

M-10 Continued		
	(c) 1 Algol IIIA Motor with Case, Nozzle, Igniter, and Polymer, Less Initiator S/N 5505-6 (Case GFP 2008)	($194,010)
	(d) 4 Algol IIIA Motors with Case, Nozzle, Igniter, and Polymer, Less Initiators S/N 5505-7 (Case GFP 2009) 5505-8 (Case GFP 2010) 5505-9 (Case GFP 2011) 5505-10(Case GFP 2006)	($779,616)
	(e) Algol IIIA Motor Igniter, with Igniter Components and Polymer, Less Initiators	($ 4,171)
	(f) Algol IIIA Motor Igniter, With Polymer, Less Initiators	($ 51,716)
	(g) PBAN Polymer, Less Initiators(GFP Cases) S/N 5505-III-1, Phase VIII, (Nozzle 036) 5505-III-2, Phase VIII, (Nozzle 038) 5505-III-3, Phase VIII, (Nozzle 035) 5505-III-4, Phase VIII, (Nozzle 037) 5505-III-5, Phase VIII, (Nozzle 034) 5505-III-6, Phase VIII, (Nozzle 011) 5505-III-7, Phase VIII, (Nozzle 39M) 5505-III-8, Phase VIII, (Nozzle 40M) 5505-III-9, Phase VIII, (Nozzle 41M) 5505-III-10,Phase VIII, (Nozzle 42M)	($135,493)
M-11	Substituting Kentron International, Inc., for Vought Corporation	
M-12	Change to Antares IIA Motor Specifications	
M-13	Castor IIA Motor lesting and Inspection (Mods 8 and 9)	$ 50,418
M-14	4 Castor IIA Motors S/N IIA-818, Phase VIII (Case 587-08) IIA-819, Phase VIII (Case 587-09) IIA-820, Phase VIII (Case 587-10) IIA-821, Phase VIII (Case 587-11)	$ 748,064
M-15	Clarification of M-14 Changes	
M-16	Contract Schedule Changes	$ 258,510
M-17	2 Additional Antares IIIA Motors, Less Initors S/N E-13 E-14	$ 181,547
M-18	Procurement Additional Altair IIIA Fourth-Stage Motors	$1,310,039
M-19	Contract Schedule Change	$ 0

TABLE XLVII Concluded - SCOUT - NAS1-14200 (CONTRACT HISTORY)
VOUGHT CORPORATION

M-20	2 Additional Altair IIIA Igniters and Antares IIIA Motors, and 1 Additional Antares III Igniter S/N E-15 E-16	$ 256,600
M-21	Additional Altair IIIA Rocket Motor S/N E54	$ 101,505
M-22	Description Change on Contract Schedule	$ 0
M-23	Specification Change to Include 2 Lots of PBAN instead of 1	$ 0
TOTAL		$10,635,981

TABLE XLVIII - SCOUT - NAS1-15000 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

TASK		FUNDED	TARGET COST	TARGET PROFIT	TARGET PRICE
A	Program Management		$4,277,542	$373,755	$4,651,297
C	Preflight Planning		166,297	14,531	180,828
D	Data Reduction/Analysis		330,835	28,907	359,742
E	Systems Engineering		1,649,821	144,155	1,793,976
F	Reliability		2,047,759	178,925	2,226,684
G	Standardization & configuration Control		848,956	74,179	923,135
H	Vehicle Processing		1,799,280	157,214	1,956,494
L	Logistics Support Management		788,663	68,911	857,574
N	Field Services		5,795,953	506,428	6,302,381
P	Langley Support		726,743	63,500	790,243
T	Support to Production		901,537	73,773	980,310
V	STE/Tool Maintenance		866,614	75,722	942,336
TOTAL			$20,200,000	$1,765,000	$21,965,000
W	Incentive			$600,000	$600,000
CONTRACT		$3,350,000	$20,200,000	$2,365,000	$22,565,000

TABLE XLVIII Continued - SCOUT - NAS1-15000 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

TASK		FUNDED	TARGET COST	TARGET PROFIT	TARGET PRICE
M-1	Schedule Change		$ 0	$ 0	$ 0
M-2	Funding-Tasks C,D,E,F, G,H,L,N,P,T,V E7000E,F,G,H,L,P,T,V E7002N, 7200H,7201C,D,N	$4,046,000	$ 0	$ 0	$ 0
M-3	Retransfer Contractor Personnel-Task N-E7000N	$ 95,000	$ 95,000	$ 0	$ 95,000
M-4	Add - Task Y 5 Scout Vehicles ($4,099,634) 6 Heat Shields - 34"-40 ($422,943) 2 Heat Shields 42"-45 ($182,554) 5 Series 25 Separation Systems ($181,554) 1 Base-A Cable (S207)($6,868) 1 Set S^2ET Components ($113,671) 1 60-lb. Motor Chamber (S207)($1,921) 40 Weights ($5,806)		$ 4,517,568	$ 496,932	$ 5,014,500
M-5	Administrative Change		$ 0	$ 0	$ 0
M-6	Funding	$2,804,000	$ 0	$ 0	$ 0
M-7	Funding	$4,500,000	$ 0	$ 0	$ 0
M-8	Cost Reporting Change		$ 0	$ 0	$ 0
M-9	Production Support, 5 Vehicles, Task T E8000T, E8002T		$ 0	$ 0	$ 0
M-10	Production Support, 6 Altair IIIA, Task T, E8000T, E8002T		$ 0	$ 0	$ 0
M-11	Guidance System		$ 6,079,000	$ 390,000	$ 6,469,000
M-12	Administrative Change		$ 0	$ 0	$ 0
M-13	Production Support (5 Veh.) (Mods 8 & 9)		$ 320,229	$ 35,225	$ 355,454
M-14	Delete 2 Heat Shields		$ -164,057	$ -18,046	$ -182,103
M-15	Funding	$9,300,000	$ 0	$ 0	$ 0
M-16	Production Support, Antares IIIA Rocket Motor, Task T,E7000T, E7002T		$ 0	$ 0	$ 0
M-17	Production Support for Castor IIA, Task T		$ 0	$ 0	$ 0
M-18	Reconfigure Phase VIII Vehicles to Accommodate Phase VII Guidance System		$ 0	$ 0	$ 0

TABLE XLVIII Continued - SCOUT - NAS1-15000 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

TASK		FUNDED	TARGET COST	TARGET PROFIT	TARGET PRICE
M-19	Production Support (Mods 17 & 18) M-17 - $89,320 M-18 - $48,580		$ 137,900	$ 15,169	$ 153,070
M-20	Storage of Guidance System Components in GFE Stores		$ 97,426	$ 8,196	$ 105,621
M-21	Task J, San Marco Support Task M, Logistics Support Mat'ls Task R, Program Support		$5,923,011*	$ 444,230*	$6,367,241
M-22	Funding	$10,000,000	$ 0	$ 0	$ 0
M-23	Transfer of Money from Task R, Special Programs, to Task M, Logistics Support, Materials		$ 0	$ 0	$ 0
M-24	Transfer of spares inventory from contract NAS1-15100		$ 0	$ 0	$ 0
M-25	Period of Performance Ext.	$ 0	$14,771,000	$1,290,542	$16,061,542
M-26	Funding	$3,200,000	$ 0	$ 0	$ 0
M-27	Add 5 ITV Scouts, Task Y Incentive, Task W		$3,854,000	$ 423,940 400,000	$4,277,940 400,000
M-28	Funding Correction	$ 0	$ 0	$ 0	$ 0
M-29	Task T, Production Support	$ 0	$ 0	$ 0	$ 0
M-30	Retransfer of Personnel	$ 61,400	$ 61,400	$ 0	$ 61.400
M-31	Task T, Production Support	$ 0	$ 228,324	$ 25,116	$ 253,440
M-33	Task S, Program Support	$ 0	$ 0	$ 0	$ 0
M-34	Funding	$13,461,000	$ 0	$ 0	$ 0

* Cost Reimbursable.

TABLE XLVIII Concluded - SCOUT - NAS1-15000 (CONTRACT HISTORY)
LTV AEROSPACE CORPORATION

TASK		FUNDED	TARGET COST	TARGET PROFIT	TARGET PRICE
M-35	4th Stage T/M-Ignition Hardware (ITV Procurement)	$ 0	$ 0	$ 0	$ 0
M-36	Task S, Program Support (CCN-001)	$ 73,787**	$ 73,787	$ 0	$ 73,787
M-37	Change in Billing Sched.	$ 0	$ 0	$ 0	$ 0
M-38	Transfer of Funds (Task M and R)	$ 0	$ 0	$ 0	$ 0
M-39	Task S, Program Support (CCN-002)	$ 176,533**	$ 176,533	$ 0	$ 176,533
M-40	Funding	$5,839,000	$ 0	$ 0	$ 0
M-41	Delivery Schedule Change	$ 0	$ 0	$ 0	$ 0
M-42	Completion Date Change (CCN S-002)	$ 0	$ 0	$ 0	$ 0
M-43	Billing Schedule Change	$ 0	$ 0	$ 0	$ 0
M-44	Funding	$1,784,000	$ 0	$ 0	$ 0
TOTAL CONTRACT		$58,690,720	$56,371,121	$5,875,304	$62,247,425

**Firm Fixed Price.

TABLE XLIX - CONTRACT NAS1-15100, TASK R SPECIAL STUDIES

TASK NO.	DESCRIPTION	J.O. (E)	COST	TOTAL/ W/PROFIT
1	General Mission Integration	7000B	$ 174,204	$ 189,185
2	Salvage Antares IIB Nozzle Cones	7000Z	43,001	46,699
3	Rewrite of Vol. VII SOP, Standard Countdown Manual	7000G	18,873	20,496
4	Phase VIII Guidance Systems and Telemetry Test Philosophy	8003Y	47,099	51,149
5	Dynamic Analysis, HCMM	7201B	13,013	14,132
6	Algol IIIA Static Test	7000F	16,158	17,548
7	Ultrasonic Inspection Training	7000K	4,817	5,231
8	TRANSAT Spacecraft Design Tasks	7200B	7,131	7,744
9	HCMM Spacecraft Design Tasks	7201B	11,687	12,691
11	TRANSAT Heat Shield Mod. & Fit Check	7200H	50,578	54,928
12	Phase VIII Engineering Changes	8000E	12,162	13,208
13	Clean Room at WFC	70000	1,378	1,497
14	Vehicle S-200 Fourth-Stage T/M Mod.	7200Y	17,323	18,813
15	Testing of Phase VII Components to Apollo Test Levels	7000F	82,122	89,184
16	X-258 Motor Shelf Life Program	7002R	23,148	25,139
17	Design & Fabricate Miscellaneous GSE	70000	45,671	49,599
18	PCM Telemetry Pkg. Development	8000R	146,733	159,352
19	X-258 & X-259 Igniter Shlf.Lf.Anal.Prog.	7000R-7002R	7,957	8,641
21	Rev. Std. Handling Manual for NAD	7000G	12,648	13,736
22	Heat Shield Rework	7002H-7199H	7,334	7,964
24	Scout Guid.Sys. Integration	8003Y	700,674	760,930
25	Scout Users Manual Revision	7000B	15,289	16,604
27	N_2 Regulator & Shut-off Valv Eval.	7000F	30,321	32,929
28	Base A Algol III Seal Installation	8000Y	17,070	18,536
29	Performance & Trajectory Rept. Update	7000D	22,731	24,686
30	Base A Battery Terminal Replacement	7000Y	3,361	3,650
31	Historical Summary Report Update	7000D	18,467	20,055
32	Scout Software Development Center	8003Y	21,659	23,522
33	Fourth-Stage Dynamic Balance Study	7000G	53,833	58,463
34	34-25 inch H/S Extension Study	8000R	18,357	19,936
36	Simulated Payload Stiffening Structure	7000V	7,356	7,989
37	GSE Changes to S-208 & Sub., Ignition/ Destruct. Sys.	80000	37,412	40,629
38	Design for Adapting 25 Series E Sects. Clamp to 200 Series E Sections	7000R	18,865	20,487
39	Reconfig. TX-354-5 to TX-354-3 Castor IIA Motors	7005Z	39,796	43,218
40	S-198 Command Destruct Receiver Repl.	7198Y	14,336	15,569
41	HCMM Spacecraft Related Effort	7201H	47,865	51,981
42	Fourth-Stage Instrumentation/Ignition System, S-201	7201J	22,652	24,600
43	X-258 Nozzle Examination	7002R	55,873	60,679
44	Design, Dev., & Qual. Antares III Mtr.	8003Z	2,821,743	3,064,409

TABLE XLIX - CONTRACT NAS1-15100, TASK R SPECIAL STUDIES, Continued

TASK NO.	DESCRIPTION	J.O. (E)	COST	TOTAL/ W/PROFIT
45	Support Antares III Des., Dev., Qual. & Incorp. into Scout Vehicle	8003Z	$ 841,025	$ 913,352
47	Scout/TDRSS Compatibility Interface Stdy.	8000R	13,767	14,953
48	Scout Payload Weight Capability	7000D	5,309	5,766
49	Film Progress Report	7000D	44,015	47,800
50	Scout PCM Telemetry Integration	8000R	26,289	28,550
51	Scout PCM Telemetry GSE Integration	8000R	260,517	282,921
52	Scout Guidance System Integration	8003Y	199,552	216,713
53	Guidance System GSE Integration	8003Y	421,484	457,731
54	Third-Stage Coast Disturbance	7000W	73,962	80,323
55	Altair III Static Test Firing	8000R	6,052	6,574
57	Qual. Marotta Regulator Design Imp.	7000F	52,539	57,057
58	E-Section Clamp Prestrain/Loads Test	7198R	50,899	55,276
59	Data Collection Satellite Sys. Study	8000D	8,422	9,146
61	X-259 Nozzle Evaluation	7000W	51,226	55,631
62	Furnishing Manufacturing Engineering	8000E	31,928	34,674
63	Incorp. Altair IIIA in S-199	7199B,H	41,201	44,745
64	Printing of Scout User's Manual	7000B	2,014	2,187
65	Analysis & Des. 34",-55 Heat Shield	8003R	43,170	46,883
66	S-192 Fourth-Stage Instrumentation	6192R	20,262	22,005
67	Castor IIA Ultrasonic Equipment	70000	1,790	1,944
68	Feasbity. of Extending 42" Dia. H/S	8003R	17,767	19,295
69	Procurement of Graphite G-90	8003Z	26,202	28,456
70	Ultrasonic Inspection Rkt.Mtr.Recert.	7000K	17,472	18,975
71	Updated Scout Fluids Design Data	7000E	4,831	5,246
72	Mfg.&Qual. Series 200 Sep.Sys.Clamp	7000R	174,957	190,003
73	P/L Sep.Nuts & Attach Rings	7198Y	62,504	67,879
74	Work Breakdown Struct. Changes, Phase VIII Vehicles	8000A	14,442	15,684
75	S-199 Special Fourth-Stage Instruments	7199H	30,936	33,596
76	SAGE Spacecraft Design Tasks	7202B	18,870	20,494
77	Battery Processing	8000K	3,545	3,850
78	Delta Postflight Data Reduction, S200	7200D	6,008	6,525
79	Antares III Incorporation into S-203	7203R	77,185	83,823
80	S-207 Modifications	7207H	26,730	29,028
81	Fab.& Test Roll & Yaw Compensation Units	7000Y	67,168	72,944
83	Rework GFE Roll/Yaw Compensation Units	7199H-6192H	36,670	39,822
84	Review Radiographic Inspections	7000F	9,688	10,521
85	Scout Payload Scale Models	70000	20,378	22,131
86	Algol IIC Igniter Shelf Life	7002R	9,721	10,557
87	Balance Middle D-Section	7000R	10,596	11,507
88	Antares III G-90 Graphite Testing	8003Z	27,775	30,164
89	Payload Environmental Control System	70000	17,020	18,484
90	Antares III Retainer Rings Test	8003Z	21,772	23,644
91	S-207 From Storage	7207H	28,996	31,490
92	MAGSAT Design	7203B	26,259	28,517

TABLE XLIX - CONTRACT NAS1-15100, TASK R SPECIAL STUDIES, Concluded

TASK NO.	DESCRIPTION	J.O. (E)	COST	TOTAL/ W/PROFIT
93	Algol III SN5504-4	7000F	$ 3,452	$ 3,749
94	SAGE Effort	7202H	59,558	64,680
95	Altair IIIA Propellant Test	8000Z	15,642	16,986
97	Review Altair IIIA Radiographs	8000F	3,188	3,462
98	Homogenity Study, Altair III Propellant	8003Z	6,470	7,026
99	Aging Study Report-Scout Motors	8003Z	46,668	50,681
100	Servo Actuator Acceptance Test Box Mod.	7000F	4,554	4,946
101	Radiographic Inspect., Algol III Motors	7000F	14,449	15,692
102	Revision SOP	7000G	12,109	13,150
103	Reprogram Contractor Report (SPAC)	7000A	3,211	3,487
104	Algol IIC Motor Shelf Life	7002R	44,039	47,826
105	Antares III Special Instrumentation	8003Z	58,037	63,028
106	Replacement of Fin Meters	70000	12,424	13,492
107	Furnish & Test ATJ-S Graphite,Antares III	8003Z	5,184	5,630
108	Post-Cure of Phase VIII H_2O_2 Bladders	8005Y	58,736	63,786
109	Update of Design Data Reports	7000E	16,510	17,930
110	S^2ET Rate Gyro Unit & Body Bending Fltr.	7000R	16,852	18,301
111	NOVA-I Preliminary Trajectory	6192B,H,8208B,H,8210B	96,729	105,027
112	Technical Changes to Scout SOP's	7000G	9,368	10,174
113	Review of Vendor Supplier Fab. Processing	8000F	81,972	89,018
114	UK-6 Spacecraft Umbilical Design	7198B	7,988	8,675
115	Processing Bladders and H_2O_2 Tanks,S-207	7207H	17,925	19,467
116	DITTO for S-199	7199H	12,063	13,100
117	MAGSAT Heat-Shield Mods, A-412	7203H	55,809	60,608
118	Nozzle Materials Study	7000R	17,070	18,538
119	Bladder, Adhesion, Processing H202 Tanks and Filters	6192H	18,177	19,740
120	Algol IIC Shelf Life Ext.& Flight Test.	7000R	98,378	106,838
121	Altair IIIA Exit Cone Investigation	7000R	2,625	2,851
122	Documentation of Phase VII Drawings	7000E	13,368	14,518
123	Silver Zinc Battery Cell Development	7000R	10,615	11,528
124	Scout MAGSAT Telemetry Interface	7203J	8,725	9,475
125	Fabrication of UK-6 Umbilical Cable	7198H	2,413	2,621
126	Scout Standard Cyclic Life Test, Phase VIII Components	8002F,8005F	80,604	87,536
127	UK-6 Add Access Door to Dummy Heat Shield	71980	3,029	3,289
128	Fourth-Stage Instrumentation, S-203	7203J	31,329	34,023
129	Scout Standard Environmental Test	7000F	10,241	11,122
132	Ultrasonic Inspection, Recert. Field Prsnl.	7000K	3,445	3,741

VEHICLE PROCUREMENT

The Scout hardware contracts for Phase VI are identified in Tables XXXIII and XXXVI. Although all the 15 Phase VI vehicles were built on contract NAS1-7199 the heat shields varied. Following is the information on the Phase VI heat shields:

Vehicle No.	H/S Size	H/S No.	Contract Number	Contract for H/S Mods.
178	34/-25	A50	NAS1-5610	NAS1-7256
179	34/-40	A409	NAS1-11000	NAS1-12500
180	34/-25	A60	NAS1-7199	NAS1-10000
181	42/-45	A504	NAS1-6935-41	NAS1-10000
182	34/-40	A404	NAS1-6935-41	NAS1-10000
183	34/-25	A63	NAS1-7199	NAS1-10000
184	34/-40	A402	NAS1-6935-41	NAS1-10000
185	34/-40	A403	NAS1-6935-41	NAS1-10000
186	42/-45	A507	NAS1-6935-41	NAS1-10000
187	42/-45	A505	NAS1-6935-41	NAS1-10000
188	42/-45	A506	NAS1-6935-41	NAS1-10000
189	34/-40	A406	NAS1-6935-41	NAS1-10000
190	34/-25	A66	NAS1-7199	NAS1-12500
191	34/-40	A405	NAS1-6935-41	NAS1-10000
192	34/-40	A411	NAS1-15000	NAS1-15000

The Separation systems used in Phase VI are itemized showing the contract information for each Phase VI vehicle equipped with a Scout separation system:

Vehicle No.	Type	Serial No.	Test Unit No.	Contract No.
180	E	36	25	NAS1-6935
181	E	46		NAS1-7256
183	E	31	27	NAS1-6935
185	E	45	32-44	NAS1-7256
186	E	49		NAS1-7256
187	E	204	203	NAS1-10000
188	E	48	47-50	NAS1-7256
189	E	206	202	NAS1-10000
191	E	102	101	NAS1-10000

MOTOR PROCUREMENT

Table XXXV itemizes the contracts that supplied the motors for the Phase VI vehicles. It should be noted that NAS1-7199 was the major hardware contract for Phase VI, however contracts NAS1-5610, NAS1-5883(1), NAS1-7102(2), NAS1-9258, NAS1-11400, NAS1-13100(3), and NAS1-14200 also included Phase VI motors. The motors of Phase VI were all solid propellant and contracted as follows:

Quantity	Stage	NASA Contract
6	Algol IIC	NAS1-7199
8	Algol III	NAS1-9258
1	Algol III	NAS1-13100
14	Castor IIA	NAS1-7199
1	Castor IIA	NAS1-11400
12	Antares IIA	NAS1-7199
1	Antares IIA	NAS1-11400
1	Antares IIB	NAS1-11400
1	Antares IIA	NAS1-14200
3	Altair IIIA	NAS1-5610
1	Altair IIA	NAS1-5883
7	Altair IIIA	NAS1-7199
3	Altair IIIA	NAS1-11400
1	Altair IIIA	NAS1-14200
1	Alcyone	NAS1-7102

Although most of the few Scout failures were due to propulsion, there were not any Scout Phase VI failures of any kind. It was the only 100 percent successful phase to date.

The propulsion procurement staff not only contracted for the aforementioned motors, but the NASA contracts also included the following additional flight hardware:

Motor Initiators
Motor Igniters
Motor Casting Powder(4)
Squib Retainers
SBASI
Motor Nozzles
Motor Nozzle Inserts

(1)NAS1-5883 contract included the only X258 motor in Phase VI, expended on vehicle S-178.

(2)NAS1-7102 contract was for BE-3 fifth-stage motors used only on S-191.

(3)NAS1-13100 contract was for Phase VII Algol III motors with the exception of one first-stage motor for S-192.

(4)The motor Casting powder was procured independent of the motor for the third stage only.

Motor Tooling
Motor Cases
Motor Spares
Safe Arm Units
Explosive Bolts[1]
Spin Motors

In addition, procurement of nonhardware propulsion requirements were also required and are listed below:

New Motor Developments
Refurbishing Tooling
Motor Inspection
Storage Requirements
Technical Support
NDT Techniques
Quality Control Program
Quality Tests
Leak Tests
Hydrotest Cases
Flightworthiness Studies
Static Tests
Ground Support Equipment
Motor Spares Administration
Storage Facility Repairs
Motor Dollies
Motor Instrumentation
Anomaly Studies
Failure Investigations
Propulsion Ground Support Equipment
Case Cleaning
Shelf Life Studies and Tests
Packaging

Table XXXIII also lists the research and development contracts of the Scout Program. Phase VI contracts were initiated to cover each of the Scout propulsion systems for R & D requirements. These contracts were as follows:

NAS1-10485 - Algol II - Aerojet General Corporation[2]
NAS1-10484 - Algol III - United Technology Corporation
NAS1-10482 - Castor - Thiokol Corporation
NAS1-10483 - Antares II - Thiokol Corporation
NAS1-10481 - X-258 Altair - Hercules Incorporated
NAS1-10484 - FW4S Altair - United Technology Corporation
NAS1-7102 - BE-3 Fifth Stage Development
NAS1-8994 - NDT Study
NAS1-11867 - NDT Study

(1) Explosive bolts were used for stage separation.
(2) Contract was negotiated and set up; however, it was never required.

The one and only five-stage Scout "E" had special contractual requirements such as section "G" shown in figure 68. Figure 69 illustrates the Scout fifth-stage layout inside the heat shield, which shows section "G" and "F" and the BE-3A9 fifth-stage motor (detailed in figure 70).

The basic "G" section was composed of a conical magnesium adapter and separation clamp. The 3.07-pound "G" section is designed for spacecraft which do not require separation from the expended fifth stage. When separation of the spacecraft is required from the fifth stage, springs, plungers, pyrotechnic bolts and wiring harness are combined with section "G" to form the fifth stage separation system. The separation signal is initiated from the fifth-stage ignition system in the upper "F" 3.48-pound section. When the telemetry system is required, a transmitter, sub-carrier oscillators and a battery are added to the "G" section, which is used simultaneously with the beacon telesponder system.

ROCKET MOTOR SHELF LIFE PROGRAM

The allowable shelf life of the Scout rocket motor varies with each motor. The present shelf life status of existing Scout rocket motors is presented in figure 71. Figure 71(a) shows 1973 status, 71(b) 1977 status, and 71(c) the 1980 status.

Individual studies have been conducted in the past to upgrade the motor shelf life to the present limits shown. However, in order to provide a basis for using motors presently in inventory, which will exceed the established shelf life, and to allow the procurement of motors in more economical quantities, it is desirable that the shelf life of Scout motors be established at the maximum practical limit. Based on predicted launch schedules and projected motor deliveries, a shelf life goal of ten years was established for the Scout motors.

The planned and proposed programs for the Scout rocket motors are individually discussed below.

Algol IIIA (Figure 72).- Currently a shelf life test program under NAS1-15000 is underway. This program is intended to verify the existing 5 years limit as well as provide predictable data for increasing the life to 10 years. The test program consists of performing laboratory tests, every 6 months, for three years and includes propellant tests as well as bond in tension samples of the case, insulation, liner and propellant system. In addition, the design similarities between the FW-4S motors and the Algol III have allowed the use of FW-4S shelf life test data to confirm increased Algol III shelf life. The same conditions exist for the igniter. Its design similarity with the FW-4S igniter has allowed the use of past test data, and a shelf life increase is currently under consideration. Actual flight tests have been observed on a 46-month old motor.

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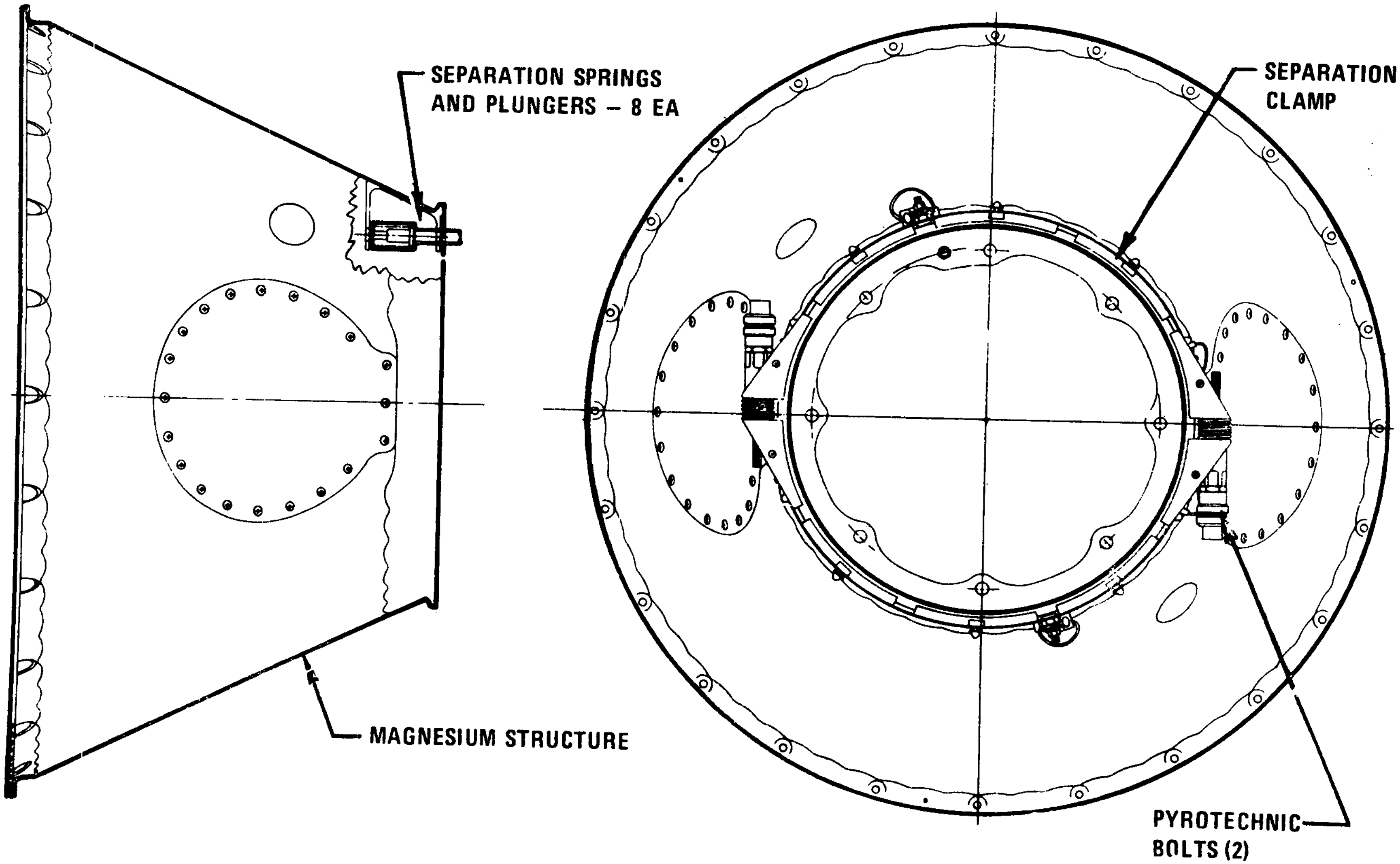

Figure 68.- Scout "G" Section Separation System.

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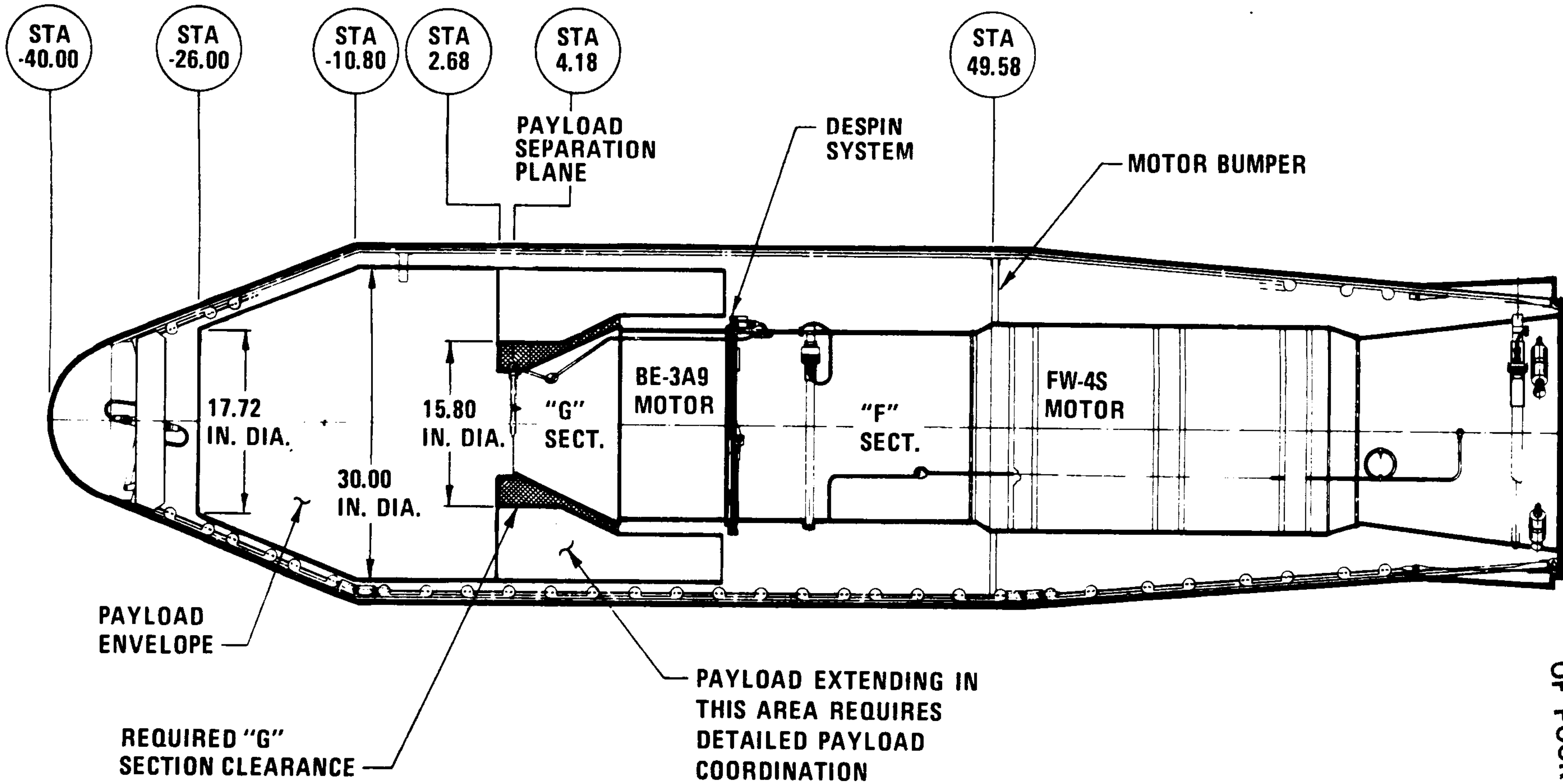

Figure 69.- Scout Fifth-Stage Layout.

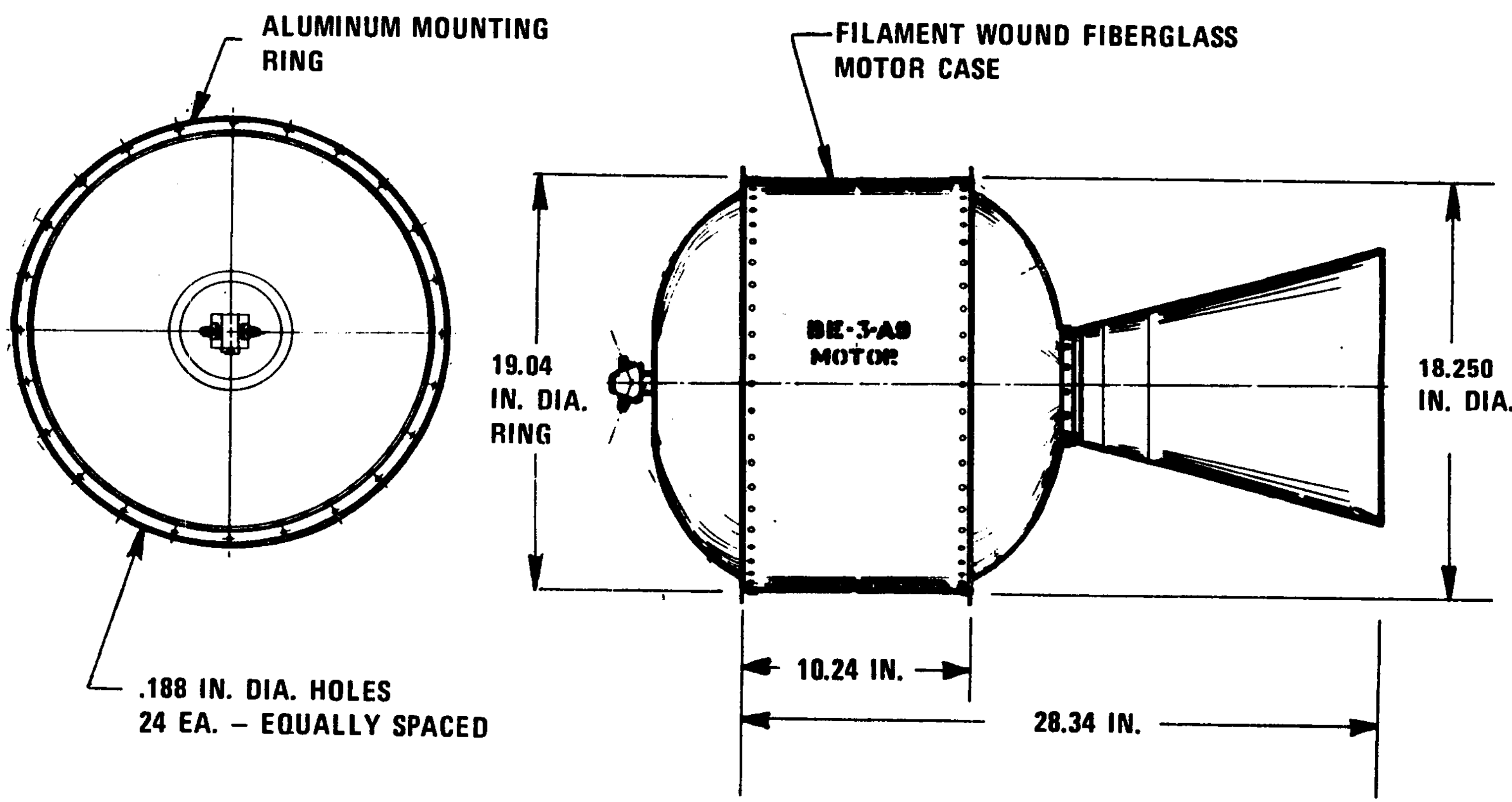

Figure 70.- Scout BE3-A9 Fifth-Stage Motor.

MOTOR SHELFLIFE SUMMARY

MOTOR	SHELFLIFE (YRS) PRESENT	TARGET	REMARKS
• ALGOL II	5	8	MOTOR S/N 70 HAS BEEN SET ASIDE FOR STATIC FIRING IN 1975
• ALGOL III	3	5	LAB TESTING BEING CONDUCTED AT 6 MOS. INTERVALS TO 3 YEARS
• CASTOR II	5	6	MOTOR S/N 177 HAS BEEN SET ASIDE FOR SHELFLIFE TESTING. LAB TESTING OF PROPELLANT AND BOND SYSTEM INITIATED IN 1972
• X-258	6	7	X-258 STATIC FIRED IN OVER-TEST CONDITIONS FOLLOWING TEMPERATURE CYCLE AND INSPECTION. EPON-946 LAB TESTING TO BE DONE
• X-259	5	7	INHIBITOR BOOT LAB TESTING TO BE DONE (2) X-259 MOTORS STATIC FIRED AT HIGH PRESSURE – DEC '72
• BE-3	3	8	PROGRAM INITIATED WITH OBJECTIVE OF 8 YEARS
• ALTAIR III	5	6	LAB TESTING OF 7 YEAR OLD MATERIALS COMPLETED LAB TESTING OF SYSTEM TO 6 YEARS REQUIRED WITH NEW VENDOR

Figure 71(a).- 1973 Status.

MOTOR SHELFLIFE SUMMARY

MOTOR	SHELFLIFE (YRS.) PRESENT	TARGET*	BASIS FOR PRESENT SHELFLIFE
• ALGOL IIC	8	10	OLDEST FLOWN-79 MOS. MATERIAL AND BONDLINE TESTING/ANALYSIS. **
• ALGOL IIIA	5	10	OLDEST FLOWN-31 MOS. MATERIAL AND BONDLINE TESTING/ANALYSIS. **
• CASTOR IIA	7	10	OLDEST FLOWN-82 MOS. MATERIAL AND BONDLINE TESTING/ANALYSIS. **
• ANTARES IIA	9	10	OLDEST TESTED-125 MOS. MATERIAL AND BONDLINE TESTING/ANALYSIS.
• ALTAIR IIIA	5	10	OLDEST FLOWN-34 MOS. MATERIAL AND BONDLINE TESTING/ANALYSIS. **
• BE-3	8	10	OLDEST TESTED-107 MOS. MATERIAL TESTING ON MINUTEMAN AND POLARIS.

* NOTE: A PROGRAM PLAN DEFINING REQUIREMENTS FOR A 10-YEAR SHELFLIFE FOR ALL MOTORS HAS BEEN PREPARED AND PRESENTED TO NASA/SPO.

** CONTINUING MATERIAL TESTING & ANALYTICAL PROGRAMS.

Figure 71(b) - 1977 Status.

MOTOR SHELFLIFE SUMMARY

MOTOR	SHELFLIFE (YRS) PRESENT	TARGET	BASIS FOR PRESENT SHELFLIFE	ACTIVE WORK
•ALGOL IIIA	5	10	OLDEST FLOWN-46 MOS. MATERIAL AND BONDLINE TESTING/ANALYSIS.*, **	SPECIMEN TESTING OF APPROX. 8 YR OLD MOTOR PROPELLANT/ BOND SYSTEM PLANNED
•CASTOR IIA	9	10	OLDEST FLOWN-82 MOS. MATERIAL AND BONDLINE TESTING/ANALYSIS* AND STATIC TEST OF 9.8 YR OLD MOTOR	INVESTIGATING METHODS TO EXTEND SHELF LIFE TO 10 YRS
•ANTARES IIA	9	10	OLDEST FIRED-126 MOS. MATERIAL AND BONDLINE TESTING/ANALYSIS	NONE
•ALTAIR IIIA	6	10	OLDEST FIRED-56 MOS. MATERIAL AND BONDLINE TESTING/ANALYSIS.*	NONE
•ANTARES IIIA	5	10	SUFFICIENT PLIMS MADE DURING DEVELOPMENT PHASE TO TEST ON AN ANNUAL BASIS FOR 10 YEARS. ONE MOTOR PLANNED TO BE SET-ASIDE DURING PRODUCTION FOR SHELF-LIFE PURPOSES.***	

* CONTINUING MATERIAL TESTING AND ANALYTICAL PROGRAMS.

** PROPELLANT AND BOND LINE TESTING COMPLETED TO 7 YEARS.

*** BY CONTRACT. VERIFICATION IN PROCESS. TESTING TO 1 YEAR COMPLETE

Figure 71(c).- 1980 Status.

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ALGOL IIIA MOTOR SHELF LIFE
(5 YEARS)

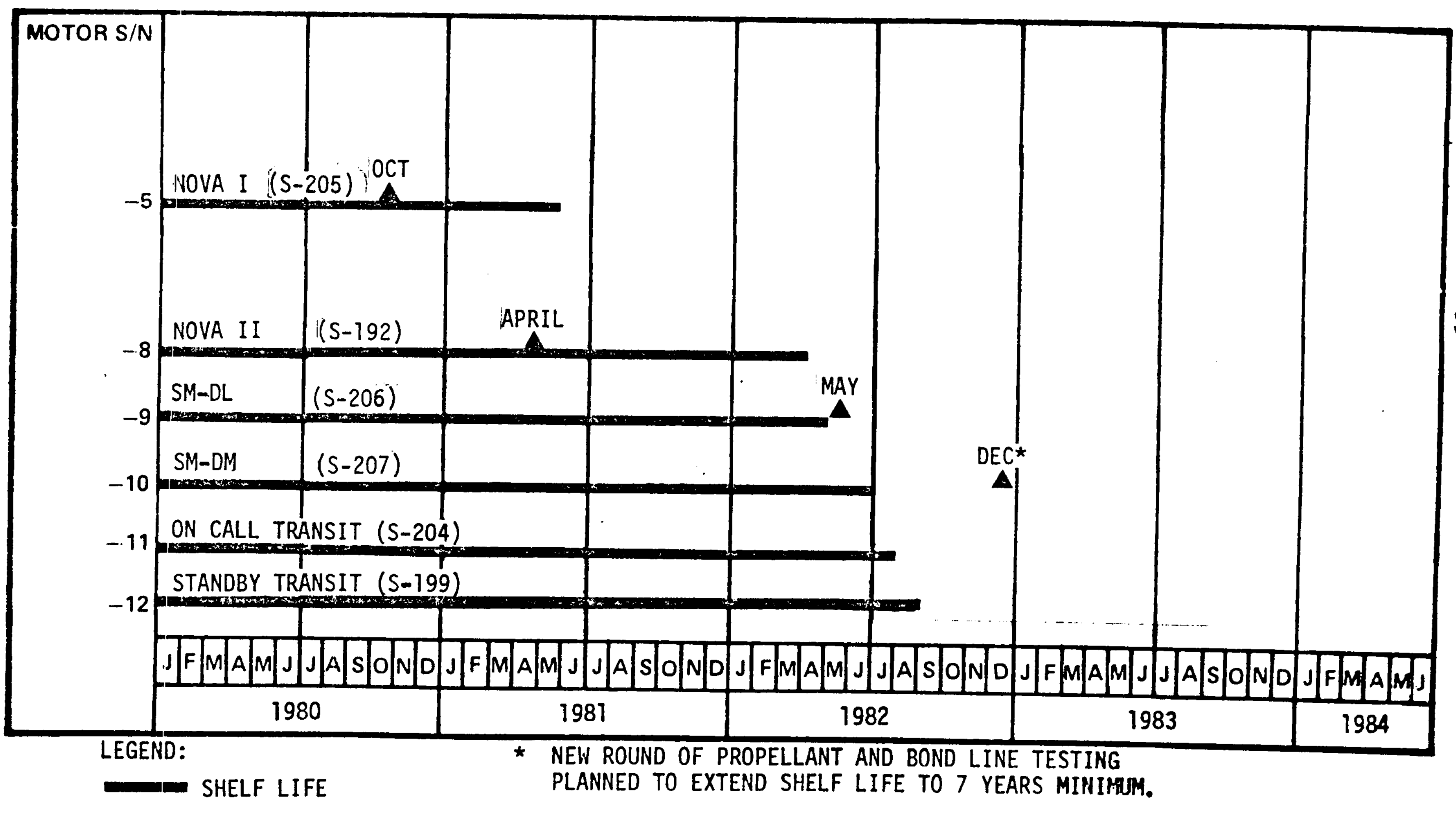

Figure 72.- Algol IIIA Motor Shelf Life.

Castor II (Figure 73).- Presently this motor is qualified for a 9-year shelf life. However during the test program conducted to establish this shelf life, an increase in propellant modulus was observed. This resulted in an apparent increase in the predicted thermal stress of the case/insulation/propellant bond line in the head end and case center areas. This increase indicated a marginal condition for certain storage and flight temperature environments.

An ultrasonic inspection was initiated as part of the inspection criteria for motors in excess of two years old. Because of this condition additional investigation of the propellant mechanical and physical properties, both by laboratory and the full scale static firing of a six year old motor was completed. Actual flight tests have been observed on an 82-month old motor.

Altair IIIA (FW-4S/TEM-640).- The shelf life for the FW-4S motor is six years. This motor was replaced by the TEM-640 motor. The TEM-640 motor was procured from the Thiokol Elkton Division under NAS1-11400. This contract required a shelf life program including real time composite and propellant specimen testing on a semi-annual basis for 72 months. The case, nozzle, and igniter are identical to the FW-4S with the only difference being the liner and propellant formulation. To date, the tests indicate superior physical properties when compared to the FW-4S and the 72-month shelf life study, completed in 1979, was easily obtainable. Actual flight tests have been observed on 56-month old motor (figure 74.)

BE-3.- Under contract NAS1-10000, Task S-033, a shelf life program included visual and X-ray inspections, a component shelf life review, and a full scale static firing of a motor in excess of 100 months old. No future use of BE-3 motor is planned.

Antares IIA.- The shelf life for an Antares IIA is 9 years. Actual flight tests have been observed on a 126-month old motor. This motor has been replaced by the Antares IIIA. (Figure 75.)

Antares IIIA (Figure 75).- The shelf life for an Antares IIIA is 5 years. This motor will be evaluated in Phase VII.

It should be understood that the shelf life tests through Phase VI were a continuation of the Scout R & D effort initiated at the start of the program and that figures 71 through 75 will benefit Phases VII and VIII. (1)

Table L itemizes the cost of shelf life program assigned to Phase VI.

FOURTH-STAGE CAPACITIVE DISCHARGE IGNITION SYSTEM

Significant system weight and size reductions can be realized when comparing a capacitive discharge ignition system to a wet-cell battery system. Programs such as Viking and Explorer have taken advantage of these factors by developing and qualifying capacitive discharge ignition system flight hardware.

(1) The charts of figure 71 thru 75 are official 1979 documents and show S-192 assigned to NOVA-II. It was later reassigned to NOVA-I so that the last Phase VI launch would be completed before S-192 aged any further.

CASTOR IIA MOTOR SHELF LIFE
(9 YEARS)

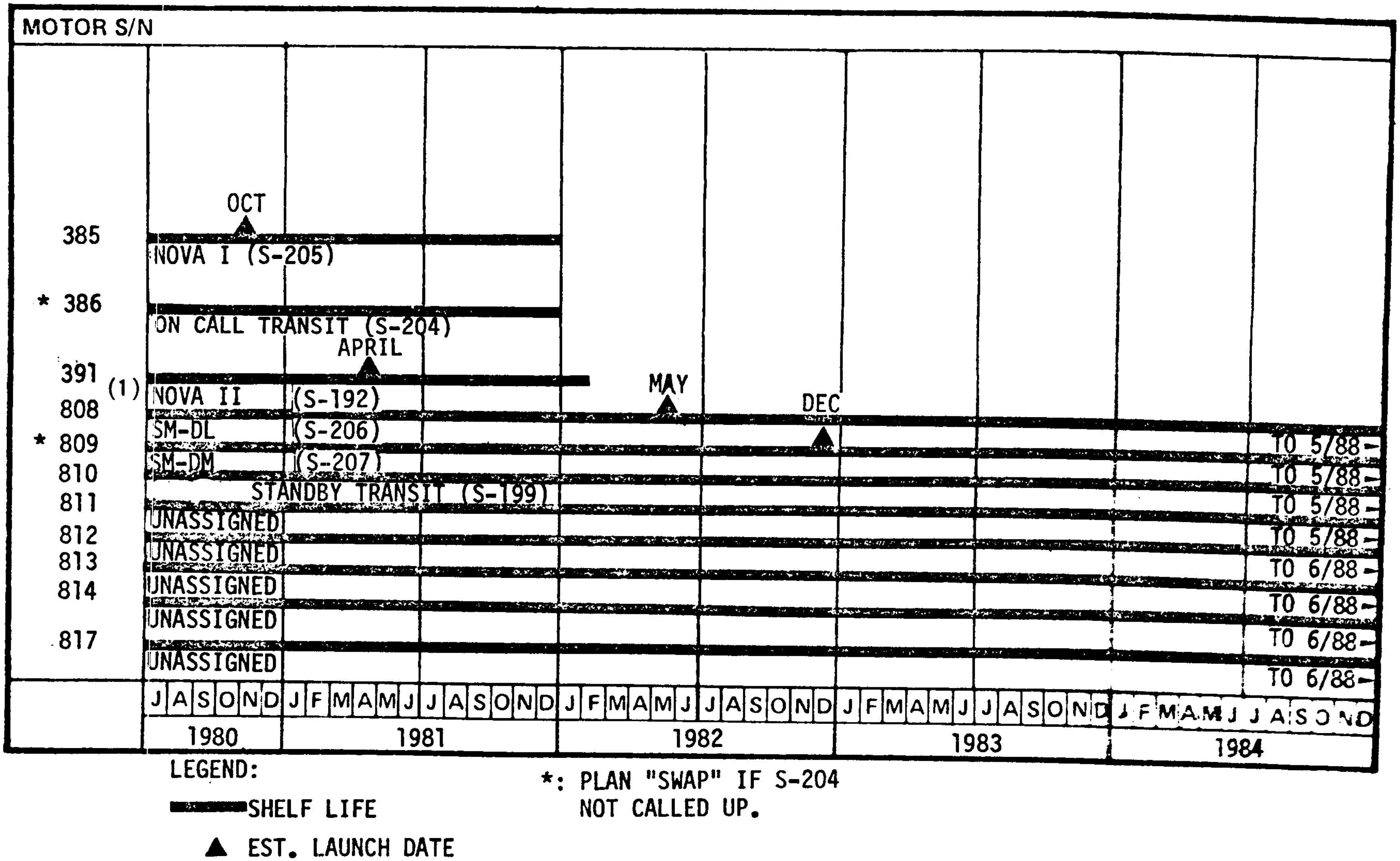

Figure 73.- Castor III Motor Shelf Life.

(1) The charts of figures 71 thru 75 are official 1979 documents and show S-192 assigned to NOVA-II. It was later reassigned to NOVA-I so that the last Phase VI launch would be completed before S-192 aged any further.

ALTAIR IIIA MOTOR SHELF LIFE
(6 YEARS)

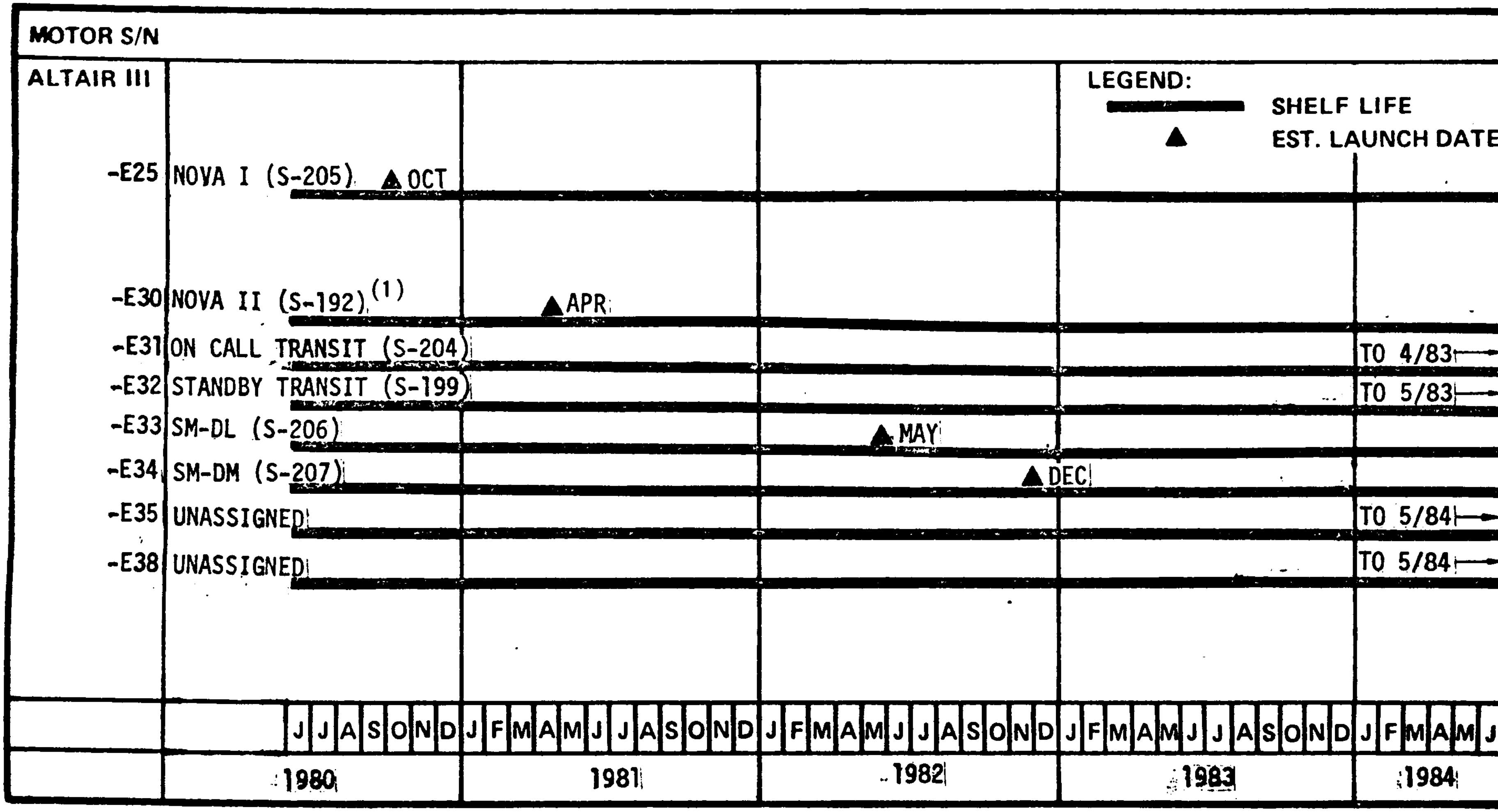

Figure 74.- Altair IIIA Motor Shelf Life.

(1) The charts of figures 71 thru 75 are official 1979 documents and show S-192 assigned to NOVA-II. It was later reassigned to NOVA-I so that the last Phase VI launch would be completed before S-192 aged any further.

ANTARES IIA MOTOR SHELF LIFE
(9 YEARS)

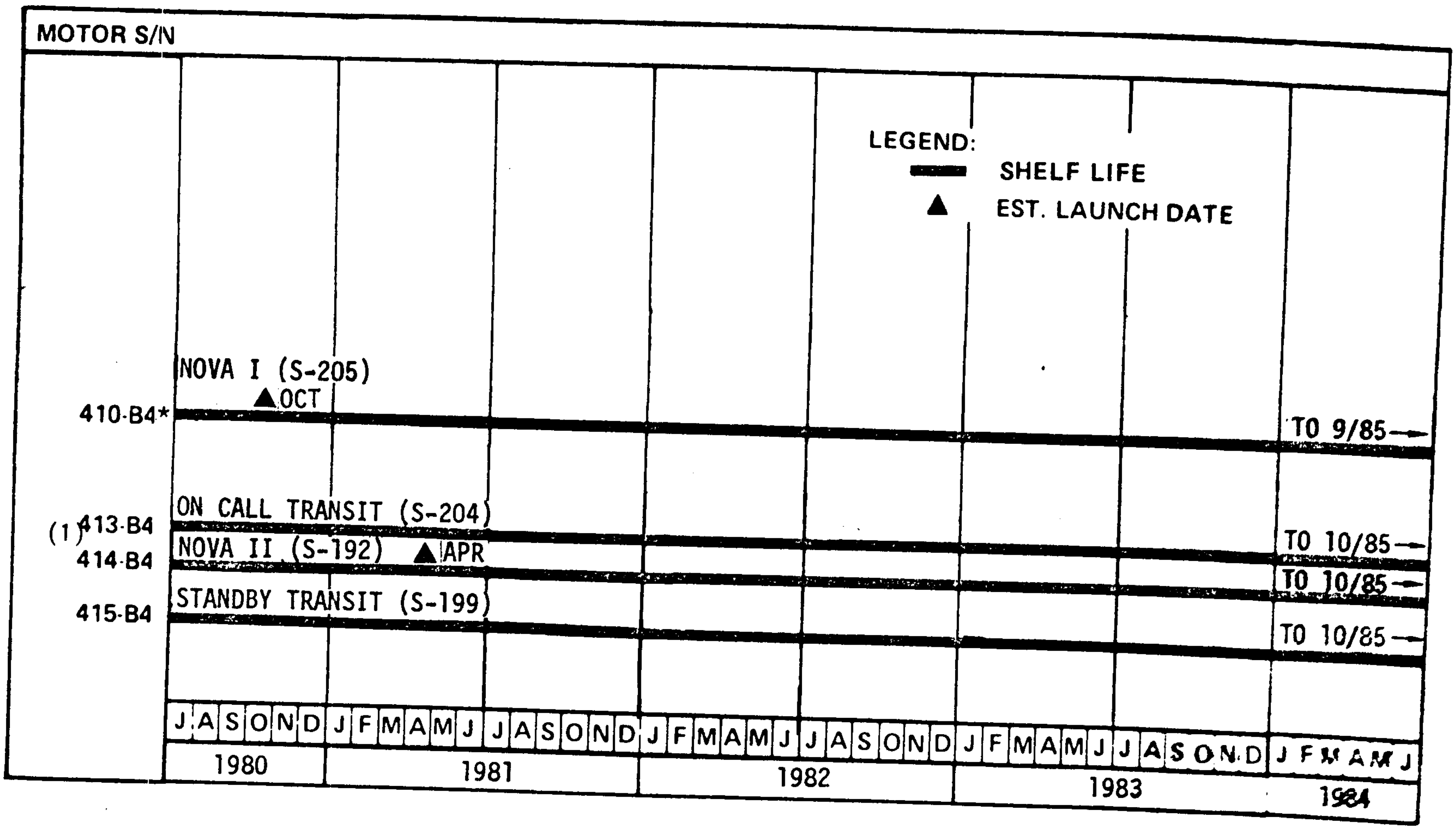

Figure 75.- Antares IIA, IIIA Motors Shelf Life.

(1) The charts of figures 71 thru 75 are official 1979 documents and show S-192 assigned to NOVA-II. It was later reassigned to NOVA-I so that the last Phase VI launch would be completed before S-192 aged any further.

TABLE L - SOLID PROPULSION AND PYROTECHNIC SHELF LIFE AND AGING PROGRAM OBLIGATIONS

P.R. NO.	ORDER NO.	ITEM	J.O. NO.	DESCRIPTION	OBLIGATION
PHASE VI					
First Stage (Algol IIC)					
	NAS1-12500-R16	222	E6000R	Initiator Shelf Life Tests	$ 905.00
Second Stage (Castor IIA)					
	NAS1-12500-R16	198	E7002R	Initiator Shelf Life Tests	905.00
Third Stage (X-259)					
60.900.119	NAS1-10483-3			X-259 Motor Shlf.Lf.Stdy.	7,000.00
66.000.076	NAS1-10000-32-CA23-S	672	E6001S	X-259 Motor Component Tsts.	40,979.00
	NAS1-12500-R34	387	E6000R	X-259 Motor Shlf.Lf.Stdy.	3,457.00
Fourth Stage (X-258)					
66.000.076	NAS1-10000-32-CA23-S	672	E6001S	Mtr.&Ign.Shlf.Lf.Ext.	40,979.00
60.900.172	NAS1-10481-4	004	E6002U	Tech.Spt.,Mtr.Shlf.Lf.Ext.	1,648.00
60.900.172	NAS1-10481-2			Hydrotest X-258 Mtr.Chmb.	7,000.00
Fourth Stage (FW-4S)					
60.900.122	NAS1-10000-14-CA13-S	326	E6000S	FW4S Shelf Life Test	31,082.00
60.900.122	NAS1-10000-14-CA13-S	315	E6185S	DITTO	31,173.00
6600.0931	NAS1-10000-14-CA13-S	314	E6188S	DITTO	31,173.00
60.900.120	NAS1-10484-3			Provide Motor Case Samples	1,200.00
Fifth Stage					
60.900.054	NAS1-6935-43			Motor Shlf.Lf.Study	15,602.00
66.000.282	NAS1-10000-39-CA33-S	346	E6000S	DITTO	47,900.00
				PHASE VI TOTAL	$261,003.00

Scout initiated a program to study, develop a preliminary design, and demonstrate the use of a capacitive discharge ignition system for use on the Scout vehicle. This system design was considered as a replacement for the Fourth-Stage Module System. The primary goal of this effort was to define a miniaturized system that could be contained in a single unit and would equal or exceed the existing system reliability. This was to be accomplished through the use of solid state electronics and by component selection that would allow the packaging of all existing redundant functions such as power, timing, safing and switching to be integrated into the existing Gulton timer (or equivalent size) envelope. It was anticipated that a 2-pound weight saving, equal to the present fourth-stage module ignition battery weight would be realized.

This program consisted of the study, design selection and design breadboarding, and demonstration testing of a capacitive discharge ignition system. In support of the system study a test program was conducted to determine and evaluate the Scout SBASI pyrotechnic device firing energy requirements. The following presents a listing of the major activities associated with this program.

A. Initiate test plans and breadboard designs.
B. Perform liaison with users and designers of capacitive discharge systems and coordinate with missile range safety offices.
C. Conduct SBASI Energy Tests.
D. Develop design concepts and conduct component surveys.
E. Perform design trade studies and select concept.
F. Complete design, breadboard the system, and conduct evaluation tests.
G. Complete trade study analysis which includes assessments of reliability, weight and cost.
H. Perform design review, finalize design and prepare final report.

The program was completed successfully.

SPARES PROCUREMENT

The procurement of spares for the Scout Program comprise a major part of the Scout Spares Program. Quantities and costs are negotiated with the prime contractor. Upon completion of the negotiations the Government authorizes the prime contractor to procure the quantities of Scout hardware and GSE, as negotiated, for additions to the Scout spares program. The prime contractor either prepares purchase orders to all required vendors or initiates the fabrication process for all the Vought-manufactured items.

The Spares Program in effect during Phase VI was initiated in 1962. The contract history for the Scout Logistics and Spares Program is documented below.

January 17, 1962 - First Logistics Spares Program Meeting.
June 14, 1962 - First Spares Contract, NAS1-1970 (parts only).
September 9, 1962 - Second Spares Contract, NAS1-2165 (management plus provisions for spares procurement and repair).
September 30, 1962 - Third Spares Contract, NAS1-3420 (management plus provisions for spares procurement and repair).
July 1, 1965 - Fourth Spares Contract, NAS1-4664, Task K (management plus provisions for spares procurement and repair).
May 31, 1966 - Inclusion of Propulsion Motor Spares in Scout Logistics Spares Program.
November 1, 1966 - Fifth Spares Contract, NAS1-6020, Task L (a continuation of NAS1-4664).
December 19, 1968 - Sixth Spares Contract, NAS1-7256, Task L (management) and Task M (materials).
November 1, 1970 - Seventh Spares Contract, NAS1-10000, Task L (management) and Task M (materials).
November 1, 1973 - Eighth Spares Contract, NAS1-12500, Task L (management) and Task M (materials).[1]

[1] With the initiation of contract NAS1-12500, the spares repair previously in Task L was transferred to Task M.

Spares were contracted by "types of spares" with the following designations:

M1	Packing and Crating Spares
M2	Rework Spares[1]
M3	Retest Spares
M4A	New Purchase of Spares
M4B	New Purchase of Consumable Spares
M5	Advanced Purchase of Control Spares
M6	GSE Spares Purchase
M7	GSE Spares Repair

The Scout Spares and Logistics Program and its operational procedures are contractually documented as LTV report number 3-30000/4R-87-F. Upon receipt of contractual authorization, the prime contractor (LTV) issues purchase orders to the required vendors and initiates the paperwork for in-house fabrication, if required. The contracts called for inspection and flight-acceptance tests as required on the vendor-delivered spares as well as the LTV-manufactured spares. The spares were stored in the Scout "Stores Area" at LTV-Dallas, as well as at the Scout launch sites. When spares are assigned to the spares shelves they are noted on the distribution list as required and approved by NASA. This included keeping a perpetual inventory file on the spares received or shipped.

The Spares Program was contracted to include the following requirements:

A. Organizations

(1) Logistics Organization -

The Scout Logistics Program is outlined in figure 76.

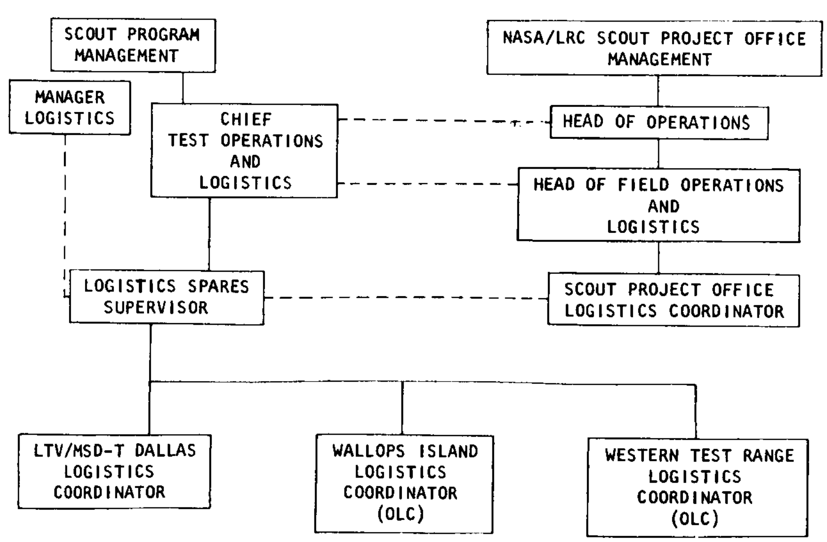

Figure 76.- Scout Logistics Organization Chart.

(1) Designated as part of "L" prior to contract NAS1-12500.

B. Management Operations

(1) Operate in accordance with an approved standard operating procedure.
(2) Maintain ground support equipment and flight-ready spares on site.
(3) Maintain ready reserve in Dallas.
(4) Complete quarterly accountability and status reporting.
(5) Shelf life program.
(6) Return failed parts:
  (a) Analysis.
  (b) Repair or replace.
  (c) Usage rate - reliability.
(7) Recommend provisioning changes.
  (a) Operation needs.
  (b) Design changes.
(8) Maintain control of on-site Government-furnished equipment range stock.

C. Accountability and Status

Status information is disseminated to all program segments by the Quarterly Replenishment Requirements Report (QRRR).

(1) Spares listed as follows:
  (a) Vehicle Spares
  (b) GSE Spares
  (c) Pyrotechnic Items
  (d) Shelf Life Index
  (e) Parts Listing for San Marco Range
(2) Authorized Operating Level.
(3) Inventory Status WTR-WI-Dallas-San Marco-MRB-Vendor.
(4) Usage Previous Month - Usage Total.
(5) Shelf Life Time and Retest Requirements.
(6) Special Requirements:
  (a) Flight Acceptance Test Required.
  (b) Logbook Required.
  (c) Vendor Data Required.
  (d) Passivation Required.
  (e) Malfunction Reports.
(7) Replacement Requirements.
(8) Effectivity Limitations.

D. Logistics Flow Pattern

In the interest of control and accountability, the Scout spares flow plan routes all items through the Dallas Spares Stores thus avoiding any direct shipments between a vendor and a field site.

E. Material Review Board

When the total extent of a malfunction cannot be determined in the field, the item is returned to Dallas on MRA for further test or from Dallas to the vendor for test to determine the exact cause of the malfunction. After receipt and inspection at Dallas, the malfunctioned item is forwarded to the Material Review Board for further disposition. Review Board action ascertains one of the following:

(1) Salvage and repurchase.
(2) Repair or replace by Contractor.
(3) Repair or replace by Vendor.

F. Quarterly Replenishment Requirements Report (QRRR) Distribution List

(1) Distribution by NASA-Langley Research Center is as shown:

(a)	Procurement - Contracts	(1 copy)
(b)	Scout Project Office	(2 copies)

(2) LTV Distribution

(a)	NAVPLANTREPO (Dallas)	(2 copies)
(b)	NASA REMO (Dallas)	(1 copy)
(c)	6595th Space Test Group, Attn: VWZC	(1 copy)
(d)	NASA/Washington Headquarters	(1 copy)
(e)	Logistics Supervisor (Dallas)	(5 copies)
(f)	Off-site Logistics Coordinator (WTR)	(2 copies)
(g)	Off-site Logistics Coordinator (WFC)	(2 copies)
(h)	MRB (Dallas)	(1 copy)
(i)	Quality (Dallas)	(1 copy)
(j)	Chief Project Engineer (Dallas)	(1 copy)
(k)	San Marco Project Engineer (Dallas)	(1 copy)

SYSTEMS MANAGEMENT PROCUREMENT

The titled "Systems Management Contract" included much more than the title implies. The contract also included multiple types of contractual environments covering different sections; one with fixed price incentive award (FPIA), a second with cost reimbursable tasks (CPFF), and also a section for firm fixed price procurements (FFP). The complex contract was simplified by designating the requirements with alphabets as follows:

Task A - Program Management
Task B - Payload Coordination
Task C - Preflight Planning
Task D - Data Reduction and Analysis
Task E - Systems Engineering
Task F - Reliability Program
Task G - Standardization and Configuration Control
Task H - Vehicle Processing
Task J - San Marco Support
Task K - Certification Training

[1]Task L - Logistics Support Management
Task M - Spares Hardware
Task N - Field Services and Launch Support
Task P - NASA Langley Support Program
[2]Task R - Special Requirements
[3]Task S - Program Support
Task T - Hardware Support
Task V - Tooling & GSE Maintenance
Task W - Failure Investigations (if required)
[5]Task Y
[5]Task Z
Performance Incentive[4]
Relocation of Off-site Personnel[6]

A typical summary of services included in a Scout Systems Management Contract is presented in table LI using NASA contract NAS1-10000 as an example. Table LII details the services in contract NAS1-10000. Table LI itemizes the services for each task presenting the quantities and time periods of services on the contract. Table LII details Tasks B, C, D, H and N for each vehicle with a designated payload, itemizing preliminary trajectories, preflight planning, final flight reports, processing, and designates the numerical order of the Scout launches. Under preliminary trajectories the contract number is designated for each payload as NAS1-7256 (total 10) or the numerical order and quantity performed on contract NAS1-10000 (total 11). Using the same designations it can be noted that three preflight plannings were performed on contract NAS1-7256 and eighteen on contract NAS1-10000. Where both contracts are designated, the services were performed twice. Also note that fourteen final reports were written and nine feasibility studies (FS) made.

The numbers in table LI are the quantities originally contracted. The numbers in table LII are the actual quantities used. Any differences are negotiated at the completion of the contract.

The contractor completed each of these tasks as follows.

Task A - The prime contractor furnished, on a sustaining basis, program management for directing, coordinating and maintaining cognizance of all Scout contractual program activities. This task supplied management for all other tasks including all subcontracts.

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(1) Detailed in Chapter 6 page 232.
(2) Cost Reimbursable (CPFF) portion.
(3) Firm Fixed Price (FFP) portion.
(4) Every successful launch earned an award. Financially this is included in Task W.
(5) Although Tasks Y and Z are not contracted for initially, they could be added by modification to order vehicle hardware (Y) or motors (Z).
(6) Financially this is included in Task (N).
(4) and (6) are not assigned alphabets contractually.

TABLE LI(a) - SUMMARY OF SERVICES, NAS1-10000

TASK	
A	Management, 3-Year
	SPAC Reporting Daily
B	3-Year Payload Coordination
	15 - Preliminary Trajectories (2-5)
	10 - Feasibility Trajectory Studies
	5 - Thermal Calculations
	5 - Dynamic and Vibrational Analyses
	15 - Payload Interface Drawings (4-N)
	15 - Payload Interface Drawings G.S.E. (4-N)
	13 - Heat Shield Designs (3-N)
	10 - Umbilical Designs
	50 - Users Manual Pages (new)
	75 - Users Manuals
	3 - SSTP Guide per Test Section
C	Preflight Planning
	15 - Preflight Planning Reports (4-N)
	11 - Instrument Calibration Summary Reports
	12 - Preflight Review Presentations
D	Final Flight Reports
	16 - Final Flight Reports (1-5)(4-RY)
E(1)	3-Year Systems Engineering
F(1)	3-Year Reliability
	Malfunction Reports
G	3-Year Standardization and Configuration Control
	1 - Family Tree Drawing List (Appendix C.)
	Drawings
H	Processing: 0.-179C(N), 1/2.-144R, 1.-180C, 2.-181C, 3.-182C(N), 4.-183C, 5.-184C, 6.-170CR(N), 7.-185C, 8.-181R, 9.-186C, 10.-187C, 11.-188C, 12.-190C(N), 1/2.-191C, 0.-189C.
J(2)	Tasks for San Marco (up to maximum 749 K)
K	2 Training Sessions
L	3-Years Logistics Support
	Spares Report
M(3)	Spares (up to maximum 500 K)
N	3-Years Launch Field Services
	1-each OPS Plan
	Countdown Manual
P	3-Years Langley Field Services
	2 - Film Progress Reports
R	Specials - R & D
S	Program Support - As Required
T	Additional Required Hardware
V	3-Years Tooling Maintenance
W	Single Point of Failure Investigation (Appendix B.)

(1) Mod 26 adds Production Support.
(2) Mod 27 adds 252 K, Mod. 35 adds 239 K.
(3) Mod 23 adds 250 K.

TABLE LI(b) - SUMMARY OF SERVICES, NAS1-12500+

TASK

A Management, 3 Years

B 3-Year Payload Coordination
- 6 - Preliminary Trajectories
- 2 - Feasibility Studies
- 5 - Environmental Studies
- 9 - Preflight Brochures
- 8 - Payload Interface Drawings
- 8 - Payload Interface Drawings G.S.E.
- 9 - Heat Shield Designs
- 3 - Umbilical Designs
- 5 - Mission Analysis and Orbital Studies
- 75 - Users Manuals
- 3 - SSTP Guide per Test Section

C Preflight Planning
- 10 - Preflight Planning Documentation Task
- 9 - Preflight Review Presentations

D Final Flight Reports
- 9 - Final Flight Reports

E* 3-Year Systems Engineering

F* 3-Year Reliability
- Malfunction Reports

G 3-Year Standardization and Configuration Control

H Processing: 0.-188, 0.-186, 1.-189, 2.-193, 3.-192, 4.-194, 5.-195, 6.-196, 7.-197, 8.-198, 9.-199, 10.-179, 1/2.-200, 1/2-191.

J Tasks for San Marco (up to maximum 1307K costs)

K 3-Year Certification Training

L 3-Years Logistics Support
- Spares Report

M Spares (up to maximum 1158K costs)

N 3-Years Launch Field Services

P 3-Years Langley Field Services

R Specials - R & D

S Program Support - As Required

T 5-Months of Vehicle Production Support

V 3-Years GSE and Tooling Maintenance

W Failure Investigations

*Mod 20 adds Production Support for Algol III Motor Procurement.
+Does not include final MOD for services not used.

TABLE LII(a) - DETAILS OF SERVICES, NAS1-10000

TASK		(B)	(C)	(D)	(H)	(N)
Contract		(1) & (9) F.S.)	(18)	(14)	(14)	
Vehicle Number	Payload	Preliminary Trajectories	Preflight Planning	Final Flight Reports	Processing	Launch Number
174C	OFO	7256	7256	1	7256	70
175C	SAS-A	7256	7256-17	2	7256	71
173C	San Marco C	7256	5	3	7256-R3	72
144CR	PAET-A	1	3	4	P-1*-R-2-10	73
177C	SOLRAD-D	7256 & F.S.	7256-18	5	7256	74
180C	CAS-A	7256	7	6	P-2	75
166C	GRP-A	7256 & FS	4	7	7256-R8	76
163CR	SSS-A	7256	6	8	7256-R9	77
183C	UK-4	7256	11	9	P-6	78
184C	MTS-A	2-5	13	10	P-7	79
182C	NA-15	X	9-14	11	P-5	80
181C	CAS-B(1)	X	X	X	P-4	X
170CR	SAS-B	4	12	12	7256 S-9	81
185C	ESRO-IV	3-6&FS	15	13	P-8	82
181CR	AEROS-A	7256	8-16	14	P-9 R30	83
178C	NA-16	X	1-10		7256-R	84
179C	NA-18	7256	2		P-3	
187	UK-5	9 & FS			P-10	90
186C	AEROS-B				P-12	88
195	TIP-2	($\frac{1}{2}$) 11 & FS				92
188	UK-X4	8 & FS			P-11	86
189	ANS-A	7-10 & FS			P-15*	89
190	SM-C2				P-13	85
191	NPE-A	FS			P14*	87
196	DAD	FS				93
194	SAS-C	.				91

*Partial Processing.

(1) CAS-B was canceled and AEROS-A assigned to Scout S-181.

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TABLE LII(b) - NAS1-12500 DETAILS

TASK		(B)	(C)	(D)	(H)	(N)
Vehicle Number	Payload	Preliminary Trajectories	Preflight Planning	Final Flight Reports	Processing	Launch Number
178C	NA-16		10000(3)	1	7256	84 10000
190	SM-C2		1	2	10000	85
188	UK-X4	10000	2	3	10000	86
191	NPE-A	1	3	4	*1	87
186C	AEROS-B	2	5	5	10000	88
189	ANS-A	10000	6	6	2	89
187	UK-5	10000	7		10000	90
194	SAS-C	4 & M.A.S.	R111	R111	5	91
195	NA-17	E.S.(4)	8	R157	6	92
196	DAD-A	E.S.(4)	R124/R125	7	7	93
179C	AF-STP	6 & E.S.(4)	R165	R165	10000, 11(2)	94
193	GP-A	3 & M.A.S.	9	8	3	95
197	TIP-III		R123/R126	9	8	96
198	UK-6	E.S.(4)			9	
199	NA-Backup		10		10	
200	TRANSAT	E.S.(4)			12(1)	
201	HCMM	5				
192	NA-Standby	M.A.S.	4		4	
	AO-7	F.S.(5)				
	HAWKEYE-2	F.S.(5)				

(1) Partial
(2) Task R
(3) 10000 (NAS1-10000)
(5) F.S. Feasibility Study
(4) E.S. Environmental Study

Scout Program reviews were scheduled semiannually. The Scout review scheduled for April 5, 1973 is presented in appendix D. Note the review is complete, presenting the up-to-date data and status of the Scout program. It presents the contractor's organization, the current progress, the results of investigations and studies, the beginning of production for the next phase, new developments, and advanced planning. Program reviews are attended by NASA, DOD, and Vought Corporation with both NASA and Vought making presentations to top management of both organizations. Management reviews are also conducted by NASA with Vought Corporation.

Contract and financial reviews are held with NASA Langley making the presentation to NASA Headquarters.

The 1975 NASA Scout Project Office Management Team is shown in figure 77. The Vought 1975 Management Organization is detailed in figure 78. By comparing figure 78 with Appendix D (Figure D-7) the changes in personnel in a two-year time period can be analyzed. The total manpower from 1964 through 1975 at the prime contractor's plant is shown in figure 79. The major contractor's manpower on the Scout program are illustrated in figure 80.

On June 15, 1973, the results of a manpower study was disclosed in a memorandum for record. This study made by the NASA Scout Project Office was initiated January 1973. The study was made to determine the number of contractor personnel required to process and launch a Scout vehicle. Excerpts from this study are presented. The basic concepts or guidelines for the study were:

"1. Retain the minimum field personnel required to efficiently perform routine field site tasks - periodic maintenance, clerical work, etc.

"2. Utilize Dallas processing personnel in the launch crew and field personnel in Dallas processing.

"3. Engineering personnel for launch crew to be derived from tasks A and E of the management contract.

"4. Hold processing schedule to as near 30 days as possible using approximately 37 people in the launch crew.

"5. Navy missions have overall priority.

"6. At the beginning of the next contract period, four vehicles will be complete through Dallas processing and ready to ship, and one vehicle will be complete through processing up to, but not including, bench tests.

"7. During the next contract period, five vehicles will be completely processed in Dallas; one vehicle will be processed through bench tests, system tests, and prepared for shipment; and one vehicle will be processed through bench tests.

"8. Tasks E and H of the next management contract are to provide for approximately 14 equivalent men each.

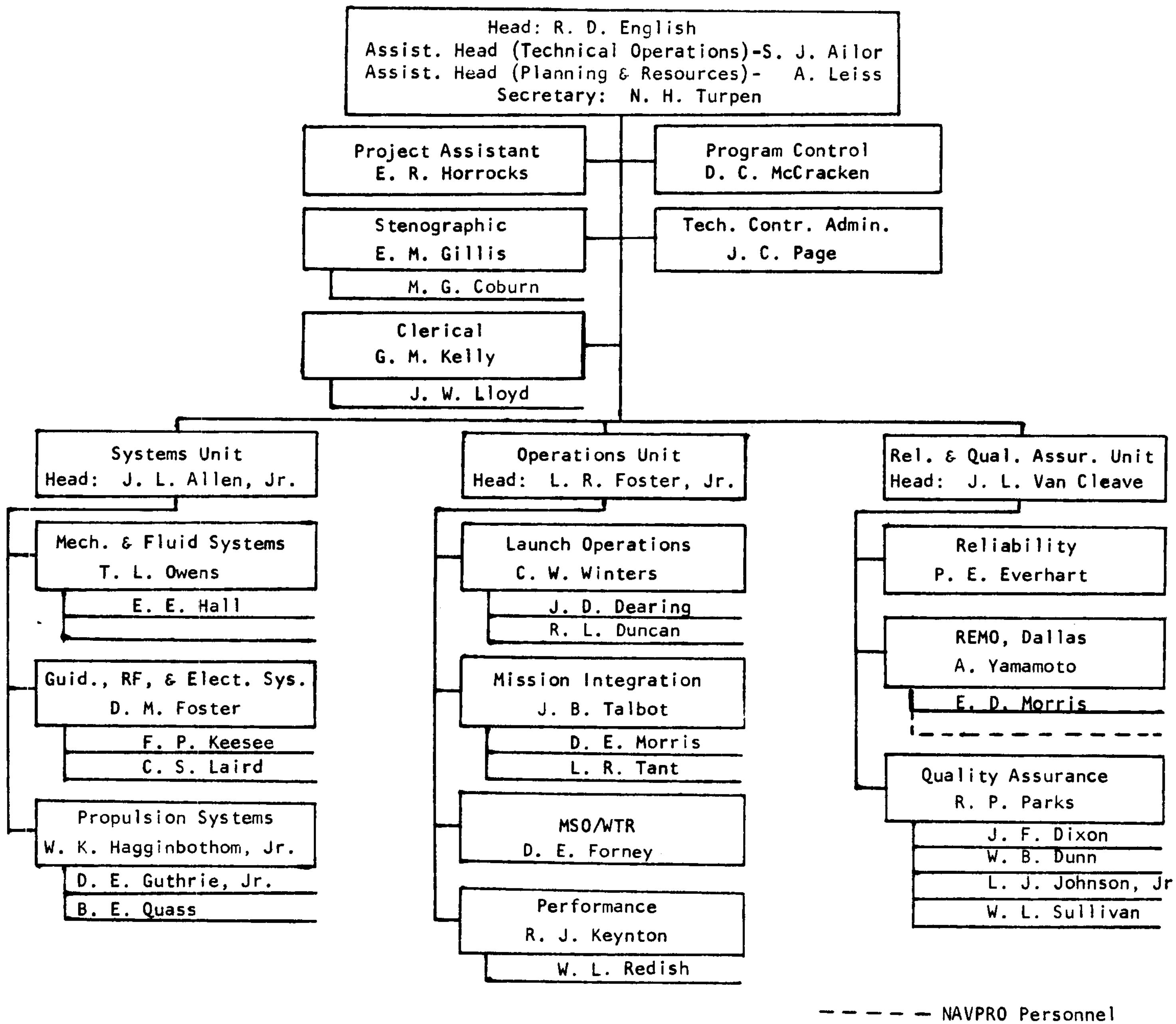

Figure 77.- Management organization of the Scout Program at Langley Research Center.

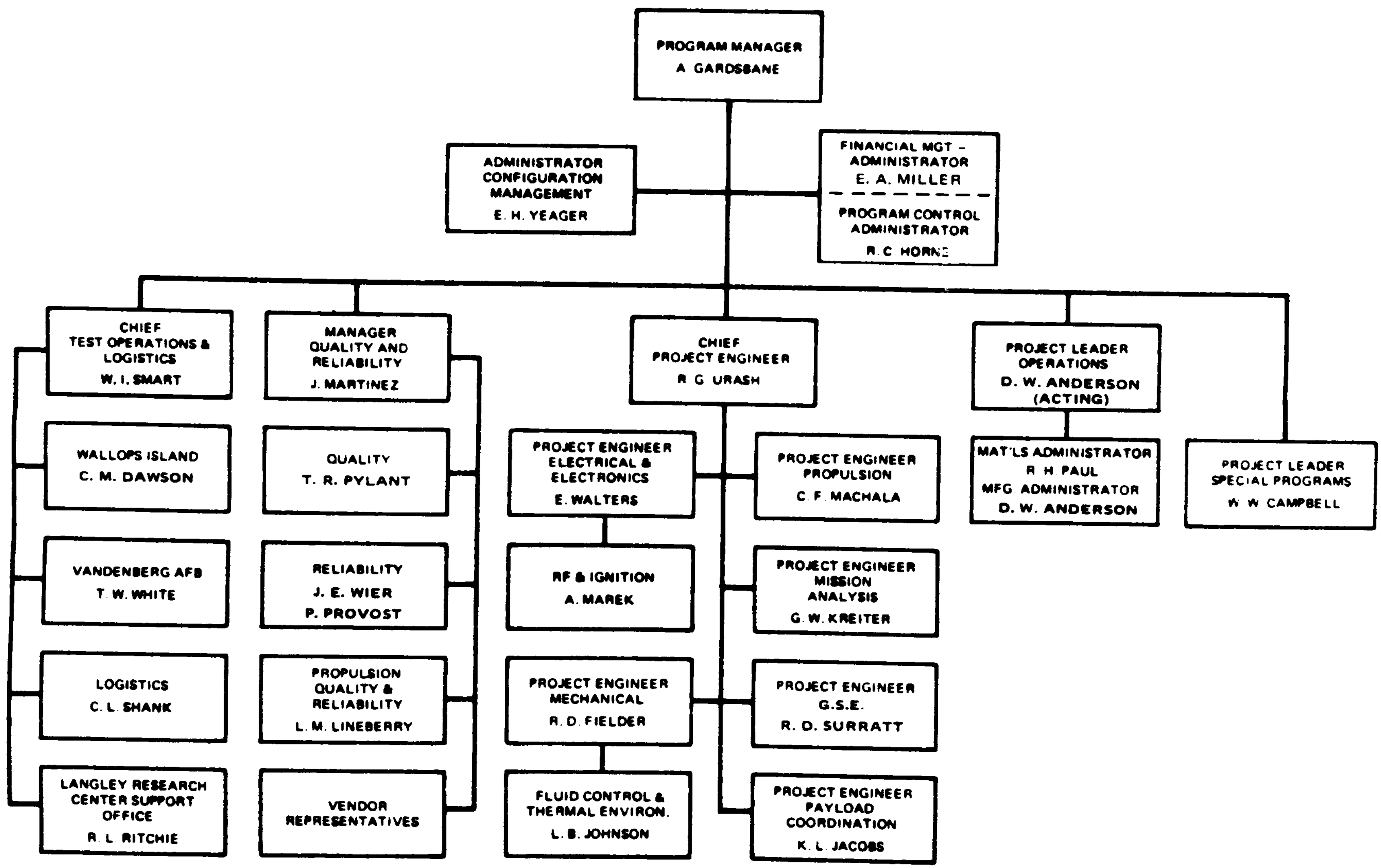

Figure 78.- LTV Scout Program Management.

Figure 79.- Total Manpower for the Scout Program (for FY 1964 thru FY 1975).

Based on Average for Fiscal Year		FY 1964		FY 1965		FY 1966		FY 1967		FY 1968		FY 1969		FY 1970		FY 1971		FY 1972		FY 1973		FY 1974		FY 1975*	
		Man-Years	%	Man-Years	%	Man-Years	%	Man-Years	%	Man-Years	%	Man-Years	%	Man-Years	%	Man-Years	%	Man-Years	%	Man-Years	%	Man-Years	%	Man-Years	%
NASA-LRC	SPO	46	3.9	38	4.2	37	3.4	29	3.4	25	3.3	23	3.7	23	4.3	26	5.3	25	6.3	32	7.6	31	8.1	36	10.9
	Support	42	3.6	51	5.6	18	1.7	14	1.7	15	2.0	7	1.1	6	1.1	9	1.8	7	1.7	1	0.2	-	-	2	0.6
DOD	Plant Reps.	31	2.7	25	2.7	30	2.7	11	1.3	10	1.3	8	1.3	11	2.1	8	1.6	7	1.7	7	1.7	7	1.8	7	2.1
	Launch Supp.	140	12.0	150	16.5	150	13.8	150	17.8	135	17.6	110	17.6	65	12.3	12	2.5	12	3.0	12	0.9	12	3.1	12	3.6
LTV PRIME	Dallas	526	45.0	367	40.2	500	45.9	453	53.7	435	56.9	353	56.4	324	61.0	303	62.0	223	55.8	208	49.6	213	55.8	178	53.8
	Field	97	8.3	88	9.6	95	8.7	73	8.7	56	7.3	47	7.5	41	7.7	75	15.3	79	19.7	65	15.5	46	12.0	44	13.3
	Subs	130	11.1	50	5.5	200	18.4	30	3.6	22	2.9	20	3.2	16	3.0	14	2.9	18	4.5	24	5.5	30	7.9	16	4.8
MOTORS	Aerojet	89	7.6	41	4.5	20	1.8	18	2.1	15	2.0	13	2.1	8	1.5	-	-	-	-	-	-	-	-	-	-
	Hercules	46	3.9	62	6.8	20	1.8	31	3.8	33	4.3	8	1.3	9	1.7	-	-	4	1.0	18	4.3	3	0.8	2	0.6
	Thiokol, H.	23	1.9	40	4.4	20	1.8	22	2.6	12	1.6	27	4.3	2	0.4	-	-	1	0.3	7	1.5	2	0.5	2	0.6
	Thiokol, E.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0.5	16	3.8	16	4.2	12	3.6
	UTC	-	-	-	-	-	-	12	1.4	6	0.8	10	1.5	26	4.9	42	8.6	22	5.5	30	7.4	22	5.8	20	6.1
TOTAL		1,170	100.0	912	100.0	1,090	100.0	843	100.0	764	100.0	626	100.0	531	100.0	489	100.0	400	100.0	420	100.0	382	100.0	331	100.0

*NASA/LRC Man-Years Estimated for FY 1975.

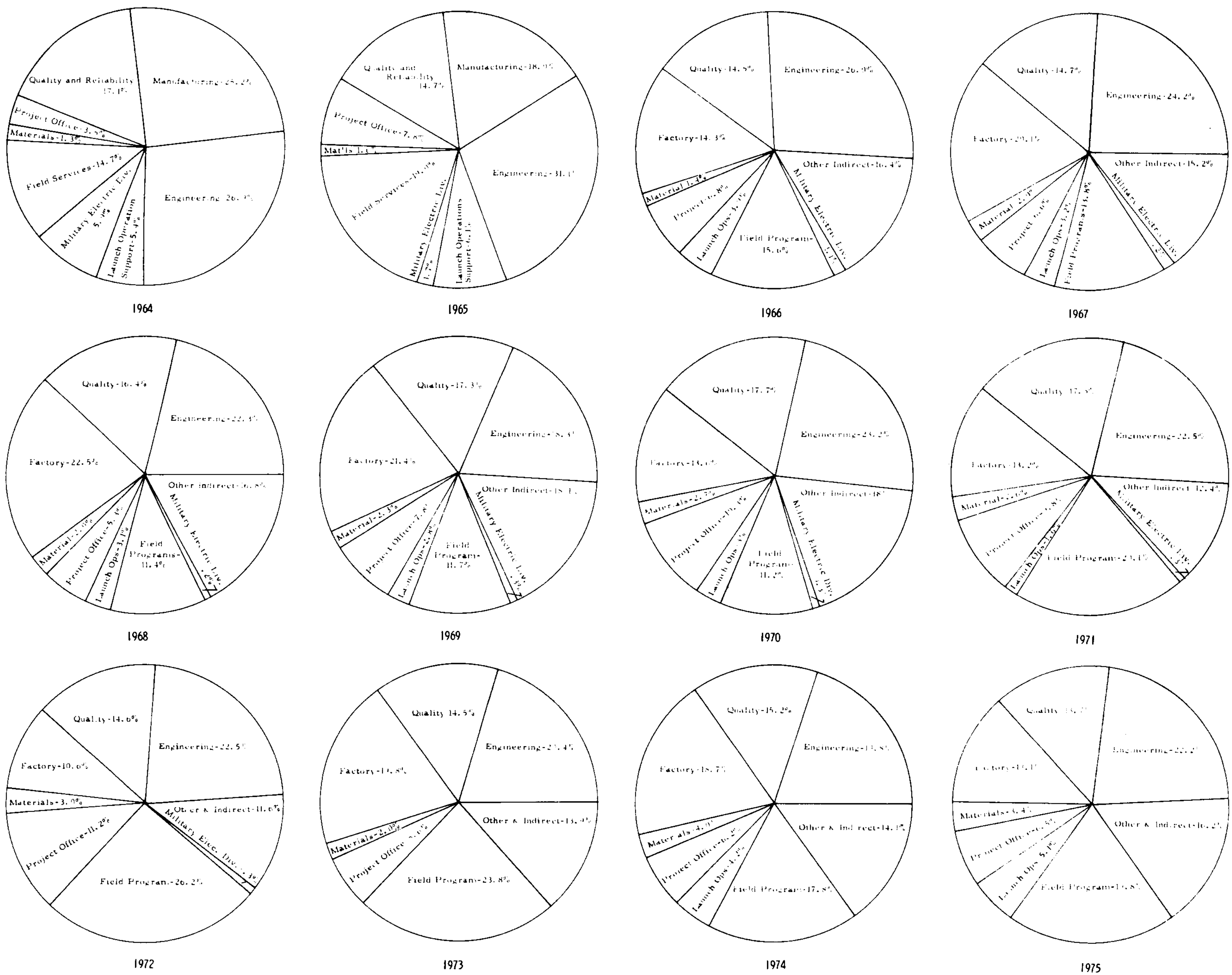

Figure 80(a) .- Vought Manpower From 1964 Through 1975.

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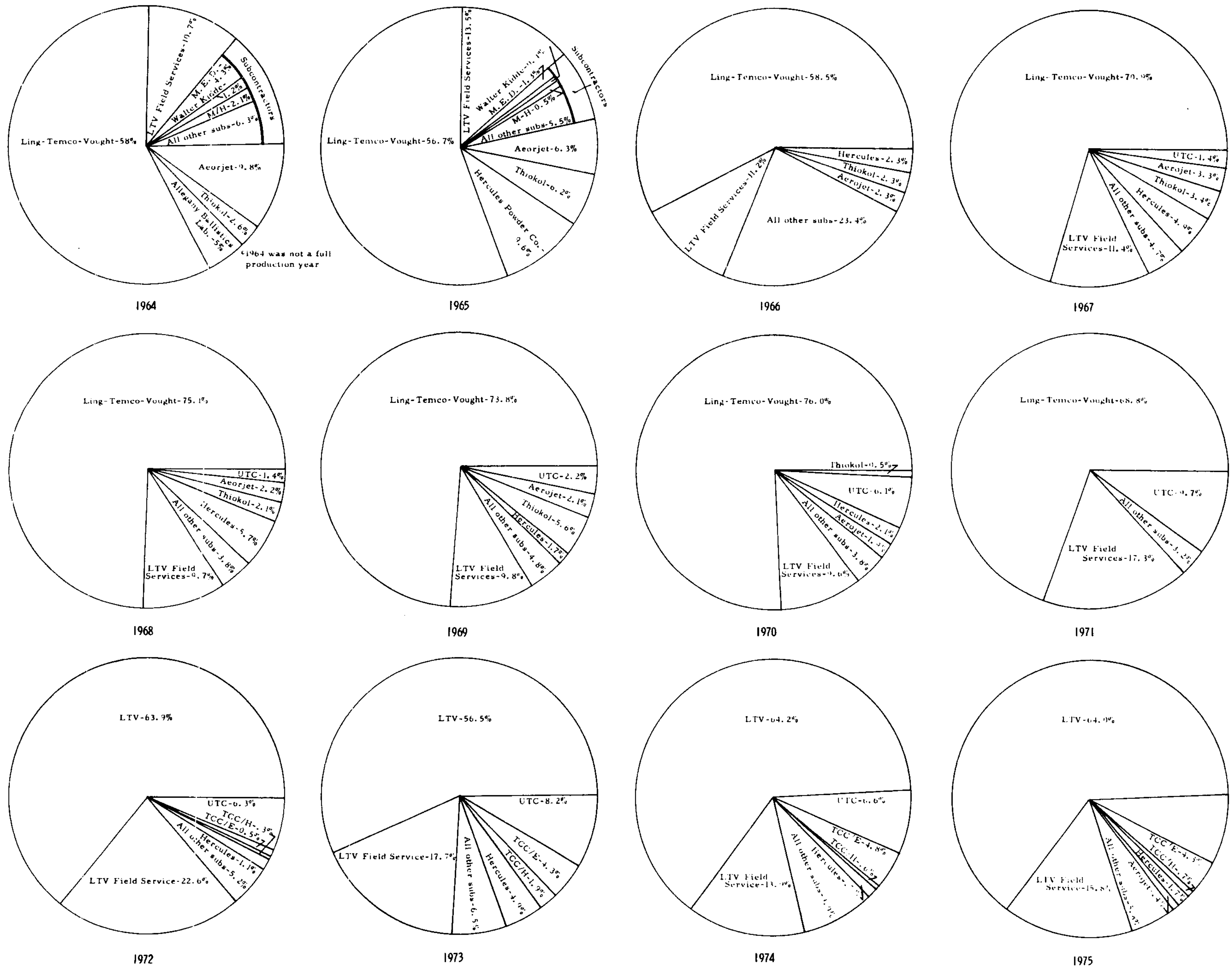

Figure 80(b).- Major Contractor's Manpower From 1964 Through 1975.

"9. Base scheduling upon ten launches, two of which are to be from the San Marco Range.

"10. Assume no support of San Marco Range."

As an initial estimate, the minimum field crew per guideline was determined to consist of 9 persons:

Site Supervisor (Electrical Engineer)
Secretary
Engineering Supervisor (Mechanical Engineer)
Air Frame/Fluids Mechanic
Mechanical GSE/Fluids Mechanic
Electrical GSE Technician
Electrical Vehicle/GSE Technician
Guidance/Instrumentation Technician
Quality Control Inspector

This number was considered a base line for the study, and was assumed to be the permanent staff at each field site.

The Dallas effort was outlined and scheduled using inputs from the NASA/REMO and contractor personnel. The manufacturing personnel required for vehicle processing is presented in Table LIII.

The next undertaking was to develop a specific manpower list which would include all personnel at the field sites and those in tasks E and H at Dallas plus one from Task A (the Assistant Administrator) and one from Task L (the field logistics coordinator/expediter). The final list is presented in Table LIV. It was selected from all the others submitted because it demonstrated more efficient utilization of available personnel.

TABLE LIII - MANUFACTURING PERSONNEL REQUIRED FOR VEHICLE PROCESSING

WEEK	WORK PERFORMED	PERSONNEL REQ'D
1	Str. Mods. L/B Str. Mods. L/D	1 Mech. 1 Mech.
2	Str. Mods. L/B Paint L/B Str. Mods. L/D	1 Mech. (1/2) Paint Shop 1 Mech.
3	Paint L/B Elect. Mods. L/B Str. Mods. L/D	Paint Shop 1 Veh. Elec. & Dept. 250 1 Mech.
4	Component Removal and Installation L/B Str. Mods. L/D Paint L/D Str. Mods. U/D	1 Mech. (1/2) 1 Elec. (1/2) 1 Mech. Paint Shop 1 Mech.

TABLE LIII Continued -

MANUFACTURING PERSONNEL REQUIRED FOR VEHICLE PROCESSING

WEEK	WORK PERFORMED	PERSONNEL REQ'D
5	Str. Mods. U/C Elect. Mods. L/D Str. Mods. U/D Elect. Mods. U/D	1 Mech./Fluid 1 Elec./Dept. 250 1 Mech. (1/2) 1 Elec./Dept. 250
6	Str. Mods. U/B Str. Mods. U/C Component Removal and Installation L/D Component Removal and Installation U/D	1 Mech./Fluid 1 Mech./Fluid 1 Mech. 1 Elec. 1 Mech. 1 Elec.
7	Str. Mods. B/A Str. Mods. U/B Elect. Mods. U/C Component Removal and Installation L/D	1 Mech./Fluid 1 Mech. 1 Mech./Fluid 1 Elec./Dept. 250 1 Mech.
8	Str. Mods. B/A Elect. Mods. U/B Str. Mods. L/C Component Removal and Installation U/C Paint B/A	1 Mech./Fluid) (1/2) 1 Mech.) 1 Elect./Dept. 250 1 Mech. 1 Mech. 1 Elec. Paint Shop
9	Elect. Mods. T/M Elect. Mods. B/A Component Removal and Installation U/B Str. Mods. L/C Paint L/C Component Removal and Installation U/C Join and C/O U/D - L/D	1 Elec./Dept. 250 1 Elec./Dept. 250 1 Mech./Fluid 1 Elec. 1 Mech. (1/2) Paint Shop 1 Mech./Fluid 1 Elec. 2 Mech. 1 Elec. (1/5)
10	Elect. Mods. T/M Elect. Mods. B/A Component Removal and Installation B/A Component Removal and Installation U/B Elect. Mods. L/C Component Removal and Installation L/C Paint U/C Join and C/O U/D - L/D	1 Elec./Dept. 250 Dept. 250 (1/5) 1 Mech./Fluid 1 Elec. 1 Mech./Fluid 1 Elec. 1 Elec.) (1/2) Dept. 250) 1 Mech.) (1/2) 1 Elect.) Paint Shop 2 Mech. 1 Elec. (1/5)

TABLE LIII Concluded -

MANUFACTURING PERSONNEL REQUIRED FOR VEHICLE PROCESSING

WEEK	WORK PERFORMED	PERSONNEL REQ'D
11	Component Removal and Installation B/A	1 Mech./Fluid 1 Elec.
	Section C/O B/A	1 Mech./Fluid 1 Mech. 1 Elec.
	Paint U/B	Paint Shop
	Component Removal and Installation L/C	1 Mech. 1 Elec.
	Section C/O U/C	1 Mech./Fluid) (1/2) 1 Elec.)
	Section C/O U-L/D	2 Mech. 1 Elec. (1/5)

KEY:
B/A - Base "A"
L/B - Lower "B"
U/B - Upper "B"
L/C - Lower "C"
U/C - Upper "C"
L/D - Lower "D"
U/D - Upper "D"
T/M - Telemetry

Task B - The contractor provided continuous liaison and mission working group representation on all matters pertaining to payload integration for both domestic and international payloads for all requirements. For all missions, the contractor verified internal contractor intergroup technical capability for each mission, and maintained cognizance and schedules of all inputs into a final trajectory calculation consisting of flight motors, flight weights, pitch program, aerodynamics, and spin motor utilization.

In support of vehicle processing, the contractor provided internal coordination to assure schedule compatibility of payload peculiar production items, such as heat shield production and modifications, heat-shield ejection tests, heat-shield fit checks, separation system tests, transition sections and separation systems, RFI tests, umbilical plugs and cables, and special payload agency-procured studies and items pertinent to the Scout vehicle.

The contractor within a category titled General Coordination made preliminary design layouts of payload interfaces, and verified their compatibility with the Scout vehicle. These layouts included the following:

Heat Shield
Separation Systems
Separation System Wiring
Transition Sections
Fourth-Stage Rocket Motor

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TABLE LIV - MANPOWER LIST (PLAN "B")

SLOT NO.	SKILL DESCRIPTION	LOCATION
1	Field Site Supervisor	WI
2	Field Site Supervisor	WTR
3	Engineering Supervisor	WI
4	Engineering Supervisor	WTR
5	Assistant Administrator	DAL
6	Field Logistics Coordinator/Expediter	DAL
7	Secretary	WI
8	Secretary	WTR
9	M. GSE/Fluids Technician (Leadman)	WI
10	M. GSE/Fluids Technician (Leadman)	WTR
11	Airframe/Fluids Technician	WI
12	Airframe/Fluids Technician	WTR
13	Airframe/Fluids Technician	DAL
14	Airframe/M. GSE/Spin Technician	WTR
15	Airframe/M. GSE Technician (Leadman)	DAL
16	Airframe/M. GSE/Spin Technician	WTR
17	Airframe Mechanic	DAL
18	Airframe Mechanic	DAL
19	Vehicle/E. GSE Technician	WI
20	Vehicle/E. GSE Technician	WTR
21	Vehicle/E. GSE Technician	DAL
22	Vehicle/E. GSE Technician	DAL
23	Vehicle EL. Technician	DAL
24	Vehicle EL. Technician	DAL
25	Elect. GSE Technician	WI
26	Elect. GSE Technician	WTR
27	Guidance/T/M Technician	WI
28	Guidance/T/M Technician	WTR
29	Guidance Technician	DAL
30	Guidance Technician	DAL
31	Instrumentation and T/M Technician	DAL
32	Instrumentation and T/M Technician	WTR
33	RF/Instrumentation/E. GSE Technician	DAL
34	RF/Instrumentation/E. GSE Technician	WTR
35	Vehicle/GSE Q.C. Insp.	WI
36	Vehicle/GSE Q.C. Insp.	WTR
37	Vehicle Mech. Q.C. Insp.	DAL
38	Vehicle Elect. Q.C. Insp.	DAL
39	Mech. Veh./GSE Engineer (2)	DAL
40	H_2O_2/Fluids Engineer (2)	DAL
41	Elect. Veh./GSE Engineer (2)	DAL
42	Guidance Engineer (2)	DAL
43	Instr./R.F. Engineer (2) (1) Test Conductor	DAL
44	Ignition/Destruct Engineer (2)	DAL
45	Q.C. LDR/Supervisor Engineer (1)	DAL

Fifth-Stage Rocket Motor (as required)
Umbilical Systems
Payload Pertinent Launch Complex and/or Associated Ground Support Equipment (GSE)
Other Interfaces
Other Interfaces Involved With Secondary Payloads and/or Special Separation Systems Furnished by Scout Users

The contractor maintained cognizance of the Scout User's Manual[a] revisions and also a User's Manual distribution control program. The contractor performed all work necessary to maintain in a current and accurate status, all material contained in the User's Manual. The contractor provided and distributed revised pages for all copies of the manual in existence. The contractor distributed additional copies of the User's Manual as directed by the NASA Scout Office.

The contractor furnished three copies of the Scout separation system test planning guide to each Scout user with each test section provided. The contractor maintained the Scout separation system test planning guide in a current and accurate status.

The contractor prepared a preflight brochure for each launch vehicle and issued this document thirty days prior to a scheduled launch.

The contractor provided preliminary trajectory calculations with respect to performance capability, range safety, and tracking.

The contractor completed mission analysis and orbital studies as specified by NASA. Figure 81 defines long-range mission scheduling.

The contractor prepared and issued vehicle and GSE payload interface drawings. These drawings were approved by all members of the Mission Working Group and when submitted in final form they included identification of all payload/vehicle and payload GSE interface technical requirements.

The contractor completed all engineering necessary to define heat shield modifications required for each mission. Figure 82 shows heat-shield door locations.

The contractor provided all engineering necessary to define payload umbilical cables for each mission.

Tables LI and LII list the contractual details of the services obtained in Task B. Figure 83 itemizes vehicle furnished services and materials for payload integration.

Although the payload coordination contractor effort was contractually covered, the mission responsibility (as it relates to the launch vehicle) was outside the scope of the contracts. Since the area of general payload-to-vehicle integration and payload coordination involved a number of different

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[a] User's Manuals are provided for all payloads assigned to Scout vehicles. This Manual acquaints the user with the capabilities of the Scout vehicle and provides detailed design information to aid the engineer in integrating his spacecraft with the vehicle.

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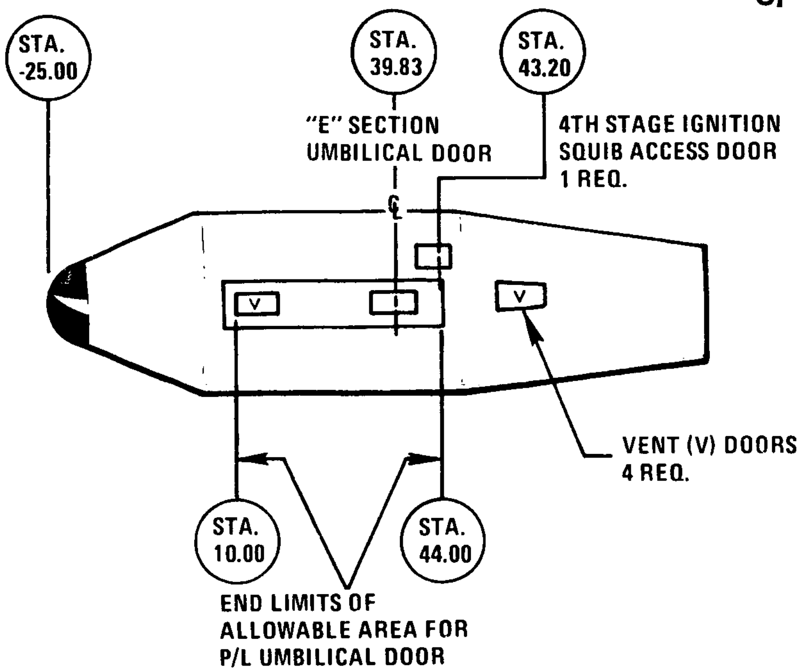
	T – MONTHS																		
	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
PAYLOAD ASSIGNED TO SCOUT	●																		
MISSION WORKING GROUP MEETINGS	●						●			●			●			●			
PROVIDE DESIGN DATA TO PAYLOAD	●																		
PAYLOAD CONFIGURATION DEFINED							●												
MISSION REQUIREMENTS DEFINED							●												
PRELIMINARY TRAJECTORY TO P/L										●									
PRELIMINARY P/L INTERFACE DWG												●							
DEFINE HEATSHIELD CONFIGURATION													●						
DEFINE GSE REQUIREMENTS													●						
GSE INTERFACE DRAWINGS RELEASED																●			
PAYLOAD – VEHICLE COMPATIBILITY TESTS																●			
PAYLOAD INTERFACE DRAWINGS RELEASED																	●		
FINAL TRAJECTORY RELEASED																		●	
LAUNCH																			●

Figure 81.- Scout Long Range Mission Scheduling.



PAYLOAD ACCESS DOORS MAY BE ADDED AS REQUIRED

Figure 82.- Scout Heat-shield Door Locations.

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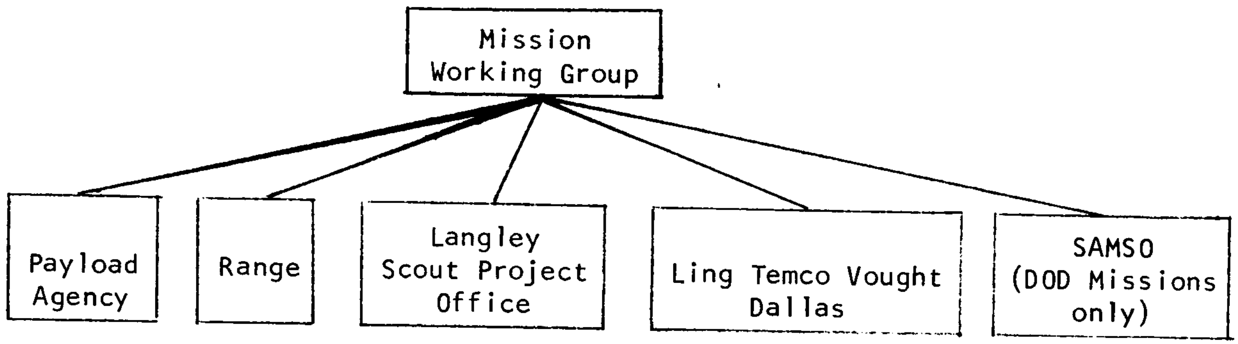
1. PAYLOAD SEPARATION SYSTEM
2. HEATSHIELD MODIFICATION (AS REQUIRED)
3. SCOUT USER'S MANUAL AND DESIGN DATA
4. PAYLOAD UMBILICAL CABLE
5. LAUNCH COMPLEX WIRING
6. MISSION PLANNING
7. RANGE INTEGRATION

Figure 83.- Scout Vehicle Furnished Services and Materials for Payload Integration.

agencies, a submanagement organization was formed to coordinate these agencies and their activities. This organization has been called the Mission Working Group. The Scout Project Office, the Range, the Contractor, the Payload Agency and the Department of Defense had personnel assigned to the payload Mission Working Group which was organized as follows:



Specifically, this group is responsible for the direction of all documentation effort; the physical integration program; the operational integrational program; and is, in general, charged with mission responsibility at the working level. The Scout payload coordination plan is outlined in table LV.

Task C - The contractor performed the preflight planning tasks necessary to deliver a payload to a designated flight condition at, or after, the last stage burnout. Portions of the resulting documentation are revised, when necessary, to reflect final stage and spacecraft weights or motor assignments. Predicted motor performance data for each motor was reevaluated, reviewed, and updated using actual motor flight performance results. This was accomplished by using representative motor data from the maximum number of the most recent flights; not to exceed eight. The techniques used are described in LTV Report 23.420.

The contractor determined the vehicle weight breakdown, center of gravity, three major moments of inertia as a function of consumable remaining weight and time histories.

The contractor defined the actual final mission flight profile based upon the motor performance and the above-determined weights, and also defined the final vehicle pitch program for each spacecraft mission.

The contractor prepared each final flight trajectory in the format of contractor routine LA0076.

For D.O.D. launches the contractor calculated optimum launch time, with the following Government-provided information:

Effective time period, and
Orbital data for each spacecraft.

The data consisted of the desired right ascension of the ascending node for a given day and its rate of change per day from that day.

TABLE LV - SCOUT PROJECT PAYLOAD COORDINATION PLAN

Months	EVENTS
-24	1. Payload assigned to Scout 2. MWG formed 3. Launch site selected 4. Design data to payload agency 5. Payload design data to vehicle 6. Establish documentation rqmts.
-20	<u>MWG Review 1</u> 1. Establish approx. launch date 2. Determine performance and accuracy requirements 3. Prelim. heat shield design 4. Payload tracking coverage 5. Define spin limits 6. Review range documentation Req.
-16	<u>MWG Review 2</u> 1. Establish launch date 2. Define boost trajectory constraint 3. Define prelim. payload mission requirements
-13	1. Define final design of payload system and heat shield 2. Define wiring required for pay-load flyaway umbilical cable
-11	<u>MWG Review 3</u> 1. Sys. design integration compl. 2. Submit range documentation 3. Define heat shield eject. test requirements and date for test 4. Provide 3 D.O.F. trajectories to payload agency
-9	Payload configuration and mission defined to permit contractor to proceed with Range Safety Report

Days	EVENTS
-180	<u>MWG Review 4</u> 1. Final date for start of range safety study 2. Definition of vehicle motor performance 3. Spin motor req. final 4. Review and establish firm launch data 5. Heat shield ejection test at Dallas 6. RFI check at Dallas
-60	Range Safety Study to WTR
-30	1. Payload arrives at launch site 2. Final trajectory due at launch site 3. Configure launch complex for payload
-15	1. Pre-pad checks 2. Payload and vehicle simulated flight and RFI checks
-10	1. Spin balance payload and veh. fourth stage together 2. Physical measurements
-9	Final Preassembly checks
-4	1. Mate payload with vehicle at pad 2. Vehicle, and payload RFI check at pad
0	LAUNCH OPERATION

A Design Information Release (DIR) as outlined in letter SL-2365/JCP dated June 19, 1973, was issued for each launch. This DIR included all the results of the Task C requirements as follows:[a]

Preflight motor assignment and performance.
Preflight weight description.
Preflight sequence of events and guidance program.
Preflight control settings and hydrogen peroxide requirements.
Preflight performance profile.
Preflight wind restriction.
Preflight spin rate predictions.
Preflight final trajectory, look angles, and stage impact points.
Data system calibration.

The contractor provided a preflight review presentation at the NASA Langley Research Center office for each launch vehicle processing, all problems, motor history, prior launch-pertinent information and contractor's opinions were presented to a group of Government experts which resulted in the "O.K. to Launch" decision.

A typical preflight report is reproduced in Appendix E.

Task D - The contractor completed all effort necessary to reduce, analyze, and report vehicle flight results for each mission. These results include motor burn, coast, orbital insertion, and analysis of any anomalies. Flight data trends or biases that could jeopardize "safety of flight" for vehicle or mission was reviewed by the contractor and reported to NASA.

The contractor prepared and submitted the final flight results for each mission in a report entitled, "Final Flight Report" within sixty days of receiving the required data from NASA. The report was required to be prepared as was LTV Postflight Report number 3-34100/IR-81. A typical flight report is reproduced in Appendix F.

Task E - The contractor supplied the system engineering effort necessary to support all aspects of the activity associated with the following systems:

Mechanical
Control
Guidance
Electrical and Electronic
Propulsion and Pyrotechnics
Launch Complex and Ground Support Equipment

[a] The contractor was required to submit to the Government a list of all new DIR's 30 days prior to each launch.

The engineering to support this effort consisted of the following:

Initiation, review, and disposition of revisions to the Scout Standard Procedures, the Standard Scout Vehicle and G.S.E. configurations.
Review and/or disposition of system and component deviations.
Review of all discrepancies, making appropriate recommendations.
Insure compliance with Scout technical standards at all sites including subvendors and storage facilities.
Notification to the Government of any significant technical problems in an expeditious manner.
Notification to the Government of any situation that could jeopardize flight performance. Notification to be made to insure receipt prior to the start of launch countdown.
Notification to the Government of any action necessary on its part to permit the contractor to fulfill his contractual obligations.

The contractor also reviewed the vehicle and ground support equipment environment, design, manufacturing and performance (including vendor component and subsystems), to find, analyze, and resolve problems, and implement changes resulting from the following items:

Safety-of-flight Items.
Capability of the contractor and subcontractors to process consistent with Scout Standard Operating Procedures.
Engineering resolution of problems.
Producibility changes.
Government-approved, Contractor-requested changes.

The contractor also provided liaison to quality control, manufacturing, materials, and launch activities to insure compatibility of all Scout systems.

Task F - A Reliability Program was managed by the contractor which included the tasks necessary to support vehicle production, in-plant and field processing of vehicles, and Scout system product improvement in accordance with applicable revision of LTV reports 23.203 and 23.247.[a]

Task G - The contractor maintained a Standardization and Configuration Control system that provided for the receipt, evaluation, and recommendation of changes to the Scout Standard Operating Procedures, vehicle and GSE configurations. The objective of this standardization and configuration control system was to provide for the interchange and evaluation of technical data, experience, and knowledge existing at the various Scout operating sites (Wallops Island, Vandenberg AFB, San Marco, NASA/Langley Research Center Scout Project Office, and contractor's Dallas facility). The contractor operated the configuration control system in accordance with LTV report 3-15000/5R-240 titled "Configuration Control Operating Procedures for the Scout System," and with LTV report 3-30000/4R-81 titled "Standard Operating Procedures Editorial Plan."

(a)Detailed in Chapter 5.

These reports include the following requirements:

"1. The contractor shall maintain storage and issuance control for Standard Operating Procedures manuals. Additional data accumulation and Quality Assurance packages at the Contractor's Dallas facility, Vandenberg AFB, and Wallops Island shall be reproduced locally by the user consistent with usage rates. The contractor shall also provide revised pages to the Standard Operating Procedures Manuals, as they are required due to changes as authorized under Standardization and Configuration Control.

"2. The contractor shall maintain and correct the system of drawings and specifications which defines all the latest vehicle and GSE configurations. Within thirty days of their effectivity date, two microfilm and three prints of each contractor and subcontractor Engineering Order (E.O.), and each contractor specification shall be furnished to NASA Langley Research Center Scout Project Office. Drawings, Engineering Orders, and Specifications furnished under other Scout contracts shall have their identification included in all listings supplied under this contract. All active drawings shall have no more than four E.O.'s outstanding at any time. A production drawing shall be made for each vehicle modification drawing (Standard Configuration only) within thirty days of effectivity date of each modification drawing. The standard GSE configuration shall be identified by family tree drawing lists of Scout Standard System Test Equipment, Scout Launch Complex equipment, and transporters. The documentation shall be maintained or provided as follows:

"(a) Scout Standard System Test (S3T) equipment drawings shall be maintained for WI and VAFB.

"(b) Standard Launch Complex (SLC) drawings for the launcher equipment shall be maintained for WI and VAFB. Those drawings peculiar to vehicle processing (functional schematics, wire books and component location charts) shall be maintained on site. Reproducible drawings of this equipment shall be forwarded to the contractor and an index of available drawings maintained.

"(c) Dynamic Spin Balance facility procedures and drawings shall be maintained at Vandenberg AFB.

"(d) The portable and mobile GSE drawings shall be maintained and corrected. Reproducibles or originals of these drawings shall be integrated in the contractor's drawing system.

"(e) The contractor shall maintain a family-tree drawing for the standard Scout vehicle incorporating all drawings down to the component installation level for 3-, 4-, and 5-stage vehicles.

"(f) The contractor shall maintain a family-tree drawing for Scout Ground Support Equipment.

"(g) The contractor shall provide the following indexes to NASA/Langley Research Center Scout Project Office every ninety days except as noted:

Alphabetical Drawing Index
Numerical Drawing Index
Numerical Specification Index
Standard Operating Procedures Cross Reference Index (semiannually)

"3. The contractor shall provide a Standard Procedure Configuration Index for each vehicle prior to processing each vehicle through checkout. This index shall identify the Standard Procedures to be used by page and revision date and shall be used as the means of procedure planning documentation. This index shall be attached to the applicable vehicle logbook. A similar index for the field portion of the Standard Procedure shall be submitted to NASA/Langley Research Center Scout Project Office two weeks prior to the start of vehicle processing in the field."

Task H - This task covers the task of vehicle processing. This covers the effort of getting the vehicle ready for launching which includes:

Remove the vehicle from storage.

Depreserve and examine all vehicle sections for completeness, condition and compliance to lobgook entries.

Inspect and/or test major items and components as per QCPP-0-005C and correct any deficiencies revealed during such inspections or tests.

Provide the effort necessary to implement changes resulting from:

- Safety-of-flight items,
- Revisions necessary to provide capability to process vehicles consistent with Standard Operating Procedures and Standardization and Configuration Control, and
- Modification necessary to producibility.

Payload Umbilical.

Vehicle Mods.

Configure for Flight.

Check Out.

Engineering, manufacturing, and quality liaison representation in the Dallas processing and field checkout and launching of vehicles.

Notification by the Government of each vehicle's launch site and expected payload assignment at least five months in advance of each vehicle's expected shipping date.

[a]One heat-shield fit and ejection test of hardware designated by the contracting officer. This test shall be made using the free-fall method per SOP. A prototype or mockup payload, if required, shall be furnished as Government Furnished Equipment on a time scale consistent with ejection test schedule. Upon completion of the ejection test, five copies, and one reproducible of individual summary report similar to LTV report 23.317 and one copy of the ejection test motion picture film shall be submitted to the NASA Langley Research Center Scout Project Office.

Conduct and report on heat shield-to-payload vehicle fit checks in accordance with Standard Operating Procedures.

Processing for launch from the Standard Launch Complex (SLC) shall follow the Standard Operating Procedures defined in LTV report 3-15000/5R-240, as revised.

Upon assignment of the Government-furnished rocket motors to a vehicle, the contractor shall conduct an inspection, and shall prepare the motors for integration into the vehicle in accordance with Volume III of the Standard Operating Procedures and the flow charts of Volume I of the Standard Operating Procedures.

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[a]Figures 84, 85, and 86 reflect the Scout payload processing and tests completed for many of the Scout payloads.

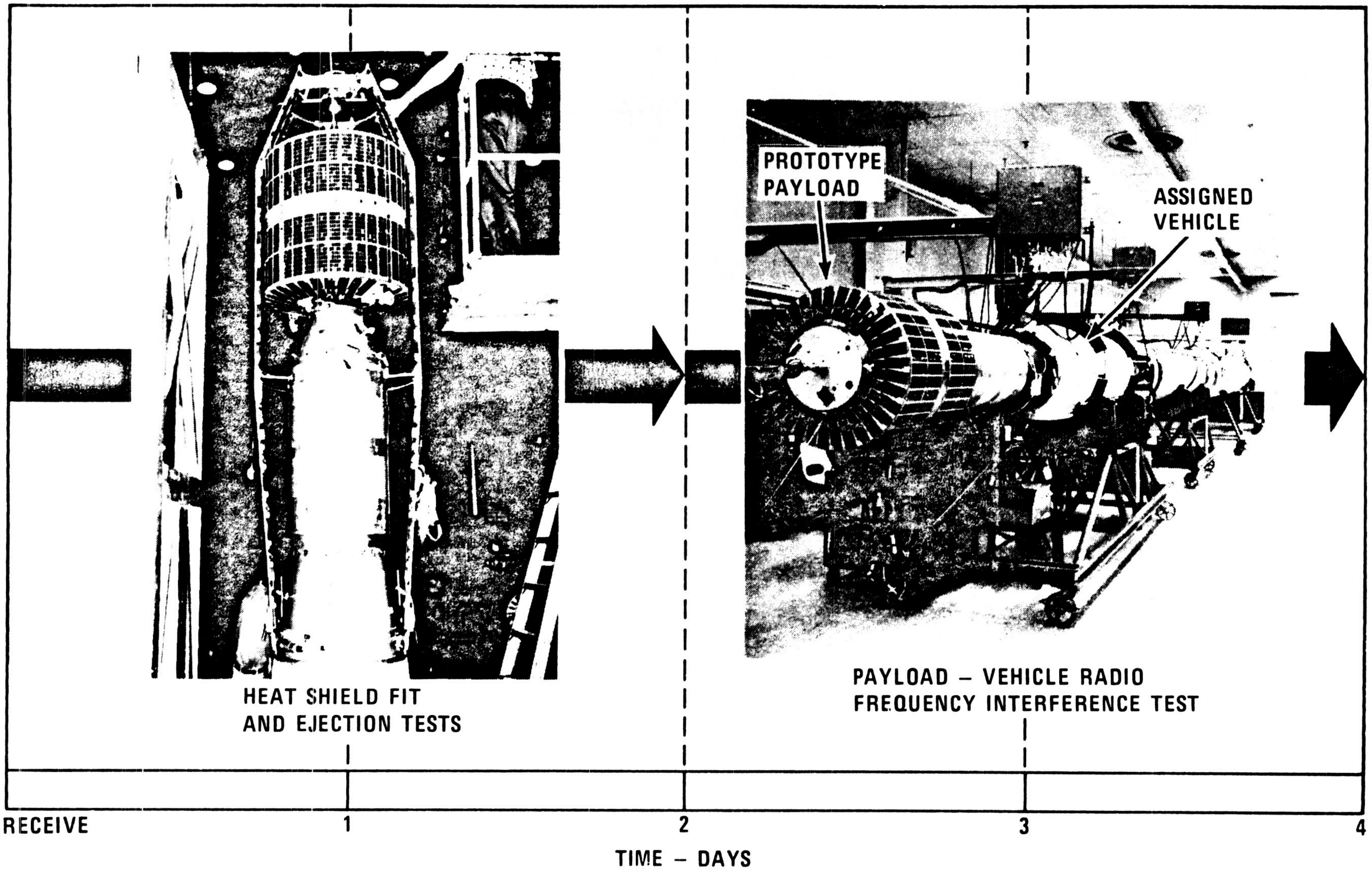

Figure 84.- Scout Dallas Payload Processing.

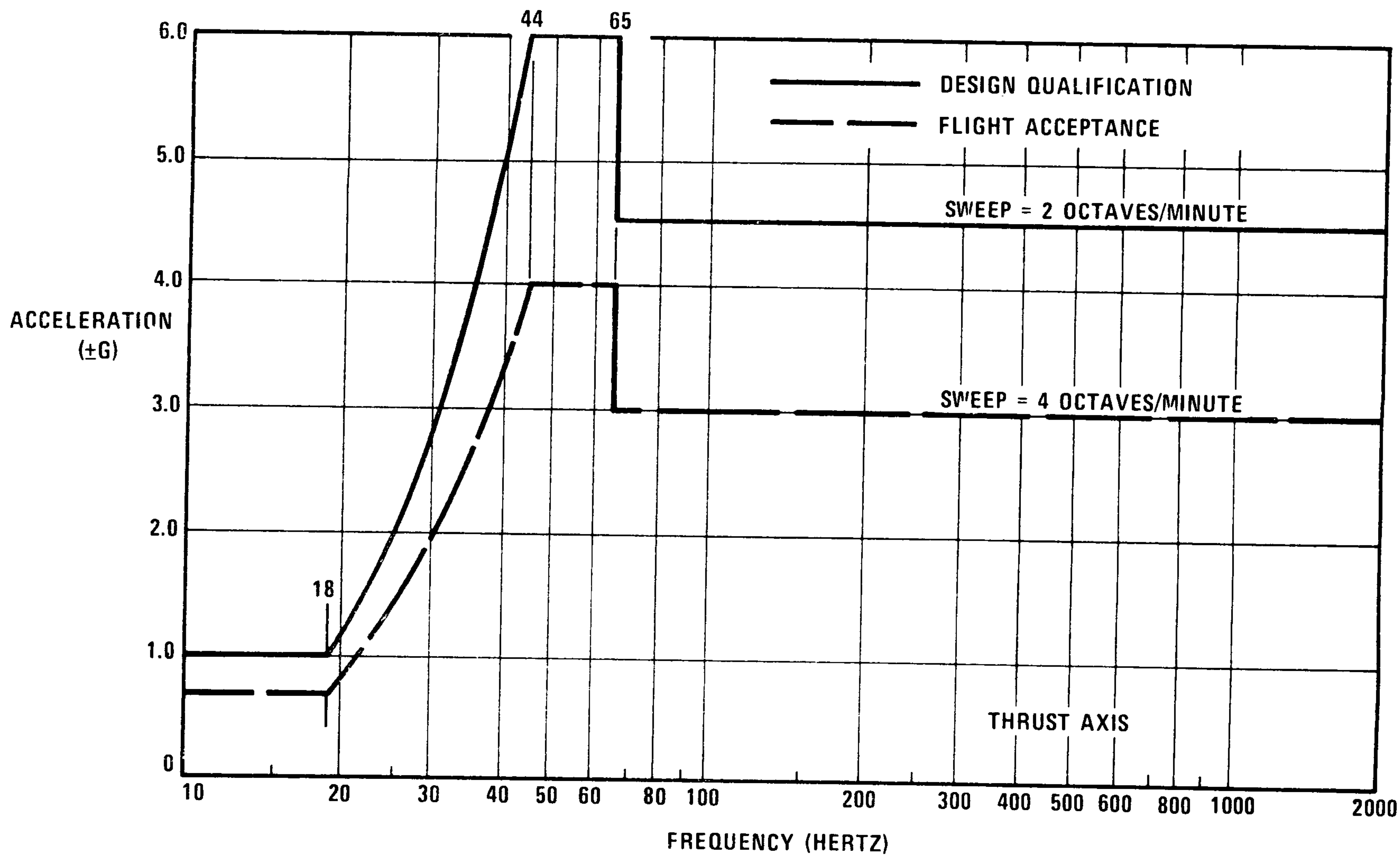

Figure 85.- Scout Payload Vibration Testing Sinusoidal Levels.

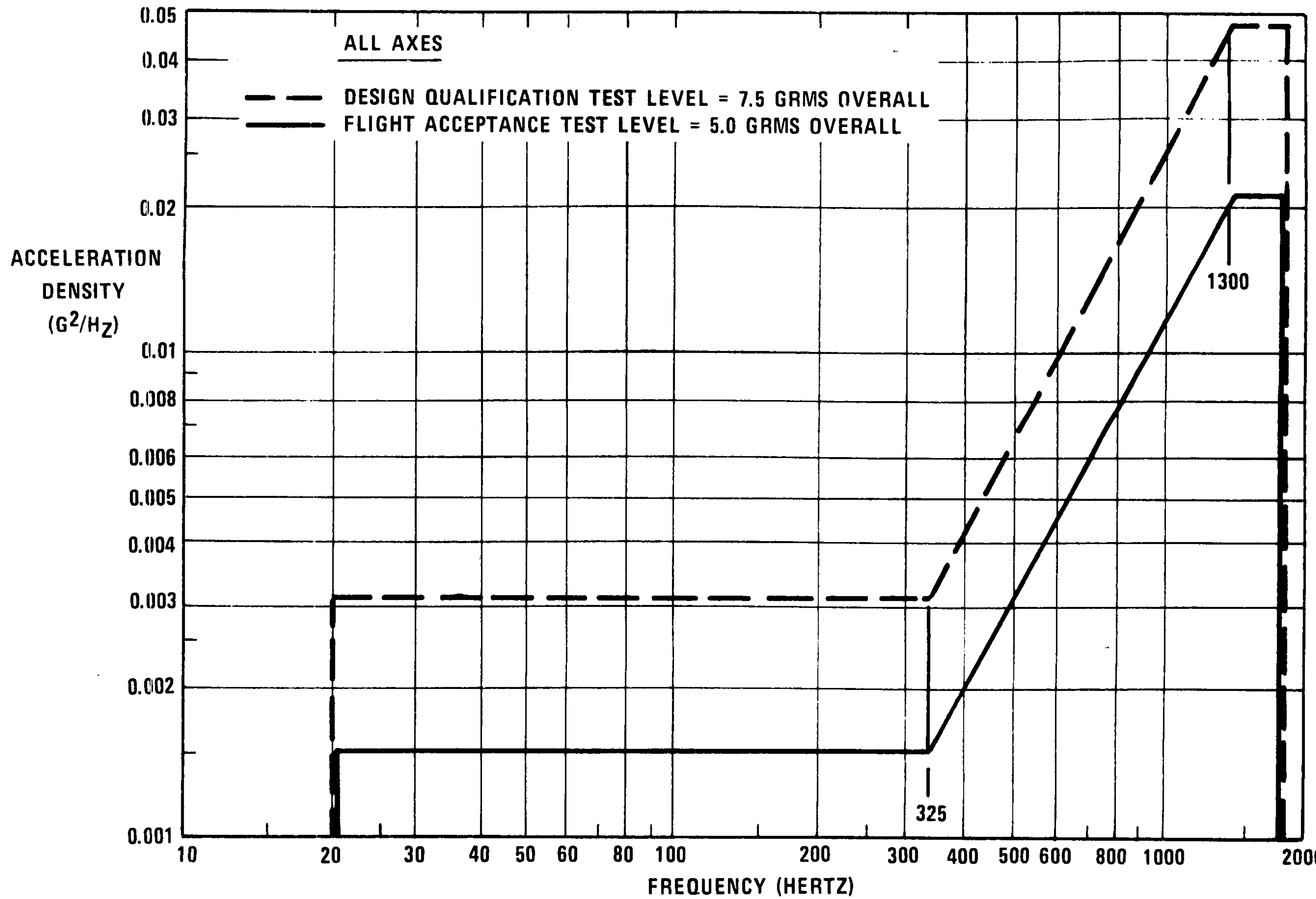

Figure 86.- Scout Payload Vibration Testing Random Levels.

Support mission integration effort and be responsible for integration of the payload and vehicle including spin balance at the launch site.

Prepare R-Day (launch date) schedules showing spacecraft/range interface requirements. At Vandenberg AFB the NASA/DOD Joint Office shall approve the R-Day schedules indicating compliance with Range Support Requirements.

The contractor defines support requirements, and prepares all applicable range documentation, preflight and 24-hour data reports and all other necessary documentation. The contractor assures that these documents are maintained in a current status.

The contractor participates in ground and range safety analyses and evaluations of range safety restraints and informs the NASA and the 6595th Aerospace Test Wing of any proposed changes that affect the NASA/DOD Scout range safety and range safety-related programs. This information is needed to support the requirements for Range Safety approval ninety days before each launch.

Responsible for maintaining the necessary ground and range safety, and developing the range schedule data for the required range support for the NASA/WTR Mission Support Office and the 6595th Aerospace Test Wing.

Furnishes four copies of changes to the ignition and destruct wiring diagrams schematics to the Government Range Safety Office forty-five days prior to each launch.

Prepares an Operations Plan and Countdown Manual for each launch at Wallops Island and submits them to the Government for approval within twenty-one and fifteen working days, respectively, prior to the scheduled launch date. In addition, prepares a Countdown Manual for each launch at the Vandenberg AFB and submits it to the Government for approval within fifteen working days prior to the scheduled launch date.

In the performance of the field effort, the contractor completes the requirements of SAMTEC 127-1, "Range Safety Manual," for Vandenberg Air Force Base and Wallops Flight Center handbooks for NASA Wallops Station.

The contractor maintains the VAFB sequencer and for the operation of the sequencer during all Scout activities involving the sequencer, SOP 6-3-2, dress rehearsal, countdown and any special Scout tests required by the host range.

Operates the Dynamic Balance Facility at Vandenberg AFB.

The contractor provides a capability to launch a NASA/DOD Scout vehicle on a schedule of thirty calendar days after a notice for launch has been given.

Participates in a flight readiness review meeting to be held following dress rehearsal. The contractor presents in detail all major systems and all anomalies which have occurred in vehicle, GSE, and/or facilities during field processing.

In accordance with Scout drawings, specifications, and Standard Operating Procedures prepares for delivery and deliver Scout vehicles as directed by NASA.

Task J - The contractor provides technical assistance to the NASA and Centro Ricerche Aerospaziali (CRA) in the review of program documentation, including launch complex maintenance and personnel proficiency maintenance, drawing maintenance for SLC and S3T, concepts and plans, and launch complex modifications necessary to remain current to the Scout vehicle configuration.

The contractor provides engineering support to assist and monitor the incorporation of GSE modifications and maintenance of the San Marco Range and assists in the maintenance of personnel proficiency of CRA.

At the direction of the contracting officer, the contractor provides the services necessary to accomplish specific tasks assigned within the limitations set forth in the areas described below:

1. Operation concepts, including plans, schedules, and flow plans are reviewed in line with established NASA/DOD Scout experience. This includes review of all plans for complex maintenance and personnel proficiency including configuration control to assure Scout compatibility.
2. Support San Marco CRA Working Group Meetings.
3. Support the CRA for modifications of the complex to be compatible with current Scout configurations.
4. Support the CRA for maintenance of the complex including assistance in determining spares requirements.
5. Maintain San Marco operating procedures, drawings (SLC and S3T), and perform tasks to maintain personnel proficiency for Scout vehicle operations.
6. Perform specific manufacturing tasks assigned by the Government.
7. Provide technical support to CRA as directed by NASA Langley Research Center Scout Project Office in conducting San Marco launch operations in one or more of the following areas:
   a. Program Coordination
   b. Propulsion
   c. Guidance
   d. Mechanical
   e. Fluids
   f. Quality Control
   g. Electrical
   h. Operations
8. Provide refurbishment of components returned from San Marco Range and procurement of new materials and spares as required to support operations and maintain current vehicle and GSE configuration.

Task K - The contractor provides the following training, i.e., certification, courses for the launch site personnel:

Coaxial Cable
Electrical Cable
Electrical Connectors
Potting and Sealing
Soldering
Pneumatics
Hydrogen Peroxide
Optical Equipment
Propulsion and Pyrotechnics

Training cycles of the above personnel were accomplished during one continuous period. Personnel certification in the above skills was accomplished every eighteen months with recertification on a schedule of four per launch site (Wallops Island and Vandenberg AFB) within a three-year period.

The Government provides training at Vandenberg AFB for launch personnel on dynamic balance procedures.

Additionally, the contractor was responsible for providing certification of launch operation console operators at VAFB.

Task L - The contractor managed the established Logistics Support Program which provided the necessary procedures, controls, and services to insure that adequate, serviceable and technically acceptable materials (spares-vehicles and GSE) were available for assembly, check out, and launch of Scout vehicles at Vandenberg AFB and Wallops Island and vehicle spares only at San Marco.

The contractor maintained the established and authorized spares replacement system. A system of records, to provide a current perpetual inventory balance and condition status of all items from receipt to consumption, was maintained.

The contractor was responsible for directing the spares support system in accordance with the latest approved revision of the Scout Logistics Support System Standard Operating Procedures, report 3-30000/4R-87.

Allocation and/or distribution schedules of all inventory items were maintained by the contractor for the complete spares inventory. Replenishment or supplementary requirements were submitted monthly to NASA Langley Research Center for review, approval and authorization as defined in Task M. The schedules and replenishment requirements were maintained including all the information previously submitted in the Quarterly Replenishment Requirements Report (QRRR). The contractor was responsible for maintaining a requirement submission schedule that provided timely replenishment of all inventory items.

For the performance of this task, the Government furnished the following at Wallops Island and Vandenberg AFB.

Storage Space,
Communication Services, and
Office Space and Equipment.

The contractor maintained vehicle spares for San Marco in the Scout Ouarterly Replenishment Requirements Reports (QRRR's).

Task M - The contractor provided the services and materials necessary to perform the tasks listed below:

1. Removed from storage and packing and crating of spare parts for shipment to field sites including receiving of sections and/or components from field sites.

2. Replenished supplemental spares parts and H_2O_2 as authorized by the contracting officer.

3. In the event that spare parts which were unavailable from spares inventory were urgently required at one of the launch sites, the contractor was authorized to furnish such items from production, if available. Similarly,

items urgently required to support in-plant vehicle processing under the recertification concept were furnished from spares inventory, if available. Any item borrowed under either requirement was replaced through the Scout Logistics Spares Program.

4. During the term of the systems management contract the contractor repairs, reworks, and/or modifies Scout vehicle and GSE parts, consisting of spares currently in the inventory for support of the Scout program as well as those that may be authorized during the period of the contract and any vendor components that malfunction during vehicle processing. This effort also includes the recertification of such spare parts and/or the corrective action necessitated by their shelf-life expiration.

5. Under item 2 above, the contractor periodically prepares a list of the recommended spare parts including labor hour and material estimates for such list. These lists include replacement of vendor components that failed during vehicle processing and which were dispositioned as scrap. Upon direction from the contracting officer, the contractor initiates procurement action to obtain those items and quantities of spares as authorized in writing. As part of the documentation effort of Task L, the contractor maintains a listing of items authorized and procured hereunder, as well as the estimated cost thereof.

Task N - The contractor's field personnel were responsible for launching Scout vehicles and maintaining the Scout Launch Complex (SLC) and Scout Standard System Test (S3T) and all associated Ground Support Equipment (including the Dynamic Balance Facility at Vandenberg AFB) and telemetry stations. All equipment was kept in operating condition (per SPO Volume II, when and where applicable) and maintained current with all Scout vehicles and range requirements.(1)

The contractor's field personnel maintained status records of all GSE assigned to field sites and coordinated all material and component requirements. Material procurement, inventory control, shipping and receiving and reporting of overtime were performed in accordance with existing contractor field operating procedures, as amended.

In addition to those tasks set forth above, the Technical Representative of the Contracting Officer, acting through the Scout Program Management Office at Dallas, Texas, assigned other tasks which utilized the services of the field personnel. All materials and/or special tools (other than handtools) which were required were furnished by the Government.

The contractor's field personnel submitted a biweekly vehicle inspection report (reference LTV report 3-15000/5R-231) listing the Test and Inspection Report activity. The activity was separated into three groups titled Hardware, Procedures, and Ground Support Equipment. This inspection report denotes what Volume II Maintenance Procedures were performed and what Malfunction Reports were initiated.

The field sites maintained a drawing file of (one microfilm and one drawing) all contractor and subcontractor new and revised drawings related to the NASA/DOD Scout vehicle and its support systems. To further insure that up-to-date drawings were available to the launch teams, the contractor's field

(1)Figure 87 charts a typical integrated field schedule that was performed by field, Dallas, and payload agency personnel. NASA personnel were also involved.

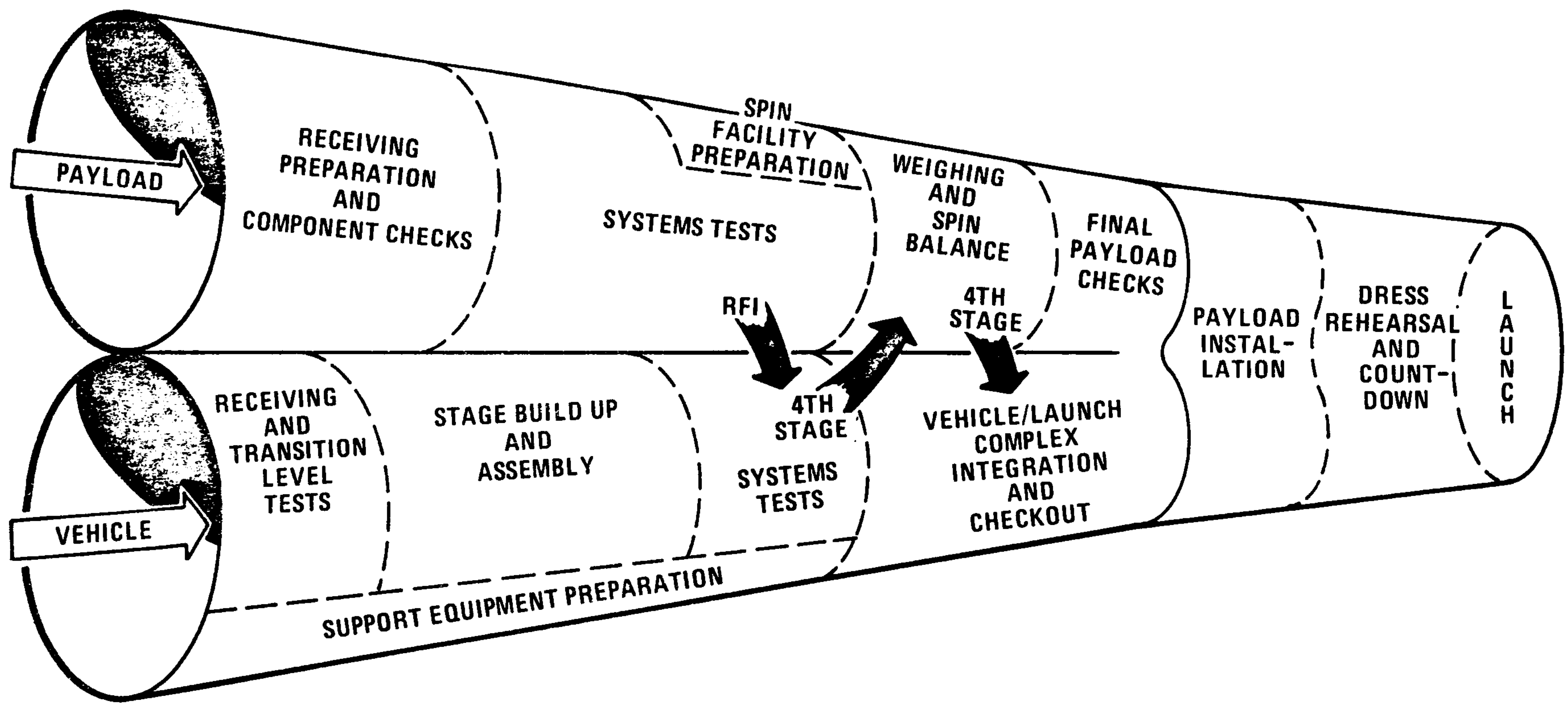

Figure 87.- Integrated Field Schedule.

personnel updated a quarterly index of all drawings and their vehicle applicability. This also included, as a minimum, the 304- through 309-series specifications.

The contractor's field personnel maintained the following working schematics for use by NASA:

1. Launch Complex Functional Schematics
2. H_2O_2 Fueling Unit (electrical and mechanical)
3. Pneumatic System (compressor room electrical and mechanical fluid flow)
4. Launcher N_2 Systems (launch arm and umbilical)
5. Launch Complex AC/DC circuits, such as Operations Support building, AC equipment, power supplies, shelter lighting and heating
6. Dynamic Balance Facility Functional Schematics (VAFB)
7. Dynamic Balance Facility Mechanical and Electrical Drawings (VAFB)
8. Scout Telemetry Stations Electrical and Flow Diagrams
9. Wire Books

The contractor's field personnel maintained proficiency by participating in the vehicle processing at the Dallas facility. For the performance of this task, the following were furnished.

1. Equipment. The Government furnished all equipment except for normal hand tools (defined as: "Those items normally identified with a skill or profession") and reproduction equipment at VAFB. This included services for the movement of heavy equipment. Calibration of test equipmentwas performed by the Government (NASA Wallops Island Laboratory or Vandenberg PMEL) in accordance with the contractor's established calibration schedule.

2. Dynamic Balance Facility (VAFB). The NASA furnished the Dynamic Balance Facility as GFE/GSE to the contractor.

3. Materials. All materials in support of GSE fabrication and changes were furnished by NASA, upon contractor request with supporting documentation. Equipment maintenance materials were provided by NASA. Material for special tests or additional tasks, as may be requested by NASA, was furnished by NASA.

4. Office, Shop, and Storage Space. Office space was assigned to the contractor's field personnel by the Government. Work areas were assigned to the contractor to support personnel, materials, tools, equipment, and launch vehicles. Storage space was provided for special items such as H_2O_2 and pyrotechnic devices.

5. Special Clothing. The Government provided additional special clothing (H_2O_2 compatible) and other safety items that are required as a result of the NASA Wallops Station and Space and Missile Technical Center (SAMTEC) safety requirements.

6. Direct Field Support Services. The following services were supplied to the contractor's field personnel on an as-needed basis in conjunction with field operations;

   a. Reproduction services at VAFB for large volume (25 or more copies of a single item) and extra large drawings.
   b. Necessary reproduction services at Wallops Island.
   c. Services of the machine, carpenter, and paint shops.

d. Heater and air-conditioning serveillance, when the vehicle is in the shelter on a 24-hour-per-day basis, except during the contractor's regular work shift.

e. Guard services at the launch pads, assembly area, and spin facility when required by local safety and/or security regulations.

f. Operator and equipment for dynamic balance operations at Wallops Island.

g. Packing, packaging, shipping, and receiving of all Scout and Scout-related equipment.

7. The contractor's field personnel also maintained all Government-furnished motor and vehicle shipping containers and handling dollies in a usable condition. Containers or dollies that become unusable, replacement was accomplished by separate contractual action.

Task P - The Government made available suitable office space and equipment at Langley Research Center, Hampton, Virginia, as was required to accommodate the personnel defined below. The contractor was not obligated to furnish more than twelve man-years of effort, including paid absences, in the performance of this task. The tasks included:

1. Mechanical and Control Systems. Maintained liaison between the NASA Langley Research Center Scout Project Office, Wallops Station, Vandenberg AFB, and Contractor's Dallas facilities; performed design and layout for integration of secondary payloads, and clarification of problem areas with vehicle and GSE; and performed other Government-approved tasks.

2. Electronic Systems. Maintained liaison between the NASA/LRC Scout Project Office, Wallops Station, Vandenberg AFB, and the contractor's Dallas facilities; performed design studies for improvement of future hardware and circuitry of electronic systems on vehicle and associated GSE; investigated problems involving Radio Frequency (RF) transmissions at each range; and performed other Government-approved tasks.

3. Propulsion Systems. Maintained liaison between the NASA/LRC Scout Project Office, Wallops Station, Vandenberg AFB, and the contractor's Dallas facilities; observed rocket motor tests; reviewed rocket motor flight performance; performed preliminary studies and evaluation as assigned by NASA/LRC Scout Project Office; and performed other Government-approved tasks.

4. Reliability and Quality. Maintained liaison between the NASA/LRC Scout Project Office, Wallops Station, Vandenberg AFB, and the contractor's Dallas facilities; to integrate the Quality Control procedures for the vehicle and the rocket motors; and performed other Government-approved tasks.

5. Operations. Maintained liaison between the NASA/LRC Scout Project Office, Wallops Station, Vandenberg AFB, and the contractor's Dallas facilities; provided coordination of Standardization and Configuration Control change traffic; investigated technical problems associated with field operations; and performed other Government-approved tasks. Appendix G describes other Scout Operations.

6. Mission Analysis. Conducted parametric studies and analyzed Scout performance for unique mission requirements and determined the performance of suggested vehicle changes using available computer programer.

7. Flight Data System. Analyzed telemetry records to determine validity, accuracy and quality, converted raw telemetry data to engineering unit displays, maintained a current data bank of past flight experiences; analyzed postflight data using the Scout Performance Evaluation Ascent Reconstruction (SPEAR) computer program, prepared and maintained "SPEAR and Scout

Data Handling" User's Manuals in a condition of readiness for operational use; and conducted studies to improve knowledge of vehicle performance and analyzed new instrument development and methods of data reduction.

8. Computer Operations. Maintained, in an operational status, Scout unique computer programs, Trajectory Optimization and Linearized Pitch Program (TOLIP) and SPEAR. Incorporated changes to the above programs as dictated by hardware and/or procedural changes of the vehicle and prepared new Scout computer programs as required for Langley Research Center computers.

Task R - The contractor was contractually required to provide the services and materials necessary to perform special programs consisting of:

Scout System Improvements
Vehicle Payload Reassignments
Scout-Related Research and Development
Reprocessing Support
User Mission Peculiars
GSE Design Changes
Component Refurbishment
Accuracy Prediction Studies
Thrust Misalinement Measurements
Feasibility Studies
Anomaly Investigations
Shelf Life Studies
Special Instrumentation
Motor Inspections
Tests and Rework
Scout-Related Studies
Analyses
Program Support
Miscellaneous Requirements

Tables LVI and LVII itemize Task R history during this time period.

Task S - Special fixed price hardware and services individually contracted by the NAVPRO office for NASA were accomplished as required. These were similar to items in Task R, but were restricted to requirements that could be negotiated as a fixed price task. R & D effort was not included.

Tables LVIII and LIX itemize Task S history during this time period.

Task T - Includes all required production support of the Scout Program. Prior to NAS1-12500 this effort was not consolidated but included in most of the tasks. The contractor supplied all the off-site REPS as required during subcontractor manufacturing. The contractor also supplied Engineering and Quality liaison for the required months of vehicle production to assure compatibility of all Scout systems and components. In addition, the contractor reviewed and advised disposition of all component and system deviations and waivers, all malfunction reports, and all discrepancy reports, Material Review Actions (MRA's) and Test and Inspection Reports (TIR's).

TABLE LVI - NAS1-10000 R-TASKS

TASK NO.	3336/ TASK CODE	DESCRIPTION	JOB ORDER	TOTAL*
1.	AAD	Scout Payload Separation/Ignition Timers, Survey & Select	E6000Y/E7000Y/ E8000Y***	$ 14,151
2.	AAA	Vehicle S-144 PAET Reentry, Payload Reassignment	E41440	70,084
3.	AAB	Vehicle S-173 Tests, San Marco	E5173H	34,622
4.	AAC	Increased Payload Weight Capability for Scout Fourth Stage	E7000R	135,871
5.	AAF	Destruct Receiver Power Switching	E7000W	29,932
6.	AAL	Advanced Effort for Scout 4th Stg. Attitude Control Sys Study	R1249**	47,297
7.	AAG	Verification of X-258 igniter integrity	E6001F	1,046
8.	AAE	Vehicle S-166 Special Test, GRP-A	E5166H	29,108
9.	AAH	Rework and Retest of Vehicle S-163	E5163H	15,060
10.	AAJ	Refurbishment of Misc. Components from Vehicle S-144	E4144H	13,361
11.	AAK	Algol III Thermal Insulation Design	E7000W	13,947
12.	AAN	Thermal Insulation Additions to Vehicle S-170	E5170Q	48,923
13.	AAM	Support for Improved Guidance Hardware Study	R1260**	17,413
14.	AAP	Veh. Simulators, 2 1/10, 6 1/48 & 2 1/32 Scale	E6000R/E7000R	30,305
15.	AAS	Veh. S-193 & Sub. Command Destruct Rec'rs, Selection	E7000W	12,836
16.	AAR	Verif. X-258 Igniter Integrity, X-Ray 3 ea. at HI/ABL	E6001F	1,863
17.	AAT	Inventory and Tag GFE at WFC and WTR	E41440/E60000	8,464
18.	AAV	Algol III Jet Vane Effectiveness Prediction	E7000W	2,640
19.	AAW	Scout Pressure Transducers, S-193 and Sub.	E7000R	5,821
20.	AAX	Safe Arm Units, Veh. S-193 and Sub., Select & Qual.	E7000Q	68,414
21.	ABB	NEMAR Output of Nominal Telemetry Data	R1244**	1,386
22.	ABA	Redesign Third Stage Arming Relay Box, FAT & Store	E7000Q	30,548
23.	AAY	Determination of Roll Moment of Inertia	E6000R	8,140
24.	ABC	Replacement of GFE Cables (4 ea. Endevco Cable Assys.)	E6000H	355
25.	ABD	Special Instrumentation for Veh. S-184, MTS-A	E6000R	44,560
26.	ABE	Design Improvement & Testing of Nitrogen Regulators (Marotta)	E6000R	30,731
27.	ABG	A-51 Heatshield Design and Modification, S-204, N-17	E7204H	5,397
28.	ABF	Integration of New Scout Components in Veh. S-193 & Sub.	E7000Y	132,411
29.	ABT	Rework Three (3) Sets of Command Destruct Rec'rs, for WFC	E7000W	9,813
30.	ABX	Modify and Reprocess Veh. S-181 for AEROS-A Payload	E6181H	95,372
31.	ABJ	Improved Radar Beacon Antenna Assy. & Antenna, S-193 & Sub.	E7000R	19,628
32.	ABH	X-259 Rocket Motor Drop Test, No. HPC 129 w/Shipping Contnr	E6000R	6,773
33.	ABK	Design Heatshield Ducting for Transit RTG (GFE 34-in -40 H/S)	E6001J	21,934
34.	ABL	Test Firing Overage 0.6KS40 Spin Motors, S/N's 63301-001 & 6409-1	E6000R	3,468
35.	ABP	Airborne Hi-Pres. Quick Disconnects, Compare Teflon O Ring Seats	E7000R	6,944
36.	ABM	Passive Roll/Yaw Comp. Simulators, Design, Fab. & Test 2 Units	E6001J	5,665
37.	ABN	Transit RTG Payload, GSE & Air Conditioning changes at VAFB	E6001J	13,069
38.	ABR	Revision of Scout Motor Transportation Specification	E7000R	6,171
39.	ABS	Cooling Air Sys. for A-404 and Field Support, INS-1	E6182J	36,325
40.	ABV/ABVY	Support for LaRC Scout Review	E6000R	72,709
41.	ABW	Scout D Design Data and Range Safety Documentation	E60001	34,043
42.	ACA	Veh. S-182 Reprocessing Support, INS-1 Transit RTG	E6182H	16,755
43.	ABY	Spec. Instrumentation on S-181 AEROS A and S-185 ESRO IV	E7000R	51,036
44.	ACC	Fabrication and Repair of Scout GSE, Dallas/WFC/VAFB	E60000	46,897
45.	ACB	Serv. to Monitor Qual. Test of 4th Stg. T/M Module Transmitter	E6000F	1,495
46.	ACD	Algol III Hydroburst Test, Motor Mfr'd by Marquardt Corp.	E7000W	65,240
47.	ACE	Castor IIA Propellant, Long Term Storage Study by TC/H	E7000R	14,611
48.	ACF	Aging Characteristics of Thixon AB-894 Primer Coat, Castor IIA	E6000R	10,864
49.	ACG	Temp. Conditioning of Castor IIA S/N 127 to -20° below F.	E6000R	5,362
50.	ACH	Test & Insp. Castor IIA S/N 196 due to -20° below F Transport.	E7197R	11,377
51.	ACJ	Eval. of Gulton Timer on 4th Stg. Module, GFE S/N 006 on Upper D	E7000Q	12,316
52.	ACN	Motor Training Program for Field, WFC, VAFB, 6595th, CRA, etc.	E6000K	27,685
53.	ACK	Design Review of High Pressure X-259 & Light Weight Igniter	E7000W	12,130
54.	ACL	Replacement of SD60EO Initiators, X-259 Rocket Motor	E7000R	14,616
55.	ACM	Refurbishment of Specific Sections of Veh. S-178, SLV-1A	E6178H	20,412
57.	ACR	Scout GSE Design Changes and SOP Revisions	E60000	18,828
58.	ACP	UK-5 Fourth Stage Tip-Off Rocket, 0.6KS40 to Altair III	E6187J	1,786
59.	ACV	Rewrite Catalog Section of Volume II of GSE Manual	E60000	5,777
60.	ACY	Algol III Motor Handling on Dolly, Reorientation, VAFB	E7000R	896
61.	ACT	Transfer Personnel to Langley Support Office, 2 ea.	E6000P	30,096

*Total with 8.119% Fee.
**180 Program J.O.

TABLE LVI - NAS1-10000 R-TASKS CONCLUDED

TASK NO.	3336/ TASK CODE	DESCRIPTION	JOB ORDER	TOTAL*
62.	ACS	Modify Scout Fifth Stage for NPE Hawkeye Mission	E6191J	$ 23,643
63.	ACW	Scout Accuracy Prediction Studies, Vehs. Sub. to S-172	E6000R	12,833
64.	ACX	Incorp. High Pressure X-259 into Scout System	E7000W	24,734
65.	ADA	SOP, Dwg. & Spec. Effort to Use Hewlett-Packard 5326A Counter	E6000G	8,879
66.	ADB	SOP, Dwg. & Spec. Effort to Use Fluke 8300A Digital Voltmeter	E6000G	3,368
67.	ADE	High Pressure X-259, GSE Mods. and SOP Effort	E7000W	26,663
68.	ADF	Scout GSE Design Changes, Design Effort Only	E70000	17,179
69.	ADC	Design & Tooling Rqmts for New 25-in. P/L Transition Sect.	E6000E	23,237
70.	ADJ	Capacitive Discharge Ignition System, Fourth Stage	R1277**	74,396
71.	ADH	Develop Math Model of NPE Hawkeye Spacecraft	E6191R	7,386
72.	ADG	Support to SPEAR Computer Program, Post Flight Analysis	R1244**	3,996
73.	ADM	Prod. of 10 min. P/L Orientation Film, Plus 1 Answer Print	E7000R	3,062
74.	ADD	Installation of PCM Encoder into Two (2) Vehicles	E8003R***	46,612
75.	ADK	Installation of GFE Acoustic Sensor on S-188	E6188R	5,088
76.	ADL	Obtain X-259 Nozzle Attach Flange Deflection Data during Proof Test	E7000R	5,794
78.	ADX	Feas. Study for Roll Stabilized Attitude & Velocity Control Sys.	R1249**	113,914
79.	ADP	Single Failure Point Investig., 4th Stage Flight ACS H/W	E6000W	41,075
80.	ADN	Feas. of Incorp. Hi-Energy Propellant in Antares IIB X-259 H/W	E7000W	104,274
81.	AEE	Proc. & Fab. of Scout GSE for Dallas, WFC and VAFB	E70000	41,367
82.	ADV	Mod. of A-62254A Nitrogen Servicing Carts, 3 Dallas, 2 WFC, 2 VAFB	E70000	12,619
83.	ADY	Design & Fab. of ACS & 5th Stg. GSE C/O Equip. for NPE Hawkeye	E6191J	84,392
84.	ADT	Thrust Misalinement Measurements on X-259 Motor at AEDC	E6000R	2,635
85.	ADR	Rework of GFE Air Bearing	E60000	3,474
86.	ADS	Feas. of Incorp. Hi-Energy Propellant in Altair IIIB H/W	E8003R***	68,392
87.	ADW	Provide Support for AEDC X-259 Motor Handling	E70000	3,174
89.	AEA	Hydrotest Two (2) GFE X-259 Chambers in Vertical Position	E7000R	4,325
90.	AEB	Replace Timers for P/L Sep. Sys. Test SEts, 19 Timing Units	E70000	22,010
91.	AED	Design/Fab. New FW-4 & Altair IIIA Hoist Slings, 1 WFC, 1 VAFB	E70000	23,688
92.	AEC	Retest of S-179 B and C Sections, A.F. P76-5	E6179H	9,258
93.	AEF	Proc., Test & Store Spare ACS Components, NPE Hawkeye	E6191J	46,541
94.	AEG	Furnishing of P/L Protective Shield, AEROS B	E6186J	1,358
96.	AEH	Test Prog. for Shelf Life Ext. of BW 101270 Safe Arm Units	E7000R	2,955
97.	AEJ	Relining of A-62254A Dallas N_2 Serv. Cart Tanks, 12 ea/3 carts	E70000	13,713
-	-	Unidentified Charges		19,135
			TOTAL	$2,462,953

At the conclusion of a contract such as NAS1-10000, the unfinished tasks were extended in time only, so as to have continuity with the replacement contract (NAS1-12500). The use of these tasks for urgent requirements was ideal, as the delay in contractual requirements were minimal because of the unique Scout task system. This system was instrumental in having Scout accomplish its program below budget. Task R has been used successfully from its inception through Phase VI, and is presently used in Phases VII and VIII contract NAS1-16200.

*Total with 8.119% Fee.
**180 Program J.O., Total $258,402.
***Phase VIII Total $121,436.

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TABLE LVII - NAS1-12500 R TASKS

TASK NO.	3384/ TASK CODE	DESCRIPTION	JOB ORDER	TOTAL*
1.	AA	Refurbishment of Wallops Island Standard Launch Complex	E7000R	$ 29,237
2.	AB	Backup Air System for Vandenberg AFB, CA, Add. of 2nd Compressor	E7000R	6,773
4.	AD	Incorp. of GFE Ign. & Instrum. Kits in 3 Vehs.	E6192Q/E7194Q/E7196Q	13,422
5.	AE	Supplemental Range Safety Data for NPE Hawkeye Mission	E6191R	1,235
6.	AF	Delta Post Flight Corporation of PCM Encoders, S-186 & S-188	E8000W	10,333
7.	AG	Altair III Alternate Qual.Test Fac.(USAF RPL Edwards AFB) Spin Fixt.	E7000R	21,417
8.	AL	X-258 (6 yrs old) Embedded Boot Strain Measurement Test	E7002R	1,881
9.	AJ	Modification of Ignition Battery Simulators	E7000R	30,598
10.	AK	Delta Effort, Due to 4th Stg., ACS & H.P. X-259	E6191J	105,827
11.	AH	Fab. Verticality Sensor Mounting Bracket	E6000R	3,286
12.	AM	Incorp. of 38 New GFE Power Supplies in Scout GSE at Dallas	E70000	24,668
13.	AN	TOLIP Computer Program Modification	E7000R	21,975
14.	AP	Test Fire One (1) Altair III Motor at Edward AFB, CA	E7000Q	6,855
15.	AR	Improved Environmental Control System (ECS) for Scout Payloads	E6000R	77,657
16.	AS	Shelf Life Test First-& Second-Stage Initiators, Spec. 304-788	E6000R	1,784
17.	AT	Modify VEGA Radar Beacon, Spec. 305-765	E7000R	1,657
18.	AV	S-178 Flight Spin Anomaly at 4th Stg. Sep.,Addendum to Post Flt Rpt	E6178R	5,814
19.	AW	Vought Support at UTC/CSD of FW-4S Motor Buy, 6 mos.	E7000Q	13,928
20.	AX	Scout SOP Revisions, S-193 & Sub. Changes, Vols. I & II	E7000R	13,545
21.	AY	Add. 8 Twisted Shielded Pairs, Umbilical Cable Wire, VAFB Complex	E70000	16,501
22.	BA	48-Pound (6 ea.) Thrust Control Mtrs Rework Prog., 4 ea on S-191	E7000Q	18,913
23.	BB	Install & Checkout GFE GSE at VAFB, Includes Mod. Kits, for S-191	E70000	31,212
24.	BC	Prep. for Flt. Two (2) BE-3A9 Motors, S/N's AN09/003 & AN09/010	E6191Q	5,388
25.	BD	Design & Fab. 2 X-259 Tunnel Tab Pull Test Tools, 1 WFC & 1 VAFB	E70000	3,977
26.	BE	Command Destruct Receivers Test & Rework, 9 MCR-151C-1	E70000	12,706
27.	BF	Hewlett-Packard HP5326A Counter Rework, 7 Dallas, 3 WFC, 3 VAFB	E70000	1,835
28.	BG	Series 200 E-Section Separation Clamp Study	E7000R	4,010
29.	BH	Scout Fourth Stage PCM Telemetry System Development	E8000W	62,092
30.	BJ	Contractor Instruction to Govt. Personnel of Scout Systems	E7000K	7,042
31.	BK	Fourth Stage Ignition Timer Check Modification	E70000	15,432
32.	BL	Install Conduit Sys. & Wiring (Explosive Proof) at VAFB, DBF-21	E7000R	8,813
33.	BM	Antares IIB Nozzle Flightworthiness Program	E7000Q	28,616
34.	BN	Static Test Firing of X-259 GFE Motor S/N HIB 211	E7000Q	21,730
35.	BP	Altair III Motor Dome Blanket	E7000Q	5,479
36.	BR	Shelf Life Extension of 20 P/N 23-002981-8 Explosive Bolts	E7000Q	2,523
37.	BS	Scout Standard Operating Procedure, Volume VII (New SOP's)	E7000G	44,116
38.	BT	BE-3A9 Motor Nozzle Plugs, Motor S/N's AN09-003 & AN09-010	E6191J	2,743
39.	BV	Assy. Two (2) Fourth Stage Modules, S/N's 005 and 011	E7000Q	1,653
40.	BW	Postflight Data Computer Program Revision, PFDATA	E7000R	5,807
41.	BX	Proc. and FAT of One (1) 23-004214-1 Regulator	E7000Q	7,657
42.	CA	Design & Fab. 2 Castor II GFE Hoist Beams, Dwg. & SOP Revisions	E70000	7,407
43.	CB	Furnish Six (6) 1/20 Scale Scout Simulators	E6000R	1,035
44.	CC	Re-hydrotest Three (3) Antares IIB Motor Cases at HI/B	E7000Q	72,779
45.	CD	Demo. High Energy Propellants in Altair III Motor (FW-4S)	E8000W	126,562
46.	CE	Demo. High Energy Propellants in Altair III Motor (TEM-640)	E8000W	107,973
47.	CF	Display Vehicle, Assy. Full Scale Launch Veh. on Transporter, WFC	E7193R	20,578
48.	CG	Mod. to D Section Cooling Air in S^3T at VAFB	E7000R	4,186
49.	CH	Mod. of Scout Vehicle S-179, Thiokol Safe/Arm Units	E6179Q	495
50.	CJ	Determ. of Feas. for Polar Launches from WFC, F-1 Profile	E8000R	28,602
51.	CK	Scout Third Stage PCM Telemetry Trade Study	E8000W	50,106
52.	CL	Scout Nozzle Data Book, Phase III	E7000R	65,031
53.	CM	Attitude Test of 60-Pound Motor	E6000R	14,295
54.	CN	Ground Support Test Set 4th Stg. Capacitive Discharge Ign. Sys.	E8000W	4,382
55.	CP	Design Loads and Testing Criteria for Upper Stages, Phase I	E7000R	32,642
56.	CR	Static Test One (1) GFE Altair III Motor at AEDC	E70000	17,576
57.	CS	Inspection of X-259 Rocket Motor, S/N HIB-307, UK-5	E6187Q	6,361
58.	CT	Autodestruct Module Design Improvement	E8000W	35,007
59.	CV	Development of Fourth Stage Ignition System	E8000W	91,701
60.	CW	Study of Replacement for Scout Third Stage Guidance	E8000W	19,882
61.	CX	S-191 Flight Anomalies Investigation, NPE Hawkeye	E6191W	4,226
62.	DA	Castor II Shelf Life Extension Program	E7000R/E7002R	62,608
63.	DB	Aging Characteristics of Thixon AB-894 Bond Promoter, 4-yr. Test	E7000R	2,854
64.	DC	VAFB GSE Remodifications Req'd to Process Veh. S-179, A.F. P76-5	E70000	11,314
65.	DD	Backup Air Supply at VAFB	E7000R	53,668

*Total with 7.989% fee.

TABLE LVII - NAS1-12500 R TASKS CONTINUED

TASK NO.	3384/ TASK CODE	DESCRIPTION	JOB ORDER	TOTAL*
66.	DE	Nozzle for High Energy Propellant Modified Antares IIB	E8000W	$ 23,990
67.	DF	Study to Define Scout Derived Vehicles	E8000R	8,585
68.	DG	Handcarry S-187 Guidance Components to San Marco Range, UK-5	E6187X	4,550
69.	DH	Support to NASA/LaRC Anomaly Investigation, S-189 ANS-A	E6189W	90,744
70.	DJ	Base A Battery Cell Improvement, Yardney PM15	E7000W	4,491
71.	DK	Wind Tunnel Prog 1/8 Scale Model, Scout w/Strap-on Motors	E8003R	104,512
73.	DM	S-189 Flight Anomaly Investigation, ANS-A	E6189W	57,250
74.	DN	X-258 Rocket Motor Shelf Life Extension Program., S/N HIB-208	E7002R	31,775
75.	DP	Final Flight Report, S-187 UK-5	E6187D	38,062
76.	DR	Extension of TX-463-1 Pyrogen Shelf Life	E7000R/E7002R	5,640
77.	DS	Design & Fab. Heatshield Support Assy. & 4th Stg. Handling GSE	E70000	37,556
78.	DT	Spec. Test of Guid. Components & Detailed Eval. of Diodes, ANS-A	E6189W	5,024
80.	DW	Rework of 4 GFE 48-lb Thrust Control Mtrs to 60-lb Config., SAS-C	E7194Q	4,777
81.	DX	Anal. to Determ. Feas. of Incorp. High Energy Propellant Algol III	E8000W	93,788
82.	EA	Anal. to Determ. Feas. of Incorp. High Energy Propellant Castor IIA	E8000W	94,951
83.	EB	Environ. Control System (ECS) for Scout Payloads, VAFB Effort	E70000	89,919
84.	DC	Environ. Control System for Scout Payloads, Remaining WFC Effort	E70000	100,487
85.	ED	Inspection of 8 GFE X-259 Motors by HI/B	E7000Z	5,199
86.	EE	Add. of Battery Access Doors to H/S's, 3 34-in & 3 42-in, DAD-A	E7196J	10,231
87.	EF	Fab. of Fwd. Relief Boot, High Energy Propellant Antares IIB	E8000W	6,817
88.	EG	Algol IIB Shelf Life Extension Program	E7000R/E7002R	111,834
89.	EH	Guid. Comp. Insp. & Retest, Diodes Proc., S/N 78 Intervalomtr Rework	E7000Q	70,484
90.	EJ	DAD Payload Interface Support	E7196J	18,108
91.	EK	Vehs. S-179 & S-192 Guid. Components Insp. & Retest	E6179R	24,428
92.	EL	GSE Mods. for Guid. System Environmental Tests & SOP's	E7000R	80,294
93.	EM	Proc. of Altair IIIA Shelf Life Extension Materials	E7000R	39,096
94.	EN	Veh. Component Processing Flow - Mech. Sys.	E7000R	43,215
95.	EP	Veh. Component Processing Flow - Guid. Sys.	E7000R	82,433
96.	ER	Veh. Component Processing Flow - Control & Hydraulic Sys.	E7000R	21,651
97.	ES	Veh. Component Processing Flow - Control Sys. & H202 Sys.	E7000R	77,491
98.	ET	Veh. Component Processing Flow - Propulsion Sys.	E7000R	60,792
99.	EV	Veh. Component Processing Flow - Ign. Destruct & Power Sys.	E7000R	58,831
100.	EW	Veh. Component Processing Flow - R.F. Components	E7000R	40,677
101.	EX	Nozzle Fab. for Antares IIB Motor with XLDB Propellant	E8000W	72,258
102.	FA	Fab. of Antares IIB Motor with XLDB High Energy Propellant	E8000W	104,529
103.	FB	Static Test Firing of Antares IIB with XLDB High Energy Propellant	E8000W	15,724
104.	FC	Perf. of S^2ET, Vehs. S-193 - S-197 & S-199, after Programing	E7000F	34,823
105.	FD	Study/Feas. of Replacing Guidance System Rate Gyros	E7000W	4,228
106.	FE	Mod. & Test of 52 GFE 48-lb Thrust Control Mtrs to 60-lb Config.	E7000Y	54,515
107.	FF	Scout Historical Summary Report, Revision to Vol. II	E7000R	18,048
108.	FG	Scout Family Tree Performance Study, 17 Configs. & 12 Missions	E7000R	26,686
109.	FH	TOLIP Computer Program Implementation on NASA Computer	E7000R	6,849
110.	FJ	Performance Review, Rpt. 23.532, Vehs. S-178, S-186 - S-191	E7000R	15,134
111.	FK	Preflight and Postflight Report & Analysis, SAS-C	E7194C/E7194D	61,268
112.	FL	Mod. & Test of Intervalometer, S/N 079-085	E7000Y	104,253
113.	FM	Mod. & Test of Intervalometer, S/N 086-092	E7000Y	104,405
114.	FN	Fabrication of Two (2) Fin Tips	E7000Y	5,959
115.	FP	Study to Reduce Damage Potential to Veh. Due to Rain Exposure	E7000R	4,683
116.	FR	Scout Engineering Training Film, Tech. Oriented, 1 Orig. & 2 cys	E7000K	34,235
117.	FS	Feas. of Eliminating Single Failure Point Sources, Guid. Sys.	E7000F	154,023
118.	FT	TIP-III Mission Heatshield (A-408) Fit Checks	E7197B	3,962
119.	FV	UK-6 Mission Fourth Stage Module Kit Assy., Mockup & Fit Check	E7198J	2,045
120.	FW	PCM Telemetry Package Development	E8000W	16,539
121.	FX	Scout Automatic Checkout Study	E8000W	31,773
122.	GA	One Engr. & One Consultant to S.M. Range, Repair Cracks in Launcher	E7000J	16,635
123.	GB	Prepare Preflight Brochure, TIP-III	E7197C	1,927
124.	GC	Prepare Preflight Brochure, DAD-A	E7196C	2,657
125.	GD	Preflight Planning Report & Preflight Review, DAD-A	E7196C	27,151
126.	GE	Preflight Planning Report & Preflight Review, TIP-III	E7197C	15,973
127.	GF	Support to Scout Shelter Improvements, WFC & VAFB	E70000	20,309
128.	GG	Paint Dummy Heatshields (to Aid S/C Cleanliness Rqmts), WFC & VAFB	E7000V	5,812
129.	GH	A-509 Heatshield Fit Check, DAD-A	E7196B	4,344
130.	GJ	Furnishing of Scout Simulators, 1/48 & 1/72 Scale	E7000R	10,616
131.	GK	UK-6 Misc. Hardware, Payload Support Rings, etc.	E7198J	13,493
132.	GL	Design, Fab., Test & Integrate 2 Heatshield Handling Fixtures	E70000	203,466

*Total with 7.989% Fee.

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TABLE LVII - NAS1-12500 R TASKS CONCLUDED

TASK NO.	3384/ TASK CODE	DESCRIPTION	JOB ORDER	TOTAL*
133.	GM	Testing to Establish Max. Quantity of Environmental Testing Limits	E7000R	$ 35,965
135.	GP	Vendor Survey to Replace 1950 Guidance Sys. for Scout Vehicle	E8003U	123,336
137.	GS	Payload Support for GP-A Payload	E7193J	43,651
138.	GT	Static Test Firing of X-258 S/N 146 Motor at HI/ABL	E7002R	41,651
139.	GV	Design & Fab. 3 Portable Digital Ordnance Test Sets	E70000	45,648
140.	GW	Demo./Test Fire Altair III with High Energy Propellant (TP-H-3335)	E8003R	103,230
141.	GX	Inspection Monitoring Case Fab., Altair III w/High Energy Propell.	E8003R	5,393
142.	HA	Heatshield-to-Payload Fit Check, GP-A	E7193B	5,705
143.	HB	Incorp. of Accumulated Mods. (Rework & Insp.), GFE S-179	E6179H	8,071
144.	HC	Installation of GFE Instrumentation Kit into S-198	E7198Y	2,624
145.	HD	Scout Standard Operating Procedures (SOP), Demonstration Phase I	E7000G	23,564
146.	HE	Generalized Lifetime Data and Accuracy Predictions	E7000B	10,796
147.	HF	Component Improvement Review	E7000F	30,452
148.	HF	Insp. of 3 Castor IIA Motors, S/N's 193, 382 & 384, at VAFB	E7000Z	2,883
149.	HH	Study Prog. Advanced High Energy Propellant Altair III, Phase I	E8003R	48,081
150.	HJ	Hazard Analysis of a Shuttle Payload Propulsion System	E8003U	62,747
151.	HK	Design & Proc. Antares IIB Igniter Shipping Containers, 18 each	E7000Z	8,656
152.	HL	Painting Interior of GFE Heatshield A-509, DAD-A	E7196J	3,367
153.	HM	Environmental Protection for Scout/Shuttle Auxiliary Stages	E8003U	49,416
154.	HN	Vol. III SOP, Short-haul Motor Transportation Procedures	E7000G	4,302
155.	HP	Fuel On-board vs. Pressure Drop Relationship, Vehs. S-193 - S-207	E7000R	12,031
156.	HR	Rework of Castor Motor Drill Fixture 23-000026-1, S/N 906047	E7000V	503
157.	HS	Final Flight Report, S-195, TIP-II	E7195D	45,798
159.	HV	GP-A Umbilical Sep. Test & Environ. Control Alarm Sys., WFC	E7193J	11,210
160.	HW	Roll and Yaw Compensation Units, Nonrecurring Effort Prior to Fab.	E7002Y	18,963
161.	HX	Relining 4 Nitrogen Serv. Cart Tanks by SOC-CO, N_2 Cart S/N 1005	E70000	6,119
162.	JA	Vendor Survey & Selection of H_2O_2 Bladders, Phase VIII Vehicles	E8000R	3,908
163.	JB	S-179 4th Stg. T/M Sys.- Design, Remove Storage, Instl. & C/O	E6179H	41,947
164.	JC	Retest of S-179 Components, A.F. P76-5	E6179H	7,411
165.	JD	S-179 Retest and Payload Reassignment, A.F. P76-5	E6179B/C/D/H/J	106,210
167.	JF	S-201 Wallops Station Polar Launch Impact Areas, HCMM	E7201J	6,543
169.	JH	Fin Switch Deletion in S3T and SLC	E7000G	6,205
170.	JJ	Overall Scout Program Review, Presentation at NASA/LaRC	E7000F	49,303
171.	JH	Stage Impact Dispersion Based on Flight Experience	E7000R	7,511
172.	JL	Antares IIA Rocket Motor Hardware Modifications	E7000Z	40,786
173.	JM	Rework & Reinspection of Antares IIA Nozzles and Igniters	**	171,906
174.	JN	Marotta Regulator Improvement Evaluation Program	E7000W	35,470
175.	JP	TIP-III Heatshield Ejection Test	E7197H	20,116
176.	JR	Rewrite Volume I Standard Operating Procedures	E7000G	37,560
177.	JS	Range Safety Requirements for Standard Operating Procedures	E7000G	1,898
178.	JT	Engineering Training Film, 1 Answer Print & 6 Copies	E7000R	40,084
179.	JV	Qualification Firing of Antares IIA (Athena) Motor	E7196W	50,174
181.	JX	Performance Capability Study of TIP-III Launch from WFC	E7197J	3,460
182.	KA	Spec. for Environmental Control Units	E70000	6,734
183.	KB	Launcher Components Maintenance/Replacement Verification	E8003Y	16,559
185.	KD	Scout Guidance System Performance Criteria	E8003Y	43,629
186.	KE	Mods. to Interface KECO Spacecraft Coolers with GSE at VAFB	E70000	12,407
190.	KH	Perf. Cap. Study, MAGSAT Launch w/New 3rd & 4th Stage Motors	E7203B	1,442
191.	KK	S-192 3rd & 4th Stage Motor Change	E6192Z	66,085
192.	KL	UK-6 E Section Clamp Test	E7198R	7,074
193.	KM	Proc. of 200 2nd Stage & 40 3rd Stage H_2O_2 Silicone Bladders	E7000Y	240,823
195.	KP	Nondestructive Testing & Inspection of GFE Castor IIA, S/N 177	E7000Z	11,125
196.	KR	Phase VIII Engineering Changes	E8000E	58,676
197.	KS	Lanyard & Electrical Disconnect Bracket Separation Tests	E7000E	21,500
198.	KT	Fab. of Roll/Yaw Compensation Units, 3 ea. P/N 23-003760-1	E7002Y	54,244
200.	KW	Resident Representatives at Vendor Facilities	E7000T	62,119
201.	KX	Critical Process Review, Scout Components (90 Comp. Incl. Motors)	E7000F	9,530
202.	LA	Insp. of 3 GFE X-258 Motors, S/N's -148, -151, -152, at HI/ABL	E7002Z	21,929
203.	LB	Maintenance Procedures for Airlog Dollies	E7000G	3,963
204.	LC	UK-6 Fit & Ejection Test, GFE 4th Stg. Module S/N 012 Flt Instl.	E7198H	45,011
205.	LD	Structural Test Antares IIB Nozzle Graphite Phenolic Taped Insert	E7000R	13,572
207.	LF	TIP-II & TIP-III Spacecraft Dynamic Loads Analyses	E7195B/E7197B	39,918
208.	LG	Hot Pressed Carbide Materials, Survey & Evaluation	E7000R	8,322
-	-	Unidentified Charges		10,147
			TOTAL	$6,428,588

*Total with 7.989% Fee.

**E6179Z-$28,736; E6192Z-$18,987; E7193Z-$28,737; E7197Z-$27,986 E7198Z-$18,986; E7200Z-$28,737; E7201Z-$18,987; E7000Z-$750.

TABLE LVIII - NAS1-10000 S TASKS

Call No.	Description	Auth.	Price
1	Ultrasonic Inspection of Castor IIA Motors No. 181, 182 and 183	$ 2,686	$ 2,686
2	Accumulation, Inspection, Packaging, and Crating of San Marco-C Pyrotechnics	989	989
3	Rework and Testing of San Marco Separation Systems	11,604	11,604
4	Provide 32 RMS Finish on certain FW-4S Motor Components	2,740	2,740
5	Furnishing of Installation and Removal Tool for Rocket Motor Igniters	11,203	11,203
6	Furnishing Scout Vehicle Long-Lead Items	11,586	11,586
7	GSE Modifications required to support the SAS-B Operation	19,500	19,500
8	Procurement of Algol III Terhmal Insulation	18,223	18,223
9	Recertification of Scout Vehicle S-170	135,850	135,850
10	Castor II Shelf Life Extension Problem and Aging Study	47,050	47,050
11	Integration of S/N-1 Fourth S-Band Module and S/N042 E-Section on Scout	3,431	3,431
12	Purging and Vacuum Drying of Vehicle 166 at Wallops Island	3,053	3,053
13	FW-4S Rocket Motor Shelf-Life Laboratory Testing Program	57,428	57,428
14	Modification of A-63 Heat Shield	532	532
15	X-Ray of X258 Motor HIB at ABL	4,028	4,028
16	Ultrasonic Inspection of Castor II Rocket Motor S/N 187 at Wallops Island	2,240	2,240
17	Training in use of Ultrasonic Inspection Equipment	5,775	5,775
18	Refurbishment of Scout B-Section	9,325	9,315
19	Procurement of Battery Cells	1,200	1,200
20	Fabrication of Payload Protection	2,568	2,568
21	Furnishing Ultrasonic Standards for Algol III Motor	6,341	6,341
22	Retuning of Command Destruct Receivers	10,125	10,125
23	X-258 Rocket Motor and Igniter Shelf-Life Extension Program	40,979	40,979
24	Furnishing of Five (5) Special Instrumentation Kits for X-259 Rocket Motors	59,810	59,810
25	Modification of Scout Vehicles to Accommodate New Safe/Arm Units	43,116	43,116
26	Furnishing of Scout Launcher Base-A Support Pins	8,525	8,525
27	Repair of Algol III Motor Raceway Drill Fixture	7,469	7,469
28	Assembly of Scout Fourth-Stage Ignition and Telemetry Systems		
29	Furnishing of Long-Lead Items	4,955	4,955

TABLE LVIII Concluded - NAS1-10000 S TASKS

Call No.	Description	Auth.	Price
30	Procurement, Fab., and Installation of Scout Ground Support Equipment Changes	$ 44,359	$ 44,359
31	Incorporation of GFE Ignition & Instrumentation Kits into Scout Vehicles	8,162	8,162
32	Provide Services to Conduct Acceptance Testing of GFE	6,192	6,192
33	BE3A9 Rocket Motor Shelf Life Extension Program	47,900	47,900
34	Procurement, Fabrication and Incorporation of Algol III Modification Kits	29,490	29,490
35	X-4 Payload Ignition Support	981	981
36	Tone and Signal Generators	54,696	54,696
37	Fourth-Stage Ignition and Telemetry System	1,301	1,301
38	Furnishing of (75) Thermistor Assemblies	17,775	17,775
	(1) TOTAL TASK S	$747,866	$747,866

(1) Task S is similar to Task R but is used instead of R when enough history is available to negotiate a fixed-price agreement. If any unknown variables apply to a specific task then the cost reimbursable Task R is selected as the proper task.

TABLE LIX - NAS1-12500 S TASKS

TASK NO.	MOD.	DESCRIPTION	JOB ORDER	NEGOTIATED FIXED PRICE
S-001	16	Mod. of Veh. S-189 to Accept the Algol III	E6289Y	$ 11,855
S-002	16	Furnishing of Scout Explosive Bolts	E7000Y	37,125
S-003	16	Furnishing of 3 N. Atlantic Phase Angle Voltmeters	E70000	8,900
S-004	16	Furnishing of Ablative Cork for Scout Vehicles	E7000Y	6,944
S-005	16	Fab. and/or Replacement of Scout Tooling at Dallas	E7000V	39,118
S-006	28	6 ea. 200 Series & 6 ea. 25 Series Add. P/L Sep. Sys.	E7000Y	168,852
S-007	28	9 Algol III Mod. Kits, 66 Fin Tips & 62 Jet Vane Assys.	E8000Y	921,148
S-008	43	Fab. and/or Replacement of Scout Fin Tools	E7000V	37,000
TOTAL				$1,230,942*

Task V - The contractor maintained and kept in calibration the Government-furnished Ground Support Equipment (GSE) as listed in Table LX, and located at the contractor's Dallas, Texas, facility in accordance with QCPP-0-005C.

TABLE LX - GOVERNMENT FURNISHED GROUND SUPPORT EQUIPMENT (GSE)

	Description	Qty, ea
(1)	Telemetry Test Set	2
(2)	Guidance Test Set	2
(3)1	Destruct/Receiver Test Set	1
(4)	Continuity & Electrical Test Set	1
(5)	Radar Beacon Test Set	1
(6)	Flight Readiness Test Set	1
(7)	Hydraulic Control Test Set	2
(8)	IRP Test Point Box	2
(9)	PVE Filter Simulator	2
(10)	Valve Test Point Box	1
(11)	J-Box & Cable Plant	2
(12)	Greer Hydraulic Cart	2
(13)	N_2 Servicing Cart	2
(14)	Servo Analyzer	2
(15)	Payload Separation Test Set	1
(16)	Rate Table	2
(17)	Ignition/Destruct Simulator	1
(18)	Dividing Head	2
(19)	Bladder Leak Test Set	1
(20)	Portable Test Set (331059999101)	1

*Supplemental Agreement 43.

TABLE LX Concluded - GOVERNMENT FURNISHED GROUND SUPPORT EQUIPMENT (GSE)

(21)	Portable Test Set (331-500001-2)	1
(22)	Valve Simulator	2
(23)	IRP Leak Test Hose	1
(24)	Rate Gyro Simulator	1
(25)	Portable Counter Oscillator	2
(26)	Base "A" Adapter	1
(27)	Shorting Connector Set	1
(28)	N_2/H_2O_2 Hose Assembly	1
(29)	H_2O_2 Hose Assembly	1
(30)	Head Cap Pressure Simulator	1
(31)	PVE Test Point Box	2
(32)	Battery Simulator (LD-601173)	1
(33)	Battery Simulator (321-00076)	1
(34)	Battery Simulator (321-00077)	1
(35)	Battery Simulator (321-00078)	1
(36)	Transition "E" Simulator	1
(37)	Ignition/Destruct Simulator	1
(38)	Base "A" Flyaway Simulator	1
(39)	Umbilical Simulator	1
(40)	Auto Destruct Test Set	2
(41)	N_2 Fill Hoses	2
(42)	VSWR Test Set	1

All remaining S3T equipment was placed into Government storage at the contractor's Dallas facility. The contractor had use of specific components within these stored S3T equipment during the contract period.

The contractor maintained all Scout assembly, machine and detail tooling required in the performance of all Scout program efforts and contracts. The term "maintenance" as used herein is defined as all effort necessary to insure that the above-mentioned tooling is kept in a condition suitable for the fabrication, assembly, and installation of all Scout hardware in accordance with applicable specifications and/or drawings. In the event the contractor considers an item of tooling in need of replacement, immediately upon such determination the item was appropriately tagged, the basis for the determination adequately documented, and the NASA notified. Hence, at the expiration of the contract, all tooling was either in acceptable condition or tagged and controlled by the contractor as in need of replacement.

In the event the Government determined that the contractor should effect replacement of any Scout assembly, machine, and detail tooling required in the performance of all Scout program efforts and contracts, such replacement was accomplished by separate contractual action.

Task W - Support for failure investigations required by the NASA were accomplished by separate contractual action in the form of a Contract Call Notification. Such call actions were serially numbered, setting forth the supplies and/or services which the Government desired, the estimated dollar amount thereof, and the allotment to be charged. The contractor was obligated, subject to the fund limitation set forth in the call, to furnish the services and/or supplies specified therein, and to submit a cost proposal therefor within the time specified in the call. These separate contractual actions included all effort for investigation, removal of parts, and testing. However, correction and reinstallation effort was accomplished by contractual action pursuant to the appropriate task thereof. These components, subsystems, systems, and/or hardware that were available from spares or production inventory were made available as GFE, if appropriate.

The Scout Systems Management Contracts included contractor performance incentive provisions. Although this is not included contractually in Task W, the Scout Project Office includes the costs under Task W as it is the negative of failure investigations. The performance definitions and criteria for receiving the award are outlined as follows:

1. Flight Success Definition. Flight performance was evaluated on the ability of the Scout booster to perform each specific flight mission successfully. For purposes of evaluating the degree of mission success, the variation from nominal of inertial velocity, altitude, inertial flight-path angle, and orbital inclination at burnout of the last stage was used for earth orbit and solar probe missions and the variation from nominal of inertial velocity, altitude, inertial flight-path angle and azimuth angle at last stage burnout was used for reentry and earth probe missions.

2. General Ground Rules.

a. Prior to each launch, the contractor submitted to NASA a Preflight Planning Report which cited the nominal values of the parameters identified in paragraph 1, together with the variation in each for a 99.7 percent probability, determined from calculations based on past flight history. The contractor also noted the mission parameters of particular interest to the payload user. This document was submitted for approval no later than thirty days prior to launch or within two weeks after receipt of the last mission and motor data inputs, whichever occurred last.

b. Launches which delivered the payload into the proper environment, within the limits established by the variation from nominal for a 99.7 percent probability, were normally considered successful. However, should a failure or malfunction of any part, component, subsystem, or system occur during flight which potentially jeopardized the success of the spacecraft mission, the Award Evaluation Board may consider such failure or malfunction in determining the degree of success of the launch. The adjustment in degree of success due to such a failure or malfunction was based upon the extent to which the contractor, in the judgment of the members of the Award Evaluation Board, met reasonable standards in the design, fabrication, reliability and quality assurance practices, and systems management with regard to the part, component, subsystem, or system which failed or malfunctioned.

c. For launches which deviated from 3-sigma limits, the Award Evaluation Board determined the degree of success attained.

d. Missions which clearly failed to achieve required performance through any fault of the vehicle were considered unsuccessful.

e. Missions aborted in flight as the result of any contingency which could be shown was not a vehicle malfunction was not considered a failure; the Award Evaluation Board determined the degree of success based on the time of flight at which abort occurred. Should a failure or malfunction which potentially jeopardized success of the spacecraft mission occur prior to the abort, the degree of success was adjusted as stated above.

f. The effectiveness with which the contractor identified the mission parameters of particular interest to the user, and gave special attention to these parameters in planning the mission, were considered in assessing the degree of success of the launch.

g. Space tracking data, based on a least six orbits, were used to determine orbital performance. Space tracking data, range tracking data, vehicle performance telemetry data, and/or payload telemetry, were used to determine solar probe performance. Range tracking data, vehicle performance telemetry data, and/or payload telemetry data were used to determine reentry performance. Depending upon the site from which the vehicle was launched, vehicle performance was determined in accordance with the following:

Wallops Launch. For flights during which Wallops FPS-16 tracks the vehicle to final-stage burnout, and provides usable data, this data was used to determine performance. In the event that Tallops FPS-16 did not track to final-stage burnout, the Spandar data was obtained at this point, then Spandar data was used to determine performance.

Vandenberg Air Force Base Launch. Any FPS-16 radar, which tracks to final-stage burnout, and provides usable data, may be used to determine performance. In the event that usable tracking data was not obtained, vehicle performance telemetry and/or spacecraft telemetry data was considered.

San Marco Launch. The San Marco AN/MPS-26 radar is used to determine performance if satisfactory track to final-stage burnout is obtained. In the event that usable tracking data was not obtained, vehicle performance telemetry and/or spacecraft telemetry data was considered.

Task X - All shipping requirements are recorded under this task by the NASA Scout Project Office. Figure 88 shows the Scout Program shipping expenditures through FY 1978. Scout motors had to be transported as per a defined specification. Appendix L includes this 1973 specification.

Task Y - All vehicle hardware contracts are recorded under this task by the NASA Scout Project Office, as noted in table XXXIII.

Task Z - All motor hardware contracts are recorded under this task by the NASA Scout Project Office, as noted in table XXXIII.

Figure 89 shows the chart used by the Scout office describing the task designations.

The LTV Scout Program Organizations is shown in figure 77. This chart covers all the managers for the above-listed management tasks. During the course of the Scout Program personnel changes were made. However, most of the managers had many years of Scout experience.

	Through FY 1971*	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	FY 197T	FY 1977	FY 1978	TOTAL
PROGRAM 180										($245.68)
L-32768	$ 5.85									5.85
NGR 34002108	13.90									13.90
NAS1-7256	28.05									28.05
NAS1-9204	57.90									57.90
NAS1-9258	6.55									6.55
NAS1-10000	16.28		$ 63.95	$ 12.90						93.13
NAS1-10483		$ 19.30								19.30
NAS1-10988			21.00							21.00
PROGRAM 490										($1,002,135.60)
L-443A					$ 43.62					43.62
L-13497A						$ 326.55				326.55
L-23491A						8.91				8.91
L-46232	33.50									33.50
L-47001	2,760.00									2,760.00
L-58203A									$ 1,164.80	1,164.80
L-68203A									1,115.96	1,115.96
L-75663	9.45									9.45
L-77088		13.88								13.88
L-84994	2,526.00					1,090.00				3,616.00
L-65843	7.82									7.82
L-97050					325.34					325.34
LX-72053			267.53							267.53
LX-72061	167.90									167.90
LX-73047			12.90							12.90
NAS1-3493	2,754.40									2,754.40
NAS1-3498	21,130.32									21,130.32
NAS1-3698	27.40									27.40
NAS1-4794	2,020.05									2,020.05
NAS1-4795	2,592.00									2,592.00
NAS1-5592	1.00									1.00
NAS1-5610	52,618.43									52,618.43
NAS1-5880	114,490.05									114,490.05
NAS1-5883	8,128.02									8,128.02
NAS1-6020	21,939.21									21,939.21
NAS1-6378	288.39		72.43	838.00	1,827.28			$ 65.46		3,091.56
NAS1-6866	12.05									12.05
NAS1-6935	8,975.47		46.72							9,022.19
NAS1-7102	6,290.19									6,290.19
NAS1-7199	56,095.86									56,095.86
NAS1-7256	110,912.17	7,340.72	1,624.93							119,877.82
NAS1-9258	4,788.20	3,595.20	5,401.96	2,136.39	1,026.28	289.00				17,237.03
NAS1-9325	136.80			71.50	65.20					273.50
NAS1-9597						441.00				441.00
NAS1-10000	98,148.56	7,100.79	44,292.87	3,142.49	9.75	-1,434.97			-30.00	151,229.49
NAS1-10172			316.75							316.75
NAS1-10481	6,812.93		51.48		66.54		$ 116.59	90.00		7,137.54
NAS1-10482									3,643.80	3,643.80
NAS1-10483							365.37		864.00	1,229.37
NAS1-10484	10.50		716.20	6,056.69	1,566.13	107.73				8,457.25
NAS1-10500	78.39		38.22							116.61
NAS1-11400	7,679.04		17,835.61	290.13	6,777.02	1,145.81				33,727.61
NAS1-11859					16.51					16.51
NAS1-11867			11.49							11.49
NAS1-12500			8,892.51	10,164.19	168,059.58	21,437.63	15,106.48	14,398.64	-1,072.01	236,981.02
NAS1-11000					1,631.56					1,631.56
NAS1-13100					407.46	4,346.24	1,210.11		2,057.08	8,020.89
NAS1-14200								2,030.47		2,030.47
NAS1-14500									11.43	11.43
NAS1-14619									1,090.85	1,090.85
NAS1-14550									2,006.68	2,006.68
NAS1-15000								320.15	42,263.24	42,583.39
NAS1-15100								5,988.59	14,143.05	20,131.64

Figure 88.- Scout Shipping Expenditures.

	Through FY 1971*	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	FY 197T	FY 1977	FY 1978	TOTAL
PROGRAM 497										($31,106.37)
NAS1-3493	15.65									15.65
NAS1-3698	509.12									509.12
NAS1-4325	670.34									670.34
NAS1-4794	3,302.00									3,302.00
NAS1-5592	11.45									11.45
NAS1-5610	6,642.29									6,642.29
NAS1-5880	637.50									637.50
NAS1-5883	6,388.11									6,388.11
NAS1-6020	11,912.69									11,912.69
NAS1-6935	1,017.22									1,017.22
PROGRAM 894										($140,657.65)
NAS1-5880	$ 2,658.80									2,658.80
NAS1-7256	1,345.17	$ 15.80								1,360.97
NAS1-10000	50,017.13	-4.65	$ 61,469.29							111,481.77
NAS1-12500			2,825.42		$ 1,718.10		$20,612.59			25,156.11
TRUST FUNDS AND REIMBURSABLES 490 (Includes DOD, UK, etc.)										($266,025.45)
CCN-301748		50.19								50.19
L-84994						$ 1,359.84		$ 1,297.16		2,657.00
NAS1-3698	3,486.37									3,486.37
NAS1-4664	2,254.43									2,254.43
NAS1-4794	1,989.60									1,989.60
NAS1-5610	20,308.75									20,308.75
NAS1-5883	13,526.86									13,526.86
NAS1-6020	13,720.49									13,720.49
NAS1-6378								45.72		45.72
NAS1-7199	617.10									617.10
NAS1-7256	23.93									23.93
NAS1-9258					1,179.20	436.13				1,615.33
NAS1-10000			1,827.00							1,827.00
NAS1-10481					27.08			42.00		69.08
NAS1-10483					1,653.18					1,653.18
NAS1-11400	6,776.00		2,010.89							8,787.69
NAS1-12500	3,258.40		163.93	51,870.76	5,676.86	51,391.28	16,704.33	24,902.08		153,967.64
NAS1-13100					1,157.40			3,690.30		4,847.70
NAS1-14200								4,581.35		4,581.35
NAS1-15000								14,518.60	$ 9,405.35	23,923.95
NAS1-15100								6,072.09		6,072.09
TOTAL	$682,652.83	$18,131.23	$147,963.08	$74,583.05	$193,234.09	$101,557.74	$33,502.88	$111,881.62	$ 76,664.23	$1,440,170.75

*Does not include LRC-OA Obligations for Shipping Costs (FY 1959-FY 1965).

Figure 88 Concluded.- Scout Shipping Expenditures.

A - Project Management
B - Mission Integration
C - Preflight Planning
D - Data Analysis
E - Systems Engineering
F - Reliability
G - Standardization
H - Vehicle Processing
I - Range Costs
J - Mission Peculiars
K - Certification Training
L - Logistics Administration
M - Spares

N - Launch Services
O - Ground Support Equipment
P - Vought Support
Q - Special Programs - 01
R - Special Programs - 02
S - Program Support
T - Production Support
U - Travel
V - Tooling Maintenance
W - Incentive
X - Shipping
Y - Vehicle Procurement
Z - Motor Procurement

Figure 89.- Contract Task Designation.

CHAPTER 7. LAUNCH SITES AND FACILITIES

Figure 16 defined the Scout launch sites that house most of the Scout facilities. Table LXI itemizes the facilities that are both Government and contractor owned.

NASA had total responsibility at the Wallops Flight Center launch site which is shown in figures 90 and 91. The Air Force was responsible for the Vandenberg Air Force Base Scout launch site which is sketched in figure 92. The Range at both sites was the responsibility of other Government groups, not the Scout Project Office. Figures 93 through 101 are photographs from the Scout launch sites.

Task N previously described the operations of the launch sites. The facilities were updated to the latest state of the arts only if cost effective. The Scout was the only space launch vehicle that operated from Wallops Island and San Marco. Figure 102 shows the payload field flow processing plan utilizing the facilities. Figure 103 shows a Scout vehicle on the Mark-II launcher at Wallops Flight Center.

A typical vehicle operations plan is outlined in Appendix G. Figure 104 shows lift off of Scout S-181 at the Vandenberg AFB launch site.

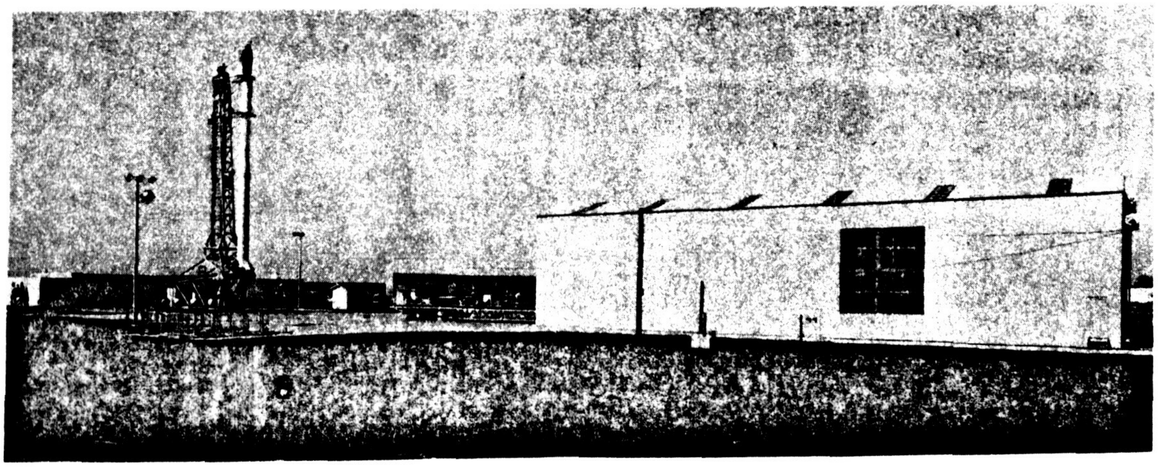

Figure 90.- Scout launch facility at Wallops Flight Center.

TABLE LXI - FACILITIES

1. Launch Complexes

   a. Wallops Station (Figs. 17(a) & 91)

      Launcher #2 & Shelter, figs. 21, 22, 90, 94, & 95.
      Launch Consoles (two sets)(fig. 93)
      Standard Scout System Test Equipment (fig. 21).
      Transporters (figs. 21 & 22).
      Assembly Buildings (Range)(fig. 98)
      Motor Storage Facilities (Range)
      Motor Handling Equipment
      Spin Facility (Range)
      Closed Circuit Television & Intercom (Range)
      Mobile Telemetry Station (fig. 99)
      Interplant Cabling
      H_2O_2 and N_2 Facility (fig. 100)
      Heating-Cooling Facility
      Blockhouse (Range)
      Spares Stock Room

   b. Western Test Range (Figs. 17(b) & 92)

      Transporter (figs. 21, 22)
      Launcher and Shelter (figs. 21, 22, 94, & 95).
      Range Users Building (fig. 96)
      Spin Facility (fig. 97)
      Mobile Telemetry Station (fig. 99)
      H_2O_2 and N_2 Facility (OSB)(fig. 100)
      Standard Scout Systems Test Equipment
      Ordnance Assembly Building (test sets)
      Spares Stock Room
      Operational Support Building (test sets)
      Motor Storage (Range)
      Interplant Cabling
      Heating (Air Force)
      Blockhouse
      Launch Consoles

2. Storage Sites

   Hawthorne Nevada-Motor Storage

3. Langley Research Center

   Research Facilities
   Test Facilities

4. Contractors' Plants

   a. LTVAC/Vought Missiles and Space Company

      Test Checkout Equipment (Two-and-a-half sets)
      Twin Assembly Lines (fig. 101)
      Jigs
      Spares Stock Room
      Vehicle Storage Area
      Minneapolis-Honeywell Facilities

   b. Aerojet General Corporation

      Manufacturing Facilities
      Test Stand Facilities

   c. Hercules Incorporated

      Manufacturing Facilities
      Test Stand Facilities

   d. Thiokol Chemical Corporation

      Manufacturing Facilities
      Test Stand Facilities

   e. United Technology Corporation

      Manufacturing Facilities
      Test Stand Facilities

5. A.E.D.C.

   Tullahoma Test Facilities Available

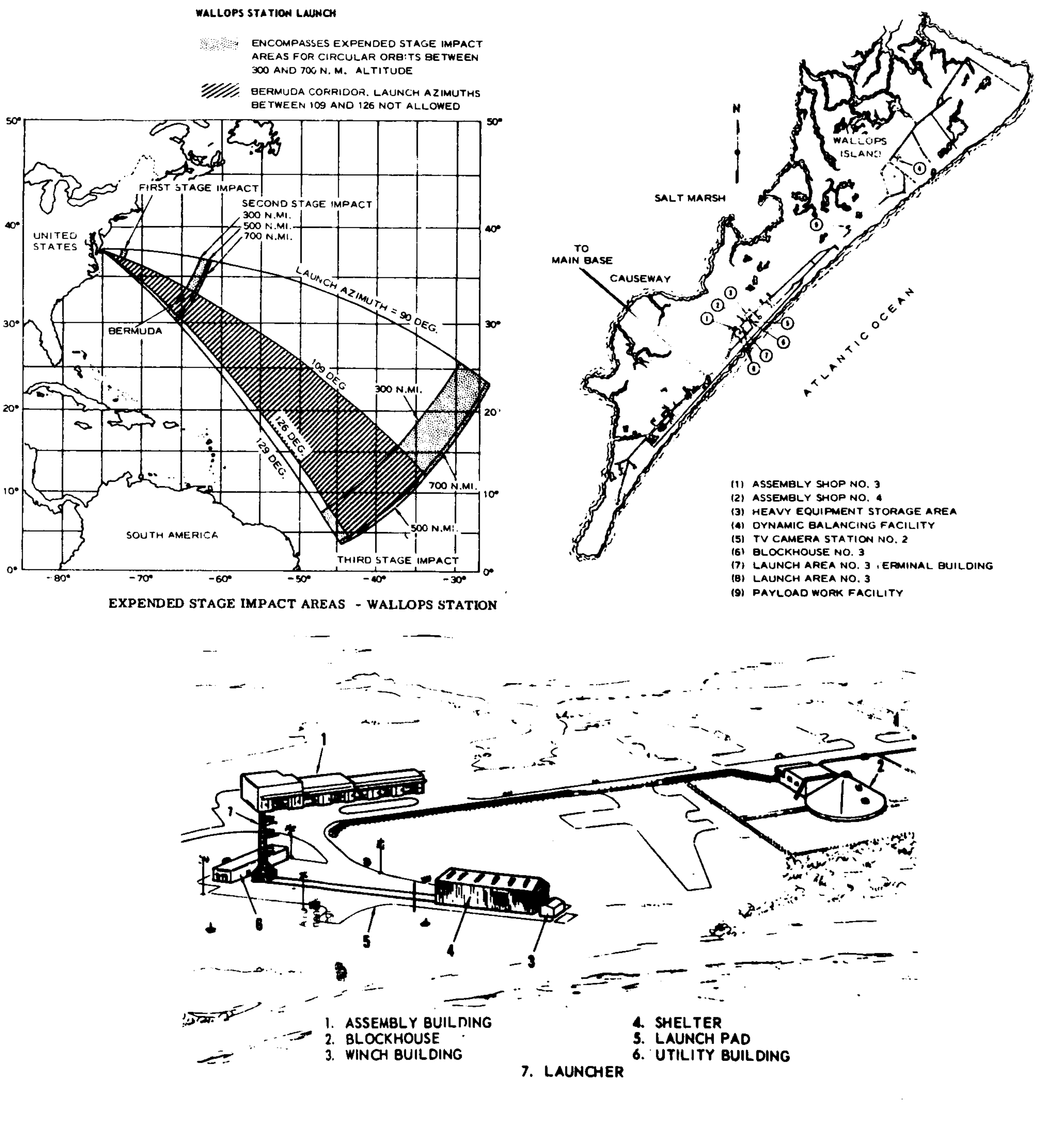

Figure 91.- Sketch of Wallops Island Launch Complexes.

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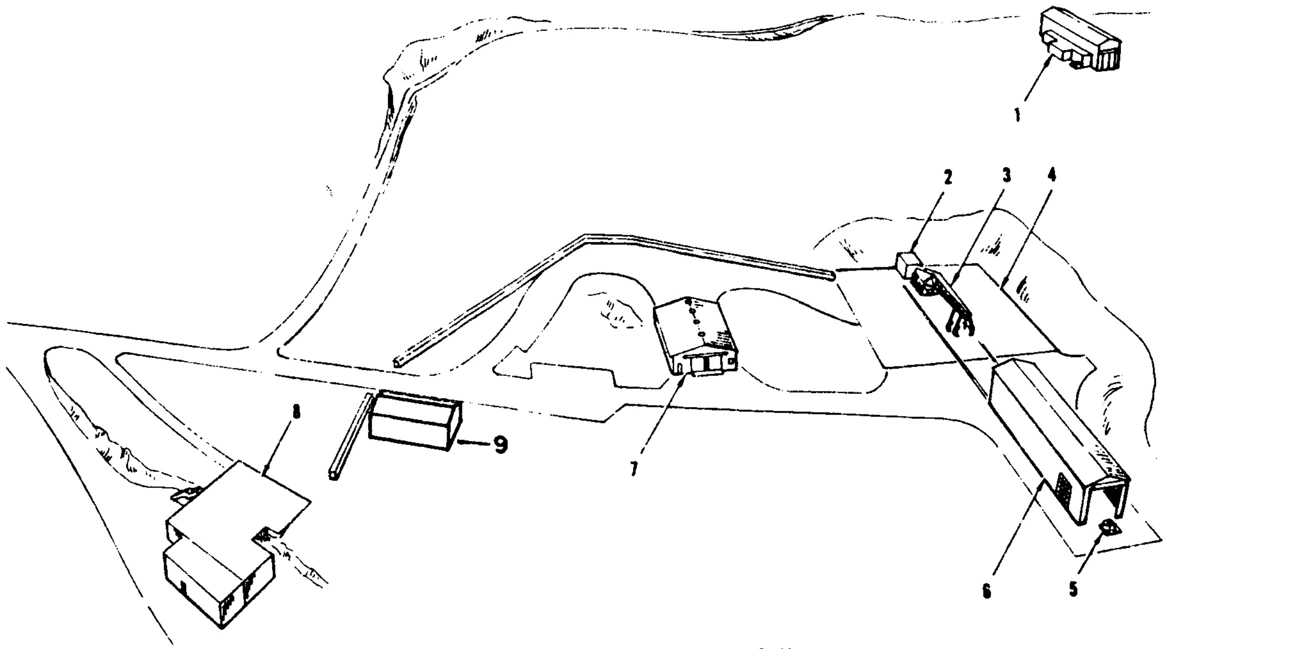
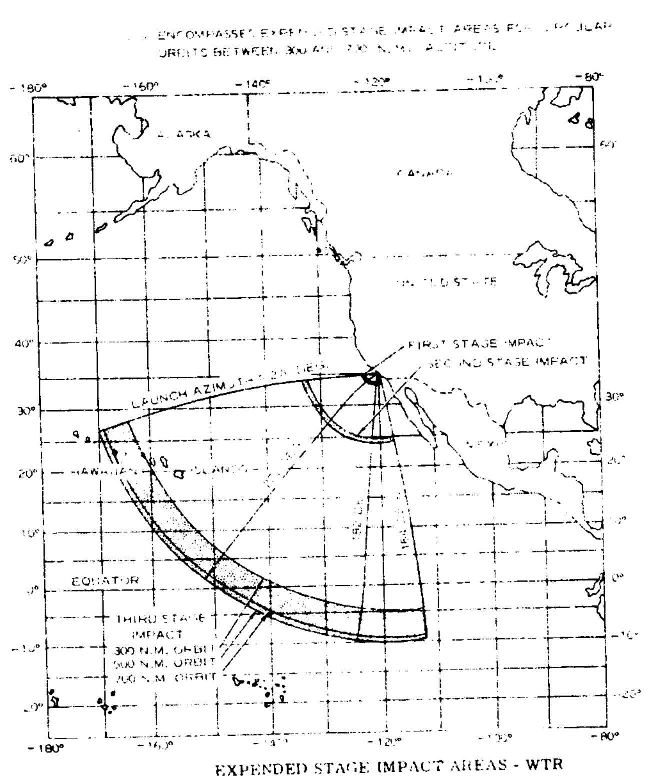


1. ASSEMBLY BUILDING
2. TERMINAL BUILDING
3. LAUNCHER
4. LAUNCH PAD
5. WINCH ASSEMBLY
6. SHELTER
7. UTILITY BUILDING (O.S.B.)
8. BLOCK HOUSE
9. **A G E BUILDING**



EXPENDED STAGE IMPACT AREAS - WTR

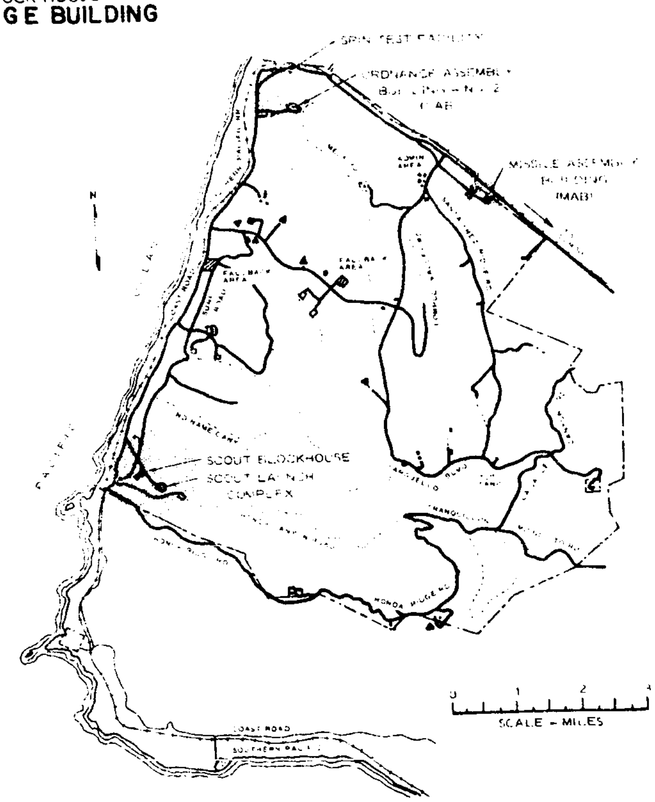


Figure 92.- Sketch of Western Test Range Launch Site.

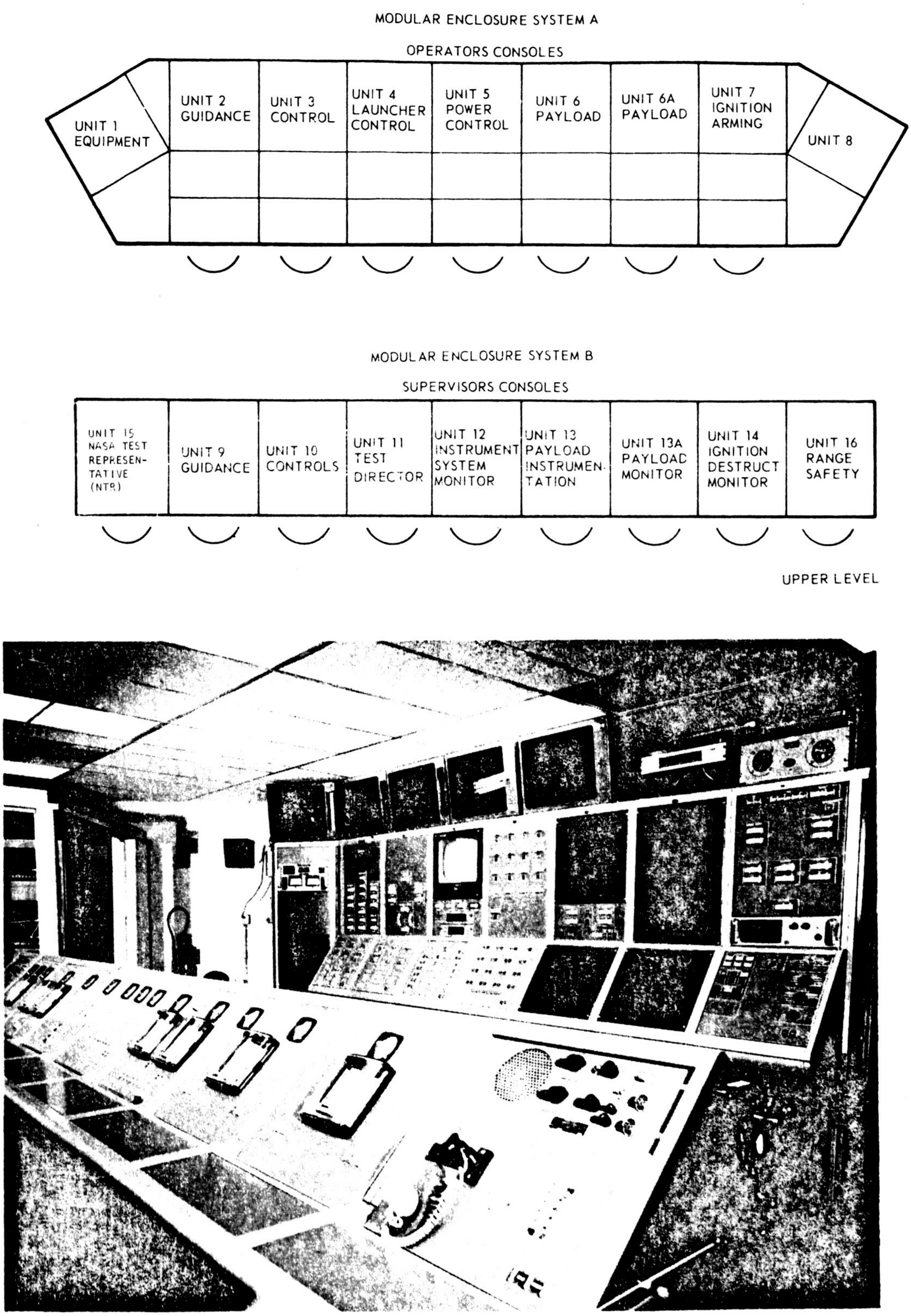


Figure 93.- Wallops Island Launch Complex Blockhouse Consoles.

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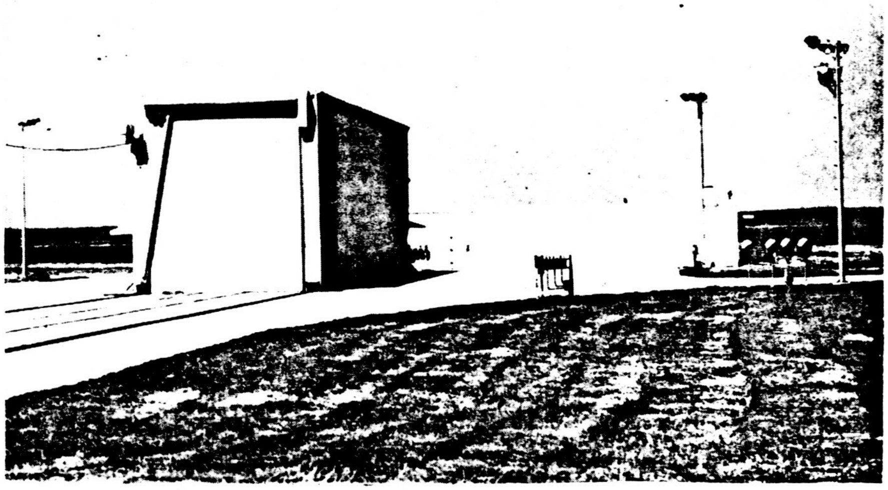

Figure 94.- Movable shelter exterior - typical.

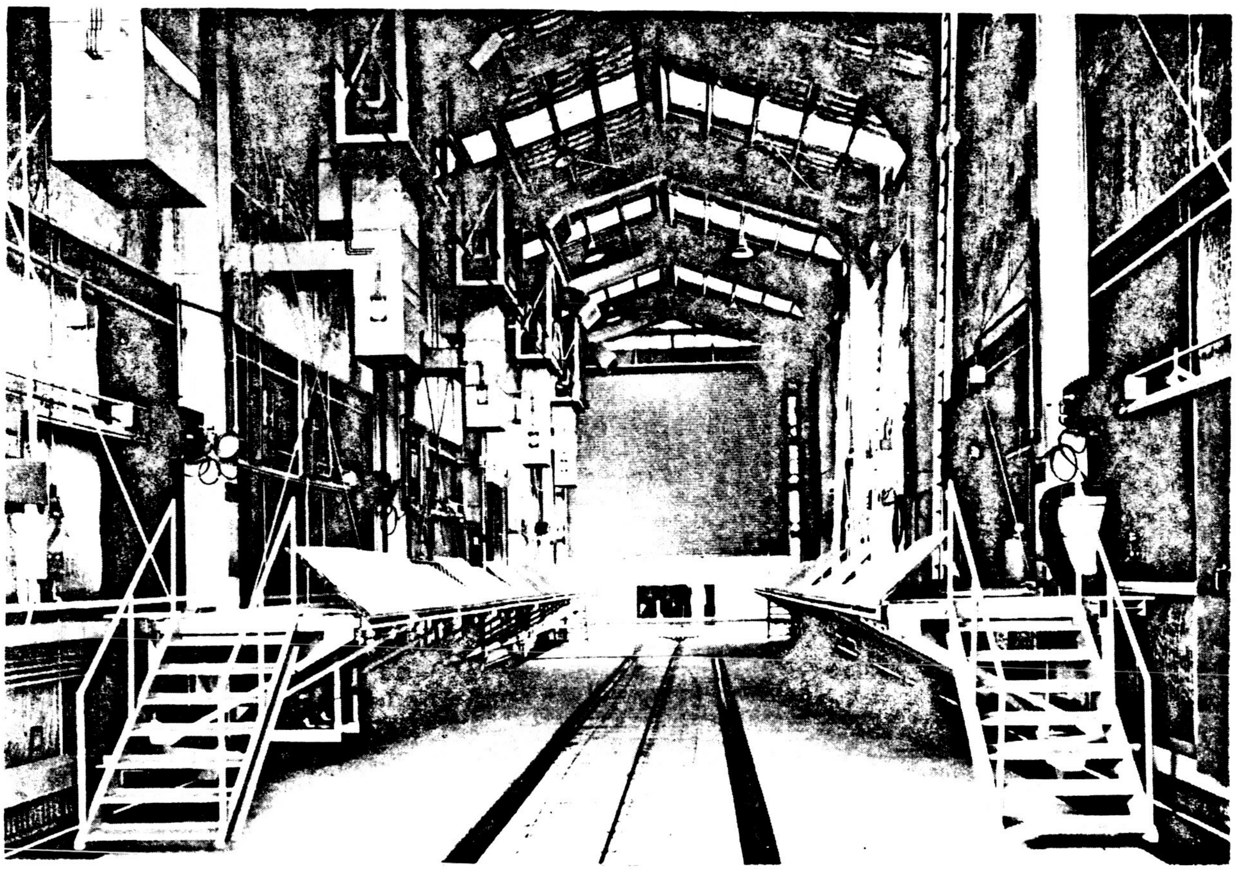

Figure 95.- Movable shelter interior - typical.

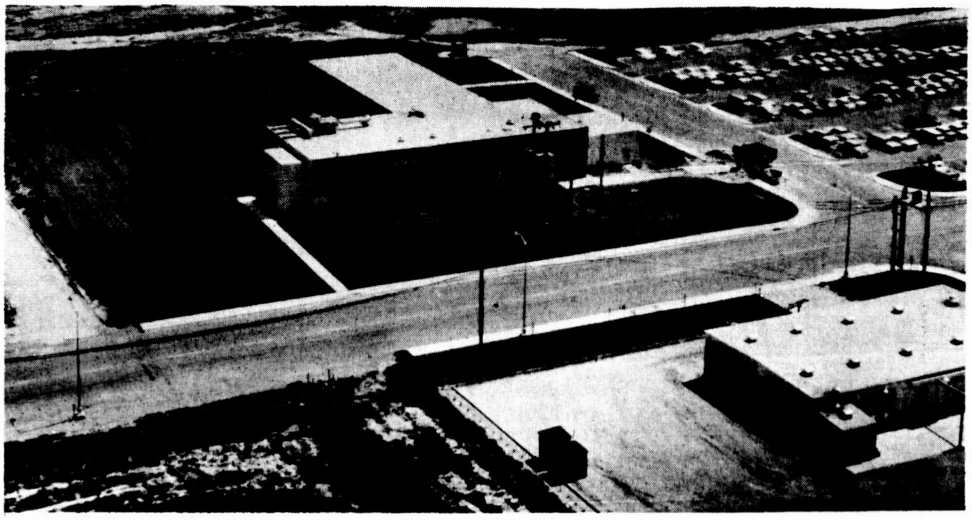

Figure 96.- Range Users Building WTR.

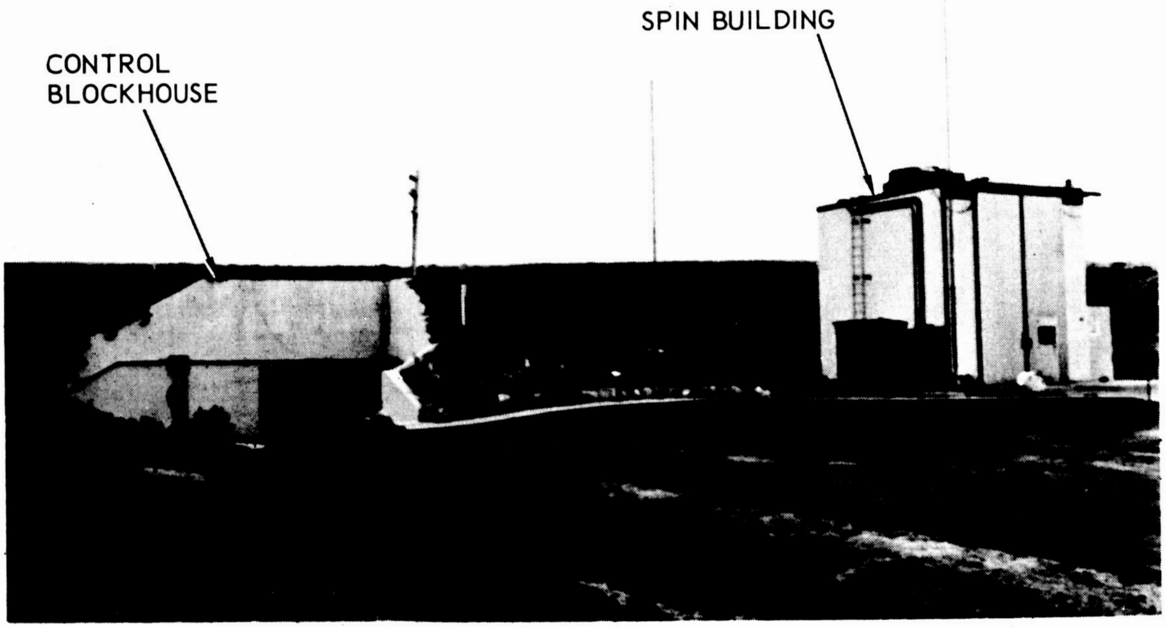

Figure 97.- Spin Test Facility - WTR.

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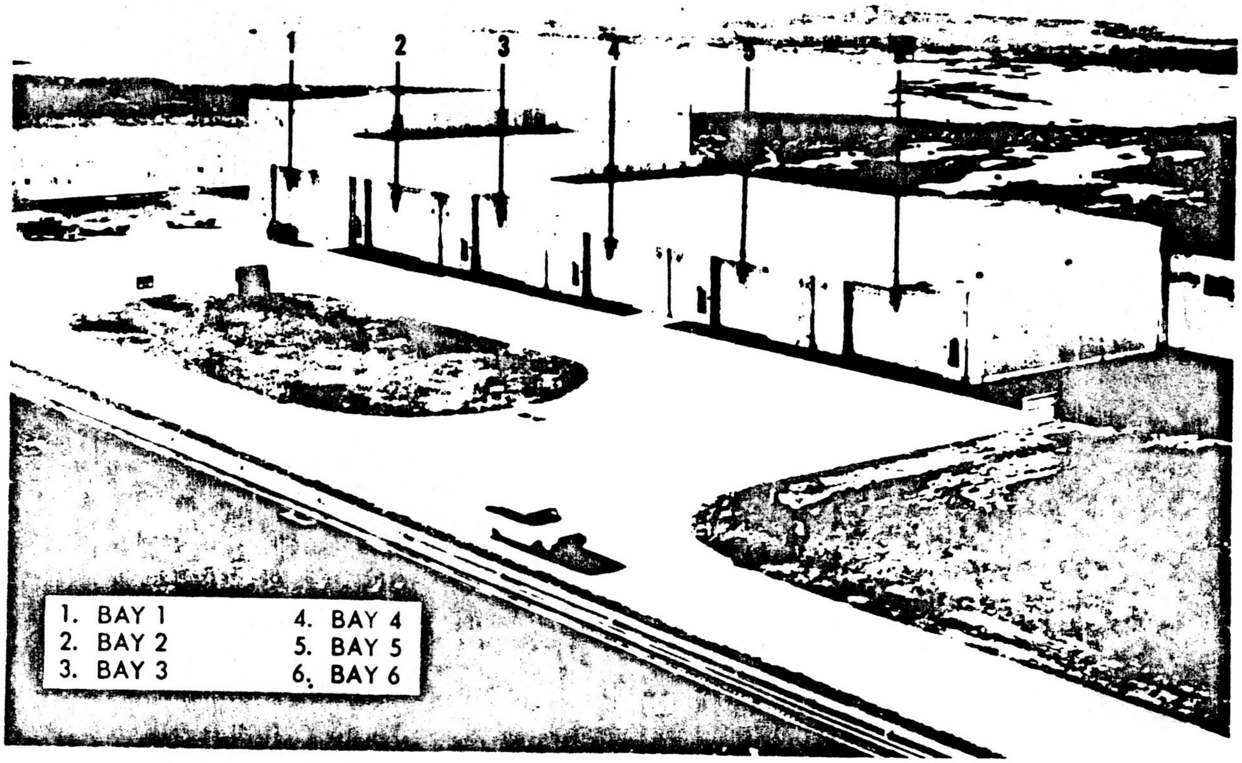

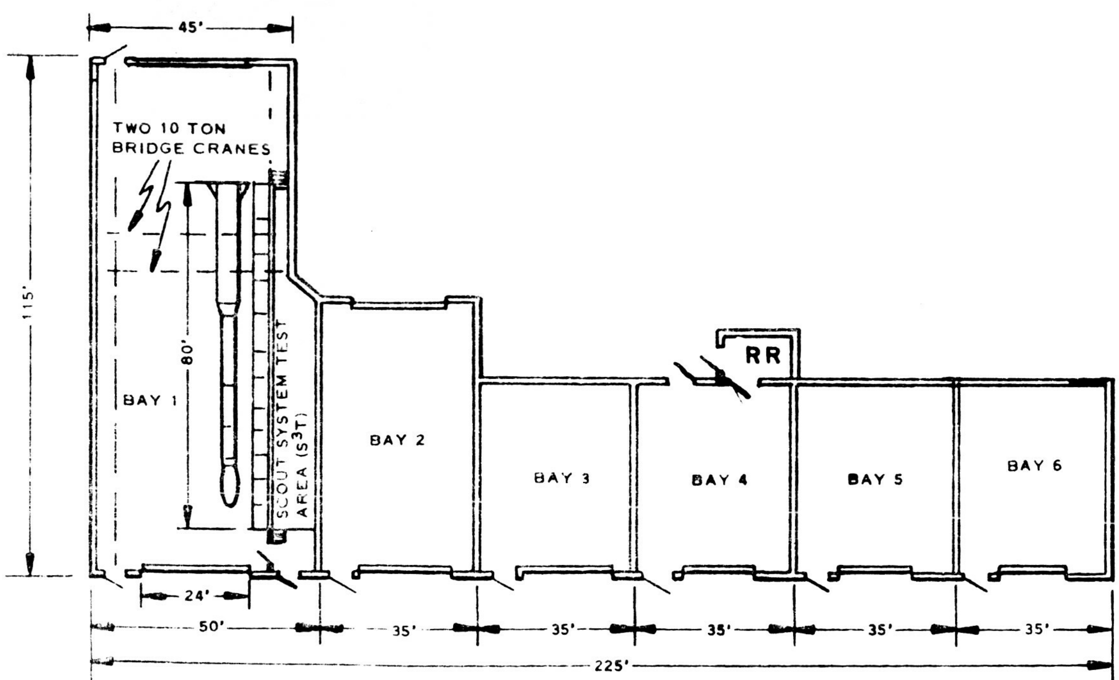

Figure 98.- Assembly Building - Wallops Island.

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Figure 99.- Telemetry mobile ground station (T/M van).

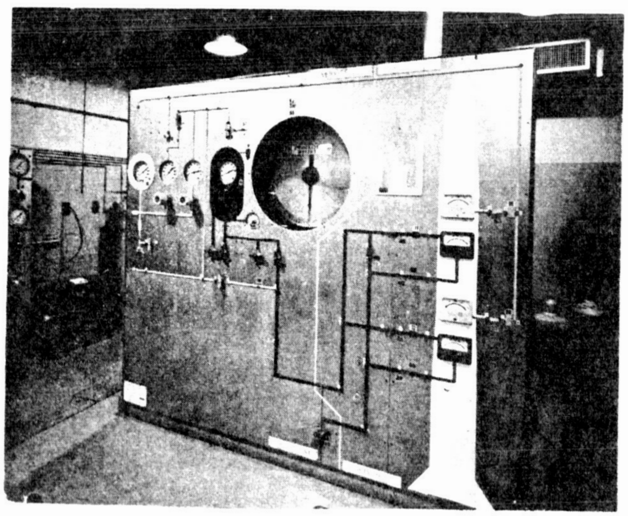

Figure 100.- Fueling room servicing equipment - typical.

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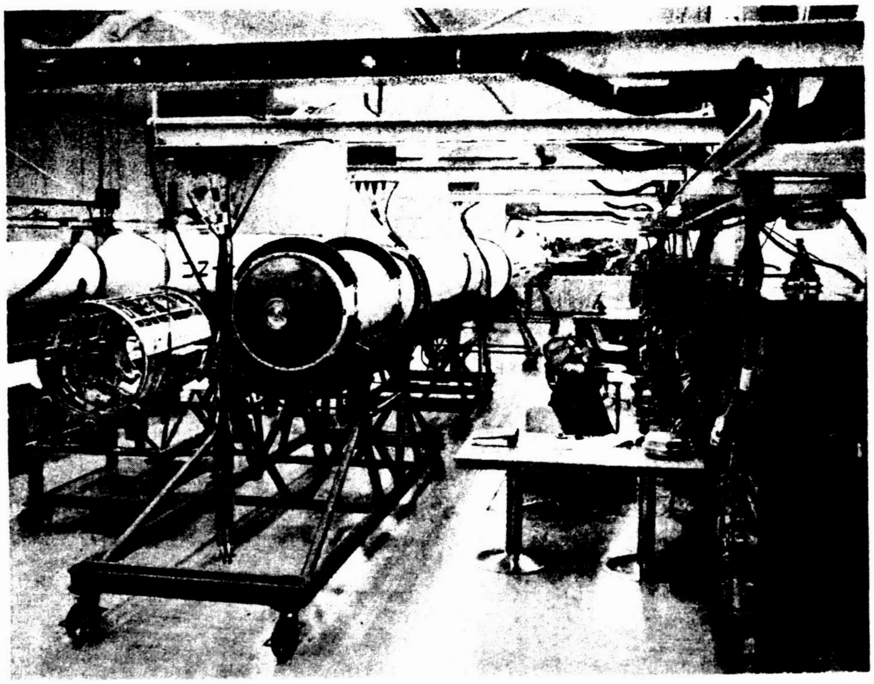

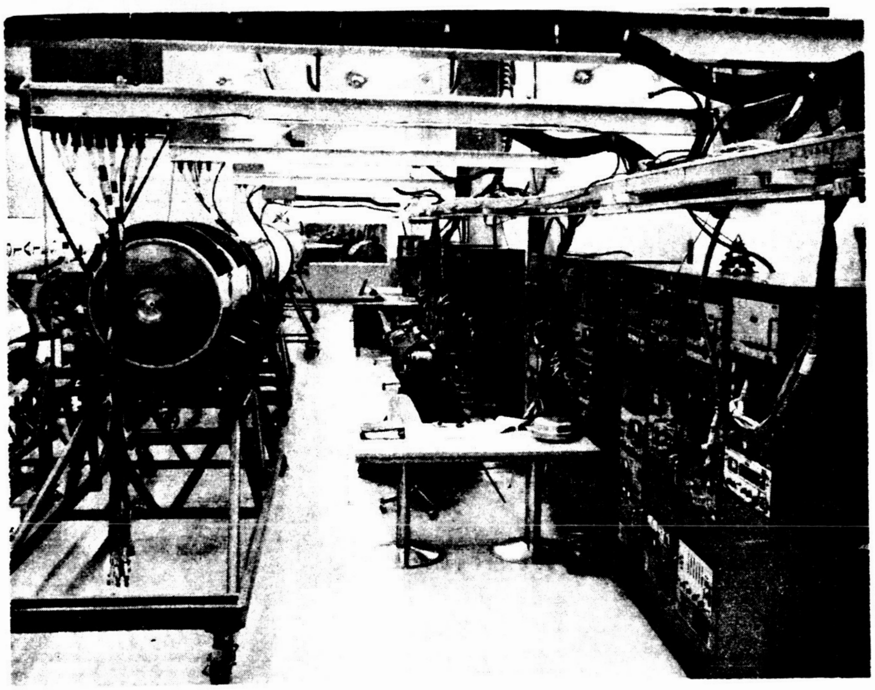

Figure 101.- Vehicle Assembly Area - Dallas.

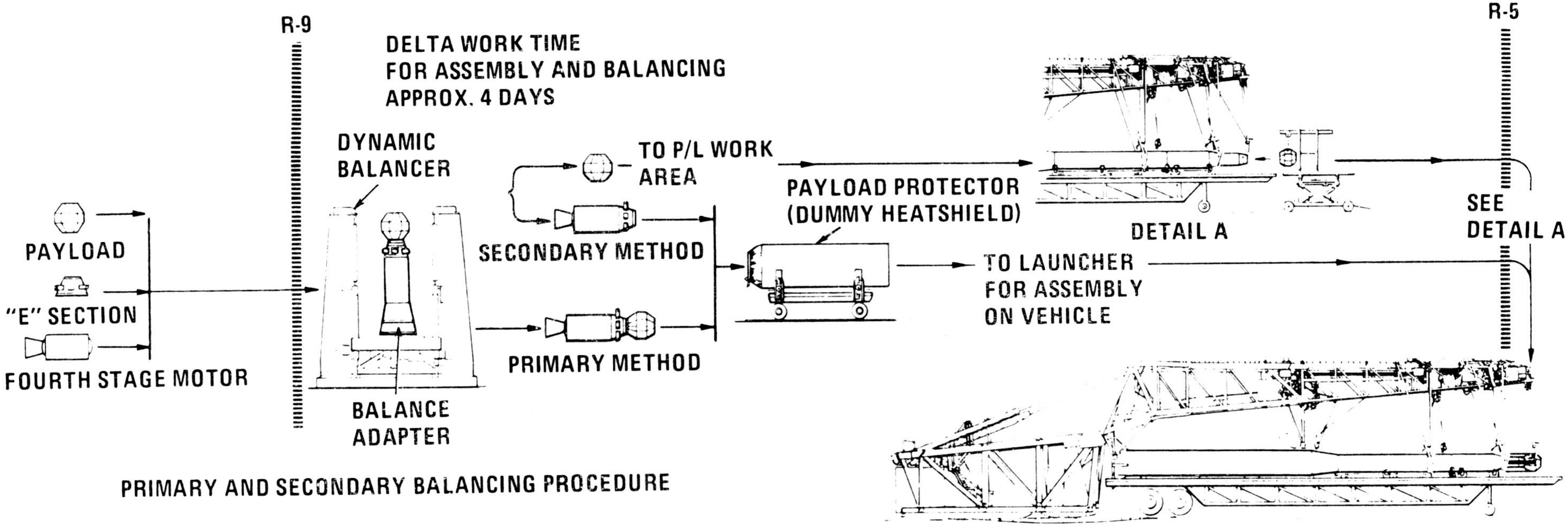

Figure 102.- Payload Field Flow Processing Plan.

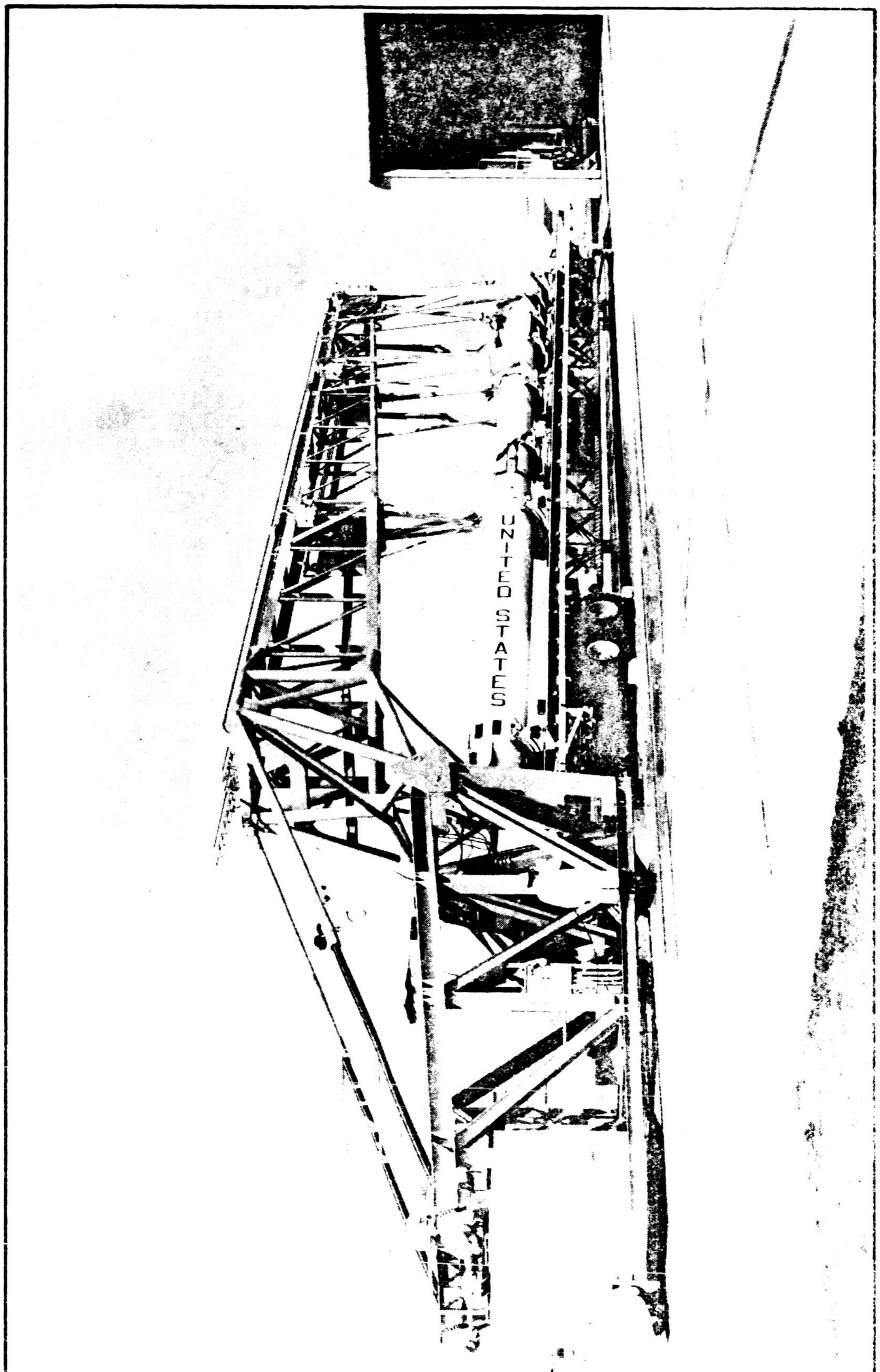

Figure 103.- Scout Mark-II Launcher at Wallops Island

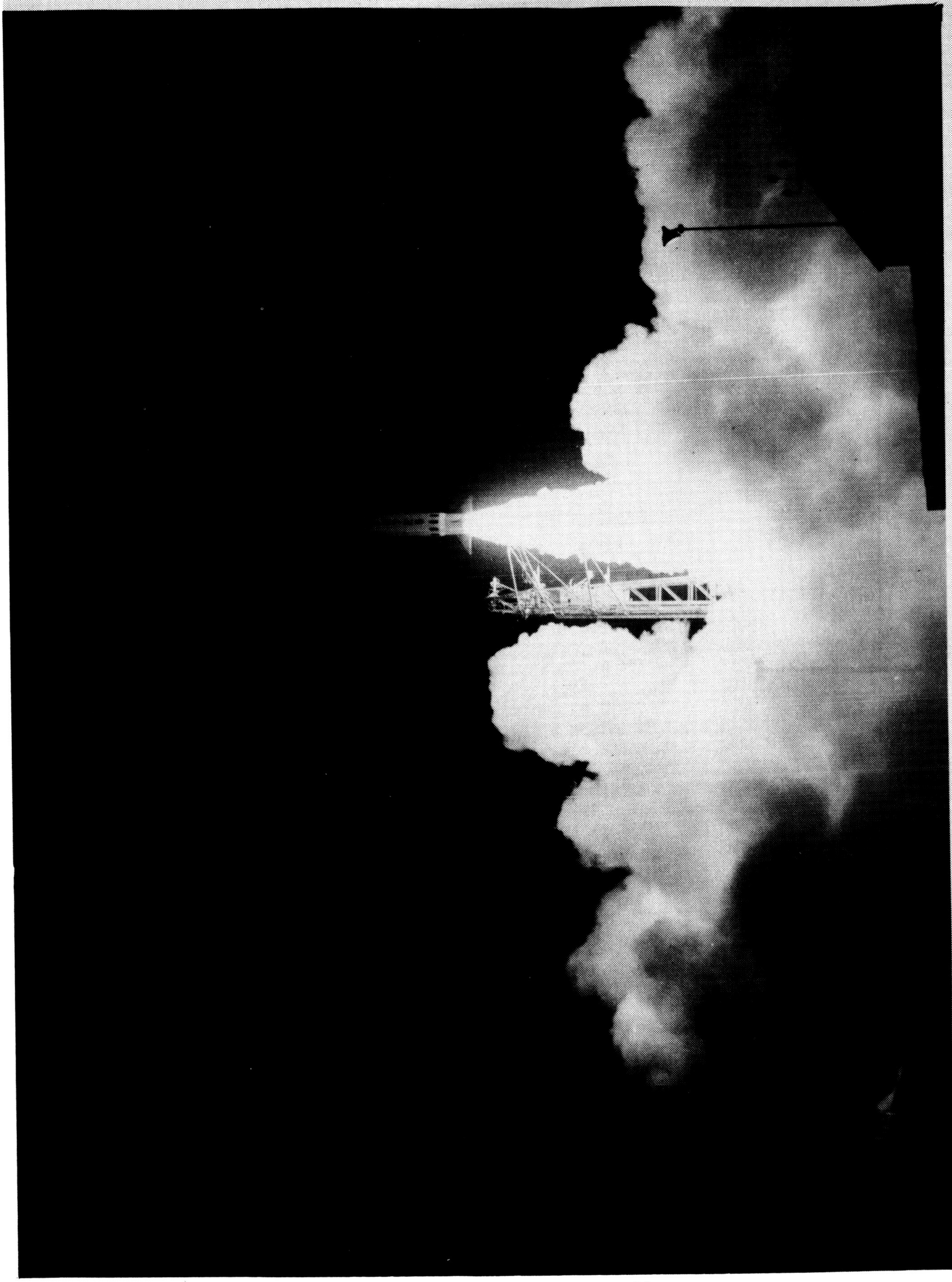

Figure 104.- Lift off of S-181 which placed AEROS-A into orbit.

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CHAPTER 8 - SCOUT FINANCIAL DATA

The Scout Program received its first funding in 1959. Appendix H consists of the Scout Status of Funds memo which was sent monthly to NASA Headquarters. It has been updated monthly as the program continued, and has been updated to its most current status. Table LXII shows the history of the Scout funds and is divided into Phases as defined on page 1. Table LXIII itemizes all the Scout funds by fiscal year.

EXPENDITURES

Development expenditures, exclusive of institutional support (nomenclature changed to RPM), through fiscal year 1976 were approximately $34.4 million.

Vehicle hardware costs through fiscal year 1976 were $112.0 million[(a)], detailed as follows:

(1) Phase II - $0.96 million per vehicle,
(2) Phase III - $1.42 million per vehicle,
(3) Phase IV - $1.18 million per vehicle,
(4) Phase V - $1.19 million per vehicle, and
(5) Phase VI - $1.31 million per vehicle.

Table LXIV details the total obligations by fiscal year in the fiscal year obligated for all Scout funds. Table LXV itemizes the obligations of each phase VI vehicle by task-job orders. Table LXVI details the hardware only obligations for each vehicle. Table LXVII summarizes the obligations of Phase VI by task for each user. Table LXVIII details the obligations in Table LXVII for each vehicle. Table LXIX details the obligations not included in Table LXVI. This table presents the non-hardware effort of the major contracts. Tables LXX through LXXVIII detail by year the activity of each fiscal year funds of the Scout program through 1979.

USER COSTS

The basis for the data in all the preceding tables is analyzed from the data calculated as contract prorations. The cost of each deliverable item in each contract was prorated from the total cost and assigned a job order that automatically computerized the cost to the correct launch vehicle and mission. This was accomplished for services, software, and research, as well as hardware. According to the ground rules (the NASA/DOD agreements) certain nonadditive costs were not to be paid by the DOD; and the cost of the field team and field services was derived by the use of a formula as illustrated in the next section of this chapter. The rules of charging non-United States users changed drastically as the Scout Program continued. Costs such as depreciation, percentage of research and development, audit costs, civil service salaries, NASA overhead, travel, and other similar costs in addition to direct costs were included.[(b)]

(a) $15.03 Million are included for Phase VII.
(b) This text is concluded on page 328 .

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TABLE LXII - HISTORY OF SCOUT FUNDS, BY PHASES

	FUNDS (Millions)		LAUNCHES		
PHASE I	NASA	OTHERS	No.	Initial	REMARKS
Development-Scout	13.4		9*	7-1-60	Two operational payloads and four other successful probes and reentry launches.
Development-Motors					
Algol IIA	2.2			8-31-62	Upgraded first stage. First flight S-114.
Antares I	1.4			7-1-60	X-254.
Antares II	1.0			3-29-62	Upgraded third stage, X-259. 1st flt. ST-9.
Altair II	1.3			6-28-63	Upgraded fourth stage, X-258. 1st flt. S-113.
Vehicle Improvements					
Cold Separation	0.1			3-1-62	First Flight on ST-8
Velocity Control	0.7	0.5			
34-inch Heat Shield	0.1			4-26-62	First Flight on S-111
New Jet Vanes	0.2			8-31-62	First Flight on S-114
Wallops Launch Complex & G.S.E.	3.3			7-1-60	Mark I & Mark II complexes
PHASE II					
10 Production Scouts	4.0	8.2	10	4-26-62	(3 NASA) Includes spares.
Air Force Special Scouts		0.6	4	5-24-62	Direct purchase of vehicles by Air Force
WTR Launch Complex and G.S.E.	2.3	2.7		4-26-62	Mark II complex.
PHASE III					
14 Production Scouts	18.1	5.4	14	12-19-63	(11 NASA) Includes recertification program and spares: also S-131 evaluation
Motor Development					
Altair III	0.1	**		8-10-65	Navy developed fourth stage (FW4S). First flight on S-131
Castor II	1.3			8-10-65	Upgraded Second Stage. First flight on S-131
Sustaining Engineering	6.7			7-1-63	Includes new reliability program and incentive contract.
Motor Prediction Study	0.5				
Algol Nozzle Redesign	0.5			7-20-64	
E-section	0.3			8-10-65	First flight on S-131.
Air Transport Study	0.2				
Standardization	1.4				
Castor II Design Completion	0.3			8-10-65	
Evaluation Vehicle	0.3			8-10-65	
G.S.E.	0.7				

*Includes prototype.
**Direct DOD Funding.

TABLE LXII Concluded - HISTORY OF SCOUT FUNDS, BY PHASES

	FUNDS (Millions)		LAUNCHES		
	NASA	OTHERS	NO.	INITIAL	REMARKS
PHASE IV					
Vehicle Hardware (01-00) (25 Vehicles)	11.8	17.7	24	11-18-65	(10 NASA) Includes Spares & Tooling
Mission Mods (01-04)	0.5	0.3			
Supporting Activities (01-00)	9.3	6.8		7-1-65	Management & Software
Product Improvement (03-00)	0	0.2		7-20-63	Algol II Nozzle
TOTAL 25 PRODUCTION SCOUTS	21.6	25.0			
PHASE V					
Vehicle Hardware (01-00) (15 Vehicles)	15.5	2.4	10	4-27-68	(13 NASA) Includes Spares & Tooling
Mission Mods (01-04)	0.9	0.2			
Supporting Activities (01-00)	17.2	2.5		11-1-67	Management & Software
Product Improvement (03-00)	1.6	0.1		9-8-67	Includes Fifth Stage, Velocity Package, Navy
TOTAL 15 PRODUCTION SCOUTS	35.2	5.2		10-9-69	Roll Yaw
PHASE VI					
Vehicle Hardware (01-00) (15 Vehicles)	10.1	8.8		8-16-71	(8 NASA) Includes Spares & Tooling
Mission Mods (01-04)	0.7	0.3			
Supporting Activities (01-00)	17.9	15.1		11-1-70	Management & Software & Range
Product Improvement (03-00)	1.3	0.3		5-31-67	Includes BE-3 Fifth Stage
				2-19-68	S-Band
				2-18-70	42-inch Heat Shield
TOTAL 15 PRODUCTION SCOUTS	30.0	24.5			
PHASE VII (Projected)					
Vehicle Hardware (01-00) (15 Vehicles)	10.5	15.6		5-8-75	(6 NASA) Includes Spares & Tooling
Mission Mods (01-04)	0.5	1.0			
Supporting Activities (01-00)	11.9	18.0		11-1-74	Management, Software & Range
Product Improvement (03-00)	2.8	0		6-26-69	Includes Algol III
				2-18-70	Jet Vanes
				12-22-70	Command Destruct
TOTAL 15 PRODUCTION SCOUTS	25.7	34.6			
TOTAL THROUGH PHASE VII	147.0	74.7			

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TABLE LXIII - SCOUT FUNDS BY FISCAL YEAR.

(Millions)

	FISCAL YEAR	61	62	63	64	65	66	67	68	69
01	Vehicle Hardware Total	0.883	6.147	0.880	0.702	1.677	1.126	3.928	1.918	6.638
02	Supporting Activities	0.0	0.309	7.160	6.715	3.926	6.427	1.425	3.141	5.341
	(SA)		(0.009)							(0.025)
	(IMS)					(0.003)			(0.004)	(0.022)
03	Product Improvement	0.317	0.127	0.014	0.683	0.085	0.047	0.047	0.104	0.512
	TOTAL LRC SCOUT 490	1.200	6.583	8.054	8.100	5.688	7.600	5.400	5.163	12.491
02	OSF DIRECT	0.0	0.0	0.0	0.0	0.099	0.100	0.0	0.037	0.109
	(DCASO)								(0.037)	(0.109)
	(IMS)									
	SUBTOTAL NASA 490	1.200	6.583	8.054	8.100	5.787	7.700	5.400	5.200	12.600
02	Supporting Activities (497)	0.0	0.0	0.0	3.400	7.495	4.000	3.982	4.963	0.0
	(SA)				(0.060)	(0.085)	(0.085)	(0.067)	(0.108)	
02	Supporting Activities (894)	0.0	0.0	1.866	0.338	0.500	0.350	0.100	0.070	0.0
	(SA)			(0.092)	(0.151)			(0.024)		
	SUBTOTAL 490, 497, AND 894	1.200	6.583	9.920	11.838	13.782	12.050	9.482	10.233	12.600
03	Scout Development (890)	16.754#	2.911	3.484	0.0	0.0	0.0	0.0	0.0	0.0
	TOTAL NASA SCOUT (490) (497) (890) AND (894)	17.954	9.494	13.404	11.838	13.782	12.050	9.482	10.233	12.600
	TRUST FUND 490 AND 894	0.0	0.0	0.0	0.200	0.480	0.0	0.030	0.0	0.048
	(SA)									
	OSF									
	REIMBURSABLES (490)	1.800	16.594	8.244	0.724	2.734	1.930	11.741	7.460	0.485
	(SA)									
	(RPM)									
	OSF									
	REIMBURSABLES (890)	0.0	0.0	0.500	0.0	0.0	0.0	0.0	0.0	0.0
	TOTAL SCOUT	19.754	26.088	22.148	12.762	16.996	13.980	21.253	17.693	13.133

	FISCAL YEAR	70	71	72	73	74	75	76	7T	77	78	79	TOTAL
01	Vehicle Hardware Total	5.298	3.745	4.485	6.356	3.674	2.989	2.400	1.052	1.608	1.217	2.641	59.364
02	Supporting Activities	6.287	7.388	9.459	8.315	3.326	8.182	7.987	2.345	2.325	14.240	7.442	111.740
	(SA)	(0.135)	(0.124)	(0.123)	(0.337)	(0.202)	(0.070)	(0.415)		(0.270)	(0.119)	(0.015)	(1.844)
	(IMS)	(0.029)	(0.131)		(0.248)	(0.507)	(0.301)	(0.300)	(0.100)	(0.250)	(0.315)	(0.191)	(2.401)
03	Product Improvement	1.450	1.407	0.400	0.900	0.444	0.213	0.069	0.0	3.408	0.643	0.417	11.287
	TOTAL LRC SCOUT 490	13.035	12.540	14.344	15.571	7.444	11.384	10.456	3.397	7.341	16.100	10.500	182.391
02	OSF DIRECT	0.665	0.659	0.756	0.129*	0.358	0.890	0.119	0.003	0.109	0.200	0.060	4.293
	(DCASO)	(0.118)	(0.112)	(0.138)	(0.125)	(0.250)	(0.100)	(0.100)		(0.100)	(0.100)	(0.060)	(1.349)
	(IMS)			(0.021)		(0.250)	(0.010)	(0.010)	(0.003)	(0.009)			(0.078)
	SUBTOTAL NASA 490	13.700	13.199	15.100	15.700	7.802	12.274	10.575	3.400	7.450	16.300	10.560	186.684
02	Supporting Activities (497)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.840
	(SA)												(0.405)
02	Supporting Activities (894)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.224
	(SA)												(0.267)
	SUBTOTAL 490, 497, AND 894	13.700	13.199	15.100	15.700	7.802	12.274	10.575	3.400	7.450	16.300	10.560	213.748
03	Scout Development (890)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.149
	TOTAL NASA SCOUT (490) (497) (890) AND (894)	13.700	13.199	15.100	15.700	7.802	12.274	10.575	3.400	7.450	16.300	10.560	235.897
	TRUST FUND 490 AND 894	2.203	1.850	0.850	2.940	1.696	1.545	0.911	0.0	0.0	0.0	0.0	12.753
	(SA)	(0.042)	(0.017)	(0.030)	(0.159)								(0.248)
	OSF						0.077						0.077
	REIMBURSABLES (490)	1.021	1.616	0.603	0.064	14.605	2.440	9.127	0.012	2.735	7.449	2.260	93.644
	(SA)							(0.086)			(0.079	(0.019)	(0.184)
	(RPM)					(0.058	(0.007)	(0.0[illegible])	(0.012)	(0.167)	(0.060)	(0.146)	(0.494)
	OSF					0.665	0.319	0.088		0.110	0.213	1.288	2.683
	REIMBURSABLES (890)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.500
	TOTAL SCOUT	16.924	16.665	16.553	18.704	24.768	16.655	20.701	3.412	10.295	23.962	14.108	346.554

* $4K to Marshall. # Includes FY59 AND FY60.

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OF POOR QUALITY

TABLE LXIV(a) - SUMMARY OF SCOUT NASA, AEC, AND DOD PROGRAMS
(Showing Fiscal Year Obligated.)

	Through FY 1971	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	FY 197T	FY 1977	FY 1978	FY 1979	TOTAL
NASA FUNDS											
R & D											
*Development	$25,576,898	$ -407	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 25,576,491
*Production	87,499,621	15,040,233	8,877,566	14,445,668	8,041,582	11,620,537	2,078,738	12,039,528	16,087,513	10,909,275	186,640,261
Technology (SRT)	4,018,279	172,077	377,403	306,002	75,954	29,829	0	1,130	0	-18,770	4,961,904
Experiments (LRC)	133,822	0	0	0	0	0	0	0	0	0	133,822
Spacecraft & S.A.	617,187	0	0	0	0	0	0	0	0	0	617,187
San Marco	3,227,924	-4,275	0	0	0	0	0	0	0	0	3,223,649
Sys. Engr. & Maint.	23,878,233	0	0	-51	0	1	0	-131	-2,898	0	28,875,154
C of F	2,633,131	0	0	0	0	0	0	0	83,202	0	2,716,333
Delta Motors	1,466,915	0	0	0	0	0	0	0	0	0	1,466,915
Subtotal	$149,052,010	$15,207,628	$9,254,969	$14,751,619	$ 8,117,536	$11,650,367	$2,078,738	$12,040,527	$16,167,817	$10,890,505	$249,211,716
DOD FUNDS											
R & D											
609A	$ 6,718,936	$ -2,908	$ 2,908	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 6,718,936
Navy	9,703,347	2,600	1	0	65,000	0	0	0	94,000	0	9,864,948
USAF	35,260,774	3,339,683	7,327,615	-1,205,820	2,802,431	-1,171,033	614,528	4,218,187	9,949,494	6,979,633	68,115,492
AEC	2,397,564	0	0	0	220,000	0	0	0	0	0	2,617,564
Subtotal	$54,080,621	$ 3,339,375	$7,330,524	$-1,205,820	$ 3,087,431	$-1,171,033	$ 614,528	$ 4,218,187	$10,043,494	$ 6,979,633	$ 87,316,940
INTERNATIONAL REIMBURSABLES											
UK-5	$ 0	$ 0	$ 0	$ 51,871	$ 18,704	$ 717,305	$ 11,307	$ 73,401	$ 0	$ 0	$ 872,588
UK-6	0	0	0	0	0	1,286	1,322	34,485	1,320,454	3,016,963	4,374,510
AEROS-B	0	0	0	808,770	2,640,505	39,004	-47,410	388,303	196,444	5,493	4,031,109
ITALY	0	0	0	0	0	0	0	183,363	479,464	210,162	873,009
Subtotal	$ 0	$ 0	$ 0	$ 860,641	$ 2,659,209	$ 757,595	$ -34,781	$ 679,552	$ 1,996,382	$ 3,232,618	$ 10,151,216
TRUST FUNDS											
ESRO	$ 2,245,359	$ 21,301	$2,310,637	$ 25,051	$ 354,988	$ 921,769	$ 86,752	$ 90,571	$ -26,692	$ 26,692	$ 6,056,428
San Marco	876,164	129,713	472,676	787,725	459,117	198,996	0	3	0	0	2,924,394
UK-X4	0	1,351	30,693	1,229,894	1,339,902	934,382	41,152	270,363	-108	1,116	3,848,745
Subtotal	$ 3,121,523	$ 152,365	$2,814,006	$ 2,042,670	$ 2,154,007	$ 2,055,147	$ 127,904	$ 360,937	$ -26,800	$ 27,808	$ 12,829,567
TOTAL	$206,254,154	$18,699,368	$19,399,499	$16,449,110	$16,018,183	$13,292,076	$2,786,389	$17,299,203	$28,180,893	$21,130,564	$359,509,439

*Includes direct OSS obligations.

TABLE LXIV(b) - SCOUT PROGRAM R & D OBLIGATIONS
(Fiscal Year Obligated)

FISCAL YEAR FUNDS	FY 1971 & PRIOR	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	FY 197T	FY 1977	FY 1978	FY 1979	TOTAL
DEVELOPMENT (890)											
FY 1959 (STG)	$ 3,810,488.00										$ 3,810,488.00
FY 1959	3,366,000.00	$ -406.75									3,365,593.25
FY 1960	2,978,043.04										2,978,043.04
FY 1961	6,600,000.00										6,600,000.00
FY 1962	2,911,217.42										2,911,217.42
FY 1963	3,484,149.22										3,484,149.22
FY 1961 (SS)	300,000.00										300,000.00
FY 1962 (SS)	1,725,000.00										1,725,000.00
FY 1963 (SS)	402,000.00										402,000.00
SUBTOTAL	$25,576,897.68	$ -406.75									$ 25,576,490.93
PRODUCTION (490)											
FY 1961	$ 1,200,000.00										$ 1,200,000.00
FY 1962	6,582,817.92										6,582,817.92
FY 1963	8,054,000.00										8,054,000.00
FY 1964	8,100,000.00										8,100,000.00
FY 1965	5,688,300.00										5,688,300.00
FY 1966	7,600,000.00										7,600,000.00
FY 1967	5,399,602.00										5,399,602.00
FY 1968	5,163,000.00										5,163,000.00
FY 1969	12,491,000.00	$ -12.00									12,490,988.00
#FY 1970	13,035,000.00	-202.25	$ -126.76	$ -37.86	$ 0.87						13,034,634.00
#FY 1971	12,517,201.54	21,720.60	2,077.86	-0.35	-934.65						12,540,065.00
#FY 1972		14,262,726.50	81,273.50								14,344,000.00
FY 1973			8,665,341.26	6,794,830.00	110,828.74					-229.52	15,570,770.48
#FY 1974				7,317,876.61	-114,212.87	$ 254,975.79		$ -15,006.30	$ 0.30	-229.52	7,443,633.53
#FY 1975					7,130,900.12	4,238,879.88	$ 14,770.00		-58.00		11,384,482.00
FY 1976						7,007,680.97	1,629,241.06	1,819,077.97	0		10,456,000.00
FY 197T							431,726.62	2,965,273.38	0		3,397,000.00
FY 1977								6,911,182.80	429,817.20		7,341,000.00
FY 1978									15,457,763.19	642,236.81	16,100,000.00
FY 1979										10,207,267.61	10,207,267.61
FY 1965-77 (STO)	1,668,700.00	756,000.00	129,000.00	333,000.00	915,000.00	119,000.00	3,000.00	359,000.00	200,000.00	60,000.00	4,542,700.00
SUBTOTAL	$87,499,621.46	$15,040,232.85	$8,877,565.86	$14,445,668.40	$8,041,582.21	$11,620,536.64	$2,078,737.68	$12,039,527.85	$16,087,512.69	$10,909,274.90	$186,640,260.54
SEAM (497)											
FY 1964	$ 3,400,000.00										$ 3.400,000.00
FY 1965	7,494,526.42										7,494,526.42
FY 1966	3,999,954.00			$ -50.47							3.999.903.53
FY 1967	3,985,091.00								$ -2,898.00		3,982,193.00
FY 1968	4,962,661.35					$ 0.65		$ -130.80		-0.20	4,962,931.00
FY 1968 (STO)	36,000.00										36,000.00
SUBTOTAL	$23,878,232.77			$ -50.47		$ 0.65		$ -130.80	$ -2,898.00	$ -0.20	$ 23,875,153.95

#Includes San Marco.

ORIGINAL PAGE IS OF POOR QUALITY

TABLE LXIV(c) - SCOUT PROGRAM R & D OBLIGATIONS
(Fiscal Year Obligated)

FISCAL YEAR FUNDS	FY 1971 & PRIOR	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	FY 197T	FY 1977	FY 1978	FY 1979	TOTAL
SAN MARCO											
FY 1963	$ 1,870,190.62	$ -4,274.90	$	$	$						$ 1,865,915.72
FY 1964	337,733.13										337,733.13
FY 1965	500,000.00										500,000.00
FY 1966	350,000.00										350,000.00
FY 1967	100,000.00										100,000.00
FY 1968	70,000.00										70,000.00
FY 1964 Trust Fund	200,000.00										200,000.00
FY 1965 Trust Fund	480,465.00	-1,548.00		1,548.00							480,465.00
FY 1967 Trust Fund	29,672.84										29,672.84
FY 1969 Trust Fund	42,529.97	5,479.09									48,009.06
FY 1970 Trust Fund	123,495.95	125,781.60	-6,018.63	6,741.08							250,000.00
FY 1973 Trust Fund			478,695.04	779,436.52	4,498.93	$ 13.95		$ 2.80			1,262,647.24
FY 1975 Trust Fund					454,618.10	198,981.90					653,600.00
SUBTOTAL	$ 4,104,087.51	$ 125,437.79	$ 472,676.41	$ 787,725.60	$ 459,117.03	$ 198,995.85		$ 2.80			$ 6,148,042.99
ESRO 1B											
FY 1970	$ 1,861,910.00	$ -0.41	$ -273.64	$ 93.17	$ 5,545.62	$ 5,505.20	$ 12,310.10	$ 17,680.96			$ 1,902,771.00
FY 1971	347,571.87		2,428.13								350,000.00
FY 1975					124,451.46	76,702.47	29,991.06	-20,488.99			210,656.00
SUBTOTAL	$ 2,209,481.87	$ -0.41	$ 2,154.49	$ 93.17	$ 129,997.08	$ 82,207.67	$ 42,301.16	$ -2,808.03			$ 2,463,427.00
ESRO IV											
FY 1970	$ 886.51	$ 3,204.87	$ 45,888.67	$ -201.00	$ -2,295.99	$ 32,508.00	$ -26,129.39	$ -3,861.67			$ 50,000.00
FY 1971	34,991.06	18,096.57	1,446,912.37	-31.00	-29,981.06	21.00	29,991.06		$ -26,691.72	$ 26,691.72	1,500,000.00
FY 1972			800,000.00		-11,640.70	0	0	11,640.70			800,000.00
FY 1973			15,681.07	25,190.12	268,908.19	25,916.29	-3,946.21	84.54			331,834.00
FY 1976						781,116.47	44,533.00	85,515.53			911,167.00
SUBTOTAL	$ 35,877.57	$ 21,301.44	$2,308,482.11	$ 24,958.12	$ 224,990.44	$ 839,561.76	$ 44,450.46	$ 93,379.10	$ -26,691.72	$ 26,691.72	$ 3,593,001.00
UK-X4											
FY 1972		$ 1,350.96	$ 30,693.46	$ -271.38	$ -6,429.92	$ 20,739.52	$ -235.20	$ 4,152.56	$ 0	0	$ 50,000.00
FY 1973				1,230,165.31	-606,949.14	667,168.19	50,125.44	4,863.20	-23.02	23.02	1,345,373.00
FY 1974					1,765,583.28	-105,816.76	0	36,019.27	-36.93	37.14	1,695,786.00
FY 1975					187,697.86	342,943.32	0	148,977.48	-77.32	1,055.66	680,597.00
FY 1976						9,347.21	-8,738.26	-637.78	28.83	0	0
FY 1975 (STS)								76,988.00	0	0	76,988.00
SUBTOTAL	$ 0	$ 1,350.96	$ 30,693.46	$ 1,229,893.93	$1,339,902.08	$ 934,381.48	$ 41,151.98	$ 270,362.73	$ -108.44	$ 1,115.82	$ 3,848,744.00
DELTA MOTORS											
FY 1964	$ 430,000.00										$ 430,000.00
FY 1965	548,758.00										548,758.00
FY 1966	488,157.00										488,157.00
SUBTOTAL	$ 1,466,915.00										$ 1,466,915.00
CONSTRUCTION OF FACILITIES (NASA)											
FY 1960 (SS)	$ 1,200,000.00										$ 1,200,000.00
FY 1962	1,433,131.43										1,433,131.43
FY 1977	0								$ 83,202.00		83,202.00
SUBTOTAL	$ 2,633,131.43								$ 83,202.00		$ 2,716,333.43
**NASA TOTAL	$147,404,245.29	$15,187,915.88	$11,691,572.33	$16,488,288.75	$10,195,588.84	$13,675,684.05	$2,206,641.28	$12,406,333.65	$16,141,016.53	$10,937,082.24	$256,325,358.84

**Does not include suballotments received nor SRT funds.

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TABLE LXIV(d) - SCOUT PROGRAM R & D OBLIGATIONS
(Fiscal Year Obligated

FISCAL YEAR FUNDS	FY 1971 & PRIOR	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	FY 197T	FY 1977	FY 1978	FY 1979	TOTAL
REIMBURSABLE-INTERNATIONAL											
AEROS-B (483)											
FY 1974				$ 808,770.12	$ 1,675,872.81	$ 19,639.85	$ -73,962.65	$ 209,679.87	$	$	$ 2,640,000.00
** FY 1975					964,631.79	-3,584.16	24,721.57	158,285.09	195,915.52	5,265.23	1,345,235.04
FY 1976						22,948.02	1,831.15	-162.00			24,617.17
FY 1977								20,500.29	-81.65		20,418.64
FY 1978									609.88	227.79	837.67
SUBTOTAL				$ 808,770.12	$ 2,640,504.60	$ 39,003.71	$ -47,409.93	$ 388,303.25	$ 196,443.75	$ 5,493.02	$ 4,031,108.52
ITALY (483)											
FY 1977								$ 183,363.00		$	$ 183,363.00
FY 1978									269,484.15	210,162.00	479,646.15
FY 1977 (STO)									110,000.00		110,000.00
FY 1978 (STO)									100,000.00		100,000.00
SUBTOTAL								$ 183,363.00	$ 479,484.15	$ 210,162.00	$ 873,009.15
UK-5 (483)											
FY 1974				$ 51,870.76	$ 68.01	$ 6,416.23		$ -30.00			$ 58,325.00
FY 1975					18,636.02	46,363.98					65,000.00
FY 1976							$ 11,307.15				11,307.15
FY 1974 (STO)						664,525.00					664,525.00
FY 1976 (STO)								73,431.00			73,431.00
SUBTOTAL				$ 51,870.76	$ 18,704.03	$ 717,305.21	$ 11,307.15	$ 73,401.00	$ 0	$ 0	$ 872,588.15
UK-6 (483)											
FY 1975						$ 19.55		$ 30,610.84	$ 67,369.61	$	$ 98,000.00
FY 1976						1,266.53	$ 16.54	4.98	1,071,889.05	1,219,376.21	2,292,553.36
FY 197T							1,305.00	-6.43	-1,298.57		0
FY 1977								3,875.60	137,443.86	-40.00	141,279.46
FY 1978									45,050.81	1,673,360.00	1,718,410.81
FY 1978 (STO)										10,000.00	10,000.00
FY 1979										114,266.32	114,266.32
SUBTOTAL						$ 1,286.08	$ 1,321.54	$ 34,484.99	$ 1,321,454.81	$ 3,016,962.53	$ 4,374,509.95
REIMBURSABLE-INTERNATIONAL TOTALS				$ 860,640.88	$ 2,659,208.63	$ 731,595.00	$ -34,781.24	$ 679,552.24	$ 1,996,382.71	$ 3,232,617.55	$ 10,151,215.77
AIR FORCE											
*FY 1960	$ 5,603,061.78	$ -2,908.00	$ 2,908.00								$ 5,603,061.78
*FY 1961	1,115,874.28										1,115,874.28
FY 1962	10,273,856.95										10,273,856.95
FY 1963	6,932,001.20										6,932,001.20
FY 1964	977,381.00	-13,754.00	13,754.00								977,381.00
FY 1965	2,745,320.44	-3,182.00	3,182.00								2,745,320.44
FY 1966	2,025,848.58				$ -112.42	$ 111.42					2,025,847.58
FY 1967	9,009,953.83	2,581,589.74	397,334.64	$-2,666,762.78	2,025,087.99	-2,511,946.99	$ 426,594.91	$2,729,148.66	$ -798,641.86	$ 796,520.07	11,988,878.21
FY 1968	2,128,252.84	755,657.91	3,834,269.94	-300,391.20	349,194.45	696,092.06	-10,697.75	10,697.75	-582,013.89	575,265.03	7,456,327.14
FY 1967-6-9-0(VAFB)	679,281.00										679,281.00
FY 1969	484,533.71				-210,350.53	210,350.53					484,533.71
FY 1970			1,020,931.00								1,020,931.00
FY 1971	4,345.24	19,371.61	1,988,639.98	-400,098.07	-1,420,279.02	84,970.00	31,451.00		1,074,896.97	230,057.57	1,613,355.28
FY 1972			23,541.17	448,334.83	-326,229.72	66,316.35		390,545.37	-0.23	-22,654.92	579,852.85
FY 1973			45,962.20	13,095.38	-32,638.14	-442.48	-8,354.98	46,529.02	-81.98	81.98	64,151.00
FY 1974				1,700,001.31	1,676,178.40	242,768.75	-717,620.79	-244,026.15	4,860,527.57	-113,991.17	7,403,837.92
FY 1975					741,579.96		494,387.33	54,032.71	-603,701.07	530,155.00	1,216,453.93
FY 1976						40,746.94	386,765.12	1,227,981.43	3,997,962.74	-1,012,817.50	4,640,638.73
FY 197T							12,003.52	-468.91			11,534.61
FY 1977									1,803,809.63	481,850.98	2,289,407.78
FY 1978									196,736.48	4,980,513.04	5,177,249.52
FY 1979										534,653.20	534,653.20
SUBTOTAL	$41,979,710.85	$ 3,336,775.26	$ 7,330,522.93	$-1,205,820.53	$ 2,802,430.97	$-1,171,033.42	$ 614,528.36	$4,218,187.05	$ 9,949,494.36	$ 6,979,633.28	$ 74,834,429.11
NAVY											
FY 1961	$ 1,800,000.00										$ 1,800,000.00
FY 1962	7,899,999.12		$ 0.88								7,900,000.00
FY 1965	3,348.00										3,348.00
FY 1971		$ 2,600.00									2,600.00
FY 1975					$ 65,000.00						65,000.00
FY 1977									$ 94,000.00		94,000.00
SUBTOTAL	$ 9,703,347.12	$ 2,600.00	$ 0.88		$ 65,000.00				$ 94,000.00		$ 9,864,948.00
AEC											
FY 1963 (AL)	$ 26,563.60										$ 26,563.60
FY 1963	2,371,000.00										2,371,000.00
FY 1974					$ 220,000.00						220,000.00
SUBTOTAL	$ 2,397,563.60				$ 220,000.00						$ 2,617,563.60
DOD REIMBURSABLE TOTALS	$54,080,621.57	$ 3,339,375.26	$ 7,330,523.81	$-1,205,820.53	$ 3,087,430.97	$-1,171,033.42	$ 614,528.36	$4,218,187.05	$10,043,494.36	$ 6,979,633.28	$ 87,316,940.71
TOTAL	$201,484,866.86	$18,527,291.14	$19,022,096.14	$16,143,109.10	$15,942,228.44	$13,262,245.63	$2,786,388.40	$17,298,072.94	$28,180,893.60	$21,149,333.07	$353,796,525.32

*609A Program.
**Includes STS direct.

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TABLE LXV(a) - PHASE VI OBLIGATION OF FUNDS BY VEHICLE - FOREIGN AGREEMENTS

J.O./ TASK	TRUST FUNDS 185	TRUST FUNDS 188	(NASA) SAN MARCO 190-000	REIMBURSABLE 186	REIMBURSABLE 190-483	TOTAL
A	$ 318,928	$ 330,943	$ 318,938	$ 310,900	$ 0	$ 1,279,709
B	45,612	13,218	6,071	4,474	0	69,375
C	16,066	22,022	12,210	14,495	0	64,793
D	45,309	40,821	36,032	43,086	0	165,248
E	151,969	213,125	145,013	186,477	0	696,584
F	184,566	166,448	145,018	155,637	0	651,669
G	67,762	63,963	53,240	61,857	0	246,822
H	183,254	229,824	148,245	276,687	0	838,010
I	842,510	881,610	0	778,606	0	2,502,726
J	0	6,069	0	1,358	720,897	728,324
K	0	0	0	0	0	0
L	0	0	0	0	0	0
M	64,286	77,544	47,341	76,467	0	265,638
N	393,228	424,650	0	424,650	0	1,242,528
O	39,500	39,500	0	39,500	0	118,500
P	0	0	0	0	0	0
Q	60,872	54,715	0	318,533	0	434,120
R	0	0	0	0	0	0
S	0	0	2,398	0	0	2,398
T	34,858	38,216	27,450	26,161	0	126,685
U	68,600	94,400	0	107,420	0	270,420
V	52,804	62,804	96,266	86,088	0	297,962
W	105,286	100,000	100,000	100,000	0	405,286
X	20,000	20,000	14,428	19,981	0	74,409
Y	546,759	541,379	539,550	561,676	0	2,189,364
Z	387,048	402,074	376,796	400,758	0	1,566,676
TOTAL	$3,629,217	$3,823,325	$2,068,996	$3,994,811	$720,897	$14,237,246

ORIGINAL PAGE IS
OF POOR QUALITY

TABLE LXV(b) - PHASE VI OBLIGATIONS OF FUNDS BY VEHICLE - NASA

TASK	180	181	183	184	187	189	190	191	TOTAL
A	$318,938	$318,938	$318,938	$318,938	$318,938	$246,447	$318,938	$394,431	$ 2,554,506
B	19,505	19,904	23,789	22,027	22,169	15,114	6,071	48,493	177,072
C	43,269	17,605	27,562	23,656	23,569	34,842	12,210	33,510	216,223
D	51,317	59,539	42,087	52,227	0	35,793	36,032	49,498	326,493
E	184,378	196,169	179,122	209,562	207,747	241,655	145,013	323,482	1,687,128
F	154,385	194,588	179,128	207,316	207,338	136,854	145,018	208,484	1,433,111
G	56,680	71,441	65,764	76,112	76,121	57,924	53,240	83,862	541,144
H	162,005	167,511	179,045	177,781	178,451	221,809	124,353	278,347	1,489,302
I	0	0	0	0	0	0	0	0	0
J	0	0	0	0	76,099	0	0	0	76,099
K	0	0	0	0	0	0	0	0	0
L	0	0	0	0	0	0	0	0	0
M	43,708	45,924	74,325	71,183	68,711	100,238	49,849	125,576	579,514
N	393,228	393,228	393,228	393,228	0	424,650	0	429,650	2,427,212
O	0	0	0	0	0	0	0	0	0
P	0	0	0	0	0	0	0	0	0
Q	0	0	0	0	0	0	0	0	0
R	8,930	95,372	9,462	0	50,759	153,018	0	466,067	783,608
S	3,431	9,748	0	8,695	0	22,634	14,002	122,253	180,763
T	33,599	108,361	56,780	109,950	64,298	77,799	85,819	72,282	608,888
U	0	0	0	0	0	0	0	0	0
V	96,265	96,265	96,265	96,265	96,265	68,902	96,266	63,614	710,107
W	105,286	105,286	105,286	105,286	100,000	100,000	100,000	36,130	757,274
X	0	0	2,119	0	0	0	14,428	59,000	75,547
Y	503,956	505,686	481,677	504,198	472,748	504,199	472,748	983,908	4,429,120
Z	326,193	372,632	326,193	372,632	360,563	331,696	372,632	531,401	2,993,942
TOTAL	$2,505,073	$2,778,197	$2,560,770	$2,749,056	$2,323,776	$2,773,574	$2,046,619	$4,309,988	$22,047,053

TABLE LXV(c) - PHASE VI OBLIGATIONS OF FUNDS BY VEHICLE

	DOD REIMBURSABLES						
	NAVY				A.F.		NASA & DOD
TASK	178	182	192	SUBTOTAL	179	TOTAL	VI TOTAL
A	$ 205,260	$ 318,938	$ 0	$ 524,198	$ (1)	$ 524,198	$ 3,078,704
B	7,075	10,591	5,160	22,826	16,743	39,569	216,641
C	37,675	32,292	35,529	105,496	25,673	131,169	347,392
D	32,591	41,959	Phase VII	74,550	(2)	74,550	401,043
E	211,315	2,255	9,831	223,401	52,483	275,884	1,963,012
F	119,517	0	0	119,517	0	119,517	1,552,628
G	58,863	0	0	58,863	0	58,863	600,007
H	149,689	150,371	240,536	540,596	324,708	865,304	2,354,606
I	0	0	0	0	0	0	0
J	0	0	0	0	0	0	76,099
K	0	0	0	0	0	0	0
L	0	0	0	0	0	0	0
M	42,508	42,508	66,379	151,395	99,221	250,616	830,130
N	393,228	393,228	Phase VII	786,456	220,364	1,006,820	3,434,032
O	0	0	0	0	0	0	0
P	0	0	0	0	0	0	0
Q	0	0	0	0	0	0	00
R	26,226	53,080	193,519	272,825	212,628	485,453	1,269,061
S	0	0	0	0	0	0	180,763
T	27,817	27,818	79,387	135,022	27,817	162,839	771,727
U	0	0	0	0	0	0	0
V	31,003	96,265	31,004	158,272	99,505	257,777	967,884
W	105,286	105,286	100,000	310,572	100,000	410,572	1,167,846
X	0	0	Phase VII	0	0	0	75,547
Y	488,535	527,181	542,326	1,558,042	510,984	2,069,026	6,498,146
Z	354,136	368,559	667,459	1,390,154	331,036	1,721,190	4,715,132
TOTALS	$2,290,724	$2,170,331	$1,971,130	$6,432,185	$2,021,162	$8,453,347	$30,500,400

(1) Included in Navy annual costs.
(2) Included in Task R.

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OF POOR QUALITY

TABLE LXVI - PHASE VI HARDWARE OBLIGATIONS
(Does not include mission peculiars - for comparison)

CONTRACT TASK / VEHICLE NO.	H	M	T	V	Y	Z	TOTAL
178	$ 149,689	$ 40,000	$ 26,161	$ 31,003	$ 508,947	$ 358,300	$ 1,114,100
179	341,732	50,529	26,161	99,505	504,304	362,934	1,385,165
180	162,005	41,208	3,427	96,265	532,472	330,357	1,165,734
181	262,991	43,416	33,705	96,265	519,458	405,164	1,360,999
182	167,126	40,000	26,161	96,265	527,181	372,724	1,229,457
183	179,045	71,817	26,608	96,265	510,193	330,357	1,214,285
184	177,781	68,675	35,294	96,265	548,830	405,164	1,332,009
185	183,254	64,286	34,858	52,804	546,759	387,048	1,269,009
186	276,687	76,467	26,161	86,088	561,676	400,758	1,427,837
187	178,451	66,403	27,381	96,265	508,009	364,727	1,241,236
188	229,824	77,544	38,216	62,804	541,379	402,074	1,351,841
189	232,588	97,930	27,738	68,902	552,603	335,661	1,315,422
190	124,353	47,341	27,450	96,266	517,380	376,797	1,189,587
191	278,347	119,868	26,160	63,614	556,101	383,909	1,427,999
192	240,536	63,871	79,387	31,004	542,326	669,967	1,627,091
S-M	702,142	302,651	0	331,390	77,920	655,861	2,069,964
S-0	0	3,200	44,665	3,575	212,566	359,378 (a)	623,384
TOTAL	$3,886,551	$1,275,206	$509,533	$1,504,545	$8,268,104	$6,901,180	$22,345,119

S-M Sustaining Major Contracts.
S-0 Sustaining Others.
(a) NASA-$266,215, DOD-$93,163.

TABLE LXVII - SUMMARY OF PHASE VI OBLIGATIONS BY TASK (490)

TASK	NASA (VEH.)	NASA (SUST.)	FOREIGN	DOD (VEH.)	DOD (SUST.)	TOTAL
A	$ 2,554,506	$ 661,141	$ 1,279,709	$ 524,198	$ 0	$ 5,019,554
B	177,072	139,527	69,375	39,569	0	425,543
C	216,223	22,099	64,793	131,169	0	434,284
D	326,493	24,875	165,248	74,550	0	591,166
E	1,687,128	1,910,948	861,832	275,884	5,245	4,741,037
F	1,433,111	648,885	651,669	119,517	0	2,853,182
G	541,144	276,361	246,822	58,863	0	1,123,190
H	1,489,302	702,142	838,010	865,304	0	3,894,758
I	0	834,852	2,502,726	0	569,146	3,906,724
J	76,099	59,529	728,324	0	0	863,952
K	0	15,948	0	0	0	15,948
L	0	407,519	0	0	0	407,519
M	579,514	305,851	265,638	250,616	0	1,401,619
N	2,427,212	0	1,242,528	1,006,820	0	4,676,560
O	0	88,280	118,500	0	73,411	280,191
P	0	318,272	0	0	0	318,272
Q	0	9,277	434,120	0	0	443,397
R	783,608	5,321,496	133,174	485,453	876,434	7,600,165
S	180,763	320,628	2,398	0	0	503,789
T	608,888	44,665	126,685	162,839	0	943,077
U	0	2,359,767	270,420	0	591,026	3,221,213
V	710,107	334,965	297,962	257,777	0	1,600,811
W	757,274	4,114	405,286	410,572	0	1,577,246
X	75,547	153,043	74,409	0	8,309	311,308
Y	4,429,120	290,486	2,189,364	2,069,026	0	8,977,996
Z	2,993,942	922,076	1,566,676	1,721,190	93,163	7,297,047
TOTAL	$22,047,053	$16,176,746	$14,545,668	$8,453,347	$2,216,734	$63,429,548

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TABLE LXVIII(a) - VEHICLE S-178 OBLIGATIONS (MAJOR CONTRACTS) BY TASKS

TASK	(1)NAS1-5610 (2)NAS1-6020	NAS1-7199	(3)NAS1-5883 NAS1-7256	NAS1-10000	(4)NAS1-11000 NAS1-12500	TOTAL
A	$	$	$205,260	$	$	$ 205,260
B				7,075		7,075
C			3,059	34,616		37,675
D					32,591	32,591
E	(2)70,144		140,039	1,132		211,315
F			119,517			119,517
G			58,863			58,863
H			149,689			149,689
J						
K						
L						
M				42,508		42,508
N				393,228		393,228
P						
R				20,412	5,814	26,226
S						
T			26,161	1,656		27,817
V			31,003			31,003
W				105,286		105,286
X						
Y	(1) 16,500	471,835			(4)200	488,535
Z	(1) 888	293,123	(3)60,125			354,136
TOTAL	$ 87,532	$764,958	$793,716	$605,913	$ 38,605	$2,290,724

TABLE LXVIII(b) - VEHICLE S-179 OBLIGATIONS OF MAJOR CONTRACTS BY TASKS

TASK	NAS1-7199A	NAS1-7256NA	NAS1-10000NA	NAS1-11000A(1) NAS1-11400A(2)	NAS1-12500NA	TOTAL
A	$	$	$	$	$	$
B					16,743A	16,743
C			25,673N			25,673
D						
E			4,173N		48,310A	52,483
F						
G						
H		56,864N	148,375A		119,469A	324,708
J						
K						
L						
M		48,692N	50,529A			99,221
N					220,364A	220,364
P						
R			9,258A		203,370NA	212,628
S						
T		26,161A	1,656A			27,817
V		31,003A	68,502A			99,505
W					100,000A	100,000
Y	470,784			40,200(1)		510,984
Z	218,935			112,101(2)		331,036
TOTAL	$689,719A	$162,720NA	$308,166NA	$152,301A	$708,256NA	$2,021,162

A - Air Force
N - Navy

TABLE LXVIII(c) - VEHICLE S-180 OBLIGATIONS OF MAJOR CONTRACTS BY TASKS

TASK	NAS1-6020	NAS1-7199	NAS1-7256	NAS1-10000	(1)NAS1-5610 (2)NAS1-6935	TOTAL
A	$	$	$	$ 318,938	$	$ 318,938
B	2,602		10,479	6,424		19,505
C				43,269		43,269
D				51,317		51,317
E				184,378		184,378
F				154,385		154,385
G				56,680		56,680
H			29,619	132,386		162,005
J						
K						
L						
M				43,708		43,708
N				393,228		393,228
P						
R					(2) 8,930	8,930
S				3,431		3,431
T			2,616	30,983		33,599
V			31,003	65,262		96,265
W				105,286		105,286
X						
Y		495,026			(2) 8,930	503,956
Z		293,123			(1) 33,070	326,193
TOTAL	$ 2,602	$ 788,149	$73,717	$1,589,675	$ 50,930	$2,505,073

TABLE LXVIII(d) - VEHICLE S-181 OBLIGATIONS OF MAJOR CONTRACTS BY TASKS

TASK	NAS1-7199	NAS1-7256	NAS1-9258	NAS1-10000	NAS1-6935	TOTAL
A	$	$	$	$ 318,938	$	$ 318,938
B		10,479		9,425		19,904
C				17,605		17,605
D				59,539		59,539
E				196,169		196,169
F				194,588		194,588
G				71,441		71,441
H				166,860	651	167,511
J						
K						
L						
M				45,924		45,924
N				393,228		393,228
P						
R				95,372		95,372
S		7,180		2,568		9,748
T		26,161		82,200		108,361
V		31,003		65,262		96,265
W				105,286		105,286
X						
Y	472,747				32,939	505,686
Z	245,840		126,792			372,632
TOTAL	$718,587	$74,823	$126,792	$1,824,405	$33,590	$2,778,197

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TABLE LXVIII(e) - VEHICLE S-182 OBLIGATIONS OF MAJOR CONTRACTS BY TASKS

TASK	NAS1-6020	NAS1-7199	(1) NAS1-11000 (2) NAS1-7256	NAS1-10000	NAS1-6935	TOTAL
A	$	$	$	$ 318,938	$	$ 318,938
B	3,003			7,588		10,591
C				32,292		32,292
D				41,959		41,959
E				2,255		2,255
F						
G						
H				150,371		150,371
J						
K						
L						
M				42,508		42,508
N				393,228		393,228
P						
R				53,080		53,080
S						
T			(2) 26,161	1,657		27,818
V			(2) 31,003	65,262		96,265
W				105,286		105,286
X						
Y		488,850	(1) 200		38,131	527,181
Z		368,559				368,559
TOTAL	$3,003	857,409	$57,364	$1,214,424	$38,131	$2,170,331

TABLE LXVIII(f) - VEHICLE S-183 OBLIGATIONS OF MAJOR CONTRACTS BY TASKS

TASK	NAS1-5610	NAS1-7199	NAS1-7256	NAS1-10000	NAS1-6935	TOTAL
A		$	$	$ 318,938	$	$ 318,938
B			20,960	2,829		23,789
C				27,562		27,562
D				42,087		42,087
E				179,122		179,122
F				179,128		179,128
G				65,764		65,764
H				153,604	25,441	179,045
J						
K						
L						
M				74,325		74,325
N				393,228		393,228
P						
R				532	8,930	9,462
S						
T			26,161	30,619		56,780
V			31,003	65,262		96,265
W				105,286		105,286
X					2,119	2,119
Y		472,747			8,930	481,677
Z	33,070	293,123				326,193
TOTAL	$33,070	$765,870	$78,124	$1,638,286	$45,420	$2,560,770

TABLE LXVIII(g) - VEHICLE S-184 OBLIGATIONS OF MAJOR CONTRACTS BY TASKS

TASK	NAS1-7199	NAS1-7256	NAS1-9258	NAS1-10000	NAS1-6935	TOTAL
A	$	$	$	$ 318,938	$	$ 318,938
B				22,027		22,027
C				23,656		23,656
D				52,227		52,227
E				209,562		209,562
F				207,316		207,316
G				76,112		76,112
H				177,781		177,781
J						
K						
L						
M				71,183		71,183
N				393,228		393,228
P						
R						
S		2,427		6,268		8,695
T		26,161		83,789		109,950
V		31,003		65,262		96,265
W				105,286		105,286
Y	472,747				31,451	504,198
Z	245,840		126,792			372,632
TOTAL	$718,587	$59,591	$126,792	$1,812,635	$31,451	$2,749,056

TABLE LXVIII(h) - VEHICLE S-185 OBLIGATIONS OF MAJOR CONTRACTS BY TASKS

TASK	NAS1-5610	NAS1-7199	NAS1-7256	NAS1-9258	NAS1-10000	NAS1-6935	TOTAL
A	$	$	$	$	$ 318,938	$	$ 318,938
B			13,973		31,639		45,612
C					16,066		16,066
D					45,309		45,309
E					151,969		151,969
F					184,566		184,566
G					67,762		67,762
H					183,254		183,254
J							
K							
L							
M					66,794		66,794
N					393,228		393,228
P							
R						8,930	8,930
S			14,360				14,360
T			26,161		83,352		109,513
V			31,003		21,801		52,804
W					105,286		105,286
X							
Y		470,784				31,451	502,235
Z	33,695	170,403		126,792			330,890
TOTAL	$33,695	$641,187	$85,497	$126,792	$1,669,964	$40,381	$2,597,516

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TABLE LXVIII(i) - VEHICLE S-186 OBLIGATIONS OF MAJOR CONTRACTS BY TASKS

TASK	NAS1-7199	NAS1-7256	NAS1-9258	NAS1-10000	NAS1-12500	NAS1-6935	TOTAL
A	$	$	$	$ 159,488	$ 151,412	$	$ 310,900
B					4,474		4,474
C					14,495		14,495
D					43,086		43,086
E				60,339	126,138		186,477
F				72,718	82,919		155,637
G				26,696	35,161		61,857
H				129,973	135,284	651	265,908
J							
K							
L							
M				58,345	20,430		78,775
N					424,650		424,650
P							
R				1,358			1,358
S		7,180		10,779			17,959
T		26,161		46,284			72,445
V		31,003		31,801	23,284		86,088
W					100,000		100,000
X							
Y	470,784	15,554*				30,710	517,048
Z	245,840		126,792				372,632
TOTAL	$716,624	$79,898	$126,792	$597,781	$1,161,333	$31,361	$2,713,789

*Contract NAS1-6020.

TABLE LXVIII(j) - VEHICLE S-187 OBLIGATIONS OF MAJOR CONTRACTS BY TASKS

TASK	NAS1-7199	NAS1-7256	NAS1-10000	NAS11400	NAS1-12500	NAS1-6935	TOTAL
A	$	$	$ 318,938	$	$	$	$ 318,938
B			17,865		4,304		22,169
C			3,114		20,455		23,569
D							
E			207,331		416		207,747
F			207,338				207,338
G			76,121				76,121
H			177,800			651	178,451
J					76,099		76,099
K							
L							
M			68,711				68,711
N							
P							
R			1,786		48,973		50,759
S							
T		26,160	38,138				64,298
V		31,003	65,262				96,265
W					100,000		100,000
X							
Y	472,748						472,748
Z	293,123			34,501		32,939	360,563
TOTAL	$765,871	$57,163	$1,182,404	$34,501	$250,247	$33,590	$2,323,776

TABLE LXVIII(k) - VEHICLE S-188 OBLIGATIONS OF MAJOR CONTRACTS BY TASKS

TASK	NAS1-7199	NAS1-7256	NAS1-9258	NAS1-10000	NAS1-12500	NAS1-6935	TOTAL
A	$	$	$	$ 239,272	$ 91,671	$	$ 330,943
B				12,324	894		13,218
C				3,259	18,763		22,022
D					40,821		40,821
E				137,010	76,115		213,125
F				116,243	50,205		166,448
G				42,675	21,288		63,963
H				136,472	81,923	650	219,045
J							
K							
L							
M				59,073	21,011		80,084
N					424,650		424,650
P							
R				5,088			5,088
S		21,540		11,760			33,300
T		26,160		29,828			55,988
V		31,003		31,801			62,804
W					100,000		100,000
X							
Y	470,784					32,939	503,723
Z	245,840		126,792				372,632
TOTAL	$716,624	$78,703	$126,792	$ 824,805	$927,341	$33,589	$2,707,854

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TABLE LXVIII(1) - VEHICLE S-189 OBLIGATIONS OF MAJOR CONTRACTS BY TASKS

TASK	NAS1-6935	NAS1-7199	NAS1-7256	NAS1-9258	NAS1-10000	NAS1-11400	NAS1-12500	TOTAL
A	$	$	$	$	$	$	$ 246,447	$ 246,447
B					8,123		6,991	15,114
C							34,842	34,842
D							35,793	35,793
E					1,889		239,766	241,655
F					1,890		134,964	136,854
G					694		57,230	57,924
H					1,618		220,191	221,809
J								
K								
L								
M					651		99,587	100,238
N							424,650	424,650
P								
R							153,018	153,018
S					10,779		11,855	22,634
T			26,160		50,061		1,578	77,799
V			31,003				37,899	68,902
W							100,000	100,000
X								
Y	31,451	472,748						504,199
Z		170,403		126,792		34,501		331,696
TOTAL	$31,451	$643,151	$57,163	$126,792	$75,705	$34,501	$1,804,811	$2,773,574

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TABLE LXVIII(m) - VEHICLE S-190 OBLIGATIONS OF MAJOR CONTRACTS BY TASKS

TASK	NAS1-7199	NAS1-7256	NAS1-9258	NAS1-10000	NAS1-12500	TOTAL
A	$	$	$	$ 318,938	$	$ 318,938
B				4,097	1,974	6,071
C				3,221	8,989	12,210
D					36,032	36,032
E				145,013		145,013
F				145,018		145,018
G				53,240		53,240
H				124,353		124,353
J				429,726	291,171	720,897 (1)
K						
L						
M				49,849		49,849
N						
P						
R						
S		2,398		11,604		14,002
T		26,160		59,659		85,819
V		31,004		65,262		96,266
W					100,000	100,000
X						
Y	472,748					472,748
Z	245,840		126,792			372,632
TOTAL	$718,588	$59,562	$126,792	$1,409,980	$438,166	$2,753,088

(1) San Marco reimbursable funds.

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TABLE LXVIII(n) - VEHICLE S-191 OBLIGATIONS OF MAJOR CONTRACTS BY TASKS

J.O. TASK	NAS1-6935	NAS1-7199	NAS1-1702** NAS1-7256*	NAS1-9258	NAS1-10000	NAS1-10500## NAS1-11400#	NAS1-12500	TOTAL
A	$	$	$	$	$159,488	$	$ 234,943	$ 394,431
B					32,206		16,287	48,493
C							33,510	33,510
D							49,498	49,498
E					128,405		195,077	323,482
F					79,818		128,666	208,484
G					29,304		54,558	83,862
H					68,414		209,933	278,347
J								
K								
L								
M			3,200**		27,436		94,940	125,576
N			5,000**				424,650	429,650
P								
R	5,780		298,325**		161,962			466,067
S			2,834*				119,419	122,253
T			26,160*		46,122			72,282
V			31,004*		32,610			63,614
W							36,130	36,130
X							59,000	59,000
Y	37,231	472,748	72,000**			401,929##		983,908
Z		171,652	150,000**	126,792		82,957#		531,401
TOTAL	$43,011	$644,400	$588,523	$126,792	$765,765	$484,886	$1,656,611	$4,309,988

TABLE LXVIII(o) - VEHICLE S-192 OBLIGATIONS OF MAJOR CONTRACTS BY TASKS

TASK	NAS1-7199	NAS1-7256	NAS1-11400	NAS1-12500	NAS1-13100	NAS1-14200	NAS1-15000	NAS1-15100	TOTAL
A	$	$	$	$	$	$	$	$	$
B				921			4,239		5,160
C				11,203			24,326		35,529
D(1)									
E				9,831					9,831
F									
G									
H				166,616			73,920		240,536
J									
K									
L									
M				13,871			50,968	1,540	66,379
N									
P									
R				101,670			113,506		215,176
S									
T		26,160					53,227		79,387
V		31,004							31,004
W							100,000		100,000
X									
Y	471,835						70,491		542,326
Z			132,903		286,147	248,409			667,459
TOTAL	$471,835	$57,164	$132,903	$304,112	$286,147	$248,409	$490,677	$1,540	$1,992,787

(1) Complete costs of vehicle S-192 include launching and shipping costs and data analysis in Phase VII are not included above.

TABLE LXIX - PHASE VI SUSTAINING EFFORT BY MAJOR CONTRACTS

TASK	NAS1-6935	(1) NAS1-6020 (2) NAS1-7199	NAS1-7256	NAS1-9258	NAS1-10000 (1)	NAS1-12500	NAS1-15000	TOTAL
A	$	$	$	$	$ 318,938	$ 342,203	$	$ 661,141
B					139,527			139,527
C					22,099			22,099
D					24,875			24,875
E	10,490	36,220 (1)			1,580,104 (2)	284,134		1,910,948
F					461,478	187,407		648,885
G	13,600				183,297	79,465		276,362
H (6)	549,619	53,002 (1)	74,600			19,679	5,242	702,142
J						476,373 (4)		476,373
K					15,948			15,948
L					407,519			407,519
M (6)	77,787	87,549 (1)				137,315		302,651
N								
P					287,272			287,272
R	1,607,562 (5)			2,489,280	720,146 (3)	98,057		4,915,045
S		81,504 (1)	106,839		230,580			418,923
T (6)								
V (6)				170,000	65,262	52,625	43,503	331,390
W								
X								
Y (6)		77,920 (2)						77,920
Z (6)	483,389	172,472 (2)						655,861
TOTAL	$2,742,447	$508,667	$181,439	$2,659,280	$4,457,045	$1,677,258	$48,745	$12,274,881

(1) Includes canceled CAS-B.
(2) Includes $5,245 (NAVY).
(3) Includes $43,577 (NAVY).
(4) Includes Italian Funds.
(5) Includes PAET $200,000 for heat shield development.
(6) Table LXVI includes hardware obligations.

TABLE LXX - SCOUT PROGRAM FY 1972 OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 1971 & PRIOR	FY 1972	TOTAL
DEVELOPMENT (890)			
FY 1959 (STG)	$ 3,810,488.00		$ 3,810,488.00
FY 1959	3,366,000.00	$ -406.75	3,365,593.25
FY 1960	2,978,043.04		2,978,043.04
FY 1961	6,600,000.00		6,600,000.00
FY 1962	2,911,217.42		2,911,217.42
FY 1963	3,484,149.22		3,484,149.22
FY 1961 (STO)	300,000.00		300,000.00
FY 1962 (STO)	1,725,000.00		1,725,000.00
FY 1963 (STO)	402,000.00		402,000.00
SUBTOTAL	$ 25,576,897.68	$ -406.75	$ 25,576,490.93
PRODUCTION (490)			
FY 1961	$ 1,200,000.00		$ 1,200,000.00
FY 1962	6,582,817.92		6,582,817.92
FY 1963	8,054,000.00		8,054,000.00
FY 1964	8,100,000.00		8,100,000.00
FY 1965	5,688,300.00		5,688,300.00
FY 1966	7,600,000.00		7,600,000.00
FY 1967	5,399,602.00		5,399,602.00
FY 1968	5,163,000.00		5,163,000.00
FY 1969	12,491,000.00	$ -12.00	12,490,988.00
#FY 1970	13,035,00.00	-202.25	13,034,797.75
FY 1971	12,517,201.54	21,720.60	12,538,922.14
FY 1972		14,262,726.50	14,262,726.50
FY 1965-72 (STO)	1,688,700.00	756,000.00	2,424,700.00
SUBTOTAL	$ 87,499,621.46	$ 15,040,232.85	$102,539,854.31
SEAM (497)			
FY 1964	$ 3,400,000.00		$ 3,400,000.00
FY 1965	7,494,526.42		7,494,526.42
FY 1966	3,999,954.00		3,999,954.00
FY 1967	3,985,091.00		3,985,091.00
FY 1968	4,962,661.35		4,962,661.35
FY 1968 (STO)	36,000.00		36,000.00
SUBTOTAL	$ 23,878,232.77		$ 23,878,232.77

#Includes San Marco.

TABLE LXX Continued - SCOUT PROGRAM FY 1972 OBLIGATIONS.

October 1, 1979

FISCAL YEAR FUNDS	FY 1971 & PRIOR	FY 1972	TOTAL
SAN MARCO			
FY 1963	$ 1,870,190.62	$ -4,274.90	$ 1,865,917.72
FY 1964	337,733.13		337,733.13
FY 1965	500,000.00		500,000.00
FY 1966	350,000.00		350,000.00
FY 1967	100,000.00		100,000.00
FY 1968	70,000.00		70,000.00
FY 1964 Trust Fund	200,000.00		200,000.00
FY 1965 Trust Fund	480,465.00	-1,548.00	478,917.00
FY 1967 Trust Fund	29,672.84		29,672.84
FY 1969 Trust Fund	42,529.97	5,479.09	48,009.06
FY 1970 Trust Fund	123,495.95	125,781.60	249,277.55
SUBTOTAL	$ 4,104,087.51	$ 125,437.79	$ 4,229,525.30
ESRO IB			
FY 1970	$ 1,861,910.00	$ -0.41	$ 1,861,909.59
FY 1971	347,571.87		347,571.87
SUBTOTAL	$ 2,209,481.87	$ -0.41	$ 2,209,481.46
ESRO IV			
FY 1970	$ 886.51	$ 3,204.87	$ 4,091.38
FY 1971	34,991.06	18,096.57	53,087.63
SUBTOTAL	$ 35,877.57	$ 21,301.44	$ 57,179.01
UK			
FY 1972		$ 1,350.96	$ 1,350.96
SUBTOTAL		$ 1,350.96	$ 1,350.96
DELTA MOTORS			
FY 1964	$ 430,000.00		$ 430,000.00
FY 1965	548,758.00		548,758.00
FY 1966	488,157.00		488,157.00
SUBTOTAL	$ 1,466,917.00		$ 1,466,915.00
CONSTRUCTION OF FACILITIES (NASA)			
FY 1960 (STO)	$ 1,200,000.00		$ 1,200,000.00
FY 1962	1,433,131.43		1,433,131.43
SUBTOTAL	$ 2,633,131.43		$ 2,633,131.43
**NASA TOTAL	$147,404,245.29	$ 15,187,915.88	$162,592,161.17

**Does not include suballotments received nor SRT funds.

ORIGINAL PAGE IS
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TABLE LXX Concluded - SCOUT PROGRAM FY 1972 OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 1971 & PRIOR	FY 1972	TOTAL
AIR FORCE			
*FY 1960	$ 5,603,061.78	$ -2,908.00	$ 5,600,153.78
*FY 1961	1,115,874.28		1,115,874.28
FY 1962	10,273,856.95		10,273,856.95
FY 1963	6,932,001.20		6,932,001.20
FY 1964	977,381.00	-13,754.00	963,627.00
FY 1965	2,745,320.44	-3,182.00	2,742,138.44
FY 1966	2,025,848.58		2,025,848.58
FY 1967	9,009,953.83	2,581,589.74	11,591,543.57
FY 1968	2,128,252.84	755,657.91	2,883,910.75
FY 1967-8-9-0 (VAFB)	679,281.00		679,281.00
FY 1969	484,533.71		484,533.71
FY 1971	4,345.24	19,371.61	23,716.85
SUBTOTAL	$ 41,979,710.85	$ 3,336,775.26	$ 45,316,486.11
NAVY			
FY 1961	$ 1,800,000.00		$ 1,800,000.00
FY 1962	7,899,999.12		7,899,999.12
FY 1965	3,348.00		3,348.00
FY 1971		$ 2,600.00	2,600.00
SUBTOTAL	$ 9,703,347.12	$ 2,600.00	$ 9,705,947.12
AEC			
FY 1963 (AL)	$ 26,563.60		$ 26,563.60
FY 1963	2,371,000.00		2,371,000.00
SUBTOTAL	$ 2,379,563.60		$ 2,397,563.60
REIMBURSABLE TOTALS	$ 54,080,621.57	$ 3,339,375.26	$ 57,419,996.83
TOTAL	$201,484,866.86	$ 18,527,291.14	$220,012,158.00

*609A Program.

TABLE LXXI - SCOUT PROGRAM FY 1973 OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 1972 & PRIOR	FY 1973	TOTAL
DEVELOPMENT (890)			
FY 1959 (STG)	$ 3,810,488.00		$ 3,810,488.00
FY 1959	3,365,593.25		3,365,593.25
FY 1960	2,978,043.04		2,978,043.04
FY 1961	6,600,000.00		6,600,000.00
FY 1962	2,911,217.42		2,911,217.42
FY 1963	3,484,149.22		3,484,149.22
FY 1961 (STO)	300,000.00		300,000.00
FY 1962 (STO)	1,725,000.00		1,725,000.00
FY 1963 (STO)	402,000.00		402,000.00
SUBTOTAL	$ 25,576,490.93		$ 25,576,490.93
PRODUCTION (490)			
FY 1961	$ 1,200,000.00		$ 1,200,000.00
FY 1962	6,582,817.92		6,582,817.92
FY 1963	8,054,000.00		8,054,000.00
FY 1964	8,100,000.00		8,100,000.00
FY 1965	5,688,300.00		5,688,300.00
FY 1966	7,600,000.00		7,600,000.00
FY 1967	5,399,602.00		5,399,602.00
FY 1968	5,163,000.00		5,163,000.00
FY 1969	12,490,988.00		12,490,988.00
#FY 1970	13,034,797.75	$ -126.76	13,034,620.99
FY 1971	12,538,922.14	2,077.86	12,541,000.00
FY 1972	14,262,726.50	81,273.50	14,344,000.00
FY 1973		8,665,341.26	8,665,341.26
FY 1965-73 (STO)	2,424,700.00	129,000.00	2,553,700.00
SUBTOTAL	$102,539,854.31	$ 8,877,565.86	$111,417,420.17
SEAM (497)			
FY 1964	$ 3,400,000.00		$ 3,400,000.00
FY 1965	7,494,526.42		7,494,526.42
FY 1966	3,999,954.00		3,999.954.00
FY 1967	3,985,091.00		3,985,091.00
FY 1968	4,962,661.35		4,962,661.35
FY 1968 (STO)	36,000.00		36,000.00
SUBTOTAL	$ 23,878,232.77		$ 23,878,232.77

#Includes San Marco.

TABLE LXXI Continued - SCOUT PROGRAM FY 1973 OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 1972 & PRIOR	FY 1973	TOTAL
SAN MARCO			
FY 1963	$ 1,865,915.72		$ 1,865,915.72
FY 1964	337,733.13		337,733.13
FY 1965	500,000.00		500,000.00
FY 1966	350,000.00		350,000.00
FY 1967	100,000.00		100,000.00
FY 1968	70,000.00		70,000.00
FY 1964 Trust Fund	200,000.00		200,000.00
FY 1965 Trust Fund	478,917.00		478,917.00
FY 1967 Trust Fund	29,672.84		29,672.84
FY 1969 Trust Fund	48,009.06		48,009.06
FY 1970 Trust Fund	249,277.55	$ -6,018.63	243,258.92
FY 1973 Trust Fund		478,695.04	478,695.04
SUBTOTAL	$ 4,229,525.30	$ 472,676.41	$ 4,702,201.71
ESRO IB			
FY 1970	$ 1,861,909.59	$ -273.64	$ 1,861,635.95
FY 1971	347,571.87	2,428.13	350,000.00
SUBTOTAL	$ 2,209,481.46	$ 2,154.49	$ 2,211,635.95
ESRO IV			
FY 1970	$ 4,091.38	$ 45,888.67	$ 49,980.05
FY 1971	53,087.63	1,446,912.37	1,500,000.00
FY 1972		800,000.00	800,000.00
FY 1973		15,681.07	15,681.07
SUBTOTAL	$ 57,179.01	$ 2,308,482.11	$ 2,365,661.12
UK			
FY 1972	$ 1,350.96	$ 30,693.46	$ 32,044.42
SUBTOTAL	$ 1,350.96	$ 30,693.46	$ 32,044.42
DELTA MOTORS			
FY 1964	$ 430,000.00		$ 430,000.00
FY 1965	548,758.00		548,758.00
FY 1966	488,157.00		488,157.00
SUBTOTAL	$ 1,466,915.00		$ 1,466.915.00
CONSTRUCTION OF FACILITIES (NASA)			
FY 1960 (STO)	$ 1,200,000.00		$ 1,200,000.00
FY 1962	1,433,131.43		1,433,131.43
SUBTOTAL	$ 2,633,131.43		$ 2,633,131.43
*NASA TOTAL	$162,592,161.17	$ 11,691,572.33	$174,283,733.50

*Does not include suballotments received nor SRT funds.

TABLE LXXI Concluded - SCOUT PROGRAM FY 1973 OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 1972 & PRIOR	FY 1973	TOTAL
AIR FORCE			
*FY 1960	$ 5,600,153.78	$ 2,908.00	$ 5,603,061.78
FY 1961	1,115,874.28		1,115,874.28
FY 1962	10,273,856.95		10,273,856.95
FY 1963	6,932,001.20		6,932,001.20
FY 1964	963,627.00	13,754.00	977,381.00
FY 1965	2,742,138.44	3,182.00	2,745,320.44
FY 1966	2,025,848.58		2,025,848.58
FY 1967	11,591,543.57	397,334.64	11,988,878.21
FY 1968	2,883,910.75	3,834,269.94	6,718,180.69
FY 1967-8-9-0 (VAFB)	679,281.00		679,281.00
FY 1969	484,533.71		484,533.71
FY 1970		1,020,931.00	1,020.931.00
FY 1971	23,716.85	1,988,639.98	2,012,356.83
FY 1972		23,541.17	23,541.17
FY 1973		45,962.20	45,962.20
SUBTOTAL	$ 45,316.486.11	$ 7,330,522.93	$ 52,647.009.04
NAVY			
FY 1961	$ 1,800,000.00		$ 1,800,000.00
FY 1962	7,899,999.12	$ 0.88	7,900,000.00
FY 1965	3,348.00		3,348.00
FY 1971	2,600.00		2,600.00
SUBTOTAL	$ 9,705,947.12	$ 0.88	$ 9,705,948.00
AEC			
FY 1963 (AL)	$ 26,563.60		$ 26,563.60
FY 1963	2,371,000.00		2,371,000.00
SUBTOTAL	$ 2,397,563.60		$ 2,397,563.60
REIMBURSABLE TOTALS	$ 57,419,996.83	$ 7,330,523.81	$ 64,750,520.64
TOTAL	$220,012,158.00	$ 19,022,096.14	$239,034,254.14

*609A Program.

TABLE LXXII - SCOUT PROGRAM FY 1974 OBLIGATIONS.

October 1, 1979

FISCAL YEAR FUNDS	FY 1973 & PRIOR	FY 1974	TOTAL
DEVELOPMENT (890)			
FY 1959 (STG)	$ 3,810,488.00		$ 3,810,488.00
FY 1959	3,365,593.25		3,365,593.25
FY 1960	2,978,043.04		2,978,043.04
FY 1961	6,600,000.00		6,600,000.00
FY 1962	2,911,217.42		2,911,217.42
FY 1963	3,484,149.22		3,484,149.22
FY 1961 (STO)	300,000.00		300,000.00
FY 1962 (STO)	1,725,000.00		1,725,000.00
FY 1963 (STO)	402,000.00		402,000.00
SUBTOTAL	$ 25,576,490.93		$ 25,576,490.93
PRODUCTION (490)			
FY 1961	$ 1,200,000.00		$ 1,200,000.00
FY 1962	6,582,817.92		6,582,817.92
FY 1963	8,054,000.00		8,054,000.00
FY 1964	8,100,000.00		8,100,000.00
FY 1965	5,688,300.00		5,688,300.00
FY 1966	7,600,000.00		7,600,000.00
FY 1967	5,399,602.00		5,399,602.00
FY 1968	5,163,000.00		5,163,000.00
FY 1969	12,490,988.00		12,490,988.00
#FY 1970	13,034,670.99	$ -37.86	13,034,633.13
FY 1971	12,541,000.00	-0.35	12,540,999.65
FY 1972	14,344,000.00		14,344,000.00
FY 1973	8,665,341.26	6,794,830.00	15,460,171.26
FY 1974		7,317,876.61	7,317,876.61
FY 1965-74 (STO)	2,553,700.00	333,000.00	2,886,700.00
SUBTOTAL	$111,417,420.17	$ 14,445,668.40	$125,863,088.57
SEAM (497)			
FY 1964	$ 3,400,000.00		$ 3,400,000.00
FY 1965	7,494,526.42		7,494,526.42
FY 1966	3,999,954.00	$ -50.47	3,999,903.53
FY 1967	3,985,091.00		3,985,091.00
FY 1968	4,962,661.35		4,962,661.35
FY 1968 (STO)	36,000.00		36,000.00
SUBTOTAL	$ 23,878,232.77	$ -50.47	$ 23,878,182.30

#Includes San Marco.

TABLE LXXII Continued - SCOUT PROGRAM FY 1974 OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 1973 & PRIOR	FY 1974	TOTAL
SAN MARCO			
FY 1963	$ 1,865,915.72		$ 1,865,915.72
FY 1964	337,733.13		337,733.13
FY 1965	500,000.00		500,000.00
FY 1966	350,000.00		350,000.00
FY 1967	100,000.00		100,000.00
FY 1968	70,000.00		70,000.00
FY 1964 Trust Fund	200,000.00		200,000.00
FY 1965 Trust Fund	478,917.00	$ 1,548.00	480,465.00
FY 1967 Trust Fund	29,672.84		29,672.84
FY 1969 Trust Fund	48,009.06		48,009.06
FY 1970 Trust Fund	243,258.92	6,741.08	250,000.00
FY 1973 Trust Fund	478,695.04	779,436.52	1,258,131.56
SUBTOTAL	$ 4,702,201.71	$ 787,725.60	$ 5,489,927.31
ESRO IB			
FY 1970	$ 1,861,635,95	$ 93.17	$ 1,861,729.12
FY 1971	350,000.00		350,000.00
SUBTOTAL	$ 2,211,635.95	$ 93.17	$ 2,211,729.12
ESRO IV			
FY 1970	$ 49,980.05	$ -201.00	$ 49,779.05
FY 1971	1,500,000.00	-31.00	1,499,969.00
FY 1972	800,000.00		800,000.00
FY 1973	15,681.07	25,190.12	40,871.19
SUBTOTAL	$ 2,365,661.12	$ 24,958.12	$ 2,390,619.24
UK			
FY 1972	$ 32,044.42	$ -271.38	$ 31,773.04
FY 1973		1,230,165.31	1,230,165.31
SUBTOTAL	$ 32,044.42	$ 1,229,893.93	$ 1,261,938.35
DELTA MOTORS			
FY 1964	$ 430,000.00		$ 430,000.00
FY 1965	548,758.00		548,758.00
FY 1966	488,157.00		488,157.00
SUBTOTAL	$ 1,466,915.00		$ 1,466,915.00
CONSTRUCTION OF FACILITIES (NASA)			
FY 1960 (STO)	$ 1,200,000.00		$ 1,200,000.00
FY 1962	1,433,131.43		1,433,131.43
SUBTOTAL	$ 2,633,131.43		$ 2,633,131.43
*NASA TOTAL	$174,283,733.50	$ 16,496,288.75	$190,780,022.25

TABLE LXXII Concluded - SCOUT PROGRAM FY 1974 OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 1973 & PRIOR	FY 1974	TOTAL
REIMBURSABLE - INTERNATIONAL			
AEROS-B (483)			
FY 1974		$ 808,770.12	$ 808,770.12
SUBTOTAL		$ 808,770.12	$ 808,770.12
UK-5 (483)			
FY 1974		$ 51,870.76	$ 51,870.76
SUBTOTAL		51,870.76	$ 51,870.76
REIMBURSABLE - INTERNATIONAL TOTALS		$ 860,640.88	$ 860.640.88
AIR FORCE			
*FY 1960	$ 5,603,061.78		$ 5,603,061.78
*FY 1961	1,115,874.28		1,115,874.28
FY 1962	10,273,856.95		10,273,856.95
FY 1963	6,932,001.20		6,932,001.20
FY 1964	977,381.00		977,381.00
FY 1965	2,745,320.44		2,745,320.44
FY 1966	2,025,848.58		2,025,848.58
FY 1967	11,988,878.21	$ -2,666,762.78	9,322,115.43
FY 1968	6,718,180.69	-300,391.20	6,417,789.49
FY 1967-8-9-0 (VAFB)	679,281.00		679,281.00
FY 1969	484,533.71		484,533.71
FY 1970	1,020,931.00		
FY 1971	2,012,356.83	-400,098.07	1,612,258.76
FY 1972	23,541.17	448,334.83	471,876.00
FY 1973	45,962.20	13,095.38	59,057.58
FY 1974		1,700,001.31	1,700,001.31
SUBTOTAL	$ 52,647.009.04	$ -1,205,820.53	$ 51,441,188.51
NAVY			
FY 1961	$ 1,800,000.00		$ 1,800,000.00
FY 1962	7,900,000.00		7,900,000.00
FY 1965	3,348.00		3,348.00
FY 1971	2,600.00		2,600.00
SUBTOTAL	$ 9,705,948.00		$ 9,705,948.00
AEC			
FY 1963 (AL)	$ 26,563.60		$ 26,563.60
FY 1963	2,371,000.00		2,371,000.00
SUBTOTAL	$ 2,397,563.60		$ 2,397,563.60
REIMBURSABLE TOTALS	$ 64,750,520.64	$ -1,205,820.53	$ 63,544,700.11
TOTAL	$239,034,254.14	$ 16,143,109.10	$255,177,363.24

TABLE LXXIII - SCOUT PROGRAM FY 1975 OBLIGATIONS
October 1, 1979

FISCAL YEAR FUNDS	FY 1974 & PRIOR	FY 1975	TOTAL
DEVELOPMENT (890)			
FY 1959 (STG)	$ 3,810,488.00		$ 3,810,488.00
FY 1959	3,365,593.25		3,365,593.25
FY 1960	2,978,043.04		2,978,043.04
FY 1961	6,600,000.00		6,600,000.00
FY 1962	2,911,217.42		2,911,217.42
FY 1963	3,484,149.22		3,484,149.22
FY 1961 (STO)	300,000.00		300,000.00
FY 1962 (STO)	1,725,000.00		1,725,000.00
FY 1963 (STO)	402,000.00		402,000.00
SUBTOTAL	$ 25,576,490.93		$ 25,576,490.93
PRODUCTION (490)			
FY 1961	$ 1,200,000.00		$ 1,200,000.00
FY 1962	6,582,817.92		6,582,817.92
FY 1963	8,054,000.00		8,054,000.00
FY 1964	8,100,000.00		8,100,000.00
FY 1965	5,688,300.00		5,688,300.00
FY 1966	7,600,000.00		7,600,000.00
FY 1967	5,399,602.00		5,399,602.00
FY 1968	5,163,000.00		5,163,000.00
FY 1969	12,490,988.00		12,490.988.00
#FY 1970	13,034,633.13	$ 0.87	13,034,634.00
FY 1971	12,540,999.65	-934.65	12,540,065.00
FY 1972	14,344,000.00		14,344,000.00
FY 1973	15,460,171.26	110,828.74	15,571,000.00
FY 1974	7,317,876.61	-114,212.87	7,203,663.74
FY 1965-75 (STO)	2,886,700.00	915,000.00	3,801,700.00
FY 1975		7,130,900.12	7,130,900.12
SUBTOTAL	$125,863,088.57	$ 8,041,582.21	$133,904,670.78
SEAM (497)			
FY 1964	$ 3,400,000.00		$ 3,400,000.00
FY 1965	7,494,526.42		7,494,526.42
FY 1966	3,999,903.53		3,999,903.53
FY 1967	3,985,091.00		3,985,091.00
FY 1968	4,962,661.35		4,962,661.35
FY 1968 (STO)	36,000.00		36,000.00
SUBTOTAL	$ 23,878,182.30		$ 23,878,182.30

#Includes San Marco.

TABLE LXXIII Continued - SCOUT PROGRAM FY 1975 OBLIGATIONS.

October 1, 1979

FISCAL YEAR FUNDS	FY 1974 & PRIOR	FY 1975	TOTAL
SAN MARCO			
FY 1963	$ 1,865,915.72		$ 1,865,915.72
FY 1964	337,733.13		337,733.13
FY 1965	500,000.00		500,000.00
FY 1966	350,000.00		350,000.00
FY 1967	100,000.00		100,000.00
FY 1968	70,000.00		70,000.00
FY 1964 Trust Fund	200,000.00		200,000.00
FY 1965 Trust Fund	480,465.00		480,465.00
FY 1967 Trust Fund	29,672.84		29,672.84
FY 1969 Trust Fund	48,009.06		48,009.06
FY 1970 Trust Fund	250,000.00		250,000.00
FY 1973 Trust Fund	1,258,131.56	$ 4,498.93	1,262,630.49
FY 1975 Trust Fund		454,618.10	454,618.10
SUBTOTAL	$ 5,489,927.31	$ 459,117.03	$ 5,949,044.34
ESRO IB			
FY 1970	$ 1,861,729.12	$ 5,545.62	$ 1,867,274.74
FY 1971	350,000.00		350,000.00
FY 1975		124,451.46	124,451.46
SUBTOTAL	$ 2,211,729.12	$ 129,997.08	$ 2,341,726.20
ESRO IV			
FY 1970	$ 49,779.05	$ -2,295.99	$ 47,483.06
FY 1971	1,499,969.00	-29,981.06	1,469,987.94
FY 1972	800,000.00	-11,640.70	788,359.30
FY 1973	40,871.19	268,908.19	309,779.38
SUBTOTAL	$ 2,390,619.24	$ 224,990.44	$ 2,615,609.68
UK-X4			
FY 1972	$ 31,773.04	$ -6,429.92	$ 25,343.12
FY 1973	1,230,165.31	-606,949.14	623,216.17
FY 1974		1,765,583.28	1,765,583.28
FY 1975		187,697.86	187,697.86
SUBTOTAL	$ 1,261,938.35	$ 1,339,902.08	$ 2,601,840.43
DELTA MOTORS			
FY 1964	$ 430,000.00		$ 430,000.00
FY 1965	548,758.00		548,758.00
FY 1966	488,157.00		488,157.00
SUBTOTAL	$ 1,466,915.00		$ 1,466,915.00
CONSTRUCTION OF FACILITIES (NASA)			
FY 1960 (STO)	$ 1,200,000.00		$ 1,200,000.00
FY 1962	1,433,131.43		1,433,131.43
SUBTOTAL	$ 2,633,131.43		$ 2,633,131.43
*NASA TOTAL	$190,780,022.25	$ 10,170,588.84	$200,950,611.09

*Does not include suballotments rece ved nor SRT funds.

TABLE LXXIII Concluded - SCOUT PROGRAM FY 1975 OBLIGATIONS.

October 1, 1979

FISCAL YEAR FUNDS	FY 1974 & PRIOR	FY 1975	TOTAL
REIMBURSABLE - INTERNATIONAL			
AEROS-B (483)			
FY 1974	$ 808,770.12	$ 1,675,872.81	$ 2,484,642.93
FY 1975		964,631.79	964,631.79
SUBTOTAL	$ 808,770.12	$ 2,640,504.60	$ 3,449,274.72
UK-5 (483)			
FY 1974	$ 51,870.76	$ 68.01	$ 51,938.77
FY 1975		18,636.02	18,636.02
SUBTOTAL	$ 51,870.76	$ 18,704.03	$ 70,574.79
REIMB-INTERNAT'L TOTALS	$ 860,640.88	$ 2,659,208.63	$ 3,519,849.51
AIR FORCE			
*FY 1960	$ 5,603,061.78		$ 5,603,061.78
*FY 1961	1,115,874.28		1,115,874.28
FY 1962	10,273,856.95		10,273,856.95
FY 1963	6,932,001.20		6,932,001.20
FY 1964	977,381.00		977,381.00
FY 1965	2,745,320.44		2,745,320.44
FY 1966	2,025,848.58	$ -112.42	2,025,736.16
FY 1967	9,322,115.43	2,025,087.99	11,347,203.42
FY 1968	6,417,789.49	349,194.45	6,766,983.94
FY 1967-8-9-0 (VAFB)	679,281.00		679,281.00
FY 1969	484,533.71	-210,350.53	274,183.18
FY 1970	1,020,931.00		1,020,931.00
FY 1971	1,612,258.76	-1,420,279.02	191,979.74
FY 1972	471,876.00	-326,229.72	145,646.28
FY 1973	59,057.58	-32,638.14	26,419.44
FY 1974	1,700,001.31	1,676,178.40	3,376,179.71
FY 1975		741,579.96	741,579.96
SUBTOTAL	$ 51,441,188.51	$ 2,802,430.97	$ 54,243,619.48
NAVY			
FY 1961	$ 1,800,000.00		$ 1,800,000.00
FY 1962	7,900,000.00		7,900,000.00
FY 1965	3,348.00		3,348.00
FY 1971	2,600.00		2,600.00
FY 1975		$ 65,000.00	65,000.00
SUBTOTAL	$ 9,705,948.00	$ 65,000.00	$ 9,770,948.00
AEC			
FY 1963 (AL)	$ 26,563.60		$ 26,563.60
FY 1963	2,371,000.00		2,371,000.00
FY 1974		$ 220,000.00	220,000.00
SUBTOTAL	$ 2,397,563.60	$ 220,000.00	$ 2,617,563.60
REIMBURSABLE TOTALS	$ 63,544,700.11	$ 3,087,430.97	$ 66,632,131.08
TOTAL	$255,177,363.24	$ 15,942,228.44	$271,119,591.68

*609A Program.

TABLE LXXIV - SCOUT PROGRAM FY 1976 OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 1975 & PRIOR	FY 1976	TOTAL
DEVELOPMENT (890)			
FY 1959 (STG)	$ 3,810,488.00		$ 3,810,488.00
FY 1959	3,365,593.25		3,365,593.25
FY 1960	2,978,043.04		2,978,043.04
FY 1961	6,600,000.00		6,600,000.00
FY 1962	2,911,217.42		2,911,217.42
FY 1963	3,484,149.22		3,484,149.22
FY 1961 (STO)	300,000.00		300,000.00
FY 1962 (STO)	1,725,000.00		1,725,000.00
FY 1963 (STO)	402,000.00		402,000.00
SUBTOTAL	$25,576,490.93		$ 25,576,490.93
PRODUCTION (490)			
FY 1961	$ 1,200,000.00		$ 1,200,000.00
FY 1962	6,582,817.92		6,582,817.92
FY 1963	8,054,000.00		8,054,000.00
FY 1964	8,100,000.00		8,100,000.00
FY 1965	5,688,300.00		5,688,300.00
FY 1966	7,600,000.00		7,600,000.00
FY 1967	5,399,602.00		5,399,602.00
FY 1968	5,163,000.00		5,163,000.00
FY 1969	12,490,988.00		12,490,988.00
#FY 1970	13,034,634.00		13,034,634.00
FY 1971	12,540,065.00		12,540,065.00
FY 1972	14,344,000.00		14,344,000.00
FY 1973	15,571,000.00		15,571,000.00
FY 1974	7,203,663.74	$ 254,975.79	7,458,639.53
FY 1965-76 (STO)	3,801,700.00	119,000.00	3,920,700.00
FY 1975	7,130,900.12	4,238,879.88	11,369,780.00
FY 1976		7,007,680.97	7,007,680.97
SUBTOTAL	$133,904,670.78	$11,620,536.64	$145,525,207.42
SEAM (497)			
FY 1964	$ 3,400,000.00		$ 3,400,000.00
FY 1965	7,494,526.42		7,494,526.42
FY 1966	3,999,903.53		3,999,903.53
FY 1967	3,985,091.00		3,985,091.00
FY 1968	4,962,661.35	$0.65	4,962,662.00
FY 1968 (STO)	36,000.00		36,000.00
SUBTOTAL	$23,878,182.30	$0.65	$23,878,182.95

#Includes San Marco.

TABLE LXXIV Continued - SCOUT PROGRAM FY 1976 OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 1975 & PRIOR	FY 1976	TOTAL
SAN MARCO			
FY 1963	$1,865,915.72		$1,865,915.72
FY 1964	337,733.13		337,733.13
FY 1965	500,000.00		500,000.00
FY 1966	350,000.00		350,000.00
FY 1967	100,000.00		100,000.00
FY 1968	70,000.00		70,000.00
FY 1964 Trust Fund	200,000.00		200,000.00
FY 1965 Trust Fund	480,465.00		480,465.00
FY 1967 Trust Fund	29,672.84		29,672.84
FY 1969 Trust Fund	48,009.06		48,009.06
FY 1970 Trust Fund	250,000.00		250,000.00
FY 1973 Trust Fund	1,262,630.49	$ 13.95	1,262,644.44
FY 1975 Trust Fund	454,618.10	198,981.90	653,600.00
SUBTOTAL	$5,949,044.34	$198,995.85	$6,148,040.19
ESRO IB			
FY 1970	$1,867,274.74	$ 5,505.20	$1,872,779.94
FY 1971	350,000.00		350,000.00
FY 1975	124,451.46	76,702.47	201,153.93
SUBTOTAL	$2,341,726.20	$ 82,207.67	$2,423,933.87
ESRO IV			
FY 1970	$ 47,483.06	$ 32,508.00	$ 79,991.06
FY 1971	1,469,987.94	21.00	1,470,008.94
FY 1972	788,359.30		788,359.30
FY 1973	309,779.38	25,916.29	335,695.67
FY 1976		781,116.47	781,116.47
SUBTOTAL	$2,615,609.68	$839,561.76	$3,455,171.44
UK-X4			
FY 1972	$ 25,343.12	$ 20,739.52	$ 46,082.64
FY 1973	623,216.17	667,168.19	1,290,384.36
FY 1974	1,765,583.28	-105,816.76	1,659,766.52
FY 1975	187,697.86	342,943.32	530,641.18
FY 1976		9,347.21	9,347.21
SUBTOTAL	$2,601,840.43	$934,381.48	$3,536,221.91
DELTA MOTORS			
FY 1964	$ 430,000.00		$ 430,000.00
FY 1965	548,758.00		548,758.00
FY 1966	488,157.00		488,157.00
SUBTOTAL	$1,466,915.00		$1,466,915.00
CONSTRUCTION OF FACILITIES			
FY 1960 (STO)	$1,200,000.00		$1,200,000.00
FY 1962	1,433,131.43		1,433,131.43
SUBTOTAL	$2,633,131.43		$2,633,131.43
*NASA TOTAL	$200,950,611.09	$13,666,684.05	$214,617,295.14

*Does not include suballotments received nor SRT funds.

TABLE LXXIV Concluded - SCOUT PROGRAM FY 1976 OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 1975 & PRIOR	FY 1976	TOTAL
REIMBURSABLE - INTERNATIONAL			
AEROS-B (483)			
FY 1974	$2,484,642.93	$ 19,639.85	$2,504,282.78
FY 1975	964,631.79	-3,584.16	961,047.63
FY 1976		22,948.02	22,948.02
SUBTOTAL	$3,449,274.72	$ 39,003.71	$3,488,278.43
UK-5 (483)			
FY 1974	$ 51,938.77	$ 6,416.23	$ 58,355.00
FY 1975	18,636.02	46,363.98	65,000.00
FY 1974 (STO)		737,956.00	737,956.00
SUBTOTAL	$ 70,574.79	$790,736.21	$ 861,311.00
UK-6 (483)			
FY 1975		$ 19.55	$ 19.55
FY 1976		1,266.53	1,266.53
SUBTOTAL		$ 1,286.08	$ 1,286.08
REIMB-INTERNAT'L TOTALS	$3,519,849.51	$831,026.00	$4,350,875.51
AIR FORCE			
*FY 1960	$ 5,603,061.78		$ 5,603,061.78
*FY 1961	1,115,874.28		1,115,874.28
FY 1962	10,273,856.95		10,273,856.95
FY 1963	6,932,001.20		6,932,001.20
FY 1964	977,381.00		977,381.00
FY 1965	2,745,320.44		2,745,320.44
FY 1966	2,025,736.16	$ 111.42	2,025,847.58
FY 1967	11,347,203.42	-2,511,946.99	8,835,256.43
FY 1968	6,766,983.94	696,092.06	7,463,076.00
FY 1967-8-9-0 (VAFB)	679,281.00		679,281.00
FY 1969	274,183.18	210,350.53	484,533.71
FY 1970	1,020,931.00		1,020,931.00
FY 1971	191,979.74	84,970.00	276,949.74
FY 1972	145,646.28	66,316.35	211,962.63
FY 1973	26,419.44	-442.48	25,976.96
FY 1974	3,376,179.71	242,768.75	3,618,948.46
FY 1975	741,579.96		741,579.96
FY 1976		40,746.94	40,746.94
SUBTOTAL	$54,243,619.48	$-1,171,033.42	$53,072,586.06
NAVY			
FY 1961	$1,800,000.00		$1,800,000.00
FY 1962	7,900,000.00		7,900,000.00
FY 1965	3,348.00		3,348.00
FY 1971	2,600.00		2,600.00
FY 1975	65,000.00		65,000.00
SUBTOTAL	$9,770,948.00		$9,770,948.00
AEC			
FY 1963 (AL)	$ 26,563.60		$ 26,563.60
FY 1963	2,371,000.00		2,371,000.00
FY 1974	220,000.00		220,000.00
SUBTOTAL	$2,617,563.60		$2,617,563.60
REIMBURSABLE TOTALS	$66,632,131.08	$-1,171,033.42	$65,461,097.66
TOTAL	$271,119,591.68	$13,335,676.63	$284,455,268.31

*609A Program.

TABLE LXXV - SCOUT PROGRAM FY 197T OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 1976 & PRIOR	FY 197T	TOTAL
DEVELOPMENT (890)			
FY 1959 (STG)	$ 3,810,488.00		$ 3,810,488.00
FY 1959	3,365,593.25		3,365,593.25
FY 1960	2,978,043.04		2,978,043.04
FY 1961	6,600,000.00		6,600,000.00
FY 1962	2,911,217.42		2,911,217.42
FY 1963	3,484,149.22		3,484,149.22
FY 1961 (STO)	300,000.00		300,000.00
FY 1962 (STO)	1,725,000.00		1,725,000.00
FY 1963 (STO)	402,000.00		402,000.00
SUBTOTAL	$25,576,490.93		$25,576,490.93
PRODUCTION (490)			
FY 1961	$ 1,200,000.00		$ 1,200,000.00
FY 1962	6,582,817.92		6,582,817.92
FY 1963	8,054,000.00		8,054,000.00
FY 1964	8,100,000.00		8,100,000.00
FY 1965	5,688,300.00		5,688,300.00
FY 1966	7,600,000.00		7,600,000.00
FY 1967	5,399.602.00		5,399,602.00
FY 1968	5,163,000.00		5,163,000.00
FY 1969	12,490,988.00		12,490,988.00
#FY 1970	13,034,634.00		13,034,634.00
FY 1971	12,540,065.00		12,540,065.00
FY 1972	14,344,000.00		14,344,000.00
FY 1973	15,571,000.00		15,571,000.00
FY 1974	7,458,639.53		7,458,639.53
FY 1965-7T (STO)	3,920,700.00	$ 3,000.00	3,923,700.00
FY 1975	11,369,780.00	14,770.00	11,384,550.00
FY 1976	7,007,680.97	1,629,241.06	8,636,922.03
FY 197T		431,726.62	431,726.62
SUBTOTAL	$145,525,207.42	$ 2,078,737.68	$147,603.945.10
SEAM(497)			
FY 1964	$ 3,400,000.00		$ 3,400,000.00
FY 1965	7,494,526.42		7,494,526.42
FY 1966	3,999,903.53		3,999,903.53
FY 1967	3,985,091.00		3,985,091.00
FY 1968	4,962,662.00		4,962,662.00
FY 1968 (STO)	36,000.00		36,000.00
SUBTOTAL	$23,878,182.95		$23,878,182.95

#Includes San Marco.

TABLE LXXV Continued - SCOUT PROGRAM FY 197T OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 1976 & PRIOR	FY 197T	TOTAL
SAN MARCO			
FY 1963	$ 1,865,915.72		$ 1,865,915.72
FY 1964	337,733.13		337,733.13
FY 1965	500,000.00		500,000.00
FY 1966	350,000.00		350,000.00
FY 1967	100,000.00		100,000.00
FY 1968	70,000.00		70,000.00
FY 1964 Trust Fund	200,000.00		200,000.00
FY 1965 Trust Fund	480,465.00		480,465.00
FY 1967 Trust Fund	29,672.84		29,672.84
FY 1969 Trust Fund	48,009.06		48,009.06
FY 1970 Trust Fund	250,000.00		250,000.00
FY 1973 Trust Fund	1,262,644.44		1,262,644.44
FY 1975 Trust Fund	653,600.00		653,600.00
SUBTOTAL	$ 6,148,040.19		$ 6,148,040.19
ESRO IB			
FY 1970	$ 1,872,779.94	$ 12,310.10	$ 1,885,090.04
FY 1971	350,000.00		350,000.00
FY 1975	201,153.93	29,991.06	231,144.99
SUBTOTAL	$ 2,423,933.87	$ 42,301.16	$ 2,466,235.03
ESRO IV			
FY 1970	$ 79,991.06	$ -26,129.39	$ 53,861.67
FY 1971	1,470,008.94	29,991.06	1,500,000.00
FY 1972	788,359.30		788,359.30
FY 1973	335,695.67	-3,946.21	331,749.46
FY 1976	781,116.47	44,535.00	825,651.47
SUBTOTAL	$ 3,455,171.44	$ 44,450.46	$ 3,499,621.90
UK-X4			
FY 1972	$ 46,082.64	$ -235.20	$ 45,847.44
FY 1973	1,290,384.36	50,125.44	1,340,509.80
FY 1974	1,659,766.52		1,659,766.52
FY 1975	530,641.18		530,641.18
FY 1976	9,347.21	-8,738.26	608.95
SUBTOTAL	$ 3,536,221.91	$ 41,151.98	$ 3,577,373.89
DELTA MOTORS			
FY 1964	$ 430,000.00		$ 430,000.00
FY 1965	548,758.00		548,758.00
FY 1966	488,157.00		488,157.00
SUBTOTAL	$ 1,466,915.00		$ 1,466,915.00
CONSTRUCTION OF FACILITIES			
FY 1960 (STO)	$ 1,200,000.00		$ 1,200,000.00
FY 1962	1,433,131.43		1,433,131.43
SUBTOTAL	$ 2,633,131.43		$ 2,633,131.43
*NASA TOTAL	$214,617,295.14	$2,206,641.28	$216,823,936.42

*Does not include suballotments received nor SRT funds.

TABLE LXXV Continued - SCOUT PROGRAM FY 197T OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 1976 & PRIOR	FY 197T	TOTAL
REIMBURSABLE - INTERNATIONAL			
AEROS-B (483)			
FY 1974	$ 2,504,282.78	$ -73,952.65	$ 2,430,320.13
FY 1975	961,047.63	24,721.57	985,769.20
FY 1976	22,948.02	1,831.15	24,779.17
SUBTOTAL	$ 3,488,278.43	$ -47,409.93	$ 3,440,868.50
UK-5 (483)			
FY 1974	$ 58,355.00		$ 58,355.00
FY 1975	65,000.00		65,000.00
FY 1976		$ 11,307.15	11,307.15
FY 1974 (STO)	737,956.00		737,956.00
SUBTOTAL	$ 861,311.00	$ 11,307.15	$ 872,618.15
UK-6 (483)			
FY 1975	$ 19.55	$	$ 19.55
FY 1976	1,266.53	16.54	1,283.07
FY 197T		1,305.00	1,305.00
SUBTOTAL	$ 1,286.08	$ 1,321.54	$ 2,607.62
REIMB-INTERNAT'L TOTAL	$ 4,350,875.51	$ -34,781.24	$ 4,316,094.27
AIR FORCE			
*FY 1960	$ 5,603,061.78	$	$ 5,603,061.78
*FY 1961	1,115,874.28		1,115,874.28
FY 1962	10,273,856.95		10,273,856.95
FY 1963	6,932,001.20		6,932,001.20
FY 1964	977,381.00		977,381.00
FY 1965	2,745,320.44		2,745,320.44
FY 1966	2,025,847.58		2,025,847.58
FY 1967	8,835,256.43	426,594.91	9,261,851.34
FY 1968	7,463,076.00	-10,697.75	7,452,378.25
FY 1967-8-9-0 (VAFB)	679,281.00		679,281.00
FY 1969	484,533.71		484,533.71
FY 1970	1,020,931.00		1,020,931.00
FY 1971	276,949.74	31,451.00	308,400.74
FY 1972	211,962.63		211,962.63
FY 1973	25,976.96	-8,354.98	17,621.98
FY 1974	3,618,948.46	-717,620.79	2,901,327.67
FY 1975	741,579.96	494,387.33	1,235,967.29
FY 1976	40,746.94	386,765.12	427,512.06
FY 197T		12,003.52	12,003.52
SUBTOTAL	$ 53,072,586.06	$ 614,528.36	$53,687,114.42
NAVY			
FY 1961	$ 1,800,000.00	$	$ 1,800,000.00
FY 1962	7,900,000.00		7,900,000.00
FY 1965	3,348.00		3,348.00
FY 1971	2,600.00		2,600.00
FY 1975	65,000.00		65,000.00
SUBTOTAL	$ 9,770,948.00		$ 9,770,948.00

*609A Program.

TABLE LXXV Concluded - SCOUT PROGRAM FY 197T OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 1976 & Prior	FY 197T	TOTAL
REIMBURSABLE - DOD			
AEC			
FY 1963 (AL)	$ 26,563.60		$ 26,563.60
FY 1963	2,371,000.00		2,371,000.00
FY 1974	220,000.00		200,000.00
SUBTOTAL	$ 2,617,563.60		$ 2,617,563.60
REIMBURSABLE TOTALS	$ 65,461,097.66	$ 614,528.36	$ 66,075,626.02
TOTAL	$284,455,268.31	$2,786,388.40	$287,241,656.71

TABLE LXXVI - SCOUT PROGRAM FY 1977 OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 197T & PRIOR	FY 1977	TOTAL
DEVELOPMENT (890)			
FY 1959 (STG)	$ 3,810,488.00		$ 3,810,488.00
FY 1959	3,365,593.25		3,365,593.25
FY 1960	2,978,043.04		2,978,043.04
FY 1961	6,600,000.00		6,600,000.00
FY 1962	2,911,217.42		2,911,217.42
FY 1963	3,484,149.22		3,484,149.22
FY 1961 (STO)	300,000.00		300,000.00
FY 1962 (STO)	1,725,000.00		1,725,000.00
FY 1963 (STO)	402,000.00		402,000.00
SUBTOTAL	$25,576,490.93		$25,576,490.93
PRODUCTION (490)			
FY 1961	$ 1,200,000.00		$ 1,200,000.00
FY 1962	6,582,817.92		6,582,817.92
FY 1963	8,054,000.00		8,054,000.00
FY 1964	8,100,000.00		8,100,000.00
FY 1965	5,688,300.00		5,688,300.00
FY 1966	7,600,000.00		7,600,000.00
FY 1967	5,399,602.00		5,399,602.00
FY 1968	5,163,000.00		5,163,000.00
FY 1969	12,490,988.00		12,490,988.00
#FY 1970	13,034,634.00		13,034,634.00
FY 1971	12,540,065.00		12,540,065.00
FY 1972	14,344,000.00		14,344,000.00
FY 1973	15,571,000.00		15,571,000.00
FY 1974	7,458,639.53	$ -15,006.30	7,443,633.23
FY 1965-77 (STO)	3,923,700.00	359,000.00	4,282,700.00
FY 1975	11,384,550.00	0	11,384,550.00
FY 1976	8,636,922.03	1,819,077.97	10,456,000.00
FY 197T	431,726.62	2,965,273.38	3,397,000.00
FY 1977	0	6,911,182.38	6,911,182.80
SUBTOTAL	$147,603,945.10	$12,039,527.85	$159,643,472.95
SEAM (497)			
FY 1964	$ 3,400,000.00		$ 3,400,000.00
FY 1965	7,494,526.42		7,494,526.42
FY 1966	3,999,903.53		3,999,903.53
FY 1967	3,985,091.00		3,985,091.00
FY 1968	4,962,662.00	$ -130.80	4,962,531.20
FY 1968 (STO)	36,000.00	0	36,000.00
SUBTOTAL	$23,878,182.95	$ -130.80	$23,878,052.15

#Includes San Marco.

TABLE LXXVI Continued - SCOUT PROGRAM FY 1977 OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 197T & PRIOR	FY 1977	TOTAL
SAN MARCO			
FY 1963	$1,865,915.72		$1,865,915.72
FY 1964	337,733.13		337,733.13
FY 1965	500,000.00		500,000.00
FY 1966	350,000.00		350,000.00
FY 1967	100,000.00		100,000.00
FY 1968	70,000.00		70,000.00
FY 1964 Trust Fund	200,000.00		200,000.00
FY 1965 Trust Fund	480,465.00		480,465.00
FY 1967 Trust Fund	29,672.84		29,672.84
FY 1969 Trust Fund	48,009.06		48,009.06
FY 1970 Trust Fund	250,000.00		250,000.00
FY 1973 Trust Fund	1,262,644.44	$ 2.80	1,262,647.24
FY 1975 Trust Fund	653,600.00	0	653,600.00
SUBTOTAL	$6,148,040.19	$ 2.80	$6,148,042.99
ESRO IB			
FY 1970	$1,885,090.04	$ 17,680.96	$1,902,771.00
FY 1971	350,000.00	0	350,000.00
FY 1975	231,144.99	-20,488.99	210,656.00
SUBTOTAL	$2,466,235.03	$ -2,808.03	$2,463,427.00
ESRO IV			
FY 1970	$ 53,861.67	$ -3,861.67	$ 50,000.00
FY 1971	1,500,000.00	0	1,500,000.00
FY 1972	788,359.30	11,640.70	800,000.00
FY 1973	331,749.46	84.54	331,834.00
FY 1976	825,651.47	85,515.53	911,167.00
SUBTOTAL	$3,499,621.90	$ 93,379.10	$3,593,001.00
UK-X4			
FY 1972	$ 45,847.44	$ 4,152.56	$ 50,000.00
FY 1973	1,340,509.80	4,863.20	1,345,373.00
FY 1974	1,659,766.52	36,019.27	1,695,785.79
FY 1975	530,641.18	148,977.48	679,618.66
FY 1975 DIRECT		76,988.00	76,988.00
FY 1976	608.95	-637.78	-28.83
SUBTOTAL	$3,577,373.89	$ 270,362.73	$3,847,736.62
DELTA MOTORS			
FY 1964	$ 430,000.00		$ 430,000.00
FY 1965	548,758.00		548,758.00
FY 1966	488,157.00		488,157.00
SUBTOTAL	$1,466,915.00		$1,466,915.00
CONSTRUCTION OF FACILITIES			
FY 1960 (STO)	$ 1,200,000.00		$ 1,200,000.00
FY 1962	1,433,131.43		1,433,131.43
SUBTOTAL	$ 2,633,131.43		$ 2,633,131.43
*NASA TOTAL	$216,823,936.42	$12,073,345.65	$228,897,282.07

*Does not include suballotments received nor SRT funds.

TABLE LXXVI Continued - SCOUT PROGRAM FY 1977 OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 197T & PRIOR	FY 1977	TOTAL
REIMBURSABLE - INTERNATIONAL			
AEROS-B (483)			
FY 1974	$2,430,320.13	$ 209,679.87	$2,640,000.00
FY 1975	985,769.20	113,010.09	1,098,779.29
FY 1976	24,779.17	-162.00	24,617.17
FY 1977	0	20,500.29	20,500.29
SUBTOTAL	$3,440,868.50	$ 343,028.25	$3,783,896.75
UK-5 (483)			
FY 1974	$ 58,355.00	$ -30.00	$ 58,325.00
FY 1975	65,000.00	0	65,000.00
FY 1976	11,307.15	0	11,307.15
FY 1974 (STO)	737,956.00	0	737,956.00
SUBTOTAL	$ 872,618.15	$ -30.00	$ 872,588.15
UK-6 (483)			
FY 1975	$ 19.55	$ 30,610.84	$ 30,630.39
FY 1976	1,283.07	4.98	1,288.05
FY 197T	1,305.00	-6.43	1,298.57
FY 1977	0	3,875.60	3,875.60
SUBTOTAL	$ 2,607.62	$ 34,484.99	$ 37,092.61
REIMB-INTERNAT'L TOTAL	$4,316,094.27	$ 377,483.24	$4,693,577.51
AIR FORCE			
*FY 1960	$ 5,603,061.78		$ 5,603,061.78
*FY 1961	1,115,874.28		1,115,874.28
FY 1962	10,273,856.95		10,273,856.95
FY 1963	6,932,001.20		6,932,001.20
FY 1964	977,381.00		977,381.00
FY 1965	2,745,320.44		2,745,320.44
FY 1966	2,025,847.58		2,025,847.58
FY 1967	9,261,851.34	$2,729,148.66	11,991,000.00
FY 1968	7,452,378.25	10,697.75	7,463,076.00
FY 1967-8-9-0 (VAFB)	679,281.00	0	679,281.00
FY 1969	484,533.71	0	484,533.71
FY 1970	1,020,931.00	0	1,020,931.00
FY 1971	308,400.74	0	308,400.74
FY 1972	211,962.63	390,545.37	602,508.00
FY 1973	17,621.98	46,529.02	64,151.00
FY 1974	2,901,327.67	-244,026.15	2,657,301.52
FY 1975	1,235,967.29	54,032.71	1,290,000.00
FY 1976	427,512.06	1,227,981.43	1,655,493.49
FY 197T	12,003.52	-468.91	11,534.61
FY 1977	0	3,747.17	3,747.17
SUBTOTAL	$53,687,114.42	$4,218,187.05	$57,905,301.47
NAVY			
FY 1961	$1,800,000.00		$1,800,000.00
FY 1962	7,900,000.00		7,900,000.00
FY 1965	3,348.00		3,348.00
FY 1971	2,600.00		2,600.00
FY 1975	65,000.00		65,000.00
SUBTOTAL	$9,770,948.00		$9,770,948.00

TABLE LXXVI Concluded - SCOUT PROGRAM FY 1977 OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 197T & Prior	FY 1977	TOTAL
REIMBURSABLE - DOD			
AEC			
FY 1963 (AL)	$ 26,563.60		$ 26,563.60
FY 1963	2,371,000.00		2,371,000.00
FY 1974	220,000.00		200,000.00
SUBTOTAL	$ 2,617,563.60		$ 2,617,563.60
REIMBURSABLE TOTALS	$ 66,075,626.02	$ 4,218,187.05	$ 67,293,813.07
TOTAL	$287,241,656.71	$16,996,003.94	$304,237,660.65

TABLE LXXVII - SCOUT PROGRAM FY 1978 OBLIGATIONS.

DEVELOPMENT (890)	FY 1977 & PRIOR	FY 1978	TOTAL
FY 1959 (STG)	$ 3,810,488.00		$ 3,810,488.00
FY 1959	3,365,593.25		3,365,593.25
FY 1960	2,978,043.04		2,978,043.04
FY 1961	6,600,000.00		6,600,000.00
FY 1962	2,911,217.42		2,911,217.42
FY 1963	3,484,149.22		3,484,149.22
FY 1961 (STO)	300,000.00		300,000.00
FY 1962 (STO)	1,725,000.00		1,725,000.00
FY 1963 (STO)	402,000.00		402,000.00
SUBTOTAL	$25,576,490.93		$25,576,490.93
PRODUCTION (490)			
FY 1961	$ 1,200,000.00		$ 1,200,000.00
FY 1962	6,582,817.92		6,582,817.92
FY 1963	8,054,000.00		8,054,000.00
FY 1964	8,100,000.00		8,100,000.00
FY 1965	5,688,300.00		5,688,300.00
FY 1966	7,600,000.00		7,600,000.00
FY 1967	5,399,602.00		5,399,602.00
FY 1968	5,163,000.00		5,163,000.00
FY 1969	12,490,988.00		12,490,988.00
#FY 1970	13,034,634.00		13,034,634.00
#FY 1971	12,540,065.00		12,540,065.00
#FY 1972	14,344,000.00		14,344,000.00
FY 1973	15,571,000.00		15,571,000.00
#FY 1974	7,443,633.23	$ 0.30	7,443,633.53
FY 1965-78 (STO)	4,282,700.00	200,000.00	4,482,700.00
#FY 1975	11,384,550.00	-68.00	11,384,482.00
FY 1976	10,456,000.00		10,456,000.00
FY 197T	3,397,000.00		3,397,000.00
FY 1977	6,911,182.80	429,817.20	7,341,000.00
FY 1978		15,457,763.19	15,457,763.19
SUBTOTAL	$159,643,472.95	$16,087,512.69	$175,730,985.64
SEAM (497)			
FY 1964	$ 3,400,000.00		$ 3,400,000.00
FY 1965	7,494,526.42		7,494,526.42
FY 1966	3,999,903.53		3,999,903.53
FY 1967	3,985,091.00	$ -2,898.00	3,982,193.00
FY 1968	4,962,531.20		4,962,531.20
FY 1968 (STO)	36,000.00		36,000.00
SUBTOTAL	$23,878,052.15	$ -2,898.00	$23,875,154.15

#Includes San Marco.

TABLE LXXVII Continued - SCOUT PROGRAM FY 1978 OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 1977 & PRIOR	FY 1978	TOTAL
SAN MARCO			
FY 1963	$1,865,915.72		$ 1,865,915.72
FY 1964	337,733.13		337,733.13
FY 1965	500,000.00		500,000.00
FY 1966	350,000.00		350,000.00
FY 1967	100,000.00		100,000.00
FY 1968	70,000.00		70,000.00
FY 1964 Trust Fund	200,000.00		200,000.00
FY 1965 Trust Fund	480,465.00		480,465.00
FY 1967 Trust Fund	29,672.84		29,672.84
FY 1969 Trust Fund	48,009.06		48,009.06
FY 1970 Trust Fund	250,000.00		250,000.00
FY 1973 Trust Fund	1,262,647.24		1,262,647.24
FY 1975 Trust Fund	653,600.00		653,600.00
SUBTOTAL	$6,148,042.99		$6,148,042.99
ESRO IB			
FY 1970	$1,902,771.00		$ 1,902,771.00
FY 1971	350,000.00		350,000.00
FY 1975	210,656.00		210,656.00
SUBTOTAL	$2,463,427.00		$ 2,463,427.00
ESRO IV			
FY 1970	$ 50,000.00		$ 50,000.00
FY 1971	1,500,000.00	$ -26,691.72	1,473,308.28
FY 1972	800,000.00		800,000.00
FY 1973	331,834.00		331,834.00
FY 1976	911,167.00		911,167.00
SUBTOTAL	$3,593,001.00	$ -26,691.72	$3,566,309.28
UK-X4			
FY 1972	$ 50,000.00		$ 50,000.00
FY 1973	1,345,373.00	$ -23.02	1,345,349.98
FY 1974	1,695,785.79	-36.93	1,695,748.86
FY 1975	679,618.66	-77.32	679,541.34
FY 1976	-28.83	28.83	0
FY 1975 (STO)	76,988.00		76,988.00
SUBTOTAL	$3,847,736.62	$ -108.44	$3,847,628.18

TABLE LXXVII Continued - SCOUT PROGRAM FY 1978 OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 1977 & PRIOR	FY 1978	TOTAL
DELTA MOTORS			
FY 1964	$ 430,000.00		$ 430,000.00
FY 1965	548,758.00		548,758.00
FY 1966	488,157.00		488,157.00
SUBTOTAL	$1,466,915.00		$1,466,915.00
CONSTRUCTION OF FACILITIES			
FY 1960 (STO)	$1,200,000.00		$1,200,000.00
FY 1962	1,433,131.43		1,433,131.43
FY 1977	0	$ 83,202.00	83,202.00
SUBTOTAL	$2,633,131.43	$ 83,202.00	$2,716,333.43
*NASA TOTAL	$228,974,270.07	$16,041,016.53	$245,015,286.60
REIMBURSABLE - INTERNATIONAL			
AEROS-B (483)			
FY 1974	$2,640,000.00		$2,640,000.00
FY 1975	1,098,779.29	$ -92,049.52	1,006,729.77
FY 1976	24,617.17	0	24,617.17
FY 1977	20,500.29	-81.65	20,418.64
FY 1978	0	609.88	609.88
FY 1975 (STO)	45,275.00	287,965.04	333,240.04
SUBTOTAL	$3,829,171.75	$ 196,443.75	$4,025,615.50
ITALY			
FY 1977	$ 183,363.00		$ 183,363.00
FY 1978	0	$ 269,484.15	269,484.15
FY 1977-78 (STO)	0	210,000.00	210,000.00
SUBTOTAL	$ 183,363.00	$ 479,484.15	$ 662,847.15
UK-5 (483)			
FY 1974	$ 58,325.00		$ 58,325.00
FY 1975	65,000.00		65,000.00
FY 1976	11,307.15		11,307.15
FY 1974-76 (STO)	737,956.00		737,956.00
SUBTOTAL	$ 872,588.15		$ 872,588.15

*Does Not include suballotments received nor SRT funds.

TABLE LXXVII Continued - SCOUT PROGRAM FY 1978 OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 1977 & PRIOR	FY 1978	TOTAL
REIMBURSABLE - INTERNATIONAL, Continued			
UK-6 (483)			
FY 1975	$ 30,630.39	$ 67,369.61	$ 98,000.00
FY 1976	1,288.05	1,071,889.05	1,073,177.10
FY 197T	1,298.57	-1,298.57	0
FY 1977	3,875.60	137,443.86	141,319.46
FY 1978	0	45,050.81	45,050.81
SUBTOTAL	$ 37,092.61	$1,320,454.76	$1,357,547.37
REIMB-INTERNAT'L TOTAL	$4,922,215.51	$1,996,382.66	$6,918,598.17
AIR FORCE			
*FY 1960	$ 5,603,061.78		$ 5,603,061.78
*FY 1961	1,115,874.28		1,115,874.28
FY 1962	10,273,856.95		10,273,856.95
FY 1963	6,932,001.20		6,932,001.20
FY 1964	977,381.00		977,381.00
FY 1965	2,745,320.44		2,745,320.44
FY 1966	2,025,847.58		2,025,847.58
FY 1967	11,991,000.00	$ -798,641.86	11,192,358.14
FY 1968	7,463,076.00	-582,013.89	6,881,062.11
FY 1967-8-9-0 (VAFB)	679,281.00		679,281.00
FY 1969	484,533.71		484,533.71
FY 1970	1,020,931.00		1,020,931.00
FY 1971	308,400.74	1,074,896.97	1,383,297.71
FY 1972	602,508.00	-0.23	602,507.77
FY 1973	64,151.00	-81.98	64,069.02
FY 1974	2,657,301.52	4,860,527.57	7,517,829.09
FY 1975	1,290,000.00	-603,701.07	686,298.93
FY 1976	1,655,493.49	3,997,962.74	5,653,456.23
FY 197T	11,534.61		11,534.61
FY 1977	3,747.17	1,803,809.63	1,807,556.80
FY 1978		196,736.48	196,736.48
SUBTOTAL	$57,905,301.47	$9,949,494.36	$67,854,795.83

*609A Program.

TABLE LXXVII Concluded - SCOUT PROGRAM FY 1978 OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 1977 & PRIOR	FY 1978	TOTAL
NAVY			
FY 1961	$1,800,000.00		$1,800,000.00
FY 1962	7,900,000.00		7,900,000.00
FY 1965	3,348.00		3,348.00
FY 1971	2,600.00		2,600.00
FY 1975	65,000.00		65,000.00
FY 1977		$ 94,000.00	94,000.00
SUBTOTAL	$9,770,948.00	$ 94,000.00	$9,864,948.00
REIMBURSABLE - DOD			
AEC			
FY 1963 (AL)	$ 26,563.60		$ 26,563.60
FY 1963	2,371,000.00		2,371,000.00
FY 1974	220,000.00		220,000.00
SUBTOTAL	$2,617,563.60		$2,617,563.60
REIMBURSABLE TOTALS	$70,293,813.07	$10,043,494.36	$80,337,304.43
TOTAL	$304,237,660.65	$28,180,893.55	$332,647,192.20

TABLE LXXVIII - SCOUT PROGRAM FY 1979 OBLIGATIONS.
October 1, 1979

FISCAL YEAR FUNDS	FY 1978 & PRIOR	FY 1979	TOTAL
DEVELOPMENTS (890)			
FY 1959 (STG)	$ 3,810,488.00		$ 3,810,488.00
FY 1959	3,365,593.25		3,365,593.25
FY 1960	2,978,043.04		2,978,043.04
FY 1961	6,600,000.00		6,600,000.00
FY 1962	2,911,217.42		2,911,217.42
FY 1963	3,484,149.22		3,484,149.22
FY 1961 (STO)	300,000.00		300,000.00
FY 1962 (STO)	1,725,000.00		1,725,000.00
FY 1963 (STO)	402,000.00		402,000.00
SUBTOTAL	$25,576,490.93		$25,576,490.93
PRODUCTION (490)			
FY 1961	$ 1,200,000.00		$ 1,200,000.00
FY 1962	6,582,817.92		6,582,817.92
FY 1963	8,054,000.00		8,054,000.00
FY 1964	8,100,000.00		8,100,000.00
FY 1965	5,688,300.00		5,688,300.00
FY 1966	7,600,000.00		7,600,000.00
FY 1967	5,399,602.00		5,399,602.00
FY 1968	5,163,000.00		5,163,000.00
FY 1969	12,490,988.00		12,490,988.00
#FY 1970	13,034,634.00	-942.90	13,033,691.10
#FY 1971	12,540,065.00		12,540,065.00
#FY 1972	14,344,000.00		14,344,000.00
FY 1973	15,571,000.00	-229.52	15,570,770.00
#FY 1974	7,443,633.53	-268.30	7,443,365.23
FY 1965-79 (STO)	4,482,700.00	160,000.00	4,642,700.00
#FY 1975	11,384,482.00		11,384,482.00
FY 1976	10,456,000.00		10,456,000.00
FY 197T	3,397,000.00		3,397,000.00
FY 1977	7,341,000.00		7,341,000.00
FY 1978	15,457,763.19	642,236.81	16,100,000.00
FY 1979		10,207,267.61	10,207,267.61
SUBTOTAL	$175,730,985.64	$10,908,063.70	$186,639,049.34
SEAM (497)			
FY 1964	$ 3,400,000.00		$ 3,400,000.00
FY 1965	7,494,526.42		7,494,526.42
FY 1966	3,999,903.53		3,999,903.53
FY 1967	3,982,193.00		3,982,193.00
FY 1968	4,962,531.20		4,962,531.20
FY 1968 (STO)	36,000.00		36,000.00
SUBTOTAL	$23,875,154.15		$23,875,154.15

#Includes San Marco.

TABLE LXXVIII Continued - SCOUT PROGRAM FY 1979 OBLIGATIONS
October 1, 1979

FISCAL YEAR FUNDS	FY 1978 & PRIOR	FY 1979	TOTAL
SAN MARCO			
FY 1963	$1,865,915.72		$1,865,915.72
FY 1964	337,733.13		337,733.13
FY 1965	500,000.00		500,000.00
FY 1966	350,000.00		350,000.00
FY 1967	100,000.00		100,000.00
FY 1968	70,000.00		70,000.00
FY 1964 Trust Fund	200,000.00		200,000.00
FY 1965 Trust Fund	480,465.00		480,465.00
FY 1967 Trust Fund	29,672.84		29,672.84
FY 1969 Trust Fund	48,009.06		48,009.06
FY 1970 Trust Fund	250,000.00		250,000.00
FY 1973 Trust Fund	1,262,647.24		1,262,647.24
FY 1975 Trust Fund	653,600.00		653,600.00
SUBTOTAL	$6,148,042.99		$6,148,042.99
ESRO IB			
FY 1970	$1,902,771.00		$1,902,771.00
FY 1971	350,000.00		350,000.00
FY 1975	210,656.00		210,656.00
SUBTOTAL	$2,463,427.00		$2,463,427.00
ESRO IV			
FY 1970	$ 50,000.00		$ 50,000.00
FY 1971	1,473,308.28	26,691.72	1,500,000.00
FY 1972	800,000.00		800,000.00
FY 1973	331,834.00		331,834.00
FY 1976	911,167.00		911,167.00
SUBTOTAL	$3,566,309.28	$26,691.72	$3,593,001.00
UK-X4			
FY 1972	$ 50,000.00		$ 50,000.00
FY 1973	1,345,349.98	$ 23.02	1,345,373.00
FY 1974	1,695,748.86	37.14	1,695,786.00
FY 1975	679,541.34	1,055.66	680,597.00
FY 1975 (STO)	76,988.00		76,977.00
SUBTOTAL	$3,847,628.18	$ 1,115.82	$3,848,744.00

TABLE LXXVIII Continued - SCOUT PROGRAM FY 1979 OBLIGATIONS
October 1, 1979

FISCAL YEAR FUNDS	FY 1978 & PRIOR	FY 1979	TOTAL
DELTA MOTORS			
FY 1964	$ 430,000.00		$ 430,000.00
FY 1965	548,758.00		548,758.00
FY 1966	488,157.00		488,157.00
SUBTOTAL	$ 1,466,915.00		$ 1,466,915.00
CONSTRUCTION OF FACILITIES			
FY 1960 (STO)	$ 1,200,000.00		$ 1,200,000.00
FY 1962	1,433,131.43		1,433,131.43
FY 1978	83,202.00		83,202.00
SUBTOTAL	$ 2,716,333.43		$ 2,716,333.43
*NASA TOTAL	$245,015,286.60	$10,935,871.24	$255,951,157.84
REIMBURSABLE - INTERNATIONAL			
AEROS-B (483)			
FY 1974	$2,640,000.00		$2,640,000.00
FY 1975	1,006,729.77	$ 5,265.23	1,011,995.00
FY 1976	24,617.17		24,617.17
FY 1977	20,418.64		20,418.64
FY 1978	609.88	227.79	837.67
FY 1975 (STO)	333,240.04		333,240.04
SUBTOTAL	$4,025,615.50	$ 5,493.02	$4,031,108.52
ITALY			
FY 1977	$ 183,363.00		$ 183,363.00
FY 1978	269,484.15	$ 206,662.00	476,146.15
FY 1977-78 (STO)	210,000.00		210,000.00
SUBTOTAL	$ 662,847.15	$ 206,662.00	$ 869,509.15
UK-5 (483)			
FY 1974	$ 58,325.00		$ 58,325.00
FY 1975	65,000.00		65,000.00
FY 1976	11,307.15		11,307.15
FY 1974-76 (STO)	737,956.00		737,956.00
SUBTOTAL	$ 872,588.15		$ 872,588.15

*Does not include suballotments received nor SRT funds.

TABLE LXXVIII Continued - SCOUT PROGRAM FY 1979 OBLIGATIONS
October 1, 1979

FISCAL YEAR FUNDS	FY 1978 & PRIOR	FY 1979	TOTAL
REIMBURSABLE - INTERNATIONAL, Continued			
UK-6 (483)			
FY 1975	$ 98,000.00		$ 98,000.00
FY 1976	1,073,177.10	$1,219,376.21	2,292,553.31
FY 1977	141,319.46	-40.00	141,279.46
FY 1978	45,050.81	1,673,360.00	1,718,410.81
FY 1979		114,266.32	114,266.32
SUBTOTAL	$1,357,547.27	$3,006,962.53	$4,364,509.90
REIMB-INTERNAT'L TOTAL	$6,918,598.17	$3,219,117.55	$10,137,715.72
AIR FORCE			
*FY 1960	$ 5,603,061.78		$ 5,603,061.78
*FY 1961	1,115,874.28		1,115,874.28
FY 1962	10,273,856.95		10,273,856.95
FY 1963	6,932,001.20		6,932,001.20
FY 1964	977,381.00		977,381.00
FY 1965	2,745,320.44		2,745,320.44
FY 1966	2,025,847.58		2,025,847.58
FY 1967	11,192,358.14	796,520.07	11,988,878.21
FY 1968	6,881,062.11	575,265.03	7,456,327.14
FY 1967-8-9-0 (VAFB)	679,281.00		679,281.00
FY 1969	484,533.71		484,533.71
FY 1970	1,020,931.00		1,020,931.00
FY 1971	1,383,297.71	230,057.57	1,613,355.28
FY 1972	602,507.77	-22,654.92	579,852.85
FY 1973	64,069.02	81.98	64,151.00
FY 1974	7,517,829.09	-113,991.17	7,403,837.92
FY 1975	686,298.93	530,155.00	1,216,453.93
FY 1976	5,653,456.23	-1,012,817.50	4,640,638.73
FY 197T	11,534.61		11,534.61
FY 1977	1,807,556.80	481,850.98	2,289,407.78
FY 1978	196,736.48	4,980,513.48	5,177,249.52
FY 1979		534,653.20	534,653.20
SUBTOTAL	$67,854,795.83	$6,979,633.28	$74,834,429.11

*609A Program.

TABLE LXXVIII Concluded - SCOUT PROGRAM FY 1979 OBLIGATIONS
October 1, 1979

FISCAL YEAR FUNDS	FY 1978 & PRIOR	FY 1979	TOTAL
NAVY			
FY 1961	$1,800,000.00		$1,800,000.00
FY 1962	7,900,000.00		7,900,000.00
FY 1965	3,348.00		3,348.00
FY 1971	2,600.00		2,600.00
FY 1975	65,000.00		65,000.00
FY 1978	94,000.00		94,000.00
SUBTOTAL	$9,864,948.00		$9,864,948.00
REIMBURSABLE - DOD			
AEC			
FY 1963 (AL)	$ 26,563.60		$ 26,563.60
FY 1963	2,371,000.00		2,371,000.00
FY 1964	220,000.00		220,000.00
SUBTOTAL	$2,617,563.60		$2,617,563.60
REIMBURSABLE TOTAL	$80,337,307.43	$6,979,633.28	$87,316,940.71
TOTAL	$332,647,192.20	$21,134,622.07	$353,781,814.27

Tables LXXIX through XCII present the Scout Program Obligation by fiscal year for NASA funding.

The summary of obligations noted is as follows:

Phases prior to VI	$68,600,297.55
Phase VI	38,223,798.88
Phases Subsequent through 1979	79,459,747.30

TABLE LXXIX (a) - FY 1961 NASA PRODUCTION (490) OBLIGATIONS

PHASE II	$ 994,867.49
PHASE III	205,132.51
TOTAL	$1,200,000.00

TABLE LXXIX (b) - FY 1962 NASA PRODUCTION (490) OBLIGATIONS

PHASE II	$1,320,697.75
PHASE III	5,236,255.53
PHASE IV	16,854.79
SUBAUTHORIZATION	9,009.85
TOTAL	$6,582,817.92

TABLE LXXIX (c) - FY 1963 NASA PRODUCTION (490) OBLIGATIONS

PHASE II	$ 616,349.56
PHASE III	1,224,911.88
PHASE IV	6,123,934.56
PHASE V	88,804.00
TOTAL	$8,054,000.00

TABLE LXXIX (d) - FY 1964 NASA PRODUCTION (490) OBLIGATIONS

PHASE II	$ 129,810.57
PHASE III	6,444,839.53
PHASE IV	1,484,215.90
PHASE V	41,134.00
TOTAL	$8,100,000.00

TABLE LXXIX (e) - FY 1965 NASA PRODUCTION (490) OBLIGATIONS

PHASE II	$ 2,500.00
PHASE III	1,508,156.68
PHASE IV	3,463,489.68
PHASE V	714,153.64
TOTAL	$5,688,300.00

TABLE LXXIX (f) - FY 1966 NASA PRODUCTION (490) OBLIGATIONS

PHASE IV	$5,492,396.68
PHASE V	2,091,821.32
PHASE VI	15,782.00
TOTAL	$7,600,000.00

PHASE VI

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6191Z	NAS1-7102	002	BE3A9 Motor	$ 15,782.00
			TOTAL	$ 15,782.00

TABLE LXXIX (g) - FY 1967 NASA PRODUCTION (490) OBLIGATIONS

PHASE IV	$ 784,837.70
PHASE V	4,478,212.30
PHASE VI	136,552.00
TOTAL	$5,399,602.00

PHASE VI

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6000W	L5009	002	BE3A9 Casting Powder	$ 2,334.00
E6191Z	NAS1-7102	004	BE3 Motors	134,218.00
			TOTAL	$ 136,552.00

TABLE LXXX - FY 1968 NASA PRODUCTION (490) OBLIGATIONS

PHASE IV	$1,181,308.39
PHASE V	2,971,987.64
PHASE VI	1,046,703.97
TOTAL	$5,200,000.00

PHASE VI

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6000H	NAS1-7256-6	E19	Instrumented E-Section	$ 74,600.00
E6000H	NAS1-7199-15(R6)	686	MODS-SBASI	30,948.00
E6000M	NAS1-10000-25	D39	Battery Cells	1,200.00
E6000W	L28596	002	Tools for Connectors	65.08
E6000W	L34648	002	Metal Finishing Supplies	20.00
E6000Z	L9706	002	Third-Stage Casting Powder	59,915.39
E6180Z	NAS1-7199	588	Second-Stage Motors, S-180	96,215.00
E6181Y	NAS1-7199	549	S-181 Hardware	420,358.00
E6183Y	NAS1-7199-14	G83	S-183 S-Band	52,281.00
E6183Z	NAS1-7199	595	S-183 Second-Stage Motor	96,215.00
E6184Z	NAS1-7199	689	S-184 Second-Stage Motor	96,215.00
E6187Z	NAS1-7199	690	S-187 Second-Stage Motor	96,215.00
E6190Y	NAS1-7199	560	A-66 Heat Shield	22,278.00
			Shipping	178.50
			TOTAL	$1,046,703.97

TABLE LXXXI - FY 1969 NASA PRODUCTION (490) OBLIGATIONS

PHASE IV	$ 671,855.47
PHASE V	4,602,216.76
PHASE VI	4,105,466.74
PHASE VII	3,294,373.56
SUBAUTHORIZATIONS V	24,775.47
TOTAL	$12,698,688.00

TABLE LXXXI Continued - FY 1969 NASA PRODUCTION (490) OBLIGATIONS

PHASE VI

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6000R	NAS1-6020-19	541	Revise QCEPS	$ 81,504.00
E6000R	NAS1-7199-19	666	Change GFE	-4,487.00
E6000R	NAS1-7199-25	672	FW4S Leak Test	5,000.00
E6000W	L-28102	002	Product Improvement	150.06
E6000W	L-28103	002	Product Improvement	120.80
E6000W	L-28596	004	Product Improvement	68.07
E6000W	L-29500	002	Product Improvement	263.15
E6000W	L-29919	002	Product Improvement	92.76
E6000R	NAS1-7102-3	006	BE3A9 Igniter Mods.	54,200.00
E6000R	NAS1-7102-5	008	BE3A9 Text Mods.	1,450.00
E6000W	NAS1-7256	002	Product Improvement	1,000.00
E6000Y	NAS1-7256-33(C31)	E38	Phase VI Vehicle Procurement	5,798.00
E6180Y	NAS1-7199	596	CAS-A Vehicle Procurement	22,278.00
E6180Y	NAS1-7199	692	CAS-A Vehicle Procurement	420,358.00
E6180Z	NAS1-7199	600	CAS-A Motor Procurement	74,188.00
E6180Z	NAS1-10000	954	CAS-A Motor Procurement	1,656.40
E6181W	NAS1-10000	G20	AEROS-A Award Incentive	105,286.00
E6181Y	NAS1-7256-33(C31)	354	E-Section for S-181 (AEROS-A)	7,180.00
E6181Z	NAS1-7199-1	601	AEROS-A Motor Procurement	74,188.00
E6181Z	NAS1-7199-2	F28	AEROS-A Motor Procurement	1,656.40
E6181Z	NAS1-7199	599	AEROS-A Motor Procurement	96,215.00
E6183G	NAS1-10000	A04	UK-4 Standardization	65,764.00
E6183Y	NAS1-7199-4	G87	UK-4 Vehicle Procurement	1,382.00
E6183Y	NAS1-7199-14	G88	UK-4 Vehicle Procurement	52,281.00
E6183Y	NAS1-7199	551	UK-4 Vehicle Procurement	420,358.00
E6183Y	NAS1-7199	673	UK-4 Vehicle Procurement	22,278.00
E6183Z	NAS1-7199	662	UK-4 Motor Procurement	122,720.00
E6183Z	NAS1-7199-1	671	UK-4 Motor Procurement	74,187.00
E6183Z	NAS1-10000	928	UK-4 Motor Procurement	1,656.00
E6184Y	NAS1-7199	553	MTS-A Vehicle Procurement	420,258.00
E6184Z	NAS1-7199-1	603	MTS-A Motor Procurement	74,187.00
E6184Z	NAS1-9258	F82	MTS-A Motor Procurement	126,792.00
E6184Z	NAS1-10000-2	936	MTS-A Motor Procurement	1,656.00
E6187B	NAS1-12500	H51	Mission Integration, UK-5	4,304.00
E6187Z	NAS1-7199-1	659	UK-5 Motor Procurement	74,188.00
E6187Z	NAS1-7199-4	663	UK-5 Motor Procurement	122,720.00
E6187Z	NAS1-10000-23	827	UK-5 Initiators	968.00
E6187Z	NAS1-10000-23	829	UK-5 Initiators	770.00
E6187Z	NAS1-10000-23	833	UK-5 Initiators	770.00
E6189A	NAS1-12500	952	ANS-A Program Management	246,447.00
E6189Y	NAS1-7199-14	C13	ANS-A Vehicle Procurement	52,281.00
E6189Y	NAS1-7199	558	ANS-A Vehicle Procurement	420,358.00
E6189Y	NAS1-7199-4	E23	ANS-A Vehicle Procurement	1,382.00
E6189Z	NAS1-7199-1	598	ANS-A Motor Procurement	74,188.00
E6189Z	NAS1-7199	602	ANS-A Motor Procurement	96,215.00

TABLE LXXXI Concluded - FY 1969 NASA PRODUCTION (490) OBLIGATIONS

PHASE VI Continued

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6190Y	NAS1-7199	559	SM-C2 Vehicle Procurement	$ 420,358.00
E6190Z	NAS1-7199	597	SM-C2 Motor Procurement	96,215.00
E6190Z	NAS1-7199-1	604	SM-C2 Motor Procurement	74,188.00
E6191G	NAS1-10000	A17	Hawkeye Standardization	54,538.00
E6191J(R1230)	NAS1-6868	004	Misc. 5th Stage Components	25,882.05
E6191J(R1230)	NAS1-6868	005	Contract Adjustment	-3,638.00
			Stock Issues	276.83
			Shipping	11,270.82
			TOTAL	$ 4,105,466.74

TABLE LXXXII - FY 1970 NASA PRODUCTION (490) OBLIGATIONS

PHASE IV	$ 248,740.23
PHASE V	8,685,276.36
PHASE VI	2,631,067.77
PHASE VII	1,451,941.88
SUBAUTHORIZATION V	134,664.86
TOTAL	$13,151,691.10

PHASE VI

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
AEA101	NAS1-10900	003	IMS	$ 1.45
E6000E	NAS1-10000	D47	Phase VI Systems Engineering	19,896.00
E6000H(RAS174)	NAS1-6935-5(T13)		Design S-Band T/M	88,073.00
E60000	NAS1-7199-18	C18	Phase VI Repair Algol Dollies	13,450.00
E60000	NAS1-7199-22	C19	Phase VI Algol Dolly Tires	277.00
E60000	NAS1-7199-28	C20	Phase VI Algol Storage at AEDC	24,000.00
E6000R	L-9695	002	Firing BE3A9 Motor at AEDC	25,200.00
E6000R	NAS1-6935-41	029	Regulator	32,939.00
E6000R	NAS1-6935-41-4	029	Regulator	61,420.00
E6000R	NAS1-7199-5	617	500 Pound PCM/Valve Assembly	6,690.00
E6000R	NAS1-7199-8	C21	Inspect Castor Nozzles	7,025.00
E6000R	NAS1-7199-24	621	Mods for SBASI	11,056.00
E6000R	NAS1-9258	F80	Design and Develop Algol III	1,050,000.00
E6000U	NAS1-9154	002	Flight Tape Recorder	753.00
E6000V	NAS1-10000-16	D65	Phase VI Tooling Maintenance	65,262.00

TABLE LXXXII Continued - FY 1970 NASA PRODUCTION (490) OBLIGATIONS

PHASE VI Continued

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6000Y	NAS1-6935-41-2	025	42-Inch Heat Shield	$ 5,668.00
E6000Y	NAS1-7199-23	C10	Vehicle SBASI, Harness	864.00
E6000Z	NAS1-7199-4	C11	Phase VI 1st Stage Motor	122,720.00
E6000Z	NAS1-7199	C12	Phase VI 2nd Stage Motor	6,414.00
E6000Z	NAS1-7256-4(C3)	E20	Phase VI Initiators	76,512.00
E6100H(RAS159)	NAS1-6935-4(T11)		P/L Separation Timer Mods.	33,255.00
E6100M(RAS140)	NAS1-6935-9(T11)		Final Cost Adjustment	-12,357.00
E6180B	NAS1-7256	708	CAS-A Mission Integration	10,479.00
E6180H	NAS1-7256	709	CAS-A Vehicle Processing	28,211.00
E6180H	NAS1-7256-28	710	CAS-A Vehicle Ignition System	405.00
E6180R(RAS140)	NAS1-6935(T11)		CAS-A Test E-Section #25	8,930.00
E6180T	NAS1-10000	F22	CAS-A Production Support	811.00
E6180Y	NAS1-7256-3	707	CAS-A Cork Installation on Base A	1,003.00
E6180Y	NAS1-6935(T11)		CAS-A E-Section #36	8,930.00
E6180Z	NAS1-5610	131	CAS-A 4th Stage Motor	33,070.00
E6180Z	NAS1-7199-4	622	CAS-A 1st Stage Motor #15	122,720.00
E6181B	NAS1-7256	711	AEROS-A Mission Integration	10,479.00
E6181H	NAS1-6935-7(T41)	024	AEROS-A Processing	650.80
E6181Y	NAS1-10000	G27	AEROS-A Jet Vane & Fin Tips	16,116.00
E6181Y	NAS1-10000-20	F26	AEROS-A Vehicle Procurement	6,700.00
E6181Z	NAS1-10000-6	F27	AEROS-A 1st Stage Motor	28,367.00
E6181Z	NAS1-7199-16	623	AEROS-A 4th Stage Motor	75,437.00
E6183B	NAS1-7256	712	UK-4 Mission Integration	20,960.00
E6183R(RAS140)	NAS1-6935(T11)		UK-4 Test E-Section #27	8,930.00
E6183T	NAS1-10000	F32	UK-4 Production Support	447.00
E6183Y(RAS140)	NAS1-6935(T11)		UK-4 Test E-Section #31	8,930.00
E6193Z	NAS1-5610	130	4th Stage Motor #12	33,070.00
E6184Y	NAS1-10000	G60	MTS Fourth-Stage Ignition & T/M	10,258.63
E6184Y	NAS1-7199-14	693	MTS S-Band	52,281.00
E6184Z	NAS1-7199-16	678	MTS 4th Stage Motor	75,437.00
E6184Z	NAS1-10000-6	G08	MTS 1st Stage Motor	28,367.00
E6187T	NAS1-10000	C44	UK-5 Production Support	1,221.00
E6187Y	NAS1-6935-5(C41)	023	UK-5 Vehicle	650.00
E6187Y	NAS1-7199-14	A01	UK-5 S-Band	52,282.00
E6190T	NAS1-10000	C21	SM-C2 Production Support	1,290.00
E6190Y	NAS1-10000	C02	SM-C2 Jet Vane and Fins	16,116.00
E6190Y	NAS1-7199-14	C15	SM-C2 S-Band	52,282.00
E6190Z	NAS1-7199-16		SM-C2 Fourth-Stage Motor	75,437.00
E6190Z	NAS1-9258		SM-C2 First-Stage Motor	126,792.00
E6191J	NAS1-5610-7	C-3	Hawkeye 5th Stage Motor	38,750.00
E6191Y	NAS1-7199	C17	Hawkeye S-Band	52,282.00
E6191Z	NAS1-7199-16	624	Hawkeye 4th Stage Motor	75,437.00
			Stock Issues	8,022.97
			Shipping	102,638.35
			DIRECT DCASO	118,000.00
			TOTAL	$2,631,067.77

TABLE LXXXIII - FY 1971 NASA PRODUCTION (490) OBLIGATIONS

PHASE IV	$ 315,937.95
PHASE V	2,834,432.32
PHASE VI	6,681,575.41
PHASE VII	3,213,348.35
SUBAUTHORIZATION V	123,769.97
TOTAL	$13,199,064.00

PHASE VI

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
(AEA101)	NAS1-10900	032	IMS	$ 50,811.94
E6000B	NAS1-10000	D05	Phase VI Mission Integration	139,527.00
E6000D	NAS1-10000	D08	Phase VI Data Analysis	24,875.00
E6000E	NAS1-10000	D54	Phase VI Systems Engineering	9,422.71
E6000G	NAS1-10000	E90	Phase VI Standardization	183,296.00
E6000M	NAS1-12500	H61	Spares	137,315.00
E6000P	NAS1-10000	D02	Phase VI LTV Support	282,427.00
E6000P	NAS1-6090	294	Computer Programer	31,000.00
E6000R (RAS173)	NAS1-6935-6(T42)		Modified Jet Vane Test	25,331.00
E6000R	NAS1-6935-7(T42)		Modified Jet Vane Test	-873.00
E6000R	NAS1-7258-27(C27)	E34	T/M Signal Cond. Unit	1,607.00
E6000R	NAS1-9258	F83	Design and Develop Algol III	1,244,635.00
E6000R	NAS1-10000	D04	P/L Environmental Control, WFC	2,635.00
E6000S	NAS1-10000	681	BE3A9 Motor Shelf Life Ext.	47,900.00
E6000V	NAS1-12500	H60	Phase VI Tooling Maintenance	52,625.00
E6000W	NAS1-6935-9(C41)	028	Regulator	46,438.00
E6000Z	NAS1-9258-7	F73	1st Stage Test Motor #5	126,792.00
E6000Z	NAS1-9258-3	F74	Algol Case Test	7,653.00
E6000Z	NAS1-10000-9	C64	Ablative Cork	2,740.00
E6000Z	NAS1-10000-32(C21)	C65	Ultrasonic Standards for Algol III	6,341.00
E6000R	NAS1-10482-Z	005	Technical Support, 2nd Stage	23,684.00
E6180E	NAS1-10000	794	CAS-A Systems Engineering	184,378.00
E6180F	NAS1-10000	G22	CAS-A Reliability	154,385.00
E6180H	NAS1-10000	F21	CAS-A Vehicle Processing	132,386.00
E6180M	NAS1-10000	A32	CAS-A Spares	13,708.00
E6180M	NAS1-10000-23	F23	CAS-A Spares	30,000.00
E6180N	NAS1-10000	F25	CAS-A Launch Site Services	393,228.00
E6180Y	NAS1-10000-9(C11)	657	CAS-A 4th Stage S-Band	3,431.00
E6181E	NAS1-10000	G18	AEROS-A Systems Engineering	196,169.00
E6181F	NAS1-10000	D48	AEROS-A Reliability	192,302.00
E6181H	NAS1-10000	G24	AEROS-A Vehicle Processing	166,860.00
E6181J	NAS1-10000-32(C20)	669	AEROS-A Protective Heat Shield	2,568.00
E6181M	NAS1-10000	A33	AEROS-A Spares	30,392.00

TABLE LXXXIII Continued - FY 1971 NASA PRODUCTION (490) OBLIGATIONS

PHASE VI Continued

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6181M	NAS1-10000-23	F31	AEROS-A Spares	$ 27,492.00
E6181N	NAS1-10000-11	A71	AEROS-A Launch Site Services	7,011.00
E6181N	NAS1-10000	G71	AEROS-A Launch Site Services	386,217.00
E6181Y	NAS1-10000-15	054	4th Stage Ignition and T/M	28,516.00
E6181T	NAS1-10000	G26	AEROS-A Production Support	844.00
E6181Y	NAS1-6935-2(T41)	009	AEROS-A Heat Shield #504	32,939.00
E6181Z	NAS1-9258-7	F81	AEROS-A 1st Stage Motor	126,792.00
E6183H	NAS1-10000	G16	UK-4 Vehicle Processing	153,604.00
E6183J	NAS1-10000-9(C14)	F34	UK-4 Mission Heat Shield Mod.	532.00
E6183M	NAS1-10000	A34	UK-4 Spares	44,325.00
E6183M	NAS1-10000-23	302	UK-4 Spares	27,492.00
E6183N	NAS1-10000-11	F36	UK-4 Launch Site Services	7,011.00
E6184B	NAS1-10000	704	MTS-A Mission Integration	22,027.00
E6184H	NAS1-10000	G32	MTS-A Vehicle Processing	154,018.00
E6184M	NAS1-10000-23	A35	MTS-A Spares	26,651.00
E6184N	NAS1-10000	F40	MTS-A Launch Site Services	216,273.36
E6184N	NAS1-10000	G10	MTS-A Launch Site Services	166,324.53
E6184W	NAS1-10000	G02	MTS-A Award Incentive	105,286.00
E6184Y	NAS1-6935-2(C41)	012	MTS-A Heat Shield 402	31,451.00
E6184Y	NAS1-10000	G33	MTS-A Jet Vanes and Fin Tips	16,116.00
E6184Z	NAS1-10000-16(C15)	070	MTS-A X-ray X259 HIB303 Motor	4,028.00
E6184Z	NAS1-10000-16(C16)	665	MTS-A Inspect Castor II Motor	2,240.00
E6187M	NAS1-10000	A40	UK-5 Spares	46,711.00
E6187M	NAS1-10000-23	C46	UK-5 Spares	22,000.00
E6187T	NAS1-10000-15	C43	UK-5 Fourth-Stage Ignition & T/M	28,516.00
E6187T	NAS1-10000-21	073	UK-5 E-Section	6,745.00
E6187Y	NAS1-6935-2(C41)	010	UK-5 Heat Shield 505	32,939.00
E6187Z	NAS1-10000-2	C45	UK-5 3rd Stage Motor	1,656.40
E6187Z	NAS1-11400	E02	UK-5 4th Stage Motor	34,501.00
E6189D	NAS1-12500	261	ANS-A Data Analysis	11,590.00
E6189Y	NAS1-10000-15	056	ANS-A 4th Stage Ignition & T/M	28,516.00
E6189Y	NAS1-10000-21	074	ANS-A Production E-Section	6,745.00
E6189Y	NAS1-6935-2(T41)	015	ANS-A Heat Shield 406	31,451.00
E6189Y	NAS1-10000-3	C67	ANS-A Jet Vanes and Fin Tips	13,143.00
E6189Z	NAS1-9258-7	F75	ANS-A Motor, First Stage	126,792.00
E6189Z	NAS1-10000-2	040	ANS-A 3rd Stage Igniters	1,656.40
E6189Z	NAS1-11400	E03	ANS-A 4th Stage Motor	34,501.00
E6190H	NAS1-10000	C80	SM-C2 Vehicle Processing	124,353.00
E6190M	NAS1-10000	A41	SM-C2 Spares	49,849.00
E6190T	NAS1-10000-15	059	SM-C2 4th Stage Igniters and T/M	28,516.00
E6190Z	NAS1-9258	F76	SM-C2 1st Stage Motor	126,792.00
E6190Z	NAS1-10000-2	037	SM-C2 3rd Stage Initiator	1,656.40
E6191T	NAS1-10000-15	056	Hawkeye 4th Stage Ignitor & T/M	28,516.00
E6191Y	NAS1-6935-2(C41)	014	Hawkeye Heat Shield 405	31,451.00
E6191Y	NAS1-10000-3	C11	HawkeyeJet Vanes and Fin Tips	16,116.00

TABLE LXXXIII Concluded - FY 1971 NASA PRODUCTION (490) OBLIGATIONS

PHASE VI Continued

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6191Z	NAS1-7256-27	E29	Services for BE3A9 Motor	$ 2,834.00
E6191Z	NAS1-9258-7	F77	Hawkeye Motor, First Stage	126,792.00
			Stock Issues	7,142.94
			Shipping	64,914.73
			DIRECT - DCASO	112,000.00
			TOTAL	$ 6,681,575.41

TABLE LXXXIV - FY 1972 NASA PRODUCTION (490) OBLIGATIONS

PHASE IV	$ 308,440.43
PHASE V	2,108,716.82
PHASE VI	7,496,774.65
PHASE VII	5,063,172.85
SUBAUTHORIZATION (Phase VI)[a]	122,895.25
TOTAL	$15,100,000.00

PHASE VI

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6000E	NAS1-10000	D53	Phase VI Systems Engineering	$ 186,915.37
E6000F	NAS1-10000	D21	Phase VI Reliability	461,478.00
E6000G	NAS1-10000-13(R25)	D29	Phase VI Tunnel Tab Test Tooling	44,560.00
E6000G	NAS1-10000-13(R32)	D31	Phase VI Wiring DBF at VAFB	6,773.00
E6000H	NAS1-10000-13(R24)	D12	BE3A9 Motor Flight Preparation	355.00
E60000	L-55235	026	Phase VI G.S.E.	129.13
E60000	L-71779	002	Phase VI G.S.E.	54.20
E60000	NAS1-10000-13(R17)	D10	Mod. VEGA Beacons	8,464.00
E6000R	NAS1-10000-13(R23)	D11	Phase VI GFE G.S.E. Kits, VAFB	8,140.00
E6000V	NAS1-6020-15(H)	E02	Phase VI Tooling Maintenance	53,002.00
E6000W	NAS1-10000-13(R79)	D37	Hardware, Altair-III XLDB	41,075.00
E6000R(RAS183)	NAS1-10500-01	008	P/L Separation Ignition Timers	226,820.00
E6000Z	L-55255	020	Third-Stage Propellant	23,242.91
E6000Z	L-55255	021	Third-Stage Propellant	4,652.00
E6180A	NAS1-10000	947	CAS-A Program Management	318,938.00
E6180B	NAS1-10000	861	CAS-A Mission Integration	6,424.00
E6180C	NAS1-10000	871	CAS-A Preflight Planning	17,271.00
E6180D	NAS1-10000	777	CAS-A Data Analysis	51,317.00
E6180G	NAS1-10000	A99	CAS-A Standardization	56,680.00

[a] $50,000 in Phase V.

TABLE LXXXIV Continued - FY 1972 NASA PRODUCTION (490) OBLIGATIONS

PHASE VI Continued

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6180V	NAS1-10000	F24	CAS-A Tooling Maintenance	$ 65,262.00
E6181A	NAS1-10000	948	AEROS-A Program Management	318,938.00
E6181B	NAS1-10000	862	AEROS-A Mission Integration	9,425.00
E6181C	NAS1-10000	872	AEROS-A Preflight Planning	17,605.00
E6181D	NAS1-10000	785	AEROS-A Data Analysis	59,539.00
E6181G	NAS1-10000	A03	AEROS-A Standardization	71,441.00
E6181H	NAS1-10000(R30)	A82	Vehicle Reprocessing	52,700.00
E6181H	NAS1-10000-13(R30)	G25	Vehicle Reprocessing	42,672.00
E6181T	NAS1-7256	E44	AEROS-A Production Support	26,161.00
E6181V	NAS1-7256	E45	AEROS-A Tooling Maintenance	31,003.00
E6181V	NAS1-10000	208	AEROS-A Tooling Maintenance	65,262.00
E6183B	NAS1-10000	816	UK-4 Mission Integration	2,829.00
E6183C	NAS1-10000	873	UK-4 Preflight Planning	27,562.00
E6183D	NAS1-10000	786	UK-4 Data Analysis	42,087.00
E6183E	NAS1-10000	D49	UK-4 Systems Engineering	179,122.00
E6183N	NAS1-10000	A57	UK-4 Launch Site Services	386,217.00
E6183V	NAS1-10000	F35	UK-4 Tooling Maintenance	65,262.00
E6184A	NAS1-10000	950	MTS-A Program Management	318,938.00
E6184C	NAS1-10000	874	MTS-A Preflight Planning	23,656.00
E6184D	NAS1-10000	787	MTS-A Data Analysis	52,227.00
E6184E	NAS1-10000	D50	MTS-A Systems Engineering	209,562.00
E6184G	NAS1-10000	A06	MTS-A Standardization	76,112.00
E6184Y	NAS1-10000	G34	MTS-A Fourth-Stg. Ignition & T/M	18,257.37
E6184V	NAS1-10000	210	MTS-A Tooling Maintenance	65,262.00
E6187A	NAS1-10000	834	UK-5 Program Management	318,938.00
E6187C	NAS1-10000	835	UK-5 Preflight Planning	3,114.00
E6187E	NAS1-10000	836	UK-5 Systems Engineering	207,331.00
E6187G	NAS1-10000	842	UK-5 Standardization	76,121.00
E6187H	NAS1-10000	840	UK-5 Vehicle Processing	177,800.00
E61870	NAS1-10000(R58)	A85	UK-5 4th Stage Tip Off Rocket	1,786.00
E6187V	NAS1-10000	845	UK-5 Tooling Maintenance	65,262.00
E6187Y	NAS1-7199	543	Vehicle Procurement, UK-5	420,358.00
E6189A	NAS1-12500	957	ANS-A Program Management	163,809.00
E6189B	NAS1-10000	818	ANS-A Mission Integration	8,123.00
E6189D	NAS1-12500	260	ANS-A Data Analysis	3,398.00
E6189E	NAS1-10000	C22	ANS-A Systems Engineering	1,889.00
E6189F	NAS1-10000	C20	ANS-A Reliability	1,890.00
E6189G	NAS1-10000	C70	ANS-A Standardization	694.00
E6189H	NAS1-10000	C68	ANS-A Vehicle Processing	1,618.00
E6189M	NAS1-12500		Spares	37,079.00
E6190A	NAS1-10000	847	SM-C2 Program Management	318,938.00
E6190B	NAS1-10000	819	SM-C2 Mission Integration	4,097.00
E6190C	NAS1-10000	875	SM-C2 Preflight Planning	3,221.00
E6190E	NAS1-10000	C07	SM-C2 Systems Engineering	145,013.00
E6190G	NAS1-10000	906	SM-C2 Standardization	53,240.00
E6190V	NAS1-7256	E27	SM-C2 Tooling Maintenance	31,004.00

TABLE LXXXIV Concluded - FY 1972 NASA PRODUCTION (490) OBLIGATIONS

PHASE VI Continued

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6190V	NAS1-10000	C04	SM-C2 Tooling Maintenance	$ 65,262.00
E6191A	NAS1-10000	848	Hawkeye Program Management	159,488.00
E6191B	NAS1-10000	754	Hawkeye Mission Integration	32,206.00
E6191E	NAS1-10000	C18	Hawkeye Systems Engineering	128,405.00
E6191H	NAS1-10000	C10	Hawkeye Vehicle Processing	68,414.00
E6191J	NAS1-10000(R83)	C14	Hawkeye GSE for ACS 5th Stage	84,392.00
E6191J	NAS1-10000(R93)	C15	Hawkeye Spares for ACS	46,541.00
E6191T	NAS1-7256	E28	Hawkeye Production Support	26,160.00
E6191T	NAS1-10000	C12	Hawkeye Production Support	1,490.00
E6191V	NAS1-7256	E30	Hawkeye Tooling Maintenance	31,004.00
E6191V	NAS1-10000	C17	Hawkeye Tooling Maintenance	32,610.00
E6191R(RAS196)	NAS1-10500-03	009	Attitude Correction System	140,000.00
E6191R(RAS184)	NAS1-10500-03	010	Attitude Correction System	148,500.00
E6191R(RAS190)	NAS1-10500-03-2	011	Attitude Correction System	-2,227.00
			Stock Issues	607,505.48
			Shipping	15,909.19
			Suballowment - Wallops	(23,225.86)
			Suballotment - WTR	(49,669.39)
			SS DIRECT - DCASO	138,000.00
			IMS (Hqs.)	21,000.00
			TOTAL	$ 7,496,774.65

TABLE LXXXV - FY 1973 NASA PRODUCTION (490) OBLIGATIONS

PHASE IV	$ 437,884.65
PHASE V	795,410.80
PHASE VI	3,342,236.31
PHASE VII	10,787,301.07
SUBAUTHORIZATION (Phase VI)	336,937.65
TOTAL	$15,699,770.48

PHASE VI

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6000F	NAS1-10000-13(R45)	D17	HE Propellant Altair III	$ 1,495.00
E6000G	NAS1-10000-13(R57)		Inspection of X259 HIB307	18,828.00
E6000G	NAS1-10000-13(R65)	D27	Back-up Air at VAFB	8,879.00

TABLE LXXXV Continued - FY 1973 NASA PRODUCTION (490) OBLIGATIONS

PHASE VI Continued

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6000G	NAS1-10000-13(R66)	D28	HEP Mod. Antares IIB Nozzle	$ 3,368.00
E6000H	NAS1-10000-13(R31)	C61	Phase VI Vehicle Processing	8,162.00
E6000I	L88316	016	SAMTEC Range Support	10,000.00
E6000I	L88316	017	SAMTEC Range Support	14,922.00
E6000K	NAS1-10000-13(R52)	D23	Nozzle Data Book	27,685.00
E6000K	NAS1-10000	D36	Phase VI Certification Training	15,948.00
E60000	L75052	002	WTR Operations & Maintenance SAMSO	1,500.00
E60000	L84253	003	Mods to Magazine at NAD	24,000.00
E60000	L84994-6	009	Motor Storage at NAD	2,500.00
E60000	L84994-7	010	Storage Rocket Motor - Nevada	2,500.00
E60000	L84994-8-9	011	U.S. NAD - Storage & Handling	15,200.00
E60000	L88316	016	Range Costs	10,000.00
E60000	L88316	017	Range Costs	14,922.00
E60000	NAS1-9776	002	Evaluat Strain & Force Instr.,WI	150.00
E60000	NAS1-10000-13(R44)	D16	Hydrotest Antares IIB Case	46,897.00
E60000	NAS1-10000-13(R59)	D25	Fourth-Stage Ignition System	5,666.00
E60000	NAS1-10000-13(R85)	D32	Inspection of X-259 Motor	3,474.00
E60000	NAS1-10000-39(53D)	D66	G.S.E. Changes	44,359.00
E6000R (6000Z)	L55255	011	Phase VI Motor Procurement	25,000.00
E6000R (6000Z)	L55255	012	Phase VI Motor Procurement	5,833.00
E6000P	NAS1-10000-13(R61)	F10	Transfer of Personnel	30,096.00
E6000R	NAS1-10000-13(R49)	D13	Temperature Conditioning Castor#27	5,362.00
E6000R	NAS1-10000-13(R34)	D14	Static Test X-259 HIB211	3,468.00
E6000R	NAS1-10000-13(R40)	D15	Data Computer Program	72,709.00
E6000R	NAS1-10000-13(R48)	D19	Mod. Cool Air WTR/WI	10,864.00
E6000R	NAS1-10000-13(R63)	D26	Aging Thixon AB894	12,833.00
E6000R	NAS1-10000-27(S24)	D33	5 Instrumentation Kits for X-259	59,910.00
E6000R (R1257)	NAS1-11867	001	NDT Technical Study	119,325.00
E6000R	NAS1-12500(R33)	H31	Altitude Test for 60-lb. Motor	13,295.00
E6000R	NAS1-12500(R43)	H32	Scout Simulators, 1/20 Scale	1,035.00
E6000R	NAS1-12500(R11)	H33	Verticality Sensor Mounting Bracket	3,286.00
E6000R	NAS1-12500(R16)	H35	Shelf Life 1st and 2nd Initiators	1,784.00
E6000T(R1257)	NAS1-11859	002	Technical Support by TCC	44,665.00
E6000U			Supplies	32,556.22
E6000Z(RAS159)	NAS1-6935(T18)		Algol Nozzles Rebuilt	348,500.00
E6000Z(RAS173)	NAS1-6935-1(T18)		Algol Nozzles Rebuilt Adjustment	-31,000.00
E6000R	NAS1-10484-Z	005	Technical Support by UTC	27,787.57
E6000R	NAS1-10483-Z	004	Technical Support by HI/B	43,154.00
E6183F	NAS1-10000	F37	UK-4 Reliability	176,842.00
E6184F	NAS1-10000	G03	MTS-A Reliability	205,030.00
E6184N	NAS1-10000	G29	MTS-A Launch Site Services	10,630.11
E6187F	NAS1-10000	837	UK-5 Reliability	205,052.00
E6189Y	NAS1-12500-16(S01)	178	ANS-A Mod. to Accept Algol III	11,855.00
E6190F	NAS1-10000	884	SM-C2 Reliability	142,732.00
E6191F	NAS1-10000	885	Hawkeye Reliability	88,532.00
E6191J	NAS1-10000(R62)	C16	Hawkeye Castor II Sh.Lf.Ext.	23,643.00

TABLE LXXXV Concluded - FY 1973 NASA PRODUCTION (490) OBLIGATIONS

PHASE VI Continued

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6191Q	NAS1-12500(R10)	218	Hawkeye 4th Stg.w/H.P.X259	$ 105,827.00
E6191Q	NAS1-12500(R24)	229	Hawkeye BE3A9 Motor Flight Prep.	5,388.00
E6191R	NAS1-10000(R71)	C19	Hawkeye Test w/Strap-on Motors	7,386.00
E6191R	NAS1-12500(R5)	214	Hawkeye Range Safety NPE Data	1,235.00
E6191R	NAS1-12500(R38)	240	Hawkeye BE3A9 Motor Nozzle Plugs	2,743.00
E6191Y	NAS1-7199	561	Hawkeye Vehicle Procurement	420,358.00
E6191Y	NAS1-10500-04	008	Attitude Correction System	47,107.00
E6191Z	NAS1-11400	030	Hawkeye Motor Procurement	77,600.00
			Shipping	56,227.53
			STS DIRECT - MSFC	4,000.00
			DCASO	125,000.00
			Suballotment - Wallops	(204,625.33)
			WTR	(122,712.32)
			Goddard	(9,600.00)
			IMS	514,130.88
			TOTAL	$ 3,342,236.31

TABLE LXXXVI - FY 1974 NASA PRODUCTION (490) OBLIGATIONS

PHASE V	$ 13,337.69
PHASE VI	3,762,536.07
PHASE VII	3,790,712.69
SUBAUTHORIZATION	209,778.78
TOTAL	$7,776,365.23

PHASE VI

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6000A	NAS1-10000	D68	CAS-B Program Management	$ 318,938.00
E6000E	NAS1-10000-13(R69)	D70	Support to LRC Anomaly Investg.	23,237.00
E6000H(RAS159)	NAS1-6935(T13)		Design Change S-Band T/M	411,900.00
E6000H(RAS159)	NAS1-6935-7(T13)		Design Change S-Band T/M	4,961.00
E6000H	NAS1-10000-37(C28)	676	Assemble 4th Stg. Ign. & T/M	4,689.00
E6000I	L88316-3	019	WTR Ops. & Maint.-SAMSO	1,568.00
E6000I	L88316-3	020	WTR Ops. & Maint.-SAMSO	12,432.00
E6000I	L88316-4	018	WTR Ops. & Maint.-SAMSO	25,000.00
E6000I	NAS1-10000-13(R41)	D34	Regulator	34,043.00
E6000I	NAS1-12500(J-1)		San Marco Support	266,845.00

TABLE LXXXVI Continued - FY 1974 NASA PRODUCTION (490) OBLIGATIONS

PHASE VI Continued

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6000L	NAS1-10000	D35	Phase VI Logistics Adminis.	$ 407,971.00
E60000	0L449	002	Electric Hoist - WFC	1,077.08
E60000	0L449A	004	Electric Hoise - WTR	1,038.50
E60000	0L774A	003	Electric Hoist - WTR	2,077.00
E60000	L18055A	001	Mechanical Prototype, Injun I	9,611.00
E60000	L84253	004	Mod. NAD Magazine	17,834.15
E60000	L2866000401	002	Life Vests	143.94
E60000	NAS1-10000-37(C26)	674	Launch Base-A Support Pins	8,525.00
E6000P	NAS1-10000	D03	Phase VI Vought Support at LRC	4,845.00
E6000R(RAS183)	NAS1-6935-2(T41)		Develop 42" Heat Shield	11,336.00
E6000R(RAS183)	NAS1-6935-2(T41)	011	Heat Shield A-502 Test	32,939.00
E6000R(RAS173)	NAS1-6935-2(T42)		Modified Jet Vane Test	34,234.00
E6000R(RAS159)	NAS1-6935-3(T44)	002	S-Band Development	58,674.00
E6000R(RAS173)	NAS1-6935-4(T44)	005	S-Band Development	47,964.00
E6000R(RAS173)	NAS1-6935-5(T42)		Modified Jet Vane Test	74,620.00
E6000R(RAS159)	NAS1-6935-7(T44)		S-Band Development	40,055.00
E6000R(RAS195)	NAS1-6935-(T44)	003	S-Band Development (R1257)	107,495.00
E6000R(RAS190)	NAS1-6935(T46)	002	Algol Dollies	129,132.00
E6000Y	NAS1-10500-01-3	005	Payload Separation Ignition Timers	20,791.00
E6000Z	L12904	002	Fire 2 Altair III Motors	25,000.00
E6000Z	L55255	019	AEDC Test Fire Altair III Motor	570.23
E6000R	NAS1-10484-5-Z	007	Technical Support at UTC	-12,765.55
E6000R	NAS1-10484-5-Z	008	Technical Support at UTC	4,227.36
E6180T	NAS1-7256	E42	CAS-A Production Support	26,161.00
E6180V	NAS1-7256	E43	CAS-A Tooling Maintenance	31,003.00
E6181Z	NAS1-10000-23M	F29	AEROS-A Motor, 1st Stg. Initiator	770.00
E6181Z	NAS1-10000-23M	F30	AEROS-Z Motor, 2nd Stg. Initiator	770.00
E6183W	NAS1-10000-48	G31	UK-4 Award Incentive	105,286.00
E6184Z	NAS1-10000-23M	G06	MTS-A 1st Stg. Initiator	770.00
E6184Z	NAS1-10000-23M	G35	MTS-A 2nd Stg. Initiator	770.00
E6187C	NAS1-12500	H41	UK-5 Preflight Planning	20,455.00
E6187Q	NAS1-12500-7(R57)	H46	Inspect X259 HIB-307 on UK-5	6,361.00
E6187T	NAS1-7256	E42	UK-5 Production Support	26,160.00
E6187V	NAS1-7256	E15	UK-5 Tooling Maintenance	31,003.00
E6187R	NAS1-10484-Z	030	Technical Support at UTC	1,725.00
E6189C	NAS1-12500	141	ANS-A Preflight Planning	34,842.00
E6189I	L7930A	009	ANS-A Range Costs	49,237.97
E6189M	NAS1-10000	C69	ANS-A Spares	651.00
E6189V	NAS1-7256	E24	ANS-A Tooling Maintenance	31,003.00
E6189R	NAS1-10484-Z	031	Technical Support at UTC	6,340.00
E6190C	NAS1-12500	A24	San Marco C2 Preflight Planning	8,989.00
E6190H	NAS1-10000-9(C3)	C06	Rework and Test SM-C2 Sep. Syst.	11,604.00
E6190H	NAS1-10000-39(C37)	C81	4th Stage Ignition System	1,301.00
E6190U	NAS1-10000-J-1		San Marco Support	189,830.00
E6190I	NAS1-12500-J-1		San Marco Support	59,529.00

TABLE LXXXVI Concluded - FY 1974 NASA PRODUCTION (490) OBLIGATIONS

PHASE VI Continued

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6191C	NAS1-12500	143	Hawkeye Preflight Planning	$ 33,510.00
E6191I	L5120A	002	Lease Com. Lines, New Zealand	5,396.00
E6191I	L6254A	002	Hawkeye Air Cooling Dwgs.	225.00
E6191Y	NAS1-10500-03-5	007	Attitude Correction System	60,520.00
			Stock Issues	32,743.54
			Shipping	22,132.32
			Suballotment -	
			GSFC-SM-C2 Support	(65,000.00)
			-Castor Motor Hoise Beam	(6,404.00)
			-IMS (STS Direct)	(7,994.00)
			WTR	(130,380.78)
			STS DIRECT -	
			DCASO	250,000.00
			SAS-C Launch Costs	83,000.00
			IMS	499,449.53
			TOTAL	$3,762,536.07

TABLE LXXXVII - FY 1975 NASA PRODUCTION (490) OBLIGATIONS

PHASE IV	$ 15,517.00
PHASE V	340,673.00
PHASE VI	2,284,180.91
PHASE VII	9,567,125.35
SUBAUTHORIZATION (Phase VII)	91,985.74
TOTAL	$12,299,482.00

PHASE VI

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6000	NAS1-7256-27(C30)		Algol III Test Components	$ 1,607.00
E6000E	NAS1-10000	D01	Phase VI Systems Engineering	363,869.92
E6000H	NAS1-7256-6		Vehicle Processing	74,600.00
E60000	L29062A	052	T.V. Camera Tower at VAFB	4,410.50
E6000R	NAS1-12500(R16)		2nd Stg. Initiator S.L. Test	1,784.00
E6000R	NAS1-12500(R53)	H37	Atltitude Test, 60-lb. Motor	14,295.00
E6000T	NAS1-7256		Production Support	28,720.00
E6000Y	NAS1-10000(R1)		Separation/Ignition/Timer	2,573.00

TABLE LXXXVII Concluded - FY 1975 NASA PRODUCTION (490) OBLIGATIONS

PHASE VI Continued

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6183J(RAS190)	NAS1-6935-3(T51)	008	UK-4 E-Section Test Rework	$ 2,119.00
E6183J(RAS196)	NAS1-6935-4(T51)	010	UK-4 E-Section Test Rework	1,600.00
E6183J(RAS196)	NAS1-6935-4(T51)	011	UK-4 E-Section Test Rework	1,798.00
E6183J	NAS1-6935-5(T51)		UK-4 E-Section Test Rework Complet.	1,847.00
E6183J(RAS190)	NAS1-6935(T51)	009	UK-4 E-Section Test Rework	8,490.00
E6183T	NAS1-7256	Pro	Production Support	26,169.00
E6184H	NAS1-10000	G36	MTS-A Vehicle Processing	23,763.00
E6187D	NAS1-12500(R75)		Final Flight Report	38,062.00
E6187J	NAS1-12500	H48	UK-5 Mission Peculiars	11,307.00
E6187W	NAS1-12500		Incentive Award	100,000.00
E6187X	NAS1-12500(R68)		S/M Guidance Components Delivery	4,528.00
E6189M	NAS1-12500	301	ANS-A Spares	60,000.00
E6189T	NAS1-7256		ANS-A Production Support	26,160.00
E6189N	NAS1-12500		ANS-A Field Services	424,650.00
E6189W	NAS1-12500		Incentive Award	100,000.00
E6189W	NAS1-12500(R69)		Flight Anomaly Investigation	90,744.00
E6189W	NAS1-12500(R73)		Flight Anomaly Investigation	57,250.00
E6189W	NAS1-7256(R78)		ANS-A Evaluation of Diodes	5,024.00
E6190	NAS1-7256-4(C4)		San Marco Protective Barriers	2,398.00
E6190B	NAS1-12500		San Marco Mission Integration	1,974.00
E6190D	NAS1-12500		San Marco Final Flight Results	36,032.00
E6190T	NAS1-7256		Production Support	26,160.00
E6190W	NAS1-12500	174	San Marco C2 Award Incentive	100,000.00
E6191M	NAS1-12500	303	Hawkeye Spares	30,000.00
E6191T	NAS1-7256-27(C21)		Services for BE3A9 Motor	2,834.00
E6191N	NAS1-12500		Hawkeye Field Services	424,650.00
E6191V	NAS1-12500		Tooling for Hawkeye Mission	36,130.00
E6191W	NAS1-12500		Incentive Award	100,000.00
			Stock Issues	3,566.24
			Shipping	45,066.25
			TOTAL	$2,284,180.91

TABLE LXXXVIII - FY 1976 NASA (490) OBLIGATIONS

PHASE VI	$ 4,101,004.55
PHASE VII & SUBSEQUENT	6,058,752.37
SUBAUTHORIZATION (Phase VII)	415,243.08
TOTAL	$10,575,000.00

TABLE LXXXVIII Continued - NASA FY 1976 PRODUCTION (490) OBLIGATIONS

PHASE VI

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6000A	NAS1-12500		Phase VI Management	$ 342,203.00
E6000C	NAS1-10000		CAS-B Preflight Planning	22,099.00
E6000E	NAS1-12500		Phase VI Systems Engineering	284,134.00
E6000F	NAS1-12500		Phase VI Reliability	187,407.00
E6000G	NAS1-12500		Phase VI Standardization	46,659.46
E6000H	NAS1-15000		Phase VI Processing	5,270.00
E6000H	NAS1-10000(R24)		Replacement of GFE Cables	355.00
E6000H	NAS1-12500		Phase VI Vehicle Processing	19,679.00
E6000I	NAS1-12500-J-1		San Marco Support	266,845.00
E6000Q	NAS1-10000-25(C19)		Battery Cells	1,200.00
E6000R	NAS1-10000-13(R14)		Simulators	30,305.00
E6000R	NAS1-10000-13(R25)		Test Nitrogen Regulators	30,731.00
E6000R(RAS184)	NAS1-10500-01-2	006	Payload Timers	30,580.00
E6000R(RAS184)	NAS1-10500-01	007	Ship Sets P/L Sep/Ign. Timers	3,027.00
E6000V	NAS1-9258	F78	Algol III Production Tooling	170,000.00
E6000V	NAS1-15000		Tooling	43,503.00
E6180B	NAS1-6020	E17	CAS-A Mission Integration	2,535.00
E6180B	NAS1-6020-37	E18	CAS-A Mission Integration	67.00
E6180C	NAS1-10000		CAS-A Preflight Planning	25,998.00
E6180M	NAS1-10000-23		CAS-A Spares	50,000.00
E6180Y	NAS1-10000-15T		CAS-A Production Support	28,516.00
E6181K	NAS1-10000-F		Cas-A Field Training	2,286.00
E6181Y	NAS1-10000-20T		Production Support	6,700.00
E6183K	NAS1-10000F		Field Training	2,286.00
E6183Y	NAS1-10000-15T		Production Support	28,516.00
E6183Z	NAS1-10000-23M		Fourth Stage Initiator	968.00
E6183Z	NAS1-10000-23M		First Stage Initiator	770.00
E6183Z	NAS1-10000-23M		Second Stage Initiator	770.00
E6184K	NAS1-10000F		Field Training	2,286.00
E6184M	NAS1-10000-23		Spares	47,492.00
E6184T	NAS1-10000		Hawkeye Production Support	2,433.00
E6184Y	NAS1-10000-20T		Hawkeye Production Support	6,700.00
E6184Z	NAS1-10000-2T		Production Support	1,657.00
E6187E	NAS1-12500		Systems Engineering	416.00
E6187K	NAS1-10000F		Field Training	2,286.00
E6189B	NAS1-12500		Mission Integration	6,991.00
E6189D	NAS1-12500		Mission Results	20,805.00
E6189E	NAS1-12500		Systems Engineering	239,766.00
E6189F	NAS1-12500		Reliability	134,964.00
E6189G	NAS1-12500		Standardization	57,230.00
E6189H	NAS1-12500		Vehicle Processing	220,191.00
E6189T	NAS1-12500		Production Support	1,578.00
E6189V	NAS1-12500		Tooling	37,899.00
E6190K	NAS1-10000F		Field Training	2,286.00
E6190I	NAS1-12500-J-1		San Marco Support	59,529.00

TABLE LXXXVIII Concluded - NASA FY 1976 PRODUCTION (490) OBLIGATIONS

PHASE VI Continued

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6191A	NAS1-12500		Hawkeye Management	$ 234,943.00
E6191B	NAS1-12500		Hawkeye Mission Integration	16,287.00
E6191D	NAS1-12500		Hawkeye Results	49,498.00
E6191E	NAS1-12500		Hawkeye Systems Engineering	195,077.00
E6191F	NAS1-12500		Hawkeye Reliability	128,666.00
E6191G	NAS1-10000		Hawkeye Standardization	29,304.00
E6191H	NAS1-12500		Hawkeye Vehicle Processing	209,933.00
E6191K	NAS1-10000F		Field Training	2,286.00
E6191M	NAS1-7102		(16) Spare Detonators	3,200.00
E6191V(R1246)	NAS1-10500-03-5	006	Hawkeye Tooling Maintenance	3,575.00
E6191W	NAS1-15000		Hawkeye Award Incentive	100,000.00
E6191O	NAS1-7102		Balance Fixture	5,000.00
E6191R	NAS1-7102		BE3A9 Mockup	11,300.00
E6191R	NAS1-7102		BE3A9 Inert Motor	37,000.00
E6191R	NAS1-7102		2 BE3A9 Test Motors	74,000.00
E6191R	NAS1-7102		Documentation	18,500.00
E6191R	NAS1-7102-1		Improvements & Testing BE-3 Mtr.	101,875.00
E6191T	NAS1-15000		Production Support	34,858.00
E6191T	NAS1-15000-19		Production Support	18,274.00
E6191Y	NAS1-7102		BE3A9 #3 5th-Stg. Motor	72,000.00
E6192B	NAS1-15100(R111)		Preliminary Trajectory	56,438.00
E6192E	NAS1-15000		Systems Engineering	10,722.00
E6192H	NAS1-15000		Vehicle Processing	74,312.00
E6192H	NAS1-15100(R66)		4th-Stage Instrumentation	22,005.00
E6192H	NAS1-15100(R83)		Rework Roll-Yaw Unit	19,911.00
E6192H	NAS1-15100(R119)		H202 Tanks, Bladder Processing	19,740.00
E6192M	NAS1-15100		First Stage Initiator	770.00
E6192M	NAS1-15100		Second Stage Initiator	770.00
E6192M	NAS1-15100		Fourth Stage Initiator	968.00
E6192Y	NAS1-15000		Heat Shield	70,490.50
			Stock Issues	481.84
			Shipping	901.75
			TOTAL	$4,101,004.55

TABLE LXXXIX - NASA FY 197T PRODUCTION (490) OBLIGATIONS

PHASE VI	$ 73,440.00
PHASE VII	3,326,560.00
TOTAL	$3,400,000.00

TABLE LXXXIX Concluded - NASA FY 197T PRODUCTION (490) OBLIGATIONS

PHASE VI

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6180Z	NAS1-10000		First Stage Initiator	$ 770.00
E6180Z	NAS1-10000		Second Stage Initiator	770.00
E6180Z	NAS1-10000		Fourth Stage Initiator	968.00
E6190Z	NAS1-10000		First Stage Initiator	770.00
E6190Z	NAS1-10000		Second Stage Initiator	770.00
E6191M	NAS1-12500		Spares	62,432.00
E6191R	NAS1-10483-Z	014	Hawkeye Technical Support-HI/B	3,880.00
E6189Z	NAS1-12500		First Stage Initiator	770.00
E6189Z	NAS1-12500		Second Stage Initiator	770.00
E6191Z	NAS1-12500		First Stage Initiator	770.00
E6191Z	NAS1-12500		Second Stage Initiator	770.00
			TOTAL	$ 73,440.00

TABLE XC - NASA FY 1977 PRODUCTION (490) OBLIGATIONS

PHASE IV	$ 5,065.38
PHASE V	222,533.44
PHASE VI	850,377.92
PHASE VII & SUBSEQUENT	6,351,541.26
SUBAUTHORIZATION (Phase VII)	270,482.00
TOTAL	$7,700,000.00

PHASE VI

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6000F	NAS1-6020-10		Off-Site Representative	$ 28,800.00
E6000F	NAS1-6020-31		Off-Site Representative	7,420.00
E6000G	NAS1-12500	H29	AEROS-A Standardization	32,805.54
E6000M	NAS1-6020-5		Spares	83,842.00
E6000M	NAS1-6020-20		Spares	3,679.00
E60000	L84253	005	San Marco C2 GSE	1,133.85
E6000R	NAS1-10482-Z	007	Test Firing 1 Altair IIIA, AEDC	45,180.64
E6000Z	L55255	026	Test Firing 1 Altair IIA, AEDC	478.87
E6180W	NAS1-10000-48		Award Incentive	105,286.00
E6180Y	NAS1-7199-14		Scout Hardware	52,281.00
E6181Y	NAS1-7199-14		Scout Hardware	52,281.00
E6183V	NAS1-7256		Tooling	31,003.00

TABLE XC Concluded - NASA FY 1977 PRODUCTION (490) OBLIGATIONS

PHASE VI Continued

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6183W	NAS1-10000		Award Incentive	$ 105,286.00
E6184T	NAS1-7256		Production Support	26,161.00
E6184V	NAS1-7256		Tooling	31,003.00
E6184W	NAS1-10000-48		Award Incentive	105,286.00
E6184Y	NAS1-7199		Scout Hardware	52,281.00
E6184Z	NAS1-7256-27(S21)		Motors	2,427.00
E6184Z	NAS1-10000		MTS-A Inisiators	968.00
E6187Z	NAS1-10000	850	UK-5 Initiators	968.00
E6189H	NAS1-10000-37(C25)		Safe Arm Unit Mod.	10,779.00
E6189Z	NAS1-12500	848	ANS-A 4th Stage Initiators	968.00
E6190H	NAS1-10000-37(C25)		Safe Arm Unit Mod.	10,779.00
E6190Z	NAS1-10000-	C38	San Marco C2 Initiators	968.00
E6191Z	NAS1-12500	846	Hawkeye 4th Stage Initiators	968.00
E6192M	NAS1-15000		Spares	50,000.00
E6000I	L29075A	005	Range Costs	7,345.02
			TOTAL	$ 850,377.92

TABLE XCI - NASA FY 1978 PRODUCTION (490) OBLIGATIONS

PHASE IV	$ 2,600.00
PHASE V	2,767.00
PHASE VI	990.884.50
PHASE VII & SUBSEQUENT	15,184,748.50
SUBAUTHORIZATION (Phase VII)	118,363.00
TOTAL	$16,299,363.00

PHASE VI

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6000E(RAS189)	NAS1-6935(T49)		Separation System Planning Man.	$ 10,490.00
E6000G(RAS192)	NAS1-6935(T47)		Scout Std. Procedures/AMM.Depot	13,600.00
E6000H(RAS190)	NAS1-6935(T48)		E-Section Marman Clamp & Ring	11,430.00
E60000(RAS173)	NAS1-6935(T35)		SBASI G.S.E.	29,500.00
E60000(RAS159)	NAS1-6935-1(T35)		SBASI G.S.E.	7,257.00
E6000Q	NAS1-5592	018	Contract Final Costs Adjustment	52.50
E6000Q	NAS1-4664	062	Contract Final Costs	9,224.00
E6000R(RAS173)	NAS1-6935(T38)		FW4S Shelf Life Extension	84,000.00

TABLE XCI Concluded - NASA FY 1978 PRODUCTION (490) OBLIGATIONS

PHASE VI Continued

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6000R (RAS159)	NAS1-6935 (T40)		Algol IIB Comp. Nozzle Mat. Desn.	$617,000.00
E6000R (RAS159)	NAS1-6935-4 (T40)		Reduce Proof Pressure Reqmts.	-350.00
E6000R (RAS159)	NAS1-6935 (T43)		X258 and BE3A9 Shelf Life Ext.	75,239.00
E6000R (RAS159)	NAS1-6935 (T44)		S-Band Development	98,687.00
E6000R (RAS159)	NAS1-6935 (T50)		4th Stage Spin Bearing Tests	6,260.00
E6183H*RAS173)	NAS1-6935 (T47)		E-Section #31 Mods	15,400.00
E6191R (RAS159)	NAS1-6935 (T37)		Hawkeye G-Section Test	5,780.00
E6191Y (RAS159)	NAS1-6935 (T37)		Hawkeye G-Section	5,780.00
			Shipping	1,535.00
			TOTAL	$990,884.50

TABLE XCII - NASA FY 1979 PRODUCTION (490) OBLIGATIONS

PHASE VI	$ 85,604.40
PHASE VII & SUBSEQUENT	10,309,395.60
SUBAUTHORIZATION	165,000.00
TOTAL	$10,560,000.00

PHASE VI

JOB ORDER NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6000I	L29075A	009	Range Costs, SAMTEC	$ 2,114.40
E6000U	NAS1-16520	002	Phase VI Data Compilation	83,490.00
			TOTAL	$ 85,604.40

Tables XCIII through CVI present the Air Force and Navy Program Obligations.

The summary of obligations noted is as follows:

Phases prior to VI	$28,612,347.69
Phase VI	10,670,081.12
Phases Subsequent through 1977	25,317,420.42

TABLE XCIII(a)- SCOUT-AIR FORCE FY 1962 OBLIGATIONS
(62-6)(63-29)(63-32)

PHASE II	$1,967,498.37
PHASE III	1,615,803.48
PHASE IV	5,021,524.15
TOTAL	$8,604,826.00

TABLE XCIII(b)- SCOUT-AIR FORCE FY 1963 OBLIGATIONS
(62-6)(63-29)(63-32)

PHASE II	$2,359,030.24
PHASE III	901,787.09
PHASE IV	2,574,232.67
PHASE V	2,046.00
TOTAL	$5,837,096.00

TABLE XCIII(c)- SCOUT-AIR FORCE FY 1964 OBLIGATIONS
(63-29)(62-6)

PHASE II	$ 108,310.00
PHASE III	458,118.20
PHASE IV	157,852.80
TOTAL	$ 724,281.00

TABLE XCIV - SCOUT-AIR FORCE FY 1965 OBLIGATIONS
(62-6)(63-29)(65-42)

PHASE II	$ 200,000.00
PHASE III	447,916.73
PHASE IV	2,066,779.77
PHASE V	5,361.50
TOTAL	2,720,058.00

TABLE XCV - SCOUT-AIR FORCE FY 1966 OBLIGATIONS
(63-29)(65-42)

PHASE II	$ 200,000.00
PHASE IV	1,727,807.58
TOTAL	$1,927,807.58

[a] Does not include 609A or Direct Navy Program (492)

TABLE XCVI - SCOUT-AIR FORCE FY 1967 OBLIGATIONS (DOD 62-6 & 66-95)

PHASE IV	$ 5,537,159.13
PHASE V	2,182,283.69
PHASE VI	3,570,854.92
PHASE VII	450,580.47
TOTAL	$11,740,878.21

PHASE VI

J.O. NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6001E	NAS1-10000	976	Systems Engineering	$ 5,245.00
E6001E	NAS1-10000(R7)	D40	Altair III Test Fixture	1,046.00
E6001F	NAS1-10000(R16)	D41	S/L Initiator	1,863.00
E6001I	L-88316	021	Navy S-179 Costs	25,000.00
E6001I	L-88316-2	022	Navy S-179 Costs	28,922.00
E6001J	NAS1-10000(R37)	D43	SOP Volume VII	13,069.00
E6001J	NAS1-10000(R36)	D44	Roll-Yaw Simulators	5,665.00
E6001O(R9205)	L-75052		WTR FY73 Ops. & Maint.-SAMSO	10,000.00
E6001U	L-84997	008	LRC Support	58,960.00
E6001U	NAS1-4664	042	LRC Support	34,695.00
E6001U	NAS1-4664	043	LRC Support	7,809.00
E6001U	NAS1-4664	044	LRC Support	1,000.00
E6001U	NAS1-4664	046	LRC Support	6,500.00
E6001U	NAS1-4664	055	LRC Support	456,206.23
E6178A	NAS1-7256	504	Administration	205,260.00
E6178C	NAS1-7256	498	Preflight Planning	3,059.00
E6178D	NAS1-12500	146	Data Analysis	32,591.00
E6178E	NAS1-7256	525	Systems Engineering	140,039.00
E6178E	NAS1-10000	F15	Systems Engineering	1,132.00
E6178F	NAS1-7256	528	Reliability	119,517.00
E6178G	NAS1-7256	533	Standardization	58,863.00
E6178H	NAS1-7256	543	Vehicle Processing, NA-16	148,281.00
E6178H	NAS1-7256-3	722	Install Cork, Base A Fins,NA-16	1,003.00
E6178N	NAS1-10000	B21	Field Services	386,217.00
E6178N	NAS1-10000-11	B27	Field Services	7,011.00
E6178R	NAS1-12500-18-R18	258	Spin Anomaly, NA-16	5,814.00
E6178R	NAS1-7256-28	553	Castor Shelf Life Extension	405.00
E6178W	NAS1-10000-29	E59	Award Incentive, NA-16	105,286.00
E6178Y	NAS1-5610	142	Heat Shield A-050	16,500.00
E6178Y	NAS1-7199	613	Vehicle Procurement, NA-16	420,358.00
E6178Z	NAS1-5610-9	E53	Algol Squib Ret. Assy.	350.00
E6178Z	NAS1-5610-4	E54	Algol IIB Initiator	538.00
E6178Z	NAS1-10000-2T	F11	Third-Stage Initiator	1,656.40

TABLE XCVI Completed - SCOUT-AIR FORCE FY 1967 OBLIGATIONS
(DOD 62-6 & 66-95)

PHASE VI Continued

J.O. NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6182A	NAS1-10000	G14	Administration	$ 318,938.00
E6182C	NAS1-10000	758	Preflight Planning	32,292.00
E6182D	NAS1-10000	788	Data Analysis	41,959.00
E6182E	NAS1-10000	B33	Systems Engineering	2,255.00
E6182H	NAS1-10000	D56	Processing	150,371.00
E6182J	NAS1-10000	G12	Cooling Air Sep. H/S A406 & Sup.	36,325.00
E6182M	NAS1-10000	945	Spares	40,000.00
E6182N	NAS1-10000	B24	Field Services	386,217.00
E6182N	NAS1-10000-11		Field Services	3,119.79
E6182V	NAS1-10000	E61	Tooling Maintenance	65,262.00
E6182W	NAS1-10000	G15	Award Incentive	105,286.00
E6182Z	NAS1-7199-1	G86	Third-Stage Motor	74,188.00
E6182Z	NAS1-10000	E62	First-Stage Motor	770.00
E6182Z	NAS1-10000	E63	Second-Stage Motor	770.00
E6182Z	NAS1-10000	G13	Third-Stage Initiator	1,656.40
E6182Z	NAS1-10000	997	FW-4S Initiators, NA-15	968.00
			Shipping	617.10
			TOTAL	$3,570,854.92

TABLE XCVII - SCOUT-AIR FORCE FY 1968 OBLIGATIONS
(DOD 66-95 & 68-71)

PHASE IV	$ 59,313.00
PHASE V	271,311.49
PHASE VI	2,094,883.04
PHASE VII	5,011,833.91
TOTAL	$7,437,341.44

PHASE VI

E60010	L-29062A	053	T.V.Camera Tower at VAFB	$ 4,410.50
E60010	L-29062A	988	T.V.Camera Tower at VAFB	4,410.50
E6001R	NAS1-10481-Z	005	Technical Support by Hercules	157,391.00
E6002I	L-7930A		WTR Range Support	2,694.22
E6002I	L-5098A	009	50% WTR FY75 Maint. & Ops.	37,500.00
E6002R	L-55255Z	007	AEDC Test Firing X-259	13,223.74
E6002R	L-55255Z	008	AEDC Test Firing X-259	13,233.74
E6002Z	L-55240	006	Antares Casting Powder	58,015.52
E6178M	NAS1-10000		Spares	40,000.00

TABLE XCVII Concluded - SCOUT-AIR FORCE FY 1968 OBLIGATIONS
(DOD 66-95 & 68-71)

J.O. NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
PHASE VI Continued				
E6178T	NAS1-6020-7-E		X-258 Off-site Rep.	$ 61,477.00
E6178T	NAS1-6020-15-E		X-258 Off-site Rep.	8,667.00
E6178V	NAS1-7256-V	E37	Tooling Maintenance	31,003.00
E6178Y	NAS1-7199-14	G90	S-Band	44,689.00
E6178Y	NAS1-7199-14		Roll-Yaw	6,680.00
E6178Y	NAS1-7199-23	G75	SBASI Harness	108.00
E6178Z	NAS1-5883-3		Fourth-Stage Motor	34,501.00
E6178Z	NAS1-7199	G91	Second-Stage Motor	96,215.00
E6178Z	NAS1-7199-1	G99	Third-Stage Motor	74,188.00
E6178Z	NAS1-7199-4	G92	First-Stage Motor	122,720.00
E6178Z	NAS1-10000-M	F12	First-Stage Initiator	770.00
E6178Z	NAS1-10000-M	F13	Second-Stage Initiator	770.00
E6178Z	NAS1-10000-M	F14	Fourth-Stage Initiator	968.00
E6178R	NAS1-10481-Z		Technical Support to Fourth Stage	3,006.00
E6178R	NAS1-10482-Z		Second-Stage Technical Support	4,811.00
E6179J	NAS1-12500-R143		GFE S-179	8,071.00
E6179C	NAS1-10000	F19	Preflight Planning	25,673.00
E6179E	NAS1-10000		Systems Engineering	4,173.00
E6179I	L-88316	486	Navy S-179 Costs	55,455.00
E6179H	NAS1-7256-3	851	Install Cork, Base A Fins, S-179	1,004.00
E6179M	NAS1-7256	E40	Spares	8,692.00
E6179R	NAS1-7256-28		Castor Shelf Life Extension	405.00
E6179V	NAS1-7256		Tooling Maintenance	31,003.00
E6182B	NAS1-6020	520	Mission Integration	2,926.00
E6182B	NAS1-6020-37	E19	Mission Integration	77.00
E6182Y	NAS1-7199-14		Eoll-Yaw	6,680.00
E6182Y	NAS1-7199-14	578	S-Band	44,689.00
E6182Z	NAS1-7199	609	Second-Stage Motor	96,215.00
E6182Z	NAS1-7199-16	610	Fourth-Stage Motor	75,437.00
E6182Z	NAS1-7199-4	G98	First-Stage Motor	122,720.00
E6192C	NAS1-12500	H27	Preflight Planning	11,203.00
E6192E	NAS1-12500	H25	Systems Engineering	7,012.42
E6192E	NAS1-15000	H66	Systems Engineering	9,831.00
E6192H	NAS1-12500		Recertification	166,616.00
E6192H	NAS1-12500-R91	H26	Retest Guidance System	12,214.00
E6192M	NAS1-12500	302	Spares	13,871.00
E6192R	NAS1-12500-R4		Vehicle Instrumentation	4,474.00
E6192W	NAS1-15000	H63	Award Incentive	100,000.00
E6192Y	NAS1-7199	583	Vehicle Hardware	210,358.00
E6192Z	NAS1-12500-R173	828	Antares Retest	18,986.57
E6192Z	NAS1-12500-R191		Fourth-Stage Motor Change	66,085.00
E6192Z	NAS1-14200	009	Third-Stage Motor	51,615.00
E6192Z	NAS1-15000-M	H62	Third-Stage Initiator	968.00
E6192Z	NAS1-15100	012	Fourth-Stage Initiator	968.00
E6192Z	NAS1-15100-M	017	First-Stage Initiator	770.00
E6192Z	NAS1-15100-M	018	Second-Stage Initiator	770.00
			Shipping	3,754.32
			Travel	14,409.51
			TOTAL	$2,094,883.04

TABLE XCVIII - SCOUT-AIR FORCE FY 1969 OBLIGATIONS
(DOD 63-29) (62-6)

PHASE IV	$326,183.30
DIRECT FIELD SERVICES	158,350.00
TOTAL	$484,533.30

TABLE XCIX - SCOUT-AIR FORCE FY 1970 OBLIGATIONS
(DOD 66-95)

PHASE VI	$ 970,882.77
PHASE VII	50,048.23
TOTAL	$1,020,931.00

PHASE VI

J.O. NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6001E	NAS1-4664	054	LTV Support	$ 932,207.35
E6182B	NAS1-10000	E93	Mission Integration	7,588.00
E6182Y	NAS1-6935(T5)		Roll-Yaw Unit	6,680.00
E60010	L-29075A	F61	WTR Range Services	24,407.42
			TOTAL	$ 970,882.77

TABLE C - SCOUT-AIR FORCE FY 1971 OBLIGATIONS
(DOD 66-95)

PHASE V	$ 263,678.50
PHASE VI	617,677.16
PHASE VII	731,999.62
TOTAL	$1,613,355.28

PHASE VI

J.O. NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E60011	L-88316	023	50% WTR FY74 Ops. & Maint.	$ 10,000.00
E60010	NAS1-10000(R33)	386	Heat Shield Ducting for RTG	21,934.00

TABLE C Concluded - SCOUT-AIR FORCE FY 1971 OBLIGATIONS
(DOD 66-95)

J.O. NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6178H	NAS1-10000-(R55)	E60	Refurbish Specific Sections 178	$ 20,412.00
E6178T	NAS1-7256	E36	Production Support	26,161.00
E6178Y	NAS1-11000	087	Dummy Roll-Yaw	200.00
E6182H	NAS1-10000-13(R42)	G21	RTG Reprocessing Support	16,755.00
E6182N	NAS1-10000-11	B36	Launch Ops. Transportation	7,011.00
E6182T	NAS1-7256	E46	Production Support	26,161.00
E6182V	NAS1-7256	E47	Tooling Maintenance	31,003.00
E6182Y	NAS1-6935-2(T41)	038	Heat Shield	31,451.00
E6182Y	NAS1-7199	550	Vehicle Hardware	420,358.00
E6182Y	NAS1-7199-23	G85	SBASI Harness	108.00
E6182Y	NAS1-6935-(T5)		Roll-Yaw Unit	6,680.00
E6182Y	NAS1-11000	068	Dummy Roll-Yaw	200.00
			Shipping	2,702.47
			Travel	-3,459.31
			TOTAL	$ 617,677.16

TABLE CI - SCOUT-AIR FORCE FY 1972 OBLIGATIONS
(DOD 66-95 & 68-71)

PHASE VI	$ 19,181.50
PHASE VII	582,847.27
TOTAL	$ 602,028.77

PHASE VI

J.O. NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6002L	L-7930A	010	Range Services	$ 2,694.22
E6002Z	L-55240	002	Antares Casting Powder	646.28
E6182R	NAS1-10482-Z		Technical Support, 2nd Stg.	4,811.00
E6182R	NAS1-10483-Z		Technical Support, 3rd Stg.	3,744.00
E6182R	NAS1-10484-Z		Technical Support, 1st Stg.	3,772.00
E6192E	NAS1-15000		Systems Engineering	3,514.00
			TOTAL	$ 19,181.50

TABLE CII - SCOUT-AIR FORCE FY 1973 OBLIGATIONS
(DOD 66-95)

PHASE VI	$	14,746.08
PHASE VII		49,404.92
TOTAL	$	64,151.00

PHASE VI

Shipping	$	27.08
Travel		14,719.00
TOTAL	$	14,746.08

TABLE CIII - SCOUT-AIR FORCE FY 1974 OBLIGATIONS
(DOD 68-71)

PHASE VI	$ 779,046.70
PHASE VII	10,871,206.03
TOTAL	$11,650,252.73

PHASE VI

J.O. NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6002U	L-12905A	002	Progress Report	$ 69.60
E6002H	NAS1-15000		Vehicle Processing	5,242.00
E6002I	L-5098A	010	Range Costs	36,077.00
E6002V	NAS1-15000		Tooling	43,503.00
E6179M	NAS1-7256		Spares	40,000.00
E6182N	NAS1-10000-11		Field Services	3,891.21
E6192B	NAS1-12500	H28	Mission Integration	921.00
E6192B	NAS1-15000		Mission Integration	4,239.00
E6192C	NAS1-15000		Preflight Planning	24,326.00
E6192E	NAS1-15000	H64	Systems Engineering	10,722.00
E6192H	NAS1-15000		Vehicle Processing	73,920.00
E6192T	NAS1-7256-12		Production Support	7,650.00
E6192T	NAS1-15000-9		Production Support	35,184.00
E6192T	NAS1-15000-19		Production Support	18,043.00
E6192Y	NAS1-7199	593	Vehicle Hardware	210,000.00
E6192Y	NAS1-7199-23	C14	Fabricate SBASI Harness	108.00
E6192Y	NAS1-11000	072	Dummy Roll Yaw	200.00
E6192R	NAS1-10482-Z	012	Technical Support, TCC	13,882.00
E6192Y	NAS1-15000		Heat Shield	70,490.50
E6192Z	NAS1-11400		Nozzle/Igniter Hardware	991.00
E6192Z	NAS1-11400		Third-Stage Case	64,187.45
E6192H	NAS1-15000(R230)		Rework vehicles S-192	7,821.00
E6192H	NAS1-15000(R232)		Assignment of NOVA-II to S-192	43,662.00
E6192H	NAS1-15000(R241)		Inspect & rework E-Section	62,023.00
			Shipping	1,777.48
			Travel	116.46
			TOTAL	$ 779,046.70

TABLE CIV - SCOUT-AIR FORCE FY 1975 OBLIGATIONS
DOD (68-71)

PHASE VI	$ 46,363.85
PHASE VII	1,153,636.15
TOTAL	$1,200,000.00

PHASE VI

J.O. NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E60021	L-22387A	005	SAMTEC Ops. and Maintenance	$ 37,500.00
E60020	L-29062A	17	Facility Mod. & Refurbishment	3,691.00
E60020	L-29062A	18	Facility Mod. & Refurbishment	4,557.00
			Shipping	615.85
			TOTAL	$ 46,363.85

TABLE CV - SCOUT-AIR FORCE FY 1976 OBLIGATIONS
DOD (68-71)

PHASE VI	$2,556,397.91
PHASE VII	4,133,477.36
TOTAL	$6,689,875.27

PHASE VI

J.O. NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
E6179B	MAS1-12500(BKH)	698	Heat-Shield Design	$ 2,608.00
E6179B	NAS1-12500(BEF)	699	Preliminary Trajectory	3,797.00
E6179B	NAS1-12500(BGD)	700	Environmental Study	10,338.00
E6179B	NAS1-12500(R165)(JDA)	712	Interface Drawing Brochure	8,410.00
E6179D	NAS1-12500(R165)	711	Preflight Planning	20,599.00
E6179D	NAS1-12500(R165)		Final Report	42,500.00
E6179E	NAS1-12500	A03	Systems Engineering	48,310.00
E6179H	NAS1-10000(R092)	F16	Retest Vehicle Components	9,258.00
E6179H	NAS1-10000	972	Vehicle Processing	148,375.00
E6179H	NAS1-12500(HGG)		Personnel From Dallas	87,794.00
E6179H	NAS1-12500(R164)	709	Retest Vehicle Components	7,411.00
E6179H	NAS1-12500(R165)(JDD)		Fit Check	16,269.00
E6179H	NAS1-12500(R91)		Retest Guidance Components	12,214.00
E6179H	NAS1-12500(HEK)	A05	Heat-Shield Mods.	31,675.00
E6179I	L-29075A	007	Range Services	62,429.00
E6179J	NAS1-12500(R165)(JD)		Vehicle Reassignment	12,711.00
E6179J	NAS1-12500(R165)(JDE)		Guidance Reprograming	5,721.00

TABLE CV Continued - SCOUT-AIR FORCE FY 1976 OBLIGATIONS

J.O. NO.	ORDER NO.	ITEM	DESCRIPTION	OBLIGATION
PHASE VI Continued				
E6179M	NAS1-10000	F17	Spares	$ 48,021.00
E6179N	NAS1-12500	704	Field Services	220,364.00
E6179Q	NAS1-12500A	706	DCASO	15,080.00
E6179R	NAS1-10482-Z	011	Technical Support, 2nd Stg.	6,536.00
E6179R	NAS1-10483-Z		Technical Support, 3rd Stg.	3,880.00
E6178R	NAS1-10484-Z		Technical Support, 1st Stg.	6,180.00
E6179Y	NAS1-11000	059	Dummy Roll-Yaw	200.00
E6179Y	NAS1-11000-10	B01	Heat Shield	40,000.00
E6179Y	NAS1-12500(R163)(JB)	648	Fourth-Stage TM	41,947.00
E6179Y	NAS1-12500(R49)		Modify Safe Arm Unit	492.00
E6179Z	NAS1-7199-4	G80	First-Stage Motor	122,720.00
E6179Z	NAS1-7199	988	Second-Stage Motor	96,215.00
E6179Z	NAS1-10000M	973	First-Stage Initiator	770.00
E6179Z	NAS1-10000M	786	Second-Stage Initiator	770.00
E6179Z	NAS1-10000T		Third-Stage Initiator	1,656.40
E6179Z	NAS1-10000M		Fourth-Stage Initiator	968.00
E6179Z	NAS1-11400	093	Third-Stage Motor	77,600.00
E6179Z	NAS1-11400		Fourth-Stage Motor	34,501.00
E6179R	NAS1-12500(R173)	788	Antares Retest	28,736.00
E6179R	NAS1-12500(R173)		3rd Stage Igniter	9,000.00
E6179T	NAS1-7256	E41	Production Support	26,161.00
E6179V	NAS1-10000	F18	Tooling Maintenance	68,502.00
E6179W	NAS1-12500	707	Award Incentive	100,000.00
E6179Y	NAS1-7199	G78	Vehicle Hardware	420,358.00
E6179Y	NAS1-7199-14	G76	S-Band	43,638.00
E6179Y	NAS1-7199-14	G77	Roll-Yaw	6,680.00
E6179Y	NAS1-7199-23	G79	Fabricate SBASI Harness	108.00
E6192I	L-68200A	001	Range Cost	152,294.13
E6192R	NAS1-10484-Z		Tech. Supt., 1st & 4th Stg.	19,618.18
E6192T	NAS1-7256	E31	Production Support	18,510.00
E6192V	NAS1-7256	E32	Tooling	31,004.00
E6192Z	NAS1-11400	F05	Fourth-Stage Case	12,724.00
E6192Z	NAS1-11400		2nd Stage Motor	55,000.00
E6192Z	NAS1-13100		First-Stage Motor	286,147.00
			Shipping	20,279.94
			Travel	14,638.44
			TOTAL	$2,556,397.91

TABLE CVI - SCOUT-AIR FORCE FY 1977 OBLIGATIONS[a]

PHASE VI	$ 47.19
PHASE VII	2,270,851.85
TOTAL	$2,270,899.04

PHASE VI

Shipping	$ 47.19
TOTAL	$ 47.19

(a) Includes 197T.

The decision to appoint the Air Force as contractor for the field crew at VAFB was agreed to mutually by the NASA Administrator and the Air Force Commanding General. This in effect during fiscal years 1967 through 1970. During this time period, D.O.D. paid Vought for all field costs and deducted the NASA prorated costs for the MIPR 66-95 and MIPR 63-29 from the funding due NASA. The amounts, by fiscal years exchanged, for this agreement are as follows:

MIPR 66-95		
	FY 1967	$210,372.00
	FY 1968	164,200.00
	FY 1969	12,109.00
	FY 1970	134,250.00
MIPR 63-29		
	FY 1969	158,350.00

This deduction from D.O.D. funds due NASA, resulted in NASA prorating D.O.D. costs on the Vought management contract for the same amount.

The total Phase VI (490) obligations summarize as follows in table CVII.

TABLE CVII - TOTAL PHASE VI (490) OBLIGATIONS

FY	NASA	DOD	OTHERS	TOTAL
1966	$ 15,782.00	$ 0	$ 0	$ 15,782.00
1967	136,552.00	3,570,854.92	0	3,707,406.92
1968	1,046,703.97	2,094,883.04	0	3,141,587.01
1969	4,105,466.74	0	0	4,105,466.74
1970	2,631,067.77	970,882.77	50,000.00	3,651,950.54
1971	6,681,575.41	617,677.16	1,500,000.00	8,799,252.57
1972	7,569,669.90	19,181.50	850,000.00	8,438,851.40
1973	3,679,173.96	14,746.08	2,652,832.11	6,346,752.15
1974	3,972,314.85	779,046.70	5,723,161.00	10,474,522.55
1975	2,284,180.91	46,363.85	2,296,078.44	4,626,623.20
1976	4,101,004.55	2,556,397.91	1,035,230.21	7,692,632.67
197T	73,440.00	0	0	73,440.00
1977	850,377.92	47.19	313,781.64	1,164,206.75
1978	990,884.50	0	120,492.80	1,111,377.30
1979	85,604.40	0	0	85,604.40
TOTAL	$38,223,798.88	$10,670,081.12	$14,541,576.20	$63,435,456.20

The prorated costs associated with the major Scout contracts are presented in this chapter:

STATISTICAL COSTS

In order to have complete financial control of a program similar to Scout, it is necessary to determine costs for specific requirements. The major unit statistics that are presented in detail include the following:

NOTE: This list continues on page 399.

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Figure 105.- Contract NAS1-5610 - Proration of Costs.

ITEM	SCOUT VEHICLE NUMBER	PHASE IV NASA	PHASE IV NAVY	PHASE IV A.F.	PHASE V NASA	PHASE V NAVY	PHASE V ESRO	PHASE VI NASA	PHASE VI NAVY	PHASE VI ESRO	TOTAL
Vehicle Hardware and Heat Shield		$	$	$	$	$	$	$	$	$	$
Scout less H/S	163				443,600						443,600
Scout less H/S	164				443,600						443,600
Scout + H/S A47	165				460,100						460,100
Scout + H/S A58	166				460,100						460,100
Scout + H/S A45	167				460,100						460,100
Scout + H/S A48	168				460,100						460,100
Scout + H/S A53	169				460,100						460,100
Scout less H/S	170				443,600						443,600
Scout less H/S	171				443,600						443,600
Scout + H/S A56	172						460,100				460,100
Scout + H/S A54	173				460,100						460,100
Scout + H/S A57	174				460,100						460,100
Scout less H/S	175				443,600						443,600
Scout + H/S A55	176					460,100					460,100
Scout less H/S	177				443,600						443,600
Heat Shields											
A43	153	16,500									16,500
A44	162		16,500								16,500
A46	160	16,500									16,500
A49	161	16,500									16,500
A50	178								16,500		16,500
A51	204								*16,500		16,500
A52	199								*16,500		16,500
E-Transition Section					18,350						18,350
Lower D-Section					6,655						6,655
Mod. 3 - Auto. Destruct Module					30,069	2,313	2,313				34,695
Mod. 7 - Fifth-Stage Mods.								38,750			38,750
Mod. 7 - Convert to S. S. Tubes					5,642	434	434				6,510
Mod. 9 - CCN 15 - Temp. Measurements (8 veh.)					2,476	412	412				3,300
Algol IIB First-Stage Motors:											
S/N 59	161	127,100									127,100
60	168				127,100						127,100
61 Test Motor					127,100						127,100
62	160	127,100									127,100
63	172						127,100				127,100
64	167				127,100						127,100
65	164				127,100						127,100
66	175				127,100						127,100
67	169				127,100						127,100
68	174				127,100						127,100
69	163				127,100						127,100
70 Test Motor	SLS							127,100			127,100
71	166				127,100						127,100
72	171				127,100						127,100
73	165				127,100						127,100
74	173				127,100						127,100
75	176					127,100					127,100
Algol Nozzle Assys. (3)											52,140
	144	17,380									
	160	17,380									
	161	17,380									
Algol Igniter Assys. (4)											3,340
	144	835									
	160	835									
	161	835									
	162		835								
Algol Squib Retainers (2)											352
	144	176									
	159	176									
Algol Nozzle Leak Check Tooling					1,490						1,490
Mod. 4 - CCN2 - Algol Initiators		1,077			5,923	538	538		538		8,614
Mod. 9 - CCN4 - Squib Ret. Assys.		700			3,850	350	350		350		5,600
Mod. 13 - Storage of Algols					3,205						3,205
Castor II Second-Stage Motors											
S/N 170	162		99,680								99,680
171	169				99,680						99,680
172	165				99,680						99,680
173	167				99,680						99,680
174	164				99,680						99,680
175	174				99,680						99,680
176	171				99,680						99,680
177 Test Motor					99,680						99,680
178	163				99,680						99,680
179	172						99,680				99,680
180	175				99,680						99,680
181	177				99,680						99,680
182	173				99,680						99,680
183	166				99,680						99,680
184	176					99,680					99,680
Castor Pyrogen Igniter					1,693						1,693
Mod. 4 - CCN5 GFP Castor Case (Test)					(-5,100)						(-5,100)
X-259 Third-Stage Motors											
B3 S/N 211 Test Motor					57,060						57,060
212	158			57,060							57,060
213	162		57,060								57,060
214	172						57,060				57,060
215	165				57,060						57,060
216	167				57,060						57,060
217	169				57,060						57,060
218	174				57,060						57,060
219	176					57,060					57,060
220	157		57,060								57,060
221	171				57,060						57,060
222 Test Motor					57,060						57,060
223	177				57,060						57,060
224	173				57,060						57,060
225	144	57,060									57,060
226	175				57,060						57,060
Mod. 7 - CCN10 Repair Containers					7,480						7,480
Mod. 8 - CCN12 Third-Stage Init.			1,429	714	6,429	714	714				10,000
Mod. 8 - CCN 13 Exit Cones (8) Mods.					3,850						3,850
FW4S Fourth-Stage Motors											
2223-1	167				33,070						33,070
2223-2	168				33,070						33,070
2223-3	174				33,070						33,070
2223-4	165				33,070						33,070
2223-5	169				33,070						33,070
2223-6	172						33,070				33,070
2223-7	177				33,070						33,070
2223-8	144	33,070									33,070
2223-9	171				33,070						33,070
2223-10	175				33,070						33,070
2223-11	166				33,070						33,070
2223-12	183							33,070			33,070
2223-13	185									33,070	33,070
2223-14	173				33,070						33,070
2223-15	180							33,070			33,070
2223-16	163				33,070						33,070
Mod. 7 - CCN3 NDT FW4S Nozzle Inserts					23,696						23,696
Mod. 8 - CCN12 Fourth-Stage Initiators					7,500		625	1,250		625	10,000
Mod.10 - CCN16 Reinforce Nozzles					54,000						54,000
Mod.10 - CCN17 Test Shipping Containers					13,130						13,130
Mod.15 - CCN12 Leak Test Nozzles (12)					1,257						1,257
Mod.16 - Refurbish Tooling					24,846						24,846
TOTAL		$450,604	$232,564	$ 57,774	$ 9,754,471	$748,701	$782,396	$233,240	$50,388	$ 33,695	$12,343,833

SLS = Shelf Life Study.
*Phase VIII.

Figure 106(a).- NAS1-6020 Proration of Costs.

TASK	PHASE IV													
	NASA (Total $4,603,397)							NAVY (Total $1,843,460)				AIR FORCE ($1,232,338)		
	PRDTN SUPPORT	152	153	155	159	160	161	154	156	157	162	150	151	158
A	$	$120,783	$	$ 49,790	$ 169,392	$ 160,392	$120,783	$	$188,839	$	$	$	$	$ 240,587
A-Indirect (1)									51,748	240,587	240,587			
B				5,266	15,603	10,532	5,461		975	1,560	3,511			6,826
Mod. 37				138	588	276	143		26	41	92			179
C		23,977	1,347	26,132	36,100	21,822	19,936	808	26,402	3,502	4,580		1,617	4,849
D		32,920	22,171	34,264	37,623	36,280	40,983	41,654	37,623	41,655	37,623	76,590	70,544	43,670
Trans. to R														
E					176,033	176,033	176,033							281,156
Mod. 7											15,369			
Mod. 10											2,167			
Mod. 15														
Mod. 31														
Mod. 42														
F					123,111	123,111	123,112							231,295
Mod. 15														
G					70,864	70,864	70,865							117,159
Mod. 6														
Mod. 17														
H,J,K,& T					263,096	263,096	263,096		263,096	263,096	263,096			42,044
Mod. 2					622	622	623		623	623	623			623
Mod. 4														
Mod. 6														
Mod. 10	14,719													
Mod. 13														
Mod. 15											2,167			
Mod. 18						465	465				465			
Mod. 24							18,900							
Mod. 29														28
L SPARES		24,318	2,604	24,318	5,003	37,899	37,899		13,581	13,581	13,581			94,250
Mod. 7					3,159	3,158	3,158		3,158	3,158	3,158			3,158
Mod. 8	5,260				9,500	9,500	9,500		9,500	9,500	9,500			9,500
Mod. 11					3,560	3,560	3,560		3,561	3,561	3,561			3,560
Mod. 14					98	98	98		99	99	99			99
Mod. 20	85,400				3,275	3,275	3,275		3,275	3,275	3,275			3,275
Mod. 28														
Mod. 36														
M-Field-Wallops					396,280	396,280								
Mod. 5														
Mod. 15														
Mod. 38														
N-Field-WTR				593,894										
Mod. 2				-522,902										
N-Direct (1)		-120,783		-49,790			-120,783							
P	296,623													
R Mod. 12		-375,000												
Mod. 13		262,542												
Mod. 15														1,329
Mod. 17										4,283				
Mod. 27						-375,000								
Mod. 30						719,191								
Mod. 39						250,000								
(D Transfer)														
S														
Mod. 16	40,732									3,160				
Mod. 19	2,859													
Mod. 32	-657													
Mod. 35									3,357					
T (See H above)														
TOTAL	$444,936	($-31,243)	$26,122	$161,110	$1,313,907	$1,911,454	$777,111	$42,462	$605,863	$591,681	$603,454	$76,590	$72,161	$1,083,587

(1) Compensation for LTV contract direct with the A.F. for launch services.

Figure 106(b)- NAS1-6020 Proration of Costs.

TASK	PHASE V										PHASE VI				BASIC TASKS NEGOTI-ATED	TASK MODI-FICA-TIONS	VEHS. 170-174 TERMI-NA-TION (Mod.33)	FINAL ADJUST-MENT (Mod. 41)	FINAL COSTS
	NASA ($5,453,386)									NAVY	NASA ($276,403)		NAVY ($73,147)						
	163	164	165	166	167	168	169	175	ENGINEER-ING SUP-PORT	176	180	PRDTN SUPPORT	182	178					
A	$160,391	$160,392	$120,783	$	$120,783	$ 160,392	$160,392	$	$	$	$	$	$	$	$2,070,971	$	$-48,028	$ -98,244	$ 1,924,699
A-Indirect: (1)																			532,922
B		13,457	15,603	12,283	36,276	22,234	33,741	4,876		1,365	2,535		2,926		219,743			-24,709	195,034
Mod. 37		353	410	323	952	584	886	128		36	67		77			5,120			5,120
C	1,617	29,904	33,676		14,009	17,781	1,347								294,483		-33,686	8,609	269,406
D		35,608	48,373		2,016	32,249									834,704		-150,178	-12,680	671,846
Trans.to R																		(-46,000)	(-46,000)
E	176,032	176,032	176,032		176,032	176,032	176,033								2,044,437		-22,629	-156,360	1,865,448
Mod. 7										15,369				61,477		92,215			92,215
Mod. 10												28,800				28,800			28,800
Mod. 15										2,167				8,667		13,001			13,001
Mod. 31												7,420				7,420			7,420
Mod. 42										-142						-142			-142
F	123,111	123,111	123,111		123,111	123,111	123,111								1,356,947		-5,774	-11,878	1,339,295
Mod. 15									5,380							5,380			5,380
G	70,863	70,863	70,863		70,863	70,863	70,863								876,155		-22,025	-99,200	754,930
Mod. 6									11,132							11,132			11,132
Mod. 17									11,534							11,534			11,534
H,J,K,&T	136,875	136,875	136,875		136,875	136,875	136,875								2,503,111		-546,775	485,534	2,441,870
Mod. 2									6,939							11,298			11,298
Mod. 4									8,667							8,667			8,667
Mod. 6									20,046							20,046			20,046
Mod. 10									6,310							21,029			21,029
Mod. 13									26,800							26,800			26,800
Mod. 15									7,690			53,002				60,692			60,692
Mod. 18																1,395			1,395
Mod. 24																18,900			18,900
Mod. 29	310	310	310		310	311	311		9,210							11,100			11,100
L-SPARES (2)		4,000	4,000		4,000	4,000									505,208			-222,174	283,034
Mod. 7																22,107			22,107
Mod. 8		10,479	10,479		10,479	10,479										113,676			113,676
Mod. 11		18,500	18,500		18,500	18,500						83,870		*15,526		198,319			198,319
Mod. 14		7,217	7,218		7,218	7,218										29,561			29,561
Mod. 20												3,679				112,004			112,004
Mod. 28		10,145	10,145		10,145	10,146										40,581			40,581
Mod. 36		15,750	15,750		15,750	15,751										63,001			63,001
M-Field-Wallops (2)		396,281				396,281									1,864,306			-279,184	1,585,122
Mod. 5									79,086							79,086			79,086
Mod. 15									10,998							10,998			10,998
Mod. 38									-27,037							-27,037			-27,037
N-Field-WTR															533,957			59,937	593,894
Mod. 2 (1)																-522,902			-522,902
N-Direct			-120,783		-120,783														-532,922
P									64,570						370,178			-8,985	361,193
R Mod. 12																-375,000			-375,000
Mod. 13																262,542			262,542
Mod. 15	8,916	8,916	8,916		8,916	8,916	8,917									54,826			54,826
Mod. 17																4,283			4,283
Mod. 27																-375,000			-375,000
Mod. 30																714,000		5,191	719,191
Mod. 39																250,000			250,000
(D Transfer)																		(46,000)	(46,000)
S																			
Mod. 16	1,914	1,914	1,914		1,914	1,915	1,915		8,676							64,054			64,054
Mod. 19									34,984			81,504				119,347			119,347
Mod. 32																-657			-657
Mod. 35									3,227							6,584			6,584
	$680,029	$1,220,107	$682,175	$12,606	$637,366	$1,213,638	$714,391	$5,004	$288,070	$18,937	$2,602	$258,275	$3,003	$85,670	$13,474,200	$1,198,760	$-829,095	$-446,143	$13,489,722

(1) Compensation for LTV contract direct with the A.F. for launch services.
(2) Designation for this contract only, Spares (L), Field Services-Wallops (M).

*Phase II transfer of 66-95 funds for Scout S-113.

Figure 107.- Contract NAS1-6935 - Proration of Costs

PHASE		IV	V				VI					VII		
				NASA										
ITEM	JOB ORDER NO.	NASA	490	180	497	OTHERS	NASA-490	NAVY-490	AEROS-B	UK-X4	OTHERS	NASA	OTHERS	TOTAL
Task 1	R1226(RAS142)	$	$	$ 90,200	$	$	$	$	$	$	$	$	$	$ 90,200
M-3	R1226(RAS142)			-700										-700
Task 2	E1008(RAS149)				3,300									3,300
Task 3	E1008(RAS160)				3,975									3,975
Task 4	E5164J(RAS149)		159,000											159,000
Task 5	R1260(RAS152)			84,220										84,220
	E5176Y					6,680(1)								6,680
	E6182Y							6,680						6,680
M-2	R1260(RAS152)			-200										-200
Task 6	E5000H(RAS140)		2,400											2,400
Task 7	E5000R(RAS140)		8,013											8,013
Task 8	R1226(RAS142)			122,300										122,300
Task 9	(RJF194)		2,400											2,400
M-1	E5164J(RAS125)		750											750
Task 10	R1226(RAS168)			118,088										118,088
M-3	R1260(RAS152)			6,773										6,773
M-4	E5000R (RAS173)		34,021											34,021
M-8	E5000R (RAS173)		-1,538											-1,538
Task 11	E6000H(RAS140)						90,144							90,144
	E5169R(RAS140)		8,910											8,910
	E6180R(RAS140)						8,930							8,930
	E5174R(RAS140)		8,930											8,930
	E6183R(RAS140)						8,930							8,930
	E7198R(RAS140)												8,930(2)	8,930
	E4144Y(RAS140)	8,930												8,930
	E4144R(RAS140)	8,930												8,930
	E6183Y(RAS140)						8,930							8,930
	E6185R(RAS140)										8,930(3)			8,930
	E7193R(RAS140)											8,930		8,930
	E5172R(RAS140)					8,930(3)								8,930
	E5174Y(RAS140)		8,930											8,930
	E6180Y(RAS140)						8,930							8,930
	E5177Y(RAS140)		8,930											8,930
Mod-3	E5000H(RAS140)		1,670											1,670
	E6000H(RAS159)						33,255							33,255
Mod-6	E5000H(RAS140)		-449											-449
Mod-7	E5000H(RAS174)		4,686											4,686
Mod-9	E5000H(RAS159)		-3,026											-3,026
	E6000H(RAS159)						-12,357							-12,357
Task 12	E1008(RAS163)				53,687									53,687
M-1	E1008(RAS163)				-100									-100
M-5	E5000R (RAS140)		135,211											135,211
M-6	E5000R		-1,058											-1,058
Task 13	E6000H(RAS159)						411,900							411,900
M-5	E6000H(RAS174)						88,073							88,073
M-7	E6000H(RAS159)						4,961							4,961
Task 14	R1231 (RAS158)			67,760										67,760
M-1	R3501 (RAS158)			-4,903										-4,903
Task 15	E4144R(RAS140)	34,640												34,640
M-1	E4144R(RAS140)	-1,582												-1,582
Task 16	E50000(RAS173)		29,784											29,784
Task 17	R1226(RAS176)			57,575										57,575
Task 18	E6000Z(RAS159)						348,500							348,500
M-1	E6000Z(RAS173)						-31,000							-31,000
Task 19	E50000(RAS173)		6,750											6,750
Task 20	R1242(RAS179)			53,375										53,375
Task 21	E5000R(RAS159)		3,380											3,380
Task 22	E5000R(RAS173)		17,257											17,257
Task 23	R3501 (RAS182)			60,950										60,950
Task 24	R1226(RAS178)			73,500										73,500
Task 25	E5000R (RAS173)		11,950											11,950
Task 26	E5000R (RAS173)		13,100											13,100
Task 27	E5000R (RAS174)		2,680											2,680
Task 28	R1226(RAS142)			16,000										16,000
Task 29	E5000J(RAS183)		9,490											9,490
Task 30	R1226(RAS152)			25,675										25,675
Task 31	R3501 (RAS158)			7,275										7,275
M-1	R3501 (RAS158)			-206										-206
M-2	R3501 (RAS158)			-82										-82
Task 32	E5000G(RAS190)		42,575											42,575
M-2	E5000G(RAS190)		-711											-711
Task 33	E4144H(RAS140)	161,175												161,175
M-1	E4144H(RAS140)	-5,568												-5,568
Task 34	R1248(RAS186)			98,575										98,575
M-2	R1248(RAS186)			18,900										18,900
Task 35	R60000(RAS173)						29,500							29,500
M-1	R60000(RAS159)						7,257							7,257
Task 36	E5000R (RAS159)		132,780											132,780
	E5163Y(RAS159)		5,780											5,780
	E7207Y(RAS159)											11,560		11,560
M-1	E5000R		2,175											2,175
Task 37	E7000Y(RAS159)											17,340		17,340
	E6191Y(RAS159)						5,780							5,780
	E6191R(RAS159)						5,780							5,780
Task 38	E6000R (RAS173)						84,000							84,000
Task 39	E5000R (RAS190)		2,900											2,900
Task 40	E6000R (RAS159)						617,000							617,000
M-4	E6000R (RAS159)						-350							-350
Task 41	E7000R (RAS173)											437,882		437,882
	(RAS301)										200,000(4)			200,000
M-2	E6184Y(RAS183)						31,451							31,451
	E6185Y(RAS183)										31,451(3)			31,451
	E6182Y(RAS183)							31,451						31,451
	E6191Y(RAS183)						31,451							31,451
	E6189Y(RAS183)						31,451							31,451
	E6000R						11,336							11,336
Task 42	R1226(RAS186)			74,250										74,250
M-2	E6000R (RAS173)						34,234							34,234
M-5	E6000 (RAS173)						74,620							74,620
M-6	E6000R (RAS173)						25,331							25,331
M-7	E6000R (RAS173)						-873							-873
Task 43	E6000R (RAS159)						75,239							75,239
Task 44	E6000R (RAS159)						98,687							98,687
	E6000R (RAS195)						107,495							107,495
M-3	E6000R (RAS159)						58,674							58,674
M-4	E6000R (RAS173)						47,964							47,964
M-7	E6000R (RAS159)						40,055							40,055
M-9	E6000						592							592
Task 45	E6183H(RAS173)						15,400							15,400
Task 46	E60000(RAS190)						129,132							129,132
Task 47	E6000G(RAS192)						13,600							13,600
Task 48	E6000H(RAS190)						11,430							11,430
Task 49	E6000E (RAS190)						10,490							10,490
Task 50	E6000R (RAS159)						6,260							6,260
Task 51	E6183H(RAS190)						8,490							8,490
M-3	E6183U(RAS190)						2,119							2,119
M-4	E6183H(RAS196)						3,398							3,398
M-5	E6183H						-1,847							-1,847
Mod-41	E6000R (RAS173)						32,939							32,939
M-2	E6000R (RAS183)						32,939							32,939
M-2	E7193Y(RAS183)											32,939		32,939
M-2	E6181Y(RAS183)						32,939							32,939
M-2	E6187Y(RAS183)						32,939							32,939
M-2	E6188Y(RAS183)									32,939				32,939
M-4	E6186Y(RAS190)								30,710					30,710
M-4	E7194Y(RAS190)											30,710		30,710
M-4	E6000R (RAS190)						61,420							61,420
M-7	E6188H(RAS173)									650				650
M-7	E7194H(RAS173)											651		651
M-7	E6187H(RAS173)						651							651
M-7	E6181H(RAS173)						651							651
M-7	E6186H(RAS173)								651					651
M-9	E7000R (RAS173)											37,150		37,150
TOTAL		$206,525	$657,670	$964,325	$60,862	$15,610	$2,778,820	$38,131	$31,361	$33,589	$321,381	$577,162	$41,869	$5,542,695

(1) Navy
(2) UK
(3) ESRO
(4) NASA-711

Figure 108.- NAS1-7199 Proration of Costs.

ITEM	SCOUT VEHICLE NUMBER	PHASE IV NASA	PHASE V NASA	PHASE VI NASA	PHASE VI NAVY	PHASE VI A.F.	PHASE VI ESRO	PHASE VI GERMAN	PHASE VI U.K.	PHASE VII NASA	PHASE VII NAVY	TOTAL
Vehicles Less Motors:		$	$	$	$	$	$	$	$	$	$	$
1 Scout	178				420,358							420,358
2 Scout	179					420,358						420,358
3 Scout + H/S A60	180			442,636								442,636
4 Scout	181			420,358								420,358
5 Scout	182				420,358							420,358
6 Scout + H/S A63	183			442,636								442,636
7 Scout	184			420,358								420,358
8 Scout	185						420,358					420,358
9 Scout	186							420,358				420,358
10 Scout	187			420,358								420,358
11 Scout	188								420,358			420,358
12 Scout	189			420,358								420,358
13 Scout + H/S A66	190			442,636								442,636
14 Scout	191			420,358								420,358
15 Scout	192				420,358							420,358
14 Heat Shields												
A58 GRA	166		22,278									22,278
A59 SOLRAD	177		22,278									22,278
A61 SAS-A	175		22,278									22,278
A62 RAM-C	171		22,278									22,278
A64											22,278	22,278
A65 CAS-B			22,278									22,278
A67											22,278	22,278
A68 SM-DM										22,278		22,278
A69 thru A74										133,668		133,668
Mod. 5 - Mod. 500 lb. RCM/ Valve Assy.				6,690								6,690
Mod. 12 - Install Cork, Buy Winter Kits, Revise QCEPS, Improve X259 Field Assy.				35,649								35,649
Mod. 14 - Buy S-Band & Other Misc. Parts				418,252	154,107	50,318	50,318	50,318	50,318		51,369	825,000
Mod. 15 - Mods for SBASI				30,948								30,948
Mod. 17 - Winter Kits				-1,936								-1,936
Mod. 19 - Change in GFE				-4,487								-4,487
Mod. 23 - Fab. SBASI Harnesses				864	324	108	108	108	108			1,620
Mod. 24 - Mods for SBASI				11,056								11,056
Algol IIC Rocket Motors (Mod. 4):												
S/N 76	177		122,720									122,720
77	144	122,720										122,720
78	180			122,720								122,720
79	187			122,720								122,720
80	*			122,720								122,720
81	*									122,720		122,720
82	*									122,720		122,720
83	179					122,720						122,720
84	182				122,720							122,720
86	178				122,720							122,720
87A	*									122,720		122,720
88	*									122,720		122,720
89	183			122,720								122,720
90	*										122,720	122,720
91	*										122,720	122,720
92	*										122,720	122,720
93	*										122,720	122,720
Algol Igniters (2)			8,720									8,720
Nozzle Housing			2,833									2,833
Mod. 18 - Repair Algol Dollies				13,450								13,450
Mod. 22 - 3 Algol Dolly Tires				277								277
Mod. 28 - Algol Storage at AGC				24,000								24,000
Castor II Rocket Motors:												
S/N 185	144	96,215										96,215
186	180			96,215								96,215
187	184			96,215								96,215
188	185						96,215					96,215
189	187			96,215								96,215
190	190			96,215								96,215
191	181			96,215								96,215
192	183			96,215								96,215
193	179					96,215						96,215
194	178				96,215							96,215
195	170		96,215									96,215
196	197										96,215	96,215
197	182				96,215							96,215
198	188								96,215			96,215
199	191			96,215								96,215
200	186							96,215				96,215
201	189			96,215								96,215
Castor Igniters (2)			6,414									6,414
Mod. 9 - Radiog. Inspect. Castor Nozzles				7,025								7,025
X-259 Rocket Motors (Mod. 1):												
S/N 301	166		74,187									74,187
302	183			74,187								74,187
303	184			74,187								74,187
304	170		74,187									74,187
305	163		74,187									74,187
306	190			74,187								74,187
307	187			74,188								74,188
308	188								74,188			74,188
309	195										74,188	74,188
310	178				74,188							74,188
311	182				74,188							74,188
312	185						74,188					74,188
313	181			74,188								74,188
314	180			74,188								74,188
315	186							74,188				74,188
316	189			74,188								74,188
FW-4S Rocket Motors (Mod. 16):												
S/N 2376-1	182				75,437							75,437
2376-2	181			75,437								75,437
2376-3	191			75,437								75,437
2376-4	190			75,437								75,437
2376-5	170		75,437									75,437
2376-6	186							75,437				75,437
2376-7	188								75,437			75,437
2376-8	184			75,437								75,437
FW-4S Leak Test (Mod. 25)				5,000								5,000
GRAND TOTAL		$218,935	$646,290	$6,058,147	$2,077,188	$689,719	$641,187	$716,624	$716,624	$646,826	$757,208	$13,168,748

*Inventory.

Figure 109(a).- NAS1-7256 Proration of Costs.

TASK	PHASE	IV	V ($10,361,287)														TASK
	PROGRAM	NASA	NASA (Total $7,766,422)										NAVY ($1,403,071)			ESRO	
	VEHICLE	144	163	166	167	169	171	173	174	175	177	SUPPORT	170	176	SUPPORT	172	
A		$ 66,935	$205,260	$205,260	$	$	$ 205,260	$205,260	$205,260	$205,260	$205,260	$	$	$ 205,260	$	$205,261	A
B		38,423	6,987			31,439	20,960		6,987	13,972				3,493		38,424	B
C			1,338	1,147		3,441	38,239	41,871	38,239	18,163	17,207		1,722	5,736		21,032	C
D					53,896	55,840	44,450							54,174		69,453	D
E		87,336	174,681	174,681			174,681	174,681	174,681	174,681	174,681			174,681		144,302	E
F		59,760	119,517	119,517			119,517	119,517	119,517	119,517	119,517			119,517		98,732	F
Mod. 17											20,698						Mod. 17
G		29,434	58,863	58,863			58,863	58,863	58,863	58,863	58,863			58,863		48,627	G
Mod. 30												27,323					Mod. 30
H,J,K (REF. H)		83,399	127,855	94,798			113,683	96,153	114,084	112,282	143,460		115,655	164,374		154,387	H,J,K (REF. H)
Mod. 1				8,700													Mod. 1
Mod. 3																	Mod. 3
Mod. 6																	Mod. 6
Mod. 7														48,280			Mod. 7
Mod. 8												19,071					Mod. 8
Mod. 9												16,100					Mod. 9
Mod. 10												21,600				10,100	Mod. 10
Mod. 19		54,650															Mod. 19
Mod. 28		405	405							405	405						Mod. 28
L						82,900	82,900		82,900					82,902		82,902	L
M		5,243	48,692	48,692			48,692	48,692	48,692	48,692	48,692			48,692		48,692	M
N						502,090	502,090									134,877	N
Mod. 16							27,037										Mod. 16
Mod. 21														151,626			Mod. 21
Mod. 29												5,008					Mod. 29
P												329,379					P
R																	R
S																	S
Mod. 4			532					2,399				5,600					Mod. 4
Mod. 14				7,819		8,858						18,122					Mod. 14
Mod. 20				1,519							1,098	35,790	1,097				Mod. 20
Mod. 23												-2,268					Mod. 23
Mod. 27												223,984			26,627		Mod. 27
Mod. 33		23,942									2,448*	20,471				408	Mod. 33
T																	T
Mod. 12																	Mod. 12
V														20,777			V
Mod. 22														13,345		28,347	Mod. 22
Mod. 26												1,778					Mod. 26
W (REF. K)												26,474					W
X (REF. K)												24,705					X
Inc. (Mod. 34)						106,250	106,250							106,250		106,250	Inc. (Mod. 34)
TOTAL		$449,527	$744,130	$720,996	$53,896	$790,818	$1,542,622	$747,436	$849,223	$751,835	$792,329	$773,137	$118,474	$1,257,970	$26,627	$1,191,794	

*Special NRL Fund.

Figure 109(b).- NAS1-7256 Proration of Costs.

TASK	PHASE VI ($1,964,308)																TASK
	NASA ($725,125)									NAVY ($1,010,639)				ESRO	AEROS-B	UK-X4	
	180	181	183	184	187	189	190	191	HARDWARE	178	179	182	192	185	186	188	
A	$	$	$	$	$	$	$	$	$	$205,260	$	$	$	$	$	$	A
B	10,479	10,479	20,960											13,973			B
C										3,059							C
D																	D
E										140,039							E
F										119,517							F
Mod. 17																	Mod. 17
G										58,863							G
Mod. 30																	Mod. 30
H,J,K	28,211									148,281	55,455						H,J,K
Mod. 1																	Mod. 1
Mod. 3	1,003									1,003	1,004						Mod. 3
Mod. 6									74,600								Mod. 6
Mod. 7																	Mod. 7
Mod. 8																	Mod. 8
Mod. 9																	Mod. 9
Mod. 10																	Mod. 10
Mod. 19																	Mod. 19
Mod. 28	405									405	405						Mod. 28
L																	L
M											48,692						M
N																	N
Mod. 16																	Mod. 16
Mod. 21																	Mod. 21
Mod. 29																	Mod. 29
P																	P
R																	R
S																	S
Mod. 4							2,398		76,512								Mod. 4
Mod. 14																	Mod. 14
Mod. 20																	Mod. 20
Mod. 23																	Mod. 23
Mod. 27				2,427				2,834	1,607								Mod. 27
Mod. 33		7,180							28,720					14,360	7,180	21,540	Mod. 33
T	26,161	26,161	26,161	26,161	26,160	26,160	26,160	26,160		26,161	26,161*	26,161	18,510	26,161	26,161	26,160	T
Mod. 12													7,650				Mod. 12
V	31,003	31,003	31,003	31,003	31,003	31,003	31,004	31,004		31,003	31,003	31,003	31,004	31,003	31,003	31,003	V
Mod. 22																	Mod. 22
Mod. 26																	Mod. 26
W																	W
X																	X
Inc. (Mod. 34)																	Inc. (Mod. 34)
TOTAL	$97,262	$74,823	$78,124	$59,591	$57,163	$57,163	$59,562	$59,998	$181,439	$733,591	$162,720	$57,164	$57,164	$85,497	$64,344	$78,703	

*P76-A.F.

Figure 109(c).- NAS1-7256 Proration of Costs.

TASK (PHASE / PROGRAM / VEHICLE)	VII / UK-6 / 198	BASIC TASKS NEGOTIATED	TASK MODIFICATIONS	SCOPE CHANGE (MOD. 35)	FINAL ADJUSTMENT (Mod. 37)	FINAL COSTS	TASK
A		$1,971,022			$ 148,514	$2,119,536	A
B		168,447		$ 9,357	38,772	216,576	B
C		200,985		-35,406	25,615	191,194	C
D		519,374		-427,570	186,009	277,813	D
E		1,484,682			272,061	1,756,743	E
F		1,360,893			-126,748	1,234,145	F
Mod. 17			$ 20,698			20,698	Mod. 17
G		879,679			-271,851	607,828	G
Mod. 30			27,323			27,323	Mod. 30
H,J,K		1,856,187		-136,050	-168,060	1,552,077	H,J,K
Mod. 1			8,700			8,700	Mod. 1
Mod. 3			3,010			3,010	Mod. 3
Mod. 6			74,600			74,600	Mod. 6
Mod. 7			48,280			48,280	Mod. 7
Mod. 8			19,071			19,071	Mod. 8
Mod. 9			16,100			16,100	Mod. 9
Mod. 10			31,700			31,700	Mod. 10
Mod. 19			54,650			54,650	Mod. 19
Mod. 28			2,835			2,835	Mod. 28
L		459,108			-44,604	414,504	L
M		500,000			-12,047	487,953	M
N		1,118,964			20,093	1,139,057	N
Mod. 16			27,037			27,037	Mod. 16
Mod. 21			151,626			151,626	Mod. 21
Mod. 29			5,008			5,008	Mod. 29
P		308,138			21,241	329,379	P
R							R
S							S
Mod. 4			87,441			87,441	Mod. 4
Mod. 14			34,799			34,799	Mod. 14
Mod. 20			39,504			39,504	Mod. 20
Mod. 23			-2,268			-2,268	Mod. 23
Mod. 27			257,479			257,479	Mod. 27
Mod. 33	14,360		140,609			140,609	Mod. 33
T		388,334			-3,575	384,759	T
Mod. 12			7,650			7,650	Mod. 12
V		485,825				485,825	V
Mod. 22			41,692			41,692	Mod. 22
Mod. 26			1,778			1,778	Mod. 26
W		34,168			-7,694	26,474	W
X		24,194			511	24,705	X
Inc.(Mod. 34)			425,000			425,000	Inc.(Mod.34)
Retransfer Pers			27,037		-18,927	8,110	Retransfer Pers.
TOTAL	$14,360	$11,760,000	$1,551,359	$-589,669	$59,310	$12,781,000	TOTAL

Figure 110.- Proration of Contract NAS1-9258

		PHASE V	PHASE VI				PHASE VII		
		NASA	NASA	ESRO	UK-X4	AEROS	NASA	NAVY	TOTAL
Design & Develop Algol III			$2,300,000						$2,300,000
Production Tooling			170,000						170,000
Mod 2, S.O.P. Mods			61,200						61,200
Mod 3, Case Test			7,653						7,653
Mod 7, Algol III 1st Stage Motors									
S/N 111-1	Scout 170	$126,792							126,792
111-2	184		126,792						126,792
111-3	181		126,792						126,792
111-4	185			$126,792					126,792
111-5	Test		126,792						126,792
111-6	190		126,792						126,792
111-7	188				$126,792				126,792
111-8	191		126,792						126,792
111-9	186					$126,792			126,792
111-10	189		126,792						126,792
111-11	194						$126,792		126,792
111-12	195							$126,792	126,792
111-13	196						126,792		126,792
111-14	Reject								
111-15	193						126,792		126,792
111-16	197							126,792	126,792
Mod 9, Specification Changes			-2,500						-2,500
Mod 10, SN5 Waiver			-2,495						-2,495
Mod 11, Extend P.O.P.			-370						-370
Mod 12, Use of 2 GFE Cases							-8,800		-8,800
TOTAL		$126,792	$3,294,240	$126,792	$126,792	$126,792	$371,576	$253,584	$4,426,568

Figure 111(a).- PRORATION OF CONTRACT NAS1-10000

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TASK	PHASE IV	PHASE V							TASK
	NASA	NASA (TOTAL $4,089,206)							
	144	163R	166	170R	173	174	175	177	
A	$159,488	$	$	$ 318,938	$	$	$	$	A
B	9,158	2,091	7,452	6,478				930	B
C	24,284	28,295	41,262	28,344	12,368		1,972	23,925	C
D	44,248	34,809	37,246	32,693	44,511	49,795	35,268	45,292	D
E	54,885		10,735	4,904		48,455	3,402		E
Mod 26									Mod 26
F	54,883			3,318					F
Mod 26									Mod 26
G	20,150			1,218					G
H	47,070			2,853					H
Mod 26									Mod 26
J		202,084		202,084	148,656		202,084		J
Mod 27		20,567		20,567			20,567		Mod 27
Mod 35									Mod 35
Mod 44,49		11,737		25,000			17,315		Mod 44,49
K									K
L	26,797			45,425					L
M	18,864			1,140					M
Mod 23									Mod 23
N	393,185		393,228			393,228		393,228	N
Mod 11									Mod 11
P									P
Mod 28									Mod 28
R	70,084	15,060	29,108	48,923	34,622				R
Mod 13	13,361								Mod 13
Mod 33									Mod 33
Mod 36,48									Mod 36,48
Mod 44,49									Mod 44,49
S									S
Mod 9			3,948	11,586	1,884			895	Mod 9
Mod 14				19,500					Mod 14
Mod 16									Mod 16
Mod 19				135,850					Mod 19
Mod 25			9,315						Mod 25
Mod 32									Mod 32
Mod 37									Mod 37
Mod 39									Mod 39
Mod 42									Mod 42
T									T
Mod 2		1,606							Mod 2
Mod 3				16,116					Mod 3
Mod 6				28,368					Mod 6
Mod 15									Mod 15
Mod 20				6,701					Mod 20
Mod 21									Mod 21
V	42,610			65,262					V
Mod 20									Mod 20
Mod 31									Mod 31
W									W
Mod 29,48									Mod 29,48
Relocation Incentive Reserve		105,285	105,285	105,285	105,285	105,286	105,286	105,286	Relocation Incentive Reserve
TOTAL	$979,067	$421,534	$637,579	$1,130,553	$347,326	$596,764	$385,894	$569,556	TOTAL

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Figure 111(b).- PRORATION OF CONTRACT NAS1-10000

PHASE VI

TASK	NAVY (TOTAL $1,934,717) 178	NAVY 179N	NAVY 182	NAVY HARDWARE SUPPORT	NAVY ENGNR. SUPPORT	AIR FORCE 179R	ESRO 185	AEROS 186	UK 188
A	$	$	$ 318,938	$	$	$	$ 318,938	$159,488	$239,272
B	7,075		7,588				31,639		12,324
C	34,616	25,673	32,292				16,066		3,259
D			41,959				45,309		
E	1,132	4,173	2,255		5,245		151,969	60,339	137,010
Mod 26									
F							184,566	72,718	116,243
Mod 26									
G							67,762	26,696	42,675
H		35,712	150,371			112,663	183,254	129,973	136,472
Mod 26									
J									
Mod 27									
Mod 35									
Mod 44,49									
K									
L									
M	42,508		42,508			50,529	52,326	58,345	59,073
Mod 23							14,468		
N	386,217		386,217				386,217		
Mod 11	7,011		7,011				7,011		
P									
Mod 28									
R	20,412		36,325	5,665	37,912	9,258		1,358	5,088
Mod 13			16,755						
Mod 33									
Mod 36,48									
Mod 44,49									
S									
Mod 9									
Mod 14									
Mod 16									
Mod 19									
Mod 25									
Mod 32									
Mod 37								10,779	10,779
Mod 39									981
Mod 42									
T							1,997		12,056
Mod 2	1,656		1,657			1,656	1,656	1,656	1,656
Mod 3							16,116	16,116	16,116
Mod 6							28,367		
Mod 15							28,516	28,512	
Mod 20							6,700		
Mod 21									
V			65,262			68,502	21,801	31,801	31,801
Mod 20									
Mod 31									
W									
Mod 29,48									
Relocation Incentive Reserve	105,286		105,286				105,286		
TOTAL	$605,913	$65,558	$1,214,424	$5,665	$43,157	$242,608	$1,669,964	$597,781	$824,805

TASK	NASA (TOTAL $14,761,807) 180	NASA 181	NASA 183	NASA 184	NASA 187	NASA 189	NASA 190	NASA 191	NASA HARDWARE SUPPORT	NASA ENGNR. SUPPORT
A	$ 318,938	$ 318,938	$ 318,938	$ 318,938	$ 318,938	$	$ 318,938	$159,488	$	$ 318,938
B	6,424	9,425	2,829	22,027	17,865	8,123	4,097	32,206		139,527
C	43,269	17,605	27,562	23,656	3,114		3,221			22,099
D	51,317	59,539	42,087	52,227						24,875
E	184,378	196,169	179,122	209,562	207,331	1,889	145,013	128,405		1,580,104
Mod 26										0
F	154,385	194,588	179,128	207,316	207,338	1,890	145,018	79,818		461,478
Mod 26										0
G	56,680	71,441	65,764	76,112	76,121	694	53,240	29,304		183,294
H	132,386	166,860	153,604	177,781	177,800	1,618	124,353	68,414		
Mod 26										0
J										
Mod 27							184,726			
Mod 35							245,000			
Mod 44,49										
K										15,948
L										407,519
M	13,708	30,392	4,325	1,635	46,711	651	49,849	27,436		
Mod 23	30,000	15,532	70,000	69,548	22,000					
N	393,228	386,217	386,217	393,228						
Mod 11		7,011	7,011							
P										282,427
Mod 28										4,845
R		52,700			1,786			161,962	2,928	
Mod 13		42,672								717,218
Mod 33										
Mod 36,48										
Mod 44,49										
S										
Mod 9	3,431		532				11,604		2,740	
Mod 14										
Mod 16				6,268						5,775
Mod 19										
Mod 25									1,200	
Mod 32		2,568								47,320
Mod 37						10,779	10,779		4,689	68,435
Mod 39							1,301		8,162	92,259
Mod 42										
T	811	844	447	2,433	1,221		1,290	1,490		
Mod 2	1,656	1,657	1,656	1,657	1,656	1,657	1,657			
Mod 3		16,116		16,116		13,143	16,116	16,116		
Mod 6		28,367		28,367						
Mod 15	28,516	28,516	28,516	28,516	28,516	28,516	28,516	28,516		
Mod 20		6,700		6,700						
Mod 21					6,745	6,745				
V	65,262	65,262	65,262	65,262	65,262		65,262	32,610	65,262	
Mod 20										
Mod 31										
W										
Mod 29,48										
Relocation Incentive Reserve	105,286	105,286	105,286	105,286						
TOTAL	$1,589,675	$1,824,405	$1,638,286	$1,812,635	$1,182,404	$75,705	$1,409,980	$765,765	$84,981	$4,372,064

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Figure 111(c).-PRORATION OF CONTRACT NAS1-10000

TASK	PHASE VII	PHASE VIII	TOTAL	TASK
A	$	$	$ 3,907,116	A
B	50,837		378,095	B
C			412,882	C
D			641,175	D
E	4,343		3,320,820	E
Mod 26	277,200		277,200	Mod 26
F			2,062,687	F
Mod 26	37,784		37,784	Mod 26
G			771,154	G
H			1,801,184	H
Mod 26			0	Mod 26
J			749,000	J
Mod 27			252,335	Mod 27
Mod 35			245,000	Mod 35
Mod 44,49			54,052	Mod 44,49
K	15,948		31,896	K
L	336,201		815,942	L
M			500,000	M
Mod 23,49			221,548	Mod 23,49
N			4,290,410	N
Mod 11			35,055	Mod 11
P	287,272		569,699	P
Mod 28			4,845	Mod 28
R	111,809		645,000	R
Mod 13	409,918		1,199,924	Mod 13
Mod 33	350,000		350,000	Mod 33
Mod 36,48		235,000	235,000	Mod 36,48
Mod 44,49	108,185	-75,000	33,185	Mod 44,49
S				S
Mod 9	47,051		83,671	Mod 9
Mod 14	57,428		76,928	Mod 14
Mod 16	29,426		41,469	Mod 16
Mod 19			135,850	Mod 19
Mod 25			10,515	Mod 25
Mod 32	10,125		60,013	Mod 32
Mod 37	12,424		128,664	Mod 37
Mod 39	108,153		210,856	Mod 39
Mod 42	-100		-100	Mod 42
T	193,451		216,040	T
Mod 2	0		23,139	Mod 2
Mod 3	92,003		234,074	Mod 3
Mod 6	0		113,469	Mod 6
Mod 15	142,564		427,720	Mod 15
Mod 20	0		26,801	Mod 20
Mod 21	13,490		26,980	Mod 21
V			816,483	V
Mod 20	6,405		6,405	Mod 20
Mod 31	-641		-641	Mod 31
W			0	W
Mod 29,48	209,705		209,705	Mod 29,48
Relocation	1,976		1,976	Relocation
Incentive			1,474,000	Incentive
TOTAL	$2,912,957	$160,000	$28,167,005	TOTAL

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Figure 112.- Proration of Other Contracts. (490-Funds only.)

PHASE	V AND PRIOR			VI				
NAS-1	NASA	NAVY	A.F.	NASA	NAVY	OTHERS	VII & SUB.	TOTAL
4664	$3,123,553	$2,180,438	$ 742,740	$ 9,224	$1,388,414	$	$	$ 7,444,369
5883	2,435,942	609,264	310,891		34,501			3,390,598
6868	1,189,569			22,244				1,211,813
7102				528,525				528,525
10481		6,355			160,397		154,042	320,794
10482	181			41,938	30,040	(1)14,433	115,077	201,669
10483	89,694			30,088	11,368	(1)11,232	208,668	351,050
10484				51,846	24,259	28,249	424,707	529,061
10500				678,693			370,589	1,049,282
11000				40,800			10,448,125	10,488,925
11859				44,665				44,665
11867				119,325				119,325
13100					286,147		3,563,112	3,849,259
16520				83,490				83,490
TOTAL	$6,838,939	$2,796,057	$1,053,631	$1,650,838	$1,935,126	$53,914	$15,284,320	$29,612,825

(1) Includes P-76 (AF) S-179.

Figure 113.- Phase VI R & D - Propulsion Prorations.

VEHICLE	CONTRACT NAS1-10481	NAS1-10482	NAS1-10483	NAS1-10484	TOTAL
178	$ 3,006	$ 4,811	$ 3,744	$ 6,180	$ 17,741
179		6,536	3,880		10,416
180		4,811	3,744	1,654	10,209
181		4,811	3,744	10,112	18,667
182		4,811	3,744	3,772	12,327
183		4,811	3,744	1,654	10,209
184		4,811	3,744	10,112	18,667
185		4,811	3,744	8,025	16,580
186		4,811	3,744	10,112	18,667
187		6,536	3,744	1,725	12,005
188		4,811	3,744	10,112	18,667
189		6,536	3,744	6,340	16,620
190		4,811	3,744	10,112	18,667
191		4,811	3,880	10,137	18,828
192		13,882		14,307	28,189
Sustaining	157,391	68,865	43,154	19,249	288,659
TOTAL	$160,397	$155,276	$ 95,842	$123,603	$535,118

(1) Includes P-76 (AF) S-179.
(2) Does not include Phase V.

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Figure 114.- CONTRACT NAS1-11400 ESTIMATED PRORATION OF COSTS

ITEM	SCOUT VEHICLE NUMBER	JOB ORDER	PHASE VI NASA	PHASE VI NAVY	PHASE VII NASA	PHASE VII NAVY	PHASE VII U.K.	TOTAL
Castor IIA Rocket Motors w/Nozzles: (TX354-IIA)								
S/N 382	S-195	E7195Z	$	$	$	$ 97,872.00	$	$ 97,872.00
383	S-196	E7196Z			97,872.00			97,872.00
**384 (Less Nozzles)-Sandia	S-202	E7202Z			55,000.00			55,000.00
**385 (Less Nozzles)-Sandia	S-192	E6192Z		55,000.00				55,000.00
**386 (Less Nozzles)-Sandia	*	E7204Z				55,000.00		55,000.00
**387 (Less Nozzles)-Sandia	S-203	E7203Z			55,000.00			55,000.00
390	S-194	E7194Z			97,872.00			97,872.00
391	*	E7000Z			97,872.00			97,872.00
392	S-193	E7193Z			97,872.00			97,872.00
393	S-200	E7200Z				97,872.00		97,872.00
394	S-198	E7198Z					97,872.00	97,872.00
395	S-201	E7201Z			97,872.00			97,872.00
911 (Case Only/MOD 14)Mtr. 808		E7000Z			47,331.75			47,331.75
912 (Case Only/MOD 14)Test		E7000R			47,331.75			47,331.75
913 (Case Only/MOD 14)Mtr. 809		E7000Z			47,331.75			47,331.75
914 (Case Only/MOD 14)Mtr. 810		E7000Z			47,331.75			47,331.75
Castor IIA Nozzles Only:								
455-03		E7202Z			42,872.00			42,872.00
455-05		E7205Z				42,872.00		42,872.00
455-07		E7204Z				42,872.00		42,872.00
455-08		E7203Z			42,872.00			42,872.00
NOTE: MOD 14 ($202,161 total credit for not loading 4 Castors has been prorated over each MOD-14 motor listed above.)								
Antares II Rocket Motors: (X259B4)								
S/N 401	S-191	E6191Z	77,600.00					77,600.00
402	S-179	E6179Z		77,600.00				77,600.00
403 (AEDC Test) Case 205		E7000Z			77,600.00			77,600.00
404	S-197	E7197Z				77,600.00		77,600.00
405	S-193	E7193Z			77,600.00			77,600.00
406	S-196	E7196Z			77,600.00			77,600.00
407	S-194	E7194Z			77,600.00			77,600.00
408	S-200	E7200Z				77,600.00		77,600.00
409	S-198	E7198Z					77,600.00	77,600.00
204 (Case Only/MOD 14)Mtr. 410	*	E7200Z				64,187.45		64,187.45
208 (Case Only/MOD 14)Mtr. 411	S-201	E7201Z			64,187.45			64,187.45
211 (Case Only/MOD 14)Mtr. 412	S-202	E7202Z			64,187.45			64,187.45
209 (HE Test/MOD 14)	(a)	E7000R			50,967.45			50,967.45
212 (Case Only/MOD 14)Mtr. 413	*	E7204Z				64,187.45		64,187.45
214 (Case Only/MOD 14)Mtr. 414	S-192	E6192Z		64,187.45				64,187.45
215 (Case Only/MOD 14)Mtr. 415	S-199	E7199Z				64,187.45		64,187.45
203 (Nozzle Deflection/MOD 14) Mtr. 417		E7000R			64,187.45			64,187.45
216 (HE Test/MOD 14)		E7000R			50,967.45			50,967.45
MOD 5 Hydrotests		E7000R			7,858.00			7,858.00
NOTE: MOD 14 ($120,713 total credit for not loading 9 X259's has been prorated over each MOD-14 motor listed above.)								
MOD 22 Antares IIB Igniters/M26(L/L)		E7000Z			36,550.00			36,550.00
MOD 28 Antares IIB Igniters		E7000Z			2,715.00			2,715.00
MOD 29 Price Reduction/M28		E7000Z			-1,596.00			-1,596.00
Altair IIIA Rocket Motors: (TEM640)								
Design Tests E01-E10		E7000R			300,205.00			300,205.00
S/N E11 77% F Alt.Test @ T.C.		E7000R			46,263.00			46,263.00
E12 77% F Alt. Test @ RPL		E7000R			46,263.00			46,263.00
E13 W/Case 008	S-187	E6187Z	34,501.00					34,501.00
E14 W/Case 009	S-189	E6189Z	34,501.00					34,501.00
E15 W/Case 014	S-195	E7195Z				34,501.00		34,501.00
E16 W/Case 020	S-194	E7194Z			34,501.00			34,501.00
E17 W/Case 013	S-197	E7197Z				34,501.00		34,501.00
E18 W/Case 012	S-196	E7196Z			34,501.00			34,501.00
E19 W/Case 027	S-193	E7193Z			34,501.00			34,501.00
E20 W/Case 026	S-200	E7200Z				34,501.00		34,501.00
E21 W/Case 024	S-179	E6179Z		34,501.00				34,501.00
E22 W/Case 023	NRL	E8006Z				38,469.00(b)		38,469.00
(Case Only 010/Mod.14) U.T.C.		E7000R			12,724.00			12,724.00
(Case Only 011/Mod.14) U.T.C.		E7000R			12,724.00			12,724.00
(Case Only 015A/Mod.14)H.E.P.Test(a)		E7000R			12,724.00			12,724.00
(Case Only 025/Mod.14) U.T.C.-N.F.W.		E7000R			12,724.00			12,724.00
(Case Only 028/Mod.14)(Motor E29)		E7198Z					12,724.00	12,724.00
(Case Only 029/Mod.14)(Motor E30)		E6192Z		12,724.00				12,724.00
(Case Only 030/Mod.14)(Motor E31)		E7000Z			13,130.00			13,130.00
E23 Nozzle/Igniter w/atch.hdwe.&Cs.P/Fit.		E7201Z			991.00			991.00
E24 DITTO	NRL	E8006Z				991.00(b)		991.00
E25 DITTO		E6192Z		991.00				991.00
E26 DITTO		E7203Z			991.00			991.00
E27 DITTO		E7202Z			991.00			991.00
E28 DITTO		E7000Z			991.00			991.00
(Nozzle Only) 004 (Motor E36) NRL		E8006Z				8,016.00(b)		8,016.00
(Nozzle Only) 014 (Motor E34) NRL		E8006Z				8,016.00(b)		8,016.00
1 Altair IIIA Nozzle	S-191	E6191Z	5,357.00					5,357.00
Mod. 3 Tooling		E7000V			2,100.00			2,100.00
Mod. 16/17 (Qual. Firing/M24)		E7000R			23,000.00			23,000.00
Mod. 18 Finish 7 Nozzles, Nos. 109-115(c)		E7000Z			9,590.00			9,590.00
Mod. 19 (Spec. Change) M24		E7000R			16,664.00			16,664.00
Mod. 20 (Inspect S/N 011) M24		E7000R			4,600.00			4,600.00
Mod. 27 (Altair III Hardware)(Case)		E7000Z			19,800.00			19,800.00
Mod. 23 (Altair III Igniters/M26)		E7000Z			17,103.00			17,103.00
TOTAL			$151,959.00	$245,003.45	$2,181,936.25	$843,245.35	$188,196.00	$3,610,340.05

*Inventory.
**These motors were purchased by Sandia, but were returned to Scout.
(a) NAS1-12500-R44.
(b) For NRL Program, Phase VIII time period.
(c) For motors E31, E32, E33, E38, E37, E35 and #115 is in Spares.
L/L Line Loss Purchased.

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Figure 115.- Proration of Contract NAS1-12500.

TASK	PHASE VI												PHASE VII				TOTAL
	NASA						NAVY			A.F.	AERO	U.K.	NASA	NAVY	U.K. 6	S/M	
	S187	S189	S190	S191	ENGR. SUPPORT	HARDWARE SUPPORT	S178	S192	S179	S179	A186	S188					
A	$	$ 246,447	$	$ 234,943	$ 342,203	$	$	$	$	$	$ 151,412	$ 91,671	$ 2,000,207	$	$201,216	$	$ 3,268,099
B	4,304	6,991	1,974	16,287				921		16,743	4,474	894	291,896	27,758	14,575		386,817
C	20,455	34,842	8,989	33,510				11,203		*(20,599)	14,495	18,763	26,177	25,187			193,621
D		35,793	36,032	49,498			32,591			*(42,500)	43,086	40,821	93,158	56,972			387,951
E	416	239,766		195,077	284,134			9,831		48,310	126,138	76,115	1,811,564	67,055	176,906		3,035,312
F		134,964		128,666	187,407						82,919	50,205	1,095,409		110,197		1,789,767
G		57,230		54,558	79,465						35,161	21,288	464,487		46,727		758,916
H		220,191		209,933		19,679		166,616		119,469	135,284	81,923	481,254	221,034	179,782		1,835,165
Mod 13													378,555	378,555			757,110
Mod 19													124,593				124,593
J-1	11,307		59,529		266,845					*(60,379)							337,681
J-J	11,307				209,430											17,913	238,650
Mod 3(J-1)	1,828		231,642		98											5,690	239,258
Mod 14	15,247															404,898	420,145
Mod 23	36,410															392,240	428,650
K													32,906				32,906
L													405,461				405,461
M		99,587		94,940		137,315		13,871			20,430	21,011	99,232	13,614			500,000
Mod 10													430,019		69,981		500,000
Mod 25													960,468				960,468
Mod 37													-339,871				-339,871
Mod 38, 41													-270,323				-270,323
N		424,650		424,650						220,364	424,650	424,650		932,409			2,851,373
Mod 19													849,300	220,381			1,069,681
P													468,373				468,373
Mod 19													38,303				38,303
R		153,018		119,419	96,273	1,784	5,814	101,670	8,071	196,920			208,784		70,247		1,000,000
Mod 7	48,973												606,380	344,606			999,959
Mod 17													998,939				998,939
Mod 21													2,250,000				2,250,000
Mod 30, 37,38,39													1,194,802				1,194,802
S 16		11,855											92,087				103,942
S 28													1,090,000				1,090,000
S 43													37,000				37,000
T		1,578											90,808				92,386
Mod 20													**(265,806)				
V		37,899		36,130		52,625					23,284		321,696		30,943		502,577
W-35													413,129				413,129
Award	100,000	100,000	100,000	59,000						100,000	100,000	100,000	100,000				759,000
Mod 27,33													100,000	200,000			300,000
Mod 36														-33,000			-33,000
TOTAL	$250,247	$1,804,811	$438,166	$1,656,611	$1,465,855	$211,403	$38,405	$304,112	$8,071	$701,805	$1,161,333	$927,341	$17,781,975	$2,454,571	$900,574	$625,007	$30,125,802

*Included in Task R
**Included in Tasks E and F.

Figure 116.- Contract NAS1-14200 - Proration of Costs.

CONTRACT	PHASE VI, NAVY S-192	PHASE VI & SUBSEQUENT	TOTAL
2nd Stage		$	$
M-6		339,800	339,800
-9-13		1,456,423	1,456,423
M-8		50,418	50,418
M-14-15		748,064	748,064
3rd Stage	$ 15,260	242,815	258,075
M-1		40,629	40,629
M-3		1,080	1,080
M-5	140,034	1,725,749	1,865,783
M-17		181,547	181,547
4th Stage	93,115	472,010	565,125
M-2		261,645	261,645
M-4		683,734	683,734
M-7		40,559	40,559
M-18		1,310,039	1,310,039
M-20		256,600	256,600
M-21		101,505	101,505
1st Stage			0
M-10		2,216,445	2,216,445
Schedule Changes		258,510	258,510
TOTAL	$248,409	$10,387,572	$10,635,981

Figure 117.- Contract NAS1-15000

TASK	PHASE VI NAVY S-192	PHASE VI HARDWARE SUPPORT	PHASE VII & SUB.
A	$	$	$ 7,811,260
B	4,239		201,744
C	24,326		202,325
D			423,399
E	14,236		3,468,928
F			3,598,302
G			1,554,754
H	73,920	5,242	4,116,334
J			304,225
L			1,126,747
M	50,968		1,415,482
N			9,596,587
P			1,052,502
R	113,506		2,902,714
S			250,317
T	35,184		2,385,846
M-19	18,043		55,741
V		43,503	1,246,744
W	100,000		500,000
X			72,611
Y	70,491		15,223,354
Z			84,939
TOTAL	$504,913	$48,745	$57,594,855

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Figure 118.- NAS1-15100 Contract Proration.

J.O.(VI)	TASK	PHASE VI	PHASE VII & SUB.	TOTAL
	J	$	$ 585,863	$ 585,863
	M	2,508	3,390,285	3,392,793
	R	118,094	9,300,124	9,418,218
E6192R	66R	(22,005)		(22,005)
E6192H	83H	(19,911	(19,911)	(39,822)
E6192B	111B	(56,438)	(48,589)	(105,027)
E6192H	119H	(19,740)		(19,740)
TOTAL		$120,602	$13,276,272	$13,396,874

The Scout participated in foreign programs from many European countries including ESRO (name changed to ESA at later date). The largest foreign reimbursable Scout program was with Italy. (Note description on page 230.) Table CVIII itemizes the funds received and Table CIX lists the work breakdown structure used for financial requirements.

TABLE CVIII - FOREIGN REIMBURSABLE AUTHORITY

Fiscal Year	AEROS	ITALY	UNITED KINGDOM UK-5	UK-6	TOTAL
FY 74	$2,640,000		$ 58,325		$ 2,698,325
FY 74 (STS DIRECT)			664,525		664,525
FY 75	1,011,995		65,000	$ 98,000	1,174,995
FY 75 (STS DIRECT)	318,533				318,533
FY 76	24,617		11,308	2,292,553	2,328,478
FY 76 (STS DIRECT)	14,707		73,431		88,138
FY 77	20,419	$ 183,363		11,200	214,982
FY 77(STS DIRECT)	110,000				110,000
FY 78	629	479,647		1,076,760	2,173,036
FY 78 (STS DIRECT)		202,629		10,000	212,629
FY 79		63,889		114,266	178,155
FY 79 (STS DIRECT)		37,042		228,335	265,377
TOTAL	$4,030,900	$1,076,570	$872,589	$4,447,114	$10,427,173

TABLE CIX - TRUST FUNDS

	ESRO IB	IV	United Kingdom X-4	Italy	TOTAL
FY 71 & Prior	$2,252,771	$1,550,000		$1,008,147	$ 4,810,918
FY 72		800,000	$ 50,000		850,000
FY 73		331,834	1,345,834	1,262,647	2,939,854
FY 74			1,695,786		1,695,786
FY 75	210,656		680,597	653,600	1,544,853
FY 75 (STS DIRECT)			76,988		76,988
FY 76		911,167			911,167
TOTAL	$2,463,427	$3,593,001	$3,848,744	$2,924,394	$12,829,566

TOTAL FOREIGN REIMBURSABLES $23,256,739

TABLE CX - ESRO IB FINAL COSTS (S-172)

1.	Vehicle Procurement		$1,023,510
	Vehicle Hardware	$462,413	
	Motors	319,137	
	Certification and Processing	164,921	
	Tooling	28,347	
	Spares	48,692	
2.	Transportation		20,000
3.	Launch Services		158,977
	GSFC	6,287	
	KSC	17,813	
	LTV/WTR	134,877	
4.	Project Management and Engineering Support		815,803
	Program Management	205,261	
	Systems Engineering	144,302	
	Reliability	98,732	
	Preflight Planning	21,032	
	Payload Coordination	38,424	
	Configuration Control	49,035	
	Data Reduction	69,453	
	R & D	412	
	LTV-Incentive Award	106,250	
	Spares Administration and Replenishment	82,902	
5.	DOD Contract Administration		15,960
6.	Travel and Project Management		81,605
7.	Range Services		347,572
8.	Overhead		38,192
		TOTAL	$2,501,619

TABLE CXI - ESRO-IV FINAL COSTS (S-185)

1.	Vehicle Procurement		$1,269,009
	Vehicle Hardware	$581,617	
	Motors	387,048	
	Certification and Processing	183,254	
	Tooling	52,804	
	Spares	64,286	
2.	Transportation		20,000
3.	Launch Services		432,728
	LTV/WTR	393,228	
	Photography (included in A.F.)	2,000	
	Complex - GSE and Maintenance	37,500	
4.	Project Management and Engineering Support		935,508
	Program Management	318,938	
	Systems Engineering	151,969	
	Reliability	184,566	
	Preflight Planning	16,066	
	Mission Integration	45,612	
	Configuration Control	67,762	
	Data Reduction	45,309	
	LTV Incentive Award	105,286	
5.	DOD Contract Administration*		23,646
6.	Others		68,600
	Travel	20,000	
	LRC Project Support	49,600	
7.	Range Services		842,510
	GSFC	37,221	
	KSC*	25,824	
	DOD	779,465	
8.	Overhead		60,872
		TOTAL	$3,653,873

*Headquarters Direct.

TABLE CXII.- AEROS-B FINAL COSTS (S-186)

1.	Vehicle Procurement		$1,429,195
	Vehicle Hardware	$587,837	
	Motors	400,758	
	Certification and Processing	276,687	
	Tooling	86,088	
	Spares	76,467	
	Mission Peculiar	1,358	
2.	Transportation		19,981
3.	Launch Services		464,150
	Vought/WTR	424,650	
	Photography	2,000	
	Complex - GSE and Maintenance	37,500	
4.	Project Management and Engineering Support		886,926
	Program Management	310,900	
	Systems Engineering	196,477	
	Reliability (F & W)	155,637	
	Preflight Planning	14,495	
	Mission Integration	4,474	
	Configuration Control	61,857	
	Data Reduction	43,086	
	Vought - Incentive	100,000	
5.	*D.O.D. Contract Administration - LRC - 25,022; GSFC - 1,067		26,089
6.	Others		246,937
	Travel	20,000	
	Administrative Expenses	87,420	
	*Depreciation	94,242	
	*GSFC-Management Support	45,275	
7.	Range Services		778,606
	*KSC (118)	19,673	
	GSFC (95) by LRC	118,583	
	D.O.D.	640,350	
8.	*Agency Overhead		179,016
	TOTAL		$4,030,900

*Headquarters Direct

TABLE CXIII - UK-X4 FINAL COSTS (S-188)

1.	Vehicle Procurement		$1,357,910
	Vehicle Hardware	$579,595	
	Motors	402,074	
	Certification and Processing	229,824	
	Tooling	62,804	
	Spares	77,544	
	Mission Peculiar	6,069	
2.	Transportation		20,000
3.	Launch Services		464,150
	Vought/WTR	424,650	
	Photography	2,000	
	Complex - GSE and Maintenance	37,500	
4.	Project Management and Engineering Support		950,540
	Program Management	330,943	
	Systems Engineering	213,125	
	Reliability	166,448	
	Preflight Planning	22,022	
	Mission Integration	13,218	
	Configuration Control	63,963	
	Data Reduction	40,821	
	Vought - Incentive	100,000	
5.	DOD Contract Administration*		25,419
6.	Others		94,400
	Travel (105)	20,000	
	Administrative Expenses (105)	74,400	
7.	Range Services		881,610
	KSC by LaRC (04)	4,140	
	*KSC (118) (15,475)01,(4,498)03,(2,300)04	24,573	
	GSFC (95) *Subauthorization)	23,000	
	DOD	829,897	
8.	Agency Overhead*		54,715
		TOTAL	$3,848,744

*Headquarters Direct.

UK-5 was a cooperative space mission between the United States and the United Kingdom. Phase VI included five cooperative missions; S-180-French, S-181-German, S-183 and S-187-United Kingdom, and S-190-Italy. However, the UK-5 (S-187) was unique in that prior to launching from the United States, the United Kingdom requested an equatorial launch from San Marco Range. The UK funded this request which is itemized in table CXIV.

TABLE CXIV - UK-5 REIMBURSABLE EXPENDITURES, FY 1974.

P.R. NO.	ORDER NO.	ITEM	J.O. NO.	DESCRIPTION	OBLIGATION
PHASE VI					
-01 HARDWARE					
MISSION PECULIARS (01-04)					
4-24-74	H1951715		R9305	Ship Motors to San Marco	$ 7,900.00
5-23-74	H1951715		R9305	Ship Motors to San Marco	40,000.00
5-3-74	H2136375		R9305	Ship Miscellaneous Items	508.80
5-23-74	H2136377		R9305	Ship Miscellaneous Items	961.73
5-23-74	H213637		R9305	Ship Miscellaneous Items	816.15
5-23-74	H2136379		R9305	Ship Miscellaneous Items	774.60
5-23-74	K0044422		R9305	Ship Miscellaneous Items	909.48
11-22-74	L0480564	001	E6187X	Ship Miscellaneous Items	18.01
4-16-75	H1951715	004	E6187X	Ship Miscellaneous Items	50.00
66.000.449	NAS1-12500-X	248	E6187X	Handcarry Guidance Comps. to S/M	4,528.00
6600.0449	NAS1-12500-X	858	E6187X	Ship Miscellaneous Items	30.00
				MISSION PECULIARS SUBTOTAL	$ 56,496.77
				HARDWARE SUBTOTAL	$ 56,496.77
-02 SUPPORTING ACTIVITIES					
MISSION REQUIREMENTS (02-04)					
6600.0449	NAS1-12500-12-J10	372	E6187-I	LTV Support to UK-5	$ 1,828.23
SS DIRECT					
	Italian Range Costs				664,525.00
				MISSION REQUIREMENTS SUBTOTAL	$ 666,353.23
				SUPPORTING ACTIVITIES SUBTOTAL	$ 666,353.23
				PHASE VI SUBTOTAL	$ 722,850.00
				FY 1974 TOTAL	$ 722,850.00

TABLE CXIV Concluded - UK-5 REIMBURSABLE EXPENDITURES, FY75 & FY76.

P.R. NO.	ORDER NO.	ITEM	J.O. NO.	DESCRIPTION	OBLIGATION
-01 HARDWARE					
MISSION PECULIARS (01-04)					
4-22-75	H1951715	003	E6187X	Ship Motors to San Marco	$ 6,451.48
4-22-76	L0276437	004	E6187X	Ship S-187 to San Marco	18,360.24
11-8-74	L0276663	001	E6187X	Ship Hydroset for Spacecraft	622.77
11-22-74	L0276662	001	E6187X	Return Vans to U.S.A.	242.00
8-14-75	L0276662	002	E6187X	Return Vans to U.S.A.	245.78
1-17-76	L0276437	002	E6187X	Return Vans to U.S.A.	1,261.19
3-19-75	K0044714	001	E6187X	Ship Miscellaneous Items	294.80
8-1-75	K004477	006	E6187X	Ship Miscellaneous Items	329.36
12-19-75	K0480557	001	E6187X	Ship Miscellaneous Items	155.72
12-19-75	K0480541	001	E6187X	Ship Miscellaneous Items	22.20
12-6-74	K0044526	001	E6187X	Ship Miscellaneous Items	604.84
				MISSION PECULIARS SUBTOTAL	$ 28,590.38
				HARDWARE SUBTOTAL	$ 28,590.38
-02 SUPPORTING ACTIVITIES					
MISSION REQUIREMENTS (02-04)					
66.000.449	NAS1-12500-12-J10	371	E61871	LTV Support to UK-5	$ 22,434.00
66.000.449	NAS1-12500-12-J10	307	E61871	LTV Support to UK-5	13,975.62
				MISSION REQUIREMENTS SUBTOTAL	$ 36,409.62
				SUPPORTING ACTIVITIES SUBTOTAL	$ 36,409.62
				PHASE VI SUBTOTAL	$ 65,000.00
				FY 1975 TOTAL	$ 65,000.00
			FY 1976		
-02 SUPPORTING ACTIVITIES					
MISSION REQUIREMENTS (02-04)					
6600.0449	NAS1-12500-12-J10	644	E61871	LTV Support to UK-5	$ 11,307.15
				MISSION REQUIREMENTS SUBTOTAL	$ 11,307.15
SS DIRECT					
				Italian Range Costs	$ 65,399.00
				CRA MITS Support	8,032.00
				OSS DIRECT SUBTOTAL	$ 73,431.00
				SUPPORTING ACTIVITIES SUBTOTAL	$ 84,738.15
				FY 1976 TOTAL	$ 84,738.15

TABLE CXV - UK-6 MAY 1, 1980 ESTIMATED COSTS.

1. Vehicle Procurement			$1,992,064
Vehicle Hardware (Y)		$973,613	
Motors (Z)		564,973	
Certification & Processing (H)		303,147	
Tooling (V)		80,350	
Spares (M)		69,981	
2. Transportation			23,514
3. Launch Services			461,734
LTV/WTR Field Maintenance (N)		175,332	
LTV/WTR Launch Services (N)		286,402	
4. Project Management & Engineering Support			1,665,494
Program Management (A)		399,273	
Systems Engineering (E)		241,972	
Reliability & Training (F, K)		235,574	
Preflight Planning (C)		34,636	
Mission Integration (B)		68,013	
Configuration Control (G)		104,633	
Data Analysis (D)		64,280	
LTV - Incentive (W)		100,000	
Spares Administration & Replenishment (L)		48,326	
R & D (R)		216,256	
Mission Peculiars, Supporting Services (J)		105,553	
LTV/SPO (P)		46,978	
5. D.O.D. Contract Administration (Q)			40,049
6. Project Management and Support			354,876
Travel: (U)		31,943	
LRC	31,900		
Wallops	43		
Management:		259,434	
LRC	129,300		
Wallops	120,134		
GSFC	10,000		
Depreciation		63,499	
7. Range Services (I)			161,400
WFC		86,400	
GSFC		75,000	
8. *Agency Overhead			306,996
TOTAL			$5,006,127

NOTE: Based on processing of 42% NAS1-12500 and 58% NAS1-15000.
*Includes Wallops @ $108,159, LaRC $145,800

TABLE CXVI - SCOUT UK-6 MISSION .

(Millions Dollars)

	FY75 & PRIOR	FY76	FY7T	FY77	FY78	FY79	FY80	TOTAL
Contract	0.100	2.240	0.75	1.573	0.3437			5.0067
R & D								
LaRC	0.098	2.2036						4.3042
G.B.L.					1.5984	0.0996	0.1197	
GSFC				0.005	0.010	0.0085		
WFC					0.075			
					0.0864			
Others								
Contract Administration								
Depreciation							0.040	0.040
LaRC							0.0635	0.0635
WFC							(0.05285)	(0.05285)
							(0.01065)	(0.01065)
RPM								
(01) Civil Service								0.5977
GSFC								(0.2545)
WFC					0.005			(0.005)
LaRC						0.1202		(0.1202)
(02) Travel				0.065	0.040	0.0243		(0.1293)
LaRC								
GSFC		0.0013	0.0012	0.0038	0.0020	0.0202	0.0027	(0.0312)
Headquarters					0.005			(0.005)
WFC								
(03) Overhead								
Headquarters								(0.307)
LaRC							0.044	(0.044)
WFC				0.073	0.0486	0.0242		(0.1458)
GSFC					0.1082			(0.1082)
					0.009			(0.009)
Unobligated								0.0013

Table CXV presents the data for the only Phase VII foreign reimbursable Scout mission. It was very well published because it was the one-hundredth Scout launch. This culminated in a NASA-wide banquet, a commemorative coin, and a full-scale nonflightworthy Scout in the newly established Aerospace Smithsonian Museum.

Table CXVI shows the funding over a typical five-year period. This depicts the funding requirements for a Scout mission.

San Marco, the largest of the Scout foreign reimbursable programs and previously mentioned, had all commitments approved by telegram from Italy. These requirements were contracted to Vought Corporation on a task-type contract referred to as "J." Tables CXVII and CXVIII itemize the tasks for contracts NAS1-10000 and NAS1-12500. These cover part of two sections of the program (San Marco C and D). Table CXIX is a typical example of the U.S. report to Italy on San Marco "C" and Table CXX is a typical Scout Project Office report on San Marco "D" to NASA Headquarters.

TABLE CXVII - SAN MARCO SUPPORT, TASK J TO CONTRACT NAS1-10000

WA 3334 TASK CODE	CRA AUTHORITY	TASK	COST W/ 8.119% FEE
AAB	SG/3501/09/N-2	H_2O_2 Equipment Rework	$ 8,132
AAG		Logistical Support for SMER	22,067
ABC	UA/3088	Miscellaneous Materials for SMER	31,282
ABD	CRA Letter 2/7/71	Microfilm Equipment for CRA	12,275
ABH	UA/2486	A/C Spares and Installation	10,188
ABL	UA/2613	Transformer for SMER	198
ABS	CRA Letter 20/1/72	Certification Training	10,771
ABW	SG/6089/09/N-2	Miscellaneous Materials for SMER	26,759
ABX	CRA Letter 3699	Miscellaneous Spares for SMER	1,777
ACA	SG/6348/09/N-2	Logistics Support to SMER	35,968
ACB	SG/6348/09/N-2	K & E Transits	12,118
ACDC	SG/6348/09/N-2	Drawing Maintenance	4,600
ACDE	SG/6348/09/N-2	Update SMOP & Configuration Control	15,113
ACF	SG/6514/09/N-2	Range Control Center Spares	213
ACJ	SG/7640/09/2	S-178 & Sub GSE Mods	198,762
ACL	SG/7640/09/2	Genesco Rate Table	13,356
ACM	CRA MSG 270473/7	Lima Crane Inspection	4,590
ACP	SG/6422	Refurbishment of SMER Equipment	13,037
ACR	SG/7640/09/2	Certification Materials	544
ACS	SG/7640/09/2	Miscellaneous Spares for SMER	5,957
ACT	SG/7641/09/2	Lima Crane Spares	6,615
ACV	SG/7770/09/N-2	Miscellaneous Materials for SMER	3,214
ACW	SG/7641/09/2	LTV Technical Support to SMER	7,086
ACX	SG/7641/09/2	LTV Technical Support to Rome	17,658
AEA	SG/7640/09/2	Battery Simulators	532
AED	UA/4212	Air Conditioning & ITEK Spares	5,292
AEE	CRA MSG 310773/1	Batteries & Spares for SM C-2	31,283
AEF	SG/7770/09/N-2	Hydrogen Peroxide for SMER	2,429
AEG	SG/7641/09/2	LTV Technical Support to SMER	11,722
AEH	SG/7770/09/N-2	Logistics Support to SMER	11,839
AEK	SG/7770/09/N-2	Miscellaneous Materials for SMER	8,943
		TOTAL	$534,350

TABLE CXVIII - SAN MARCO SUPPORT, CONTRACT NAS1-12500 TASK J

TASK NO.	CRA AUTHORITY	TASK	CRA TOTAL COST
J-3	SG/6348/09/N-2	Configuration Management	$ 81,649
J-4	SG/7975/09/N-2	Logistics Support to San Marco Range	25,798
J-6-1	SG/7977/09/N-2	Air Conditioning Equipment for Telemetry Room	10,684
J-6-2	SG/4385, 121173/4	Headsets, Filters, Ring, Alinement Tools	7,611
J-6-3	SG/7770/09/N-2	Miscellaneous Tools and Capacitors	1,766
J-6-4	SG/7770/09/N-2	Connectors, Valves, Squibs	2,768
J-6-5	SG/7770/09/N-2	TEKTRONIC Probe and Tracer Spares	2,506
J-6-6	SG/7770/09/N-2	Stop Assembly and Direction Plate	1,774
J-6-7	SG/7770/09/N-2	MIT Station Spares, Generator Spares	25,364
J-6-8	UA/4385	Electrical Spares	1,246
J-6-9	271273/1	Converter and Generator Spares	8,969
J-6-10	291373/1	Telemetry Room Spares and Miscellaneous Materials	4,947
J-6-11	271173/2	Miscellaneous Materials and MIT Station Spares	38,726
J-6-12	08/1200Z	Communication Spares	10,259
J-6-13	121720Z, 011304Z	Miscellaneous Materials	2,529
J-6-14	D10374/1	S-193 and Sub. Mod. Kits	44,527
J-6-15	UA/4553, 140921/74	Crane Motor and Miscellaneous Spares	5,856
J-6-16	UA/4594, 4638, 4639	Miscellaneous Materials	30,011
J-6-17	SG/8805/09/4	Electrical Components	46,142
J-6-18	20674/2	Hewlett Packard Components	1,630
J-6-19	SG/8504/09/4	Interferometer System	51,340
J-6-20	UA/4554	Miscellaneous Materials	247
J-6-21	UA/4640	Roller Bearings and Potentiometers	159
J-6-22	UA/4673	Transformer	249
J-6-23	UA/4744	Motor Boat Spares	2,636
J-6-24	UA/4745	Submarine Pumps	8,997
J-6-25	UA/4748	Beckman Testers	2,088
J-6-26	020974/1, 160774/1	Electrical Spares	15,736
J-6-27	23/1220Z	Ingersoll Rand and Forklift Spares	2,893
J-6-28	UA/4744	Marine Engine Type 760	14,156
J-6-29	SG/8805/09/4	Technical Support for S-193 Modifications	18,161
J-6-30	CRA letter #2 12/16/74	Drafting Support S-193 Modifications	10,993
J-6-31	CRA letter 11/21/75	Misc. LeTourneau and S. Atlanta Spares	19,666
J-6-32	CRA letter 12/17/74	DAF Engine and Spares	35,305
J-6-33	SG/8805/09/N-4	Logistic Support for S-194 Processing	19,192
J-6-34	CRA Telex 2/4/75	Electrical Technical Support for S-193 Mods.	28,153
J-6-35	CRA Telex 3/7/75	Mechanical Technical Support S-194 Processing	8,652
J-6-36	CRA Telex 3/10/75	Mechanical Foreman S-194 Processing	8,014
J-6-37	UA 4957, 07/1225 05/1088	Electronic Spares, Lost Materials	19,828
J-6-38	CRA Telex 3/10/75	Hydrogen Peroxide	3,168
J-6-39	CRA Telex 7/21/75	Mechanical Foreman to SMER (Oct-Nov 1975)	6,459
J-6-40	CRA letter 11/21/74	Electrical Test Equipment & LeTourneau Spares	41,476
J-6-41	UA 5087	Volume II of SMOP	66,406
J-6-42	UA 5087	Preservation of Motor Shipping Vans	16,215
J-6-43	UA 5052	Telemetry Station Spares	6,367
J-6-44	UA 5051	Electronic Spares	16,041
J-6-45	UA 5086	Electronic Test Set, DAF, & A/C Spares	54,358
J-6-46	UA 5087	Structures Engineer to SMER	2,748
J-6-47	UA 5085	Materials for S3T Cable Plant	3,890
J-6-48	CRA Telex 3-24-76	Update Long Range Spares Report	9,560
J-6-49	CRA Telex 3-25-76	Logistics Support to SMER	12,596
J-6-50	CRA Telex 3-24-76	Personnel Profficiency Program Support	23,892
J-6-51	CRA Telex 4-1-76	Mechanical Technician Support to SMER	7,714
J-6-53	UA 5030 6-26-75	Certification Materials	2,580
J-7	SG/7770/09/N2	Shipping Charges for Mission Procurements	58,049
J-8	SG/6422	Refurbishment of San Marco Range Equipment	26,486
J-11	SG/8306	Operations Consultant for S-187	15,247
J-12	SG/8805/09/4	Logistics Support through S-187	22,459
J-14	010774/1	Interim Logistics Support	11,862
J-16	UA 5084	Sodium Payload Procurement from GCA	51,260
		TOTAL	$1,080,056

NASA

National Aeronautics and
Space Administration

Washington, D.C.
20546

TABLE CXIX - (EXHIBIT)

15 JUN 1978

Reply to Attn of: MLE-9

Professor Luigi Broglio
Director, Centro Ricerche Aerospaziali
Universita Degli Studi di Roma
Via Salaria N. 851
Rome, Italy 00199

Dear Professor Broglio:

The current status of the San Marco C Trust Fund is reported below.

1. Funds Received

The following deposits of funds were received directly from the University of Rome:

February 1969	$ 48,009.06
May 1970	$ 250,000.00
October 1972	$ 500,000.00
May 1973	$ 762,647.24
December 1974	$ 453,600.00
Total	$2,014,256.30

Also, the following payments for services provided by the CRA under NASA Contracts NASW-1761 and NASW-2135 were deposited to the San Marco account:

SAS-C Support - June 1975	$200,000.00
UK-5 Support - January 1977	$ 73,431.00
UK-5 Support - January 1977	$ 8,032.00
MITS Support - June 1977	$101,900.00
MITS Support - October 1977	$ 35,077.00
Total	$418,440.00

TABLE CXIX Continued - (EXHIBIT)

2

The total funding deposited to the San Marco account is $2,432,696.30.

2. Funds Obligated

As of May 31, 1978, the following obligations have been made for the CRA:

Item	Amount
Training	$ 30,313.03
Motor Shipping Containers	$ 23,616.81
Dummy Motor Shipment	$ 2,145.82
Range Expendables and Shipping Charges	$ 114,411.13
LTV Invoices	$ 78,272.00
MPS-19 Spare Parts	$ 8,232.19
Return of Motor Containers	$ 13,717.48
Spare Parts	$ 179,666.02
H_2O_2 System Rework	$ 34,415.09
Clean Room Equipment	$ 14,085.64
S-173C/S.M.-C Vehicle Shipment	$ 58,240.44
Nike Apache Rockets	$ 41,777.21
Support of Nike-Apache Launch Ops.	$ 7,141.00
Motor Container Rework/Refurbishment	$ 34,059.00
Algol III Modifications	$ 20,000.00
Microfilm System	$ 12,209.00
Transits	$ 11,000.00
Drawing Maintenance and Logistic Survey, S&CC Implementation	$ 49,381.00
LTV Support to CRA, Rome (1973)	$ 17,536.00
S&CC Maintenance (NAS 1-10,000)	$ 30,829.00
S&CC Maintenance (NAS 1-12,500)	$ 25,228.00
Certification Training	$ 11,557.00
S-Band Telemetry	$ 251,726.13
Santa Rita Inspection	$ 13,310.00
San Marco C-2 Support/Spare Parts	$ 31,272.15
GSE & Range Equipment Refurbishment	$ 29,869.00
Electrical and Mechanical GSE	$ 93,438.36
Scout Phase V GSE Mod Kits	$ 78,974.00
Scout Phase VI GSE & Telemetry Mod Kits	$ 42,030.00
42" Heat Shield Modifications	$ 38,131.00
Phase VI Mod Kits Installation	$ 23,408.00

TABLE CXIX Continued - (EXHIBIT) 3

Item	Amount
Payload Umbilical Arm Rework	$ 14,153.00
Scout S-190C/S.M.-C2 Vehicle Shipment	$ 60,969.26
Lima Crane Refurbishment	$ 18,158.00
LTV Logistics Support for S-190C	$ 23,306.00
Electrical Equipment for T/M Room	$ 10,684.00
MITS Spare Parts	$ 48,901.00
Communication System Spare Parts	$ 10,259.00
Scout S-193 and Sub Mod Kits and Installation	$ 101,941.01
Radar System Modifications and Maintenance	$ 17,130.22
San Marco C2 Communication Support	$ 76,969.00
Sounding Rocket Procurement (1974)	$ 52,508.80
LTV Logistic Support for S-194C	$ 19,381.00
LTV Support for S-187C Processing	$ 34,937.00
Submarine Cables & Electrical Components	$ 46,094.00
Interferometer System	$ 51,340.00
LTV Configuration Management Support	$ 50,000.00
Marine Engine Type 760	$ 14,156.00
DAF Engine and Spare Parts	$ 30,490.00
LTV Support at SMER	$ 24,845.00
LTV Logistic Support	$ 14,900.00
Standard Procedures (SMOP Vol II)	$ 73,648.00
Spares Program Support (TWX dtd. March 24, 1976)	$ 7,192.00
Logistic Support (SG/8805/09/04)	$ 19,192.00
Configuration Management (SG/6348/09/N-2)	$ 795.47
Operations Support/S-187 (SG/8506)	$ 1,810.00
Logistic Support/S-187 (SG/8805/09/4)	$ 959.00
Spares System Management (TWX dated March 24, 1976)	$ 577.69
Spare Parts (UA/4640)	$ 159.00
S-193 Mods Installation (TWX dated February 4, 1975)	$ 28,123.00
Personnel Proficiency Program (TWX dated March 23, 1976)	$ 23,892.00
Mechanical Tech. Support/SMER (TWX dated April 1, 1976)	$ 7,714.00
Logistic Support/SMER (TWX dated Mar. 24, 1976)	$ 1,333.84
Vought Corp. Invoices (SG/10182)	$ 51,537.00

TABLE CXIX Concluded - (EXHIBIT)

Item	Amount
Vought Corp. Invoices (TWX dated August 3, 1976)	$ 74,271.00
DAF and Electrical Spares (UA 5086)	$ 54,354.00
GCA Payloads (TWX UA 5084)	$ 51,260.00
Logistic Support (TWX dated Mar. 23, 1976)	$ 11,262.16
Certification Program Materials (UA 5030)	$ 2,580.00
Total Obligations	$2,551,773.95

3. San Marco C Trust Fund Account Balance

Total Obligations	$2,551,773.95
Total SMTFA Funding	$2,432,696.30
	$ 119,077.65
Payments From San Marco D Deposit Account:	
SMDDA-8	$ 84,884.65
SMDDA-9	$ 34,193.00
	$ 119,077.65
San Marco C Trust Fund Balance	-0-

Sincerely,

Original signed by
P. E. Goozh

Paul E. Goozh
Scout-San Marco Program Manager
Expendable Launch Vehicle Programs

CWW/1-26-82
Rev. A

TABLE CXX - SAN MARCO-D DEPOSIT ACCOUNT

Date	Funds Rec'd
November 1977	$ 300,000.00
January 1978	200,000.00
May 1978	200,000.00
July 1978	200,000.00
November 1978	100,000.00
March 1981	223,578.00
April 1981	126,039.00
May 1981	318,609.45
Total	$1,783,226.45

Funds Obligation

		Item	Status	CRA Auth.	Amt. Authorized/ Disbursed
1.	GSFC	Radiometer		SMDDA-1	$ 110,000.00
2.		Vought Invoices		SMDDA-5	60,068.00
		Vought Invoices		SMDDA-9	34,193.00
3.		Radar Modifications		SMDDA-12	3,500.00
4.		Unpaid Commitments from Trust Fund		SMDDA-8	84,456.00
5.	GSFC	Radiometer		SMDDA-18	100,000.00
6.	J2-01	Configuration Management	Closed	SMDDA-7	19,125.36
7.	J2-02	Proficiency Training	Closed	SG 10351/07-3	20,853.95
8.	J2-03	Van Storage	Closed	SMDDA-6	5,592.86
9.	J2-04	Payload Storage	Closed	SMDDA-6	2,013.99
10.	J2-05	DeLong Inspection	Closed	SMDDA-8	4,481.55
11.	J2-06	Generators	Closed	SMDDA-11	54,708.36
12.	J2-07	Algol III Feas. Study, SM Scout	Closed	SMDDA-10	44,678.27
13.	J2-08	Delong Engineering	Closed	SMDDA-13	31,458.09
14.	J2-09	SM Launcher Improvement, SM Scout	Closed	SMDDA-14	13,074.78
15.	J2-10	NEMAR Training	Closed	SMDDA-15	14,487.80
16.	J2-11	Material - Certification	Closed	SMDDA-16	5,868.57
17.	J2-12	Material - Air Compressor	Closed	SMDDA-17	3,968.74
18.	J2-13	Motor Generator Shipment	Closed	SMDDA-19	3,474.40
19.	J2-14	Support to Launcher Improvement	Closed	SMDDA-21	20,271.29
20.	J2-15	Engine Parts	Closed	SMDDA-22	4,935.89
21.	GSFC	Tech. Monitoring & Support	Closed	SMDDA-25	35,600.00
22.	J2-16	Van Storage	Closed	SMDDA-26	3,346.47
23.	J2-17	Storage of Lithium P/L's & Motor Shipping Vans	Open	SMDDA-36	4,000.00
24.	J2-17A	Payload Storage	Open	SMDDA-27	3,084.00
25.	J2-18	Prelim. SM Documentation Update	Closed	SMDDA-24	9,530.95
26.		Test Rocket SM Meteorological Prog		UA/6935	4,050.00
27.	GSFC	Emergency Procurement	Open	SMDDA-28	35,000.00
28.	J2-19	Phase VII Mod. Kits & Material	Closed	SMDDA-29	4,796.65
29.	J2-20	Long-lead Items, Mech. & Fluids	Closed	SMDDA-30	34,576.30*
30.	J2-21	Refurb. SM Components at Vought	Closed	SMDDA-31	15,627.27
31.	GSFC	San Marco D Procurement	Closed	SMDDA-32	35,000.00

TABLE CXX Concluded - SAN MARCO-D DEPOSIT ACCOUNT

		Item	Status	CRA Auth.	Amt. Authorized/ Disbursed
32	GSFC	San Marco D Procurement	Closed	SMDDA-33	$ 35,000.00
33.		Spacecraft Parts Requests	Closed	SMDDA-34	**
34.		Direct to GSFC	Closed	SMDDA-35	**
35.		Inspection of CRA Rocket Motors	Closed	SMDDA-37	6,206.00
36.	GSFC	San Marco D Proc. & Travel	Closed	SMDDA-38	55,000.00
37.	GSFC	San Marco D Procurement	Closed	TELEX 3/81	500,000.00
38.		Spacecraft Umbilical Connectors	Open	SMDDA-39	620.00***
39.	J2-22	Proc. of Misc. Items for Vol. II	Open	SMDDA-40	745.00
40.		Parts Listing & Elect. Manual	Open	SMDDA-41	125.00
41.	J2-01	Vought Quotes 1L-26, -27, -28, -29 & -30	Open	SMDDA-42	200,000.00
42.		Shipment of MPS-19 Radar & MPS-21 Spares, Personnel Travel	Open	SMDDA-43	20,600.00
43.	J2-03	Shipment of Misc. Mat'ls to SMER	Open	SMDDA-44	5,000.00
44.		Phase VII Mat'ls Procurement	Open	SMDDA-45	130,000.00
				Total	$1,779,218.54
				Balance	$ 4,007.91

The two main Phase VI DOD Scout programs were DOD MIPR's 66-95 and 68-71. MIPR 66-95 consisted of six Scout launches: one Phase IV - S-157; three Phase V - S-162, S-170 , and S-176; and two Phase VI - S-178 and S-182. It covered costs from 1967 through 1974. MIPR 68-71 had two Phase VI launches, S-179 and S-192. The remainder were Phase VII. MIPR 68-71 covered costs from 1975 through 1985. Table

Table CXXI lists the total projected DOD program for Phases II through VIII for funds through 1979. Tables CXXII through CXXVII detail MIPR's 66-95 and 68-71 financial programs. Table CXXVIII itemizes the special DOD P76 program. Tables CXXIX through XCCCVI detail the hardware for E-Sections, heat shields, on-base costs, production support, spares, range operations, and field services as typical program requirements.

*J2-20.- Proc. of long-lead-time items. Time from cost quote submitted to CRA and approval by CRA requires quicker response; quotes are often for 30 days only, and approval is received after cost quote is invalid.

**Funds not issued from Deposit Account.

***Purchased under NAS1-12500, Task M-4-32, transferred 8 connector to SM DL Program.

TABLE CXXI - DOD EXPENDITURES

SCOUT	( )** PHASES II THROUGH V	PHASE VI	PHASE VII & SUBSEQUENT	NONSCOUT	TOTAL
59-4-5-6				$6,718,936	$ 6,718,936
NA492					9,703,348
1961	$ 1,800,000				(1,800,000)
1962	7,900,000				(7,900,000)
1965	3,348				(3,348)
62-6					11,212,996
1962	$ 7,172,858			89,524	(7,262,382)
1963	884,096			9,190	(893,286)
1964	260,281				(260,281)
1965	1,264,759			10,747	(1,275,506)
1966	641,427			2,000	(643,427)
1967	520,612				(520,612)
1969	267,502				(267,502)
1975				90,000	(90,000)
62-12				264,395	264,395
62-13				482,794	482,794
62-14				1,324,347	1,324,347
63-27				100,000	100,000
*63-29					7,463,381
1962	975,670				(975,670)
1963	3,465,000				(3,465,000)
1964	464,000				(464,000)
1965	1,255,299				(1,255,299)
1966	1,086,381				(1,086,381)
1969	217,031				(217,031)
63-30				5,301	5,301
63-32(1962-3)	1,944,298				1,944,298
63-44				132,110	132,110
64-30				223,080	223,080
65-42(1965-6)	400,000				400,000
66-87				248,000	248,000
*66-95					17,485,138
1967	7,198,831	3,570,855	450,581		(11,220,267)
1968	330,625	1,045,529	2,153,771		(3,529,925)
1970	0	970,883	50,048		(1,020,931)
1971	263,679	617,677	732,000		(1,613,356)
1972		12,327	20,181		(32,508)
1973		14,746	49,405		(64,151)
1974		4,000			(4,000)
*68-71					31,189,252
1968		1,049,354	2,858,063		(3,907,417)
1972		6,855	562,666		(569,521)
1974		775,047	10,871,206		(11,646,253)
1975		46,364	1,153,636		(1,200,000)
1976		2,556,398	2,693,529		(5,249,927)
197T			11,535		(11,535)
1977		47	2,270,852		(2,270,899)
1978		0	4,178,250		(4,178,250)
1979		0	2,065,450		(2,065,450)
RST-535 (NAVY)					90,000
			90,000		(90,000)
TOTAL	$38,315,697	$10,670,082	$30,211,173	$9,700,424	$88,897,376

*Navy Program funded by Air Force. Does not include funds for WTR Field Team.
**Final Costs.

TABLE CXXII - DOD COST SUMMARY.

1.	FINAL ESTIMATED COSTS MIPR 66-95 THRU FY74		$17,485,136
(a)	Includes 5 Vehicles	$6,103,049	
(b)	Includes Annual Costs FY67-FY74	9,561,953	
(c)	Per-Launch Costs (5 Vehicles)	986,622	
(d)	Special Requirements Thru FY74	1,354,443	
(e)	NASA's Share	(-520,931)	
2.	ESTIMATED COSTS MIPR 68-71 THRU FY86		$120,821,606
(a)	Includes 12 Transit Vehicles, Air Force P76-5, & 5 A.F. ITV Veh.	$52,983,258	
(b)	Includes Annual Costs FY74-FY85 (est.)	55,406,956	
(c)	Per-Launch Costs (12 Vehicles)	12,431,392	

TABLE CXXIII - SCOUT 66-95 PROGRAM, PER-LAUNCH COST.

	157C	162C	170CR	176C	182C	178C
Payload Coordination	$ 5,261	$ 6,592	$1,722	$ 4,363	$ 10,591	$ 7,075
Preflight Planning	16,952	16,952		5,736	32,292	37,675
Data Analysis	82,143	82,143		54,174	41,959	32,591
Launch Crew (TDY)	0	0		0	25,000	25,000
Travel	3,000	3,000		3,000	3,000	3,000
Specials (Estimate)						20,412
Payload Cooling & Health Physics					97,206	
Incentives	0	0		106,000	105,286	105,286
TOTAL	$107,356	$108,687	$1,722	$173,273	$315,334	$231,039

TABLE CXXIV - SCOUT/66-95 PROGRAM COSTS (Estimated), PHASES V & VI - ANNUAL COSTS.

	NAS1-6020		NAS1-7256		NAS1-10000			NAS1-12500
RECURRING	FY1967	FY1968	FY1969	FY1970	FY1971	FY1972	FY1973	FY1974
FIXED ANNUAL								
Field Crew	$ 1	$ 2	$ 0	$126,626	$131,076	$131,076	$131,076	$ 0
Travel	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
DCASO	89,368	59,313	54,500	59,000	56,000	69,000	64,500	24,144
VAFB Assessments	0	0	0	0	8,912	5,375	0	0
VARIABLE ANNUAL								
Contract Program Adm.	269,722	269,726	205,260	205,260	106,312	106,313	106,313	0
LTV Support	49,352	49,357	0	0	0	0	0	0
Reliability	180,855	180,873	119,517	119,517	0	0	0	0
S & C^2	116,905	116,906	58,863	58,863	0	0	0	0
Systems Engineering	274,276	274,552	157,360	157,360	2,880	4,003	5,922	0
Logistics Support	144,593	144,595	41,451	41,451	0	0	0	0
NONRECURRING								
Subauthorizations to GSFC	0	0	0	0	0	0	4,000	0
Specials & VAFB Assess.	25,241	25,241	8,190	10,616	7,465	6,497	0	100,000
Motor Test Program	0	0	0	0	100,000	123,815	40,000	12,000
Motor Shelf Life	45,509	17,318	37,533	60,345	0	23,525	40,979	34,930
TOTAL	$1,200,822	$1,142,885	$687,674	$844,038	$417,645	$474,604	$397,790	$176,074

TABLE CXXV - SCOUT 68-71 PLANNED PROGRAM ESTIMATES (Per-Mission Cost).

	195	179	197	200	204	205	192	199
Mission Integration (B)	$ 36,368	$ 25,153	$ 12,226	$ 34,785	$ 35,215	$ 36,000	$ 5,160	$ 38,000
Preflight Planning (C)	36,526	46,272	31,700	29,515	33,000	33,000	36,027	39,000
Data Analysis (D)	44,000	42,500	40,377	56,571	66,000	61,000	86,554	70,000
Launch Services:								
(E)	100,708	52,483	100,708	206,950	207,000	60,000	24,036	60,000
(F)	25,983	0	25,983	88,382	80,000	82,000	0	0
(G)	25,950	0	25,950	145,000	90,000	48,000	0	0
(H)(tr)	72,094	84,823	72,094	23,041	0	0	0	0
(N)	53,666	53,666	53,666	264,046	242,000	242,000	259,000	259,000
DCASO	4,458	18,170	3,264	7,180	7,000	5,000	8,179	5,000
Travel	10,000	25,000	12,000	12,000	10,000	10,000	32,000	32,000
VAFB Assessments (Range)	48,948	62,429	75,800	40,985	180,000	180,000	153,200	180,000
Incentives	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Mission Peculiars	3,953	92,737	3,432	32,676	60,000	60,000	101,670	108,671
Shipping (Total)	20,000	20,000	20,000	24,000	0	0	22,000	25,000
TOTAL	$582,654	$623,233	$577,200	$1,065,131	$1,110,215	$917,000	$827,826	$916,671

	208	209	210	211	212	213	214	215	216	217
Mission Integration (B)	$ 42	$ 42	$ 55	$ 42	$ 47	$ 42	$ 42	$ 42	$ 47	$ 47
Preflight Planning (C)	42	42	54	42	50	42	42	42	50	50
Data Analysis (D)	96	96	126	96	116	96	96	96	116	116
Incentives (W)	100	100	100	100	100	100	100	100	100	100
Mission Peculiars (R)	60	64	79	64	74	69	69	69	74	74
Range Costs (I)	200	543	250	543	250	597	597	597	250	250
TOTAL*	$540	$887	$664	$887	$637	$946	$946	$946	$637	$637

*Thousands.

TABLE CXXVI - SCOUT/68-71 PROGRAM COSTS (Estimated), PHASES VI & VII - ANNUAL COST ESTIMATES.

RECURRING	NAS1-12500			NAS1-15000		
	1974	1975	1976	1977	1978	1979
Fixed Annual						
Field Crew	$ 491,051	$ 491,051	$ 491,052	$ 542,016	$ 542,016	$ 542,016
Training	0	7,333	7,333	0	0	0
Travel (2)	0	6,000	12,000	12,000	6,000	45,000
DCASO	0	11,281	11,281	12,726	248,201	125,000
VAFB-Assessment (Quintron)	78,209	73,577	49,349	(T) 72,763	81,143	21,196
LRC-Assessment (IMS)	0	60,000	60,000	0	0	0
VAFB Scout Program Assessment	0	120,371	27,500	35,000	30,450	9,500
Variable Annual						
Contract Program Administration (A)	0	0	0	753,456	753,456	753,455
LTV Support (P)	0	0	0	0	0	0
Reliability (F)	0	0	0	0	0	0
S & C^2 (G)	0	0	0	0	0	0
Systems Engineering (E)	52,483	33,527	33,528	0	0	0
Logistics Support (L)	0	0	0	0	0	0
VAFB-Cash Fund (KSC)	37,500	37,500	102,514 (T)	116,857	61,207	0
NON-Recurring						
Motor Shelf Life	0	78,372	76,250	60,000	60,000	60,007
Specials	0	100,000	100,000	242,123	130,305	23,745
SAMSO (Stearns Roger)	0	0	97,500	54,110	50,000	0
TOTAL (Additive)	$659,243	$1,019,012	$1,168,307	$1,901,050	$1,962,778	$1,579,920

(T) Includes FY7T.

TABLE CXXVII - DOD/SCOUT 68-71 SUMMARY THROUGH 1979[a]

Vehicles	Designation	Vehicle Number	Phase	FY Launched	Hardware	Cost Per Launch	Total
1	N-17	195	VII	1976	$1,728,933	$ 589,472	$2,318,405
2	AF-P76-5	179	VI	1976	1,386,896	845,682	2,232,578
3	N-18	197	VII	1977	1,781,023	575,338	2,356,361
4	N-19	200	VII	1978	2,131,281	1,214,301	3,345,682
5	N-20	204	VII	1979	2,286,723	1,206,000	3,492,723
6	N-21	192	VI	1979	1,825,830	1,257,450	3,083,280
						TOTAL	$16,829,029

(a) Thirteen additional launches planned after 1979 for the Navy.

TABLE CXXVIII - COST ESTIMATES FOR P76-5 (S-179)

1. Vehicle Procurement			$1,421,221
Vehicle Hardware		$530,465	
Motors		362,934	
Certification and Processing		341,732	
Vehicle Processing	$148,375		
34-inch Heat Shield Mods (HEK)	31,675		
Fit Check Buildup (JDD) R-165	16,269		
Personnel from Dallas (HGG)	87,794		
Retest Vehicle Components[(a)]	57,619		
Tooling		68,502	
Spares		50,529	
Mission Peculiars		67,059	
Fourth-Stage Telemetry (JB) R-163	41,947		
Vehicle Reassignment (JD) R-165	12,711		
Guidance Reprograming (JDE) R-165	5,721		
Roll Yaw (7199 M14)	6,680		
2. Transportation			27,034
3. Field Crew			220,364
4. Project Management and Engineering Support			236,562
Systems Engineering		48,310	
Preflight Planning (R165)		20,599	
Mission Integration		25,153	
Heat Shield Design (BKH)	2,608		
Interface Dwg.-Brochure (JDA) R-165	8,410		
New Trajectory (Preliminary)(BEF)	3,797		
Environmental Study (BGD)	10,338		
Data Reduction (R165)		42,500	
LTV Incentive Award		100,000	
5. DOD Contract Administration			15,080
6. Travel			24,396
7. *Range Services - L29075A			62,429
TOTAL			$2,007,086

(a) R92-NAS1-10000 - $9,258.00.
R164-NAS1-12500 - $7,411.00.
R173-NAS1-12500 - $28,736.00.
R91-NAS1-12500 - $12,214.00.

TABLE CXXIX - VAFB REIMBURSABLE SERVICES

MIPR	FY 1974	FY 1975	FY 1976	FY 197T	FY 1977	FY 1978	FY 1979	FY 1980
VAFB ASSESSMENT (RECURRING) (Q)								
L-88316 (SAMTEC) - QUINTRON	$127,844							
L-5098A (SAMTEC) - QUINTRON		$147,154						
L-22387A (SAMTEC) - QUINTRON			$ 75,000	$23,698				
L-52306A (SAMTEC) - QUINTRON					$ 70,526			
L-69148A (SAMTEC) - QUINTRON						$ 77,500	$ 42,393	
L-86521A (SAMTEC) - QUINTRON								$ 94,922
VAFB UTILITIES								
L-50725A					3,243			
L-68209A						12,000		
L-86494A							19,000	25,000
VAFB ASSESSMENT (NONRECURRING)								
L-29062A (SAMSO) (C)(Stearns Roger)	210,000	67,250	266,938		100,000	100,000		50,000
L-93196 (SAMSO)	100,000							
VAFB RANGE SUPPORT								
L-7930A NAVY (Standby 192)		2,694						
L-7930A AEROS (483)		640,350						
L-7930A ANS-A		49,238						
L-29075A TRANSIT			40			2,114		
TIP-II			44,100					
TIP-III			44,000					
AF-(179)			29,059	26,055	7,315			
AF-(179)Aircraft			19,585					
L-24697A ESRO-IV			779,465					
L-27381A DAD			117,500		7,315			
L-50692A TIP-III				31,800				
L-50696A NAVY Standby (BPDAO)						56,897		
L-50696A NAVY TRANSAT					40,985			
L-4616A UK-X4			829,897					
L-68200A NOVA (BPDAO)						153,200		
L-68202A HCMM						89,248	305	
L-86493 A MAGSAT (EOD49)							165,300	
***VAFB ASSESSMENT VIA KSC**								
OA-76-490 (23-4-27 (0-LC00-295))			15,000					
VAFB Range SPO SUPPORT								
L-68201A (EOD40)						31,995		
L-86492A (EOD40)								37,100
HAWTHORNE STORAGE								
L-68203A-3					22,011		42,989	60,000
L-68208A-3						75,000	4,500	1,944
MSO-GSA CAR (03)								
SUBAUTHORIZATION TO KSC								1,500
MSO-SUPPORT BY KSC (04)								
SUBAUTHORIZATION TO KSC								40,000
MSO-OPEN PURCHASE REQUESTS								
LaRC Contract (8308.0001)					100,000			
MSO-VAFB								
NAS1-15077								100,000

* From Subauthorization.
(Q)50% DOD, 50% NASA.
(C)Includes $83,202 C of F.

TABLE CXXX - VAFB UTILITY COSTS

FY 1977 (L50725A)	ELECTRICITY		WATER		SEWAGE		REFUSE	
	KWH	$	M/GAL	$	M/GAL	$	CY	$
June	16,918	$ 664.88	22	$ 12.32	13	$ 6.37	53	$ 55.65
July	16,918	709.64	22	19.58	13	8.32	53	55.65
August	16,918	771.46	22	19.58	13	8.32	53	55.65
September	16,918	771.46	22	19.58	13	8.32	53	55.65
TOTAL FY 1977	67,672	$ 2,917.44	88	$ 71.06	52	$ 31.33	212	$ 222.60
FY 1978								
October	16,918	$ 771.46	22	$ 19.58	13	$ 8.32	53	$ 55.65
November	16,918	759.62	22	16.06	13	7.28	53	55.12
December	16,918	759.62	22	16.06	13	7.28	53	55.12
January	16,918	759.62	22	16.06	13	7.28	53	55.12
February	16,918	759.62	22	16.06	13	7.28	53	55.12
March	16,918	759.62	22	16.06	13	7.28	53	55.12
April	16,918	759.62	22	16.06	13	7.28	53	55.12
May	16,918	759.62	22	16.06	13	7.28	53	55.12
June	16,918	759.62	22	16.06	13	7.28	53	55.12
July	16,918	759.62	22	16.06	13	7.28	53	55.12
August	16,918	759.62	22	16.06	13	7.28	53	55.12
September	16,918	759.62	22	16.06	13	7.28	42	55.12
TOTAL FY 1978	203,016	$ 9,127.28	264	$ 196.24	156	$ 88.40	636	$ 661.97

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TABLE CXXXI(a) - SCOUT E-SECTIONS

NO.	CONTRACT	SPACECRAFT ASSIGNED	VEHICLE ASSIGNED
*0	3899	Test (SM-C - Training)	Test
*1P	1928	SECOR/SEV	S-131
*1	3899	CAS-A	Test
*2P	1928	SOLRAD-A	S-138
2	3899	OFO (E-Section Tests)	Test
3	3899	ESRO IIA	Test
*4	3899	UK-E	S-155
5	3899	UK-E	Test
6	3899	SSS-A	Test
*7	3899	AF-OV3-1	S-145
*8	3899	AF-OV3-4	S-147
*9	3899	AF-OV3-3	S-148
*10	3899	AF-OV3-2	S-150
*11	3899	AF-OV3-5	S-151
*12	3899	ESRO I (Failed)	Test
13	3899	OWL	Test
14	3899	ADIE-C	Test
15	3899	ESRO I	Test
*16	5592-1	ADIE-C	S-165
*17	5592-1	SOLRAD-B	S-160
*18	5592-1	ESRO IIA	S-152
*19	5592-1	ESRO IA	S-167
*20	5592-1	AF-OV3-6	S-158
*21	5592-1	GRS-A1	S-169
*22	5592-1	ESRO IIB	S-161
**23	ERNO 15468	German-Direct (ERNO)	Test
24	6935	GRS-A	Test
25	6935	CAS-A	Test
26	6935	RMS	Test
27	6935	UK-4	Test
*28	6935	UK-6 (Failed)	Test
*29	6935	PAET	S-144
30	6935	Returned to LRC PAET	Test
31	6935	UK-4	S-183
32	6935	ESRO-IV	Test
33	6935	GRS-B	Test
*34	6935	ESRO-IB	S-172
*35	6935	OFO/RMS	S-174
*36	6935	CAS-A	S-180
*37	6935	SOLRAD-C	S-177
**38-41	BM34616	German-Direct (Junkers)	Not NASA
42	7256	UK-6 (Modified)	Government Stores
***43	7256	UK-6 (Partially modified)	Government Stores
44	7256	ESRO-IV	Test at ESRO
*45	7256	ESRO-IV	S-185
*46	7256	AEROS-A	S-181
47	7256	UK-X4	Test in England

*Expended. **Direct Procurement by Germany, not NASA.
***Assigned to UK-5 (not used).

TABLE CXXXI(a) Concluded - SCOUT E-SECTIONS

NO.	CONTRACT	SPACECRAFT ASSIGNED	VEHICLE ASSIGNED
*48	7256	UK-X4	S-188
*49	7256	AEROS-B	S-186
50	7256	UK-X4	Test in England
51	7256	UK-6 (Partially modified)	Government Stores
52	7256	UK-6	Government Stores
53	7256		Government Stores
54	7256		Government Stores
*201	10000 R4	Vought	Tested to Failure
202	10000 R4	ANS	Test
203	10000 R4	UK-5	Test
*204	10000 Mod 21 Task T	UK-5	S-187
*205	10000 Mod 21 Task T	Vought	Tested-Nonflightworthy
*206	10000 Mod 21 Task T	ANS	S-189
207	10000 Mod 21 Task T	UK-6	S-198
208	12500-S006	UK-6	Test
209	12500-S006		Government Stores
*210	12500-S006	Vought	Test
211	12500-S006	SM-D_L	S-206
212	12500-S006	SM-D_L	Government Stores
*213	12500-S006	Vought	Test

TABLE CXXXI(b) - SCOUT E-25 SECTIONS

*251	10500-4	Vought	Test Unit
*252	10500-4	GP-A	S-193
253	10500-4	DAD	Test Unit
*254	10500-4	DAD	S-196
255	10500-4	GP-A	Test Unit
256	12500-S006	HCMM	at Boeing
*257	12500-S006	HCMM	S-201
258	12500-S006	SAGE	Test Unit
259	12500-S006	SAGE	S-202
260	12500-S006		Government Stores
261	12500-S006		Government Stores

TABLE CXXXI(c) - SCOUT E-G SECTIONS

1	6935-36	SSS-A	At GSFC
*2	69350-36	Vought	Test-Nonflightworthy
*3	6935-36	Vought	Test-Nonflightworthy
*4	6935-36	SSS-A	S-163
5	6935-36	SM-D_M	Government Stores
6	6935-36	SM-D_M	S-207

TABLE CXXXI(d) - SCOUT G-SECTIONS

NO.	CONTRACT	SPACECRAFT ASSIGNED	VEHICLE ASSIGNED
*1	6868	Vought	Test
2	6868	SSS	Test-At GSFC
3	6935-37		Government Stores
4	6935-37	Modified to 102	Test
5	6935-37	Modified to 101	
6	6935-37	Vought	Government Stores
7	6935-37	Vought	Government Stores
*101	10000	HAWKEYE (From No. 5)	Test-In Gov't. Stores
*102	10000	HAWKEYE (From No. 4)	S-191

*Expended

TABLE CXXXI(e) - SCOUT E- & G-SECTIONS PROCUREMENT

P.R. NO.	CONTRACT	DESCRIPTION	FUNDS	AMOUNT
E-G SECTION				
(6-SSS, 2-Test, 2-Unassigned)				
60.400.954	NAS1-6935-36	Scout E-G Separation Sys.	490-PJ(MP)	$150,120.00
		E-G SECTION SUBTOTAL		$ 150,120.00
G-SECTION				
(7-Hawkeye, 3-Test, 3-Unassigned)				
60.900.010	NAS1-6935-37	Proc. 5 G-Sections	490-PM(MP)	$ 28,900.00
		G-SECTION SUBTOTAL		$ 28,900.00
E-SECTION*				
(13 (GR-1-4-REIMB.) CAS-B, ESRO IV, AEROS-B, UK-X4, 2-Test, 6 Unassigned, Phase VI)				
60.900.094	NAS1-6935-51	E-Section Test Rework, UK-X4	490-PK(MP)	$ 8,490.00
60.900.023	NAS1-7256-33-Ca31-S	Procurement of 6 E-Sections	490	30,439.00
60.900.010	NAS1-7256-33-Ca31-S	Procurement of 7 E-Sections	490	62,901.00
60.400.931	NAS1-10000-R-23	Deter. of Roll Momen. Inertia	490-PL(MP)	8,133.00
66.000.013	NAS1-10000-9-Ca11-S	Inter. 4th Stg, S-Band/E-Sect. (Item 324, J.O. E6000S)	490-PK(PI)	3,431.00
66.000.171	NAS1-10000-24-T	Fabricate 4 E-Sect. Castings	490	27,500.00
		E-SECTION SUBTOTAL		$140,894.00
200 SERIES E-SECTION, UK-5, ANSA, 4-Test, 7-Unassigned				
	NAS1-10000-R4	3 E-Sections, 200 Series, Incl. Dev.		$135,040.00
	NAS1-10000-21-T	4 E-Sections, 200 Series		27,500.00
	NAS1-12500-S006	6 E-Sections, 200 Series		84,426.00
6600.0449	NAS1-12500-R28	E-Sect. Sep. Sys. Clamp	490-PJ(MP)	4,075.00
		200 SERIES E-SECTION SUBTOTAL		$251,041.00
25 SERIES E-SECTION				
(11-GP-A, HCMM, DAD, 3 Test, 4-Unassigned)				
	NAS1-10500-4	Design & Fab. Large Sep. System		$225,125.00
	NAS1-12500-S006	6 E-Sections - 25 Series		84,426.00
		25 SERIES E-SECTION SUBTOTAL		$309,551.00
		TOTAL		$880,506.00

TABLE CXXXII(a) - 34-INCH HEAT SHIELD

P.R. NO.	ORDER NO.	ITEM	DESCRIPTION	TOTAL
P2Y-021	NAS1-1295-7(c3)		Heat Shields	$ 101,864.00
P2Y-021	NAS1-1295-7(c3)		Heat Shields	142,037.00
P25-018	NAS1-1295-15(c24)		Heat Shields, S-114,124,129	4,624.00
P25-088	NAS1-1295-15(c24)		Heat Shields, S-114,123,129	16,000.00
P06351	NAS1-1295-24		2 Heat Shields for San Marco	13,373.00
P00894	NAS1-1295-25(c38)		Heat Shields	34,368.00
P39-012	NAS1-1295-25(c38)		Heat Shields	125,000.00
P01315	NAS1-1295-25(c42)		Heat Shield Mods	39,813.00
P01315	NAS1-1295-25(c42)		Mod's 11 Heat Shields	12,500.00
P05695	NAS1-1295-25(c47)		S-127 Heat Shield A-7 Eject. Test	10,680.00
P05950	NAS1-1295-25(c50)		S-66 Heat Shield, A-2	29,688.00
20.200.070	NAS1-1295-25		S-48 Heat Shield, A-9	28,711.00
20.200.019	NAS1-1295-29(c57)		S-55C Heat Shield S/N 124	8,204.00
20.200.123	NAS1-1295-29(c67)		Heat Shield RFD-2, A-12	27,211.00
P05678	NAS1-1295-32(c50)		S-52 Heat Shield, A-7	19,638.00
20.200.170	NAS1-1295-32(c68)		S-56B Heat Shield, A-13	30,947.00
20.200.215	NAS1-1295-32(c70)		Heat Shield	27,938.00
20.200.224	NAS1-1295-32(c71)		Modify Heat Shield A-8	4,799.00
20.200.276	NAS1-1295-32(c74)		A-8 Heat Shield Ejection Test	5,890.00
20.200.286	NAS1-1295-32(c75)		A-14 Heat Shield	31,012.00
20.200.421	NAS1-1295-35		Modify A-12 Heat Shield	1,800.00
20.200.489	NAS1-1295-35		A-10 Heat Shield for S-55C Mod.	10,242.00
20.200.561	NAS1-1295-35		Modify Heat Shield A-12	1,587.00
20.200.628	NAS1-1295-36		RFD-2 A-12 Heat Shield Test	16,934.00
20.200.643	NAS1-3589-2(c3)		Fit Check A-6 Heat Shield	672.00
20.200.678	NAS1-3589-5(c6)		Mod. to A-2 Heat Shield	4,082.00
20.200.675	NAS1-3589-5(c7)		Mod. to A-9 Heat Shield	4,255.00
60.400.116	NAS1-3589-12(c25)		Apply Cork Insulation to A-2 Heat Shield	2,302.00
60.400.200	NAS1-3589-16(c36)		Apply Cork Insulation to A-23 H/S	1,440.00
60.400.210	NAS1-3589-16(c37)		Fab. Heat Shield A-26 for SOLRAD	1,817.00
60.400.264	NAS1-3589-16(c40)		Heat Shield A-27 (SECOR)	1,775.00
60.400.414	NAS1-3589-20(c47)		Mod. A-14 Heat Shield	7,000.00
60.400.514	NAS1-3589-20(c47)		Torque Tube, A-14	7,871.00
20.200.652	NAS1-3899-3		H/S A-21, Fit and Ejection Test, AD/1B	3,350.00
20.200.656	NAS1-3899-3		H/S A-21, Fit and Ejection Test, RFD2A	7,000.00
60.400.011	NAS1-3899-5		Fit and Ejection Test, A-2/S-66A	2,500.00
20.200.715	NAS1-3899-10		Fit Check, A-23/S-66B	727.00
60.400.273	NAS1-3899-26		Heat Shield Ejection Test, A-26	9,150.00
60.400.272	NAS1-3899-30		Apply Cork 22 Heat Shields	12,198.00
60.400.280	NAS1-3899-32		Heat Shield Fit Check, A-27 and SECOR	7,500.00
60.400.339	NAS1-3899-32		Heat Shield A-27 Ejection Test	2,413.00
60.400.360	NAS1-3899-39		Configuration Heat Shield A-28/FR-1	13,300.00
60.400.396	NAS1-3899-39		A-28 Heat Shield	5,700.00
60.400.644	NAS1-5592-9		Heat Shield	3,430.00
60.400.667	NAS1-5592-9		Evaluate Heat Shield for Sunblazer P/L	10,000.00
60.400.759	NAS1-5610-7		Heat Shield and D-Section Mods.	6,510.00
6600.0921	NAS1-5610	056	1 Heat Shield	1,100.00
6600.0921	NAS1-5610	071	Heat Shield, One	14,300.00
6600.0921	NAS1-5610	099	1 Heat Shield, ESRO IB	1,110.00
6600.0921	NAS1-5610		Heat Shield A-43, San Marco B	16,500.00
6600.0921	NAS1-5610		Heat Shield A-44, N-13	16,500.00
6600.0921	NAS1-5610		Heat Shield A-45, ESRO-I	16,500.00
6600.0921	NAS1-5610		Heat Shield A-46, SOLRAD	16,500.00
6600.0921	NAS1-5610		Heat Shield A-47, AD/I-C	16,500.00
6600.0921	NAS1-5610		Heat Shield A-48, RAM C-B	16,500.00
6600.0921	NAS1-5610		Heat Shield A-49, ESRO-IIB	16,500.00
6600.0921	NAS1-5610		Heat Shield A-50, N-16	16,500.00
6600.0921	NAS1-5610		Heat Shield A-51, Navy Inventory	16,500.00
6600.0921	NAS1-5610		Heat Shield A-52, Navy Inventory	16,500.00
6600.0921	NAS1-5610		Heat Shield A-53, GRS-A	16,500.00
6600.0921	NAS1-5610		Heat Shield A-54, San Marco C	16,500.00
6600.0921	NAS1-5610		Heat Shield A-55, N-14	16,500.00
6600.0921	NAS1-5610		Heat Shield A-56, ESRO-IB	16,500.00
5500.0921	NAS1-5610		Heat Shield A-57, OFO	16,500.00

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TABLE CXXXII(a) Concluded - 34-INCH HEAT SHIELD

P.R. NO.	ORDER NO.	ITEM	DESCRIPTION	TOTAL
60.400.718	NAS1-6020-10(c3)-K		Heat Shield Mods and Fit Check	$4,719.00
6600.0999	NAS1-6935-41-2	012	Heat Shield A-402, MTS-A	31,451.00
6600.0999	NAS1-6935-41-2	013	Heat Shield A-404,	31,451.00
6600.0999	NAS1-6935-41-2	014	Heat Shield A-405, Hawkeye	31,451.00
6600.0999	NAS1-6935-41-2	015	Heat Shield A-406, ANS-A	31,451.00
6600.0999	NAS1-6935-41-2	017	Heat Shield A-403, ESRO-IV	31,451.00
6600.0932	NAS1-7199		Heat Shield A-58, GRP-A	22,278.00
6600.0932	NAS1-7199		Heat Shield, A-59, SOLRAD-D	22,278.00
6600.0932	NAS1-7199		Heat Shield, A-60, CAS-A	22,278.00
6600.0932	NAS1-7199		Heat Shield, A-61, SAS-A	22,278.00
6600.0932	NAS1-7199		Heat Shield, A-62, RAM-C-C	22,278.00
6600.0932	NAS1-7199		Heat Shield, A-63, UK-4	22,278.00
6600.0932	NAS1-7199		Heat Shield, A-64, TIP-II	22,278.00
6600.0932	NAS1-7199		Heat Shield, A-65, CAS-A	22,278.00
6600.0932	NAS1-7199		Heat Shield, A-66, San Marco C-2	22,278.00
6600.0932	NAS1-7199		Heat Shield, A-67, NA-21	22,278.00
6600.0932	NAS1-7199		Heat Shield, A-68, GP-A	22,278.00
6600.0932	NAS1-7199		Heat Shield, A-69	22,278.00
6600.0932	NAS1-7199		Heat Shield, A-70	22,278.00
6600.0932	NAS1-7199		Heat Shield, A-71	22,278.00
6600.0932	NAS1-7199		Heat Shield, A-72	22,278.00
6600.0932	NAS1-7199		Heat Shield, A-73	22,278.00
6600.0932	NAS1-7199		Heat Shield, A-74	22,278.00
6600.0939	NAS1-7256-33-Ca33-S	153	Fab. SOLRAD-C Protective P/L Shield(A-59)	23,942.00
60.400.931	NAS1-10000-17-R39	392	Cooling Air Sep. H/S A-406 & Field Sup.	36,932.00
6600.0931	NAS1-10000-27	621	N-18 H/S Des. and Mod., A-51	5,436.00
60.400.931	NAS1-10000-R33	386	Heat Shield Ducting for RTG	21,883.00
6600.0280	NAS1-11000-10	043	2 Heat Shields, A-411/NOVA-I,A-412/MAGSAT	112,000.00
6600.0341	NAS1-11000-10	044	2 Heat Shields, A-407/TIP-I, A-408/TIP-II	130,473.13
6600.0280	NAS1-11000-10	045	1 Heat Shield, A-409/P76-5	32,000.00
6600.0173	NAS1-11000-10	054	1 Heat Shield, A-410/TRANSAT	46,763.43
6600.0449	NAS1-12500-18-R118	210	Fit Test, Seat Shield A-408/TIP-II	3,619.00
			TOTAL 34-INCH HEAT SHIELD	$2,087,240.56

TABLE CXXXII(b) - 42-INCH HEAT SHIELD

PHASES VI AND VII

P.R. NO.	ORDER NO.	ITEM	DESCRIPTION	TOTAL
6600.0999	NAS1-6935-41	016	Design of Heat Shield	$ 410,202.00
60.900.051	NAS1-6935-41	008	Heat Shield, A-501 Test	32,939.00
6600.0999	NAS1-6935-41-2	011	Heat Shield, A-502 Test	32,939.00
6600.0999	NAS1-6935-41-2	018	Heat Shield, A-503, GP-A	32,939.00
6600.0999	NAS1-6935-41-2	019	Heat Shield, A-504, AEROS-A	32,939.00
6600.0999	NAS1-6935-41-2	025	Heat Shield, A-505, UK-5	5,668.00
6600.0999	NAS1-6935-41-2	026	Heat Shield, A-506, UK-X4	5,668.00
66.000.057	NAS1-6935-41-4	027	Heat Shield, A-507, AEROS-B	27,540.00
60.900.082	NAS1-6935-41-4	028	Heat Shield, A-508, SAS-C	46,438.00
60.900.051	NAS1-6935-41-4	029	Design of Heat Shield	14,982.00
6600.0999	NAS1-6935-41-7	020	Heat Shield, AEROS-B	650.80
6600.0999	NAS1-6935-41-7	021	Door for Heat Shield, UK-X4	650.80
6600.0999	NAS1-6935-41-7	022	Door for Heat Shield, SAS-C	650.80
6600.0999	NAS1-6935-41-7	023	Door for Heat Shield, UK-5	650.80
6600.0999	NAS1-6935-41-7	024	Door for Heat Shield, AEROS-A	650.80
66.000.057	NAS1-6935-41-9	030	Heat Shield	9,610.00
66.000.280	NAS1-11000-10	043	2 Heat Shields, A-509, A-510	224,000.00
6600.0341	NAS1-11000-10	044	2 Heat Shields, A-510, A-512	130,273.13
6600.0280	NAS1-11000-10	045	1 Heat Shield, A-513	32,000.00
6600.0173	NAS1-11000-10	054	1 Heat Shield, A-514	93,526.87
			PHASES VI AND VII SUBTOTAL	$1,134,918.00
			TOTAL ALL PHASES 42-INCH HEAT SHIELD	$1,134,918.00

TABLE CXXXIII - TASK M - (01) PER VEHICLE LOGISTICS COSTS (NAS1-12500/15100)

PART NUMBER	NOMENCLATURE	PER VEH.	LOAD COST (EACH)	YEAR BOUGHT
1/2" OD AMS3195	Silicone Cord Seal	100"	$ 33	1978
13948-020-01-01	Fourth-stage Module Timer Battery	2	200	1973
**15375	Battery			
5-565-N304-7	O-Ring (Antares IIB)	2	12	1977
5-565-N304-7	O-Ring (Alcyone IA)	2	12	1977
688-3-3TC	O-Ring (Antares IIA)	2	10	1970
688-3-3TC	O-Ring (X-258)	2	10	1970
AN-6227B-7	O-Ring (Antares IIA Nozzle)	1	3	1976
AN-6227B-52	O-Ring (Algol IIB)	1	2	1974
AN-6227B-71	O-Ring (X-258 Nozzle)	1	5	1976
AN-6227B-77	O-Ring (Antares IIA Igniter)	2	7	1976
AN-6230B-16	O-Ring (X-258 Igniter)	1	3	1976
AN-6230B-36	O-Ring (Antares IIB Igniter)	1	6	1976
ARP568-902	O-Ring (Altair III Pr. Port Plug)	4	5	1973
ARP568-905	O-Ring (Altair III Initiators)	4	5	1974
B08015-01-01	Algol III Nozzle Seal (Ball)	1	100	1976
DM5300-1912P-006	Connector (for 23-002588 Battery)	2	65	1975
MS28775-009	O-Ring (Antares IIA and IIB)	2	3	1975
MS28775-010	O-Ring (Castor II)	2	2	1973
MS28775-016	O-Ring (X-259)	2	3	Unknown
MS28775-112	O-Ring (Castor II)	2	3	1974
MS28775-129	O-Ring (Castor II)	2	4	1974
MS28775-136	O-Ring (Castor II)	2	4	1974
MS9021-159	O-Ring (Altair III)	1	3	1974
MS9021-232	O-Ring (Altair III)	1	3	1976
MS9068-011	O-Ring (For PC19-009 Cartridge)	2	4	1974
MS9068-012	O-Ring (Castor II)	2	4	1974
MS9068-248	O-Ring (Castor II)	2	12	1974
NAS1595-3	O-Ring (For PC19-009 Cartridge)	2	8	1974
NAS1595-8	O-Ring (Algol II and III, Castor)	6	8	1974
R42653	Castor Nozzle Closure Plug	1	500	1974
R42692	Castor II Pyrogen Ring	1	20	Unknown
PM1-7	Battery Cells (Std.)	202	29	1977
PM3-6	Battery Cells (Std.)	80	42	1977
PM05-7A	Battery Cells (Std.)	64	25	1977
PM15-8	Battery Cells (Std.)	22	80	1977
PM1-7	Battery Cells (5-stage Vehicle)	280	29	1977
PM05-7A	Battery Cells (4th Mod. Ign.)	96	25	1977
35% H_2O_2	RCS Fuel (Vol. II Maintenance)	1	150	1977
90% H_2O_2	RCS Fuel (Flt.)	3	300	1977
HIS-SN7313-2B	Separation Nut	4	335	1971
23-002051-2	Base A 28-volt Battery (Assembly)	1	1,437	
23-002052-1	Guidance 28-volt Battery	1	975	1971
23-002850-1/-2/-3/-4	N_2 Regulators	2	5,000	1977
23-003283-1	Guidance 37-volt Batteries	1	425	
23-003293-12	Autodestruct Battery	4	477	
23-003293-12	Autodestruct Battery (4/4th Mod.Ign.Syst.)	6	477	
23-003365-15	C/D and Radar Beacon Battery	3	501	
23-004098-1	Fourth Module T/M Battery	1	1,135	1971
23-004271-1	P /L Sep. & Despin Syst. Bolt Cutter & Bolt	2*	175	1975
23-004272-1	Clamp Bolt	2*	125	1975
23-000127-1	Destructor Union	2	340	1973
23-002588-2	Ign./Destr. Battery (E.P.)	2	1,900	1976
23-002981-8	"D" Sep. Explosive Bolt (Holex)	4	485	1974
23-002983-1	0.6 KS40 Spin Motor	*	1,615	1971
23-002983-2	1.0 KS40 Spin Motor	*	2,250	1974
23-002983-3	1 KS75 Spin Motor	*	2,660	1974
23-003147-1	Destructor	2	200	1973
23-003793-1	Initiator (Algol and Castor)	4	464	1977

*Quantity per vehicle determined by payload requirement.
**Alternate for 13948-020-01-01.
Total of four spin motors used.

TABLE CXXXIII Concluded - TASK M - (01) PER VEHICLE LOGISTICS COSTS (NAS1-12500/15100)

PART NUMBER	NOMENCLATURE	PER VEH.	LOAD COST (EACH)	YEAR BOUGHT
5M0050-1-1	FW4S Chamber Protective Plug	1	$ 15	Unknown
5M0060-1-1	FW4S Nozzle Plug	1	10	Unknown
#8G64	Switch	1	216	Unknown
#8G65	Switch	1	216	Unknown
X258-B1-2-05-0032B	X-258 (Navy) Igniter	1	8,000	1967
23-004181-1	Destructor	1	350	1973
23-004181-2	Destructor	1	350	1973
23-004180-1	Destructor	1	350	1973
23-004180-2	Destructor	1	350	1973
23-004179-1	Destructor	1	350	1973
23-004179-2	Destructor	1	350	1973
23-004177-1	Safe Arm Unit (Stages 1 and 2)	2	4,000	1974
23-004177-2	Safe Arm Unit (Stage 3)	1	4,000	1974
3398B670055-1	Heat Shield Cartridge	2	162	1977
PC19-021	Explosive Cartridge	2	240	1975
PC19-31	200 Series E Separation Cartridge	2	240	1977
PC33	200-Series E Separation Cartridge	2	230	1974
SD60A1	Initiator (Altair III)	2	968	1977
SD60A1	Initiator (X-258)	2	968	1977
SD60E0	Initiator (Antares IIA)	2	525	1971
SEB26100001-211	Initiator (Antares IIB)	2	200	1974
S01-266-4	Initiator (Alcyone IA)	2	145	1974
23-004112-1	"E" Sep. Band Nut Assembly	2	590	1972
71-339510-6P	Special "E" Section Connector	1*	110	Unknown
71-339512-10P	Special "E" Section Connector	1*	106	Unknown
71-339514-18P	Special "E" Section Connector	1*	110	Unknown
71-339518-30P	Special "E" Section Connector	1*	110	Unknown
71-339520-16P	Special "E" Section Connector	1*	110	Unknown
71-339522-36P	Special "E" Section Connector	1*	130	Unknown
72-339512-8P	Special "E" Section Connector	1*	110	Unknown
72-339516-26G	Special "E" Section Connector	1*	120	Unknown
72-339520-39G	Special "E" Section Connector	1*	95	Unknown
72-490703-8P	Special Payload Connector	1*	250	Unknown
72-490703-10P	Special Payload Connector	1*	250	Unknown
72-490704-18P	Special Payload Connector	1*	250	Unknown
72-490705-23P	Special Payload Connector	1*	275	Unknown
72-490705-26P	Special Payload Connector	1*	275	Unknown
72-490706-20P	Special Payload Connector	1*	300	Unknown
72-490706-32P	Special Payload Connector	1*	300	Unknown
72-490707-24P	Special Payload Connector	1*	300	Unknown
72-490707-39P	Special Payload Connector	1*	300	Unknown
72-490707-41P	Special Payload Connector	1*	300	1974
83136D00002-003	Antares IIB Nozzle Closure Plug	1	150	Holding
CA3101E28-21S	Special Payload Connector	1*	50	1974
CA3101E28-21SW	Special Payload Connector	1*	50	1974
CA3101E26-10S	Special Payload Connector	1*	50	1974
CA3101E36-10SW	Special Payload Connector	1*	50	1974
CA3101E36-10SX	Special Payload Connector	1*	50	1974
CA3101E36-10SY	Special Payload Connector	1*	50	1974
K749	Thermistor, "B" Section, RCS Instrument	1	143	Unknown
K750	Thermistor, "D" Ambient Temperature Meas.	2	63	Unknown
PT01E-22-21SW	Special Payload Connector	1*	50	1974
83136D00139	X-259 Nozzle Retainer Ring	1	2,770	1977
2-318091	Algol II Nozzle Seal	1	204	Unknown
**212059	Motor Valve Mesh Catalyst	13	300	1974
**212060	Motor Valve Mesh Catalyst	5	300	1974
23-002667-2	Vehicle Balance Weights	3	40	1978
##23-003352-1	0-500-pound Transducer	1	648	1977
23-003530-1	Alinement Target	1	2	Unknown
23-004149-2	FW4S Initiator Adapter	2	135	1978
AN-6289-4S	X-258 Nut	10	10	Unknown
AN-6289-6S	X-258 Nut	10	10	Unknown
AN-6289-8S	X-258 Nut	10	10	Unknown
AN-6289-10S	X-258 Nut	10	10	Unknown
BR28458-51E	Castor II Pyrogen Gasket	1	12	1977

*Special requirement dependent upon spacecraft requirements.
**Vehicles 208-217.
#Phase VIII.
##Vehicles 192, 198, 199.

TABLE CXXXIV - TYPICAL ANALYSIS OF TASK T USING TASK T OF NAS1-15000

	MAN MONTHS	PHASE VIII/5 MAN MONTHS
Teledyne	21.83	
Hercules Bacchus	2.00	
Algol III	9.9	9.9
Altair III	6.7	2.1
Castor	10.65	5.325
Edler/Altair Nozzle	6.54	2.1
Edler/Castor Nozzl	3.0	3.0
Walter Kidde	13.65	6.825
Honeywell	15.55	7.78
West Coast Subs	23.5	23.5
LTV Special Rover	8.75	8.75
Elkton/Antares III	9.0	4.5
HITCO	3.0	1.5
SAI	4.0	2.0
Teledynamics (TM)	7.0	3.5
WASATCH/Antares III	9.0	4.5
TOTAL	154.07	85.28
Current Contract	139.0	18.1 (Non-Motors)
FUTURE	15.07	62.18 (Motors Only)

Contracted Hours	Engineering	Quality	Res. Reps.
Contracted Hours	5700	2540	(139 Man Months)
Cost	$67,032	$23,419	$527,505
Overhead	65,691	44,028	
Travel	12,277	12,000	
Reproduction	2,642	3,000	
G & A	29,135	16,148	100,226
Profit	14,197	7,868	48,839
	$196,674	$109,003	$676,570

TOTAL: $982,247 Eng. & Qual.: $305,677

(Revised 533): $971,677 $295,107

$971,677 (Contractual T)
$295,107 (Eng.& Qual.) X 62.18/139 = $132,013
676,570 (Res. Rep.) X 77.75/139 = 378,406

Guidance (est.)	68,000 (10)	34,000
Antares III (est.)	292,000 (10)	146,000
Castor (est.)	162,750 (10)	81,375
Additional Res. Reps.	80,000 (15)	40,000
Phase VIII Vehicles	445,125 (5)	445,124
TOTAL		$1,256,918

TABLE CXXXV(a) - PRORATION OF NAS1-12500 TASK N.

ESTIMATED FINAL COST $3,951,700

Launches	Date	NASA (W)	NASA (V)	DOD (V)
S-188	3-8-74		UK-X4	
S-191	6-3-74		Hawkeye	
S-186	7-16-74		AEROS-B	
S-189	8-30-74		ANS-A	
S-195	10-11-75			TIP-II
S-196	12-5-75		DAD	
S-179	5-22-76			AF-P76-5
S-193	6-18-76	GP-A		
S-197	9-1-76			TIP-III
TOTAL		1	5	3

Vought proposal quotes 12 to launch from W. to V. = $10,572 each
Using 7-1/2% profit and 8 VAFB launches = 90,919. (8 x 11,365)

Using analysis from Vought proposal, it takes 9,728 hours to launch a Scout:

$$\frac{9{,}728 \text{ hrs}}{1{,}920 \text{ hrs/man yr}} = 5.067 \text{ Man Years}$$

From Vought proposal Manpower TASK N:

$$\frac{1{,}225{,}791 \times 1.075}{32} = \$41{,}179$$

Therefore, 5.067 x $41,179 = $208,654 (cost per launch)

Assume same cost at Wallops, therefore 9 x 208,654 = $1,877,886

Assume 10 at Wallops and 27 at VAFB (includes 7 men added by modification).

Total	-	$3,922,000
Travel	-	90,919
Per Launch Cost	-	1,877,886
3 year Maintenance Costs	-	$1,953,195

10/37 x 1,982,895 = $527,890 WFC

27/37 x 1,982,895 = $1,425,305 VAFB

TABLE CXXXV(b) - PRORATION OF NAS1-12500 TASK N (Continued)

50% D.O.D. = $712,652
50% NASA = $712,653

NASA-WFC = $527,890
NASA-VAFB = $712,653

(Maint.) TOTAL NASA $1,240,543

1/3 x $1,240,543 = $413,514 per Year (NASA)

1/3 x $712,652 = $237,551 per Year (D.O.D.)

1/5 x 712,653 = $142,531 per NASA Foreign Launch at VAFB

*TASK N SUMMARY

UK-X4	142,531 + 208,654 + 11,365	= $362,550
AEROS-B	142,531 + 208,654 + 11,365	= $362,550
NASA(V)	3(208,654 + 11,365) + (712,653 - 2(142,531)	= $1,087,648
NASA(W)	208,654 + 527,890	= $ 736,544
NAVY	2(208,654 + 11,365) + 712,652	= $1,152,690
A.F.	(208,654 + 11,364)	= $220,018
	TOTAL	$3,922,000

NASA Unit Price = 2,549,292 ÷ 6 = $424,882

*Does not include costs of launch supplement from TASK H.

TABLE CXXXVI - TASK N - FIELD TEAM SUMMARY

Contract	Phase IV	Phase V	Phase VI
NAS1-12500			
NASA			$ 719,253 (2)
Navy			487,868
Air Force			220,024
NAS1-10000			
NASA	$ 313,667	$ 938,004	1,563,340 (1)
Navy			1,475,936
NAS1-7256			
NASA		1,189,144	
Navy		0	
NAS1-6020			
NASA	970,309	968,099	
Navy	Direct	Direct	
NASA Share of DOD Contract			
FY 1967	155,152		
FY 1968	164,200		
FY 1969		158,350	
FY 1970		172,169	
NAS1-15000			
NASA			
Navy			726,911
TOTAL NASA	$1,603,328	$3,425,766	$2,282,593
TOTAL DOD	Direct	Direct	$2,910,739*
UNIT NASA	$160,333	$244,698	$207,509
UNIT DOD			$727,684

*Additional funds may be required to complete.

(1) Includes ESRO IV

(2) Includes UKX4 & AEROS-B

TABLE CXXXVII - RANGE OPERATIONS AND MAINTENANCE EXPENDITURES, VAFB

FY71	ORDER NO.	NASA	ITEM	DOD	ITEM	FOREIGN FUNDS	ITEM	FUNDS	PHASE
60.900.134	L-52073	$ 8,911.50		$ 8,911.50				NGPK	V
FY72									
60.000.065	L-64709	5,375.00		5,375.00				NHPL	V
FY73									
66.000.145	L-75052	1,500.00	002					PM	VI
FY74									
66.000.263	L-88316	10,000.00	016					PM	VI
6600.0999	L-88316			25,000.00	021			NG	VI
6600.0999	L-88316			10,000.00	023			NK	VI
66.000.324	L-88316-2	14,922.00	017					PM	VI
6600.0999	L-88316-2			28,922.00	022			NG	VI
66.000.358	L-88316-3	1,568.00	019					PX	VI
6600.0999	L-88316-3	12,432.00	020					PX	VI
66.000.375	L-88316-4	25,000.00	018					PX	VI
6600.0350	L-93196	50,000.00	005					PX	VII
6600.0350	L-93196	50,000.00	006					PM	VII
FY71-FY74 SUBTOTAL		$ 179,708.50		$ 78,208.50					
FY75									
6600.0481	L-5098A	37,500.00	007	36,077.00	010			PYX	VI, VII
66.000.389	L-5098A	36,077.00	008					YHPX	VII
6600.0999	L-5098A			37,500.00	009			YH	VI
6600.0999	L-7930A			150.22	005			YL	VI
6600.0999	L-7930A					$166,650.00	007	AX	VI
6600.0999	L-7930A					473,699.66	008	AX	VI
6600.0999	L-7930A	49,237.97	009	2,694.22	010			YLPX	VI
6600.0999	L-7930A			-150.22	011			YL	VI
6600.0439	L-29075A			44,100.00	001			YW	VII
FY75 SUBTOTAL		$ 122,814.97		$ 120,371.22		$640,349.66			

TABLE CXXXVII Continued - RANGE OPERATIONS AND MAINTENANCE EXPENDITURES, VAFB

FY76	ORDER NO.	NASA	ITEM	DOD	ITEM	FOREIGN FUNDS	ITEM	FUNDS	PHASE
6600.0488	L-22387A	$ 37,500.00	006	$ 37,500.00	005	$		PYW	VI, VII
8300.0632	L-22387A	11,849.00	007	11,849.00	008			YLPZ	VII
6600.0497	L-24697A					779,465.00	002	EQ	VI
6600.0489	L-27381A	39,000.00	001					PW	VII
8300.0559	L-27381A	36,000.00	002					PQ	VII
8300.0585	L-27381A	42,500.00	003					PQ	VII
8300.0642	L-27381A	7,314.56	004					PT	VII
8300.0686	L-29062A	50,000.00	013	50,000.00	055			YQPT	VII
8300.0618	L-29062A	1,179.00	015					PYW	VII
8300.0539	L-29062A	9,138.00	016	3,691.00	017			PQYW	VI, VII
6600.0516	L-29062A	3,960.00	021	50,868.00	019			PWYX	VII
6600.0516	L-29062A	26,847.00	022	5,358.50	020			PQYX	VII
6600.0516	L-29062A	2,510.00	023	1,245.00	027			PQYX	VII
6600.0516	L-29062A	10,365.00	024					PQ	VII
6600.0506	L-29062A	100,000.00	025					YQPX	VII
6600.0506	L-29062A	97,263.00	026					PQ	VII
8300.0558	L-20962A	70,696.00	028					PQ	VII
8300.0516	L-29062A	25,673.00	029					PQ	VII
8300.0539	L-29062A	3,518.00	030	4,557.00	018			PQYW	VI
8300.0539	L-29062A	484.00	031	1,002.00	033			PQYX	VII
8300.0516	L-29062A	5,358.50	032	2,722.50	044			PQYX	VII
8300.0539	L-29062A	1,002.00	034					PQ	VII
8300.0545	L-29062A	125.00	036	3,876.69	035			PQYX	VII
8300.0516	L-29062A	9,750.00	037	13,925.50	041			PQYX	VII
6600.0506	L-29062A	2,737.00	038					PQ	VII
8300.0539	L-29062A	1,608.00	039					PQ	VII
8300.0516	L-29062A	4,629.00	040					PQ	VII
8300.0516	L-29062A	13,925.50	042	4,338.00	046			PQYX	VII
8300.0516	L-29062A	5,820.00	043	429.00	049			PQYX	VII
8300.0516	L-29062A	2,722.50	045					PQ	VII
8300.0516	L-29062A	4,338.00	047					PQ	VII
8300.0516	L-29062A	3,898.00	048					PT	VII
8300.0516	L-29062A	429.00	050					PQ	VII
8300.0516	L-29062A	888.00	051					PQ	VII
8300.0516	L-29062A	50,000.00	060					PT	VII
8300.0516	L-29062A	29,304.00	061					PT	VII
8300.0618	L-29062A	4,410.50	052	4,410.50	053			NHPW	VI

TABLE CXXXVII Concluded - RANGE OPERATIONS AND MAINTENANCE EXPENDITURES, VAFB

FY76 Continued	ORDER NO.	NASA	ITEM	DOD	ITEM	FOREIGN FUNDS	ITEM	FUNDS	PHASE
8300.0545	L-29062A	$		$ 5,998.31	056	$		YX	VII
8300.0686	L-29062A			-812.00	057			YQ	VII
8300.0787	L-29062A			50,000.00	059			YV	VII
8800.0439	L-29075A			44,100.00	001			YW	VII
8300.0550	L-29075A			44,000.00	003			YX	VI
8300.0653	L-29075A	9,459.42	005					PT	VI
8300.0550	L-29075A	10,166.00	008	62,429.00	007			YQPW	VI, VII
FY76 SUBTOTAL		$ 736,366.98		$ 352,300.00		$779,465.00			
FY7T									
6600.0488	L-22387A	$ 37,500.00	006	$ 37,500.00	005			PYW	VI, VII
8300.0632	L-22387A	11,849.00	007					PZ	VII
				11,849.00	008			YLPZ	VII
8300.0634	L-50692A			31,800.00	002			YQ	VII
FY7T SUBTOTAL		$ 49,349.00		$ 81,149.00					
FY77									
8300.0647	L-50696A	$ 102,500.00	001	$		$		PX	VII
8300.0694	L-50725A	3,242.43	001					PT	VII
8300.0631	L-52306A	1.00	004	9,616.00	005			YHPZ	VII
8300.0631	L-52306A	35,262.00	007	25,647.00	006			YWPZ	VII
FY77 SUBTOTAL		$ 141,005.43		$ 35,263.00					
FY78									
8300.0710	L-68200A	$		$ 152,294.13	001			YQ	VI
8300.0711	L-68201A	28,200.00	001	28,200.00	002			YQPT	VII
8300.0729	L-68201A	2,250.00	003	2,250.00	004			PVYX	VII
8300.0745	L-68209A	12,000.00	001					PV	VII
8300.0720	L-69148A	38,750.00	001	38,750.00	002			PTYX	VII
8300.0809	L-69148A			42,393.00	003			YV	VII
8300.0712	L-68202A	142,600.00	001					PT	VII
FY78 SUBTOTAL		$ 223,800.00		$ 263,887.13					
TOTAL		$1,453,044.88		$ 931,178.85		$1,419,814.66			

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TABLE CXXXVIII(a) - MSO-WTR EXPENDITURES

SUMMARY	FY76	FY7T
Propellants	$ 2,293.74	$ 361.70
Photo Squadron	5,843.00	479.93
PMEL & CCF	10,575.00	3,000.00
Misc, Base Supply Hardware	930.00	0
Misc. GSA/DSA Items	5,622.39	2,078.97
Purchases Under $500	19,034.03	4,353.44
Purchases Over $500 (Listed Below)	28,830.45	1,848.53
CCTV Installation	28,000.00	0
Misc. GBL's	785.63	0
Imprest Fund Purchases	600.02	0
TOTAL	$102,514.26	$12,122.57

DETAIL LISTING OF FY76 PURCHASES OVER $500

Reduce, Print & Bind Scout Schematics Eng. Serv. on ECS	$ 868.65
Air Conditioning Units	3,000.00
Freon for ECS Air Conditioning Units	841.80
Printing Calculator for Spin Balance	648.00
Air Lift Work Platforms (for VAFB and WFC)	9,998.00
Portable Vacuum Pump	688.70
RTV 88	502.56
Engineering Services and Warranty Validation on OSB Air Compressor	580.00
Xerox Card Printer Rental	2,025.00
Super Clean Nitrogen Gas	650.64
RTV 88	502.56
Aluminum Plate and Structure for Shelter Work Platforms	2,526.74
Structural Steel for Shelter Work Platforms	541.62
RTV 88	651.00
Polarized Antenna and Reflector	591.70
ECS Ducting	1,100.84
RTV 88	651.00
Engineering Services on Cosmodyne Unit	749.00
RTV 88	542.34
RTV 88	651.00
RTV 88	519.30
Xerox Card Printer Purchase (Credit received for previous rental payment)	7,405.00
Electronic Flowmeter	2,220.00
TOTAL	$28,830.45

FY7T

RTV 88	$1,848.52

TABLE CXXXVIII(b) - MSO EXPENDITURES - SUMMARY SHEET, FY 1977

ITEM:	
Propellants	$ 811.31
Photo Squadron	2,837.72
PMEL & CCF (See Note 1)	0
Misc. Base Supply Hardware	725.98
Misc. USA/GSA Hardware	4,748.86
Purchases Under $500	21,510.59
Purchases Over $500 (Listed Below)	36,943.71
Misc. GBL's	212.49
Imprest Fund Purchases (See Note 2)	0
TOTAL	$67,790.66

NOTE 1: Beginning FY77, this Item is a Range charge against E0D40.
NOTE 2: Imprest fund buying capability no longer available to MSO. This item is, therefore, included in Purchases Under $500.

LISTING OF FY77 PURCHASES OVER $500

DESCRIPTION	AMOUNT
T/M Receiver Repair	$ 1,245.00
CCTV Pan Tilt Heads	1,674.00
Terminals for T/M Data Display System	3,390.00
Interface Cards for Above Terminals	2,025.00
Lambda Power Supplies	760.00
Micro-wave Equipment for Data Display System	9,890.00
RTV-88	2,037.48
Reduce, Print and Bind Scout Functional Schematics	759.20
Video Tape Read-out Equipment	2,024.35
Micro-wave Equipment for Data Display System	2,850.00
Adhesive Foil and Tape	646.68
Air Log Dolly Parts	558.00
Shelter Door Repair	756.00
Forklift Repair	3,878.00
Data Graphix Terminal	4,450.00
TOTAL	$36,943.71

TABLE CXXXVIII(c) - MSO EXPENDITURES - SUMMARY SHEET, FY 1978

ITEM:	
Propellants	$ 1,019.16
Photo Squadron	4,853.43
Misc. Base Supply Hardware	2,537.14
Misc. USA/GSA Hardware	6,325.52
Purchases Under $500	34,083.94
Purchases Over $500 (Listed Below)	5,874.25
Misc. GBL's	638.82
TOTAL	$ 55,332.26

LISTING OF FY78 PURCHASES OVER $500

DESCRIPTION	AMOUNT
Repair Fairbanks Scales	$ 951.00
Connectors	703.82
Thread Gauges	501.10
RTV-88	1,344.60
Tubing	502.23
RTV-88	1,368.00
Diametrics	503.50
TOTAL	$ 5,874.25

The NASA Scout Project Office Range Resident supervised all the requirements by the field personnel. Table CXXXVII lists typical obligations by LTV for VAFB through 1978. Table CXXXVIII are the requirements that were filled through G.S.A. and Scout Project Office. Table CXXXIX itemizes costs for ground support equipment. DCASO assessments are listed in table CXL. Shipping costs are listed in table CXLI.

Scout improvements were continuously being programmed for the next hardware purchase and Phase VI improvements are shown in table CXLII. The special R & D funds (180) program costs are listed in table CXLIII.

TABLE CXXXIX - GSE EXPENDITURES

WALLOPS

FY72 FUNDS	
LTV	$ 0
Others	54.20
Suballotment	73,225.86
FY73 FUNDS	
LTV	0
Others	6,912.08
Suballotment	204,625.33
FY74 FUNDS	
LTV	1,077.08
Others	0
Suballotment	0
FY75 FUNDS	
LTV	0
Others	2,600.00
Suballotment	49,985.74
FY76 FUNDS	
LTV	$ 0
Others	2,400.00
Suballotment	315,000.00
FY7T FUNDS	
LTV	$ 0
Others	0
Suballotment	0
FY77 FUNDS	
LTV	$ 0
Others	1,827.92
Suballotment	199,982.00
FY78 FUNDS	
LTV	$ 0
Others	69.95
Suballotment	100,000.00
FY79 FUNDS	
LTV	0
Others	0
Suballotment	0
	$ 957,760.16

WTR

FY72 FUNDS	
LTV	$ 520,148.61
Others	135.26
Suballotment	49,669.39
FY73 FUNDS	
LTV	20,059.00
Others	116,247.54
Suballotment	122,712.32
(Microwave Equip. $20,000.00)	
FY74 FUNDS	
LTV	0
Others	260,713.15
Suballotment	130,380.78
FY75 FUNDS	
LTV	0
Others	9,549.50
Suballotment	0
FY 76 FUNDS	
LTV	0
Others	299,826.50
Suballotment	99,475.77
FY7T FUNDS	
LTV	0
Others	0
Suballotment	0
FY77 FUNDS	
LTV	481,706.25
Others	0
Suballotment	61,500.00
FY78 FUNDS	
LTV	0
Others	6,529.01
Suballotment	0
FY79 FUNDS	
LTV	0
Others	0
Suballotment	0
	$2,178,653.08

TABLE CXL - DOD PLANT SERVICES

(Prorated)	1964-1971	1972	1973	1974	1975	1976	1977	TOTAL
AEC	$ 4,776.02	$ 0	$ 0	$ 0	$ 0	$ 0	$ 0	$ 4,776.02
AIR FORCE	118,773.04	0	0	0	0	(18,179.00)	0	118,773.04
NAVY	547,851.65	69,500.00	62,500.00	125,000.00	(15,639.00)	(32,715.00)	(19,906.00)	804,851.65
NASA	948,541.01	69,500.00	62,500.00	125,000.00	100,000.00	100,000.00	100,000.00	1,505,541.01
ESRO IB	0	0	0	0	(15,960.00)	0	0	0
ESRO IV	(23,646.00)	0	0	0	0	0	0	0
AEROS B	0	0	0	0	(26,062.00)	0	0	0
UK-X4	0	0	0	(25,111.00)	0	0	0	0
TOTAL	$1,619,941.72	$139,000.00	$125,000.00	$250,000.00	$100,000.00	$100,000.00	$100,000.00	$2,433,941.72

TABLE CXLI(a) - SCOUT SHIPPING EXPENDITURES

	Through FY 1971*	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	FY 197T	FY 1977	FY 1978	TOTAL
PROGRAM 894										($140,657.65)
NAS1-5880	$ 2,658.80									2,658.80
NAS1-7256	1,345.17	$ 15.80								1,360.97
NAS1-10000	50,017.13	-4.65	$ 61,469.29							111,481.77
NAS1-12500			2,825.42		$ 1,718.10		$20,612.59			25,156.11
TRUST FUNDS AND REIMBURSABLES 490 (includes DOD, UK, etc.)										($266,025.45)
CCN-301748		50.19								50.19
L-84994						$ 1,359.84		$ 1,297.16		2,657.00
NAS1-3698	3,486.37									3,486.37
NAS1-4664	2,254.43									2,254.43
NAS1-4794	1,989.60									1,989.60
NAS1-5610	20,308.75									20,308.75
NAS1-5883	13,526.86									13,526.86
NAS1-6020	13,720.49									13,720.49
NAS1-6378								45.72		45.72
NAS1-7199	617.10									617.10
NAS1-7256	23.93									23.93
NAS1-9258					1,179.20	436.13				1,615.33
NAS1-10000			1,827.00							1,827.00
NAS1-10481					27.08			42.00		69.08
NAS1-10483					1,653.18					1,653.18
NAS1-11400	6,776.80		2,010.89							8,787.69
NAS1-12500	3,258.40		163.93	51,870.76	5,676.86	51,391.28	16,704.33	24,902.08		153,967.64
NAS1-13100					1,157.40			3,690.30		4,847.70
NAS1-14200								4,581.35		4,581.35
NAS1-15000								14,518.60	$ 9,405.35	23,923.95
NAS1-15100								6,072.09		6,072.09
TOTAL	$682,652.83	$18,131.23	$147,963.08	$74,583.05	$193,234.09	$101,557.74	$33,502.88	$111,881.62	$ 76,664.23	$1,440,170.75

*Does not include LRC-OA Obligations for Shipping Costs (FY 1959-FY 1965).

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TABLE CXLI (b) - SCOUT SHIPPING EXPENDITURES Concluded

	Through FY 1971*	FY 1972	FY 1973	FY 1974	FY 1975	FY 1976	FY 197T	FY 1977	FY 1978	TOTAL
PROGRAM 180										
L-32768	$ 5.85									($245.68)
NGR 34002108	13.90									5.85
NAS1-7256	28.05									13.90
NAS1-9204	57.90									28.05
NAS1-9258	6.55									57.90
NAS1-10000	16.28		$ 63.95	$ 12.90						6.55
NAS1-10483		$ 19.30								93.13
NAS1-10988			21.00							19.30
										21.00
PROGRAM 490										
L-443A										($1,002,135.60)
L-13497A					$ 43.62					43.62
L-23491A						$ 326.55				326.55
L-46232	33.50					8.91				8.91
L-47001	2,760.00									33.50
L-58203A										2,760.00
L-68203A									$ 1,164.80	1,164.80
L-75663	9.45								1,115.96	1,115.96
L-77088		13.88								9.45
L-84994	2,526.00					1,090.00				13.88
L-85843	7.82									3,616.00
L-97050										7.82
LX-72053					325.34					325.34
LX-72061	167.90		267.53							267.53
LX-73047			12.90							167.90
NAS1-3493	2,754.40									12.90
NAS1-3498	21,130.32									2,754.40
NAS1-3698	27.40									21,130.32
NAS1-4794	2,020.05									27.40
NAS1-4795	2,592.00									2,020.05
NAS1-5592	1.00									2,592.00
NAS1-5610	52,618.43									1.00
NAS1-5880	114,490.05									52,618.43
NAS1-5883	8,128.02									114,490.05
NAS1-6020	21,939.21									8,128.02
NAS1-6378	288.39		72.43	838.00	1,827.28			$ 65.46		21,939.21
NAS1-6866	12.05									3,091.56
NAS1-6935	8,975.47		46.72							12.05
NAS1-7102	6,290.19									9,022.19
NAS1-7199	56,095.86									6,290.19
NAS1-7256	110,912.17	7,340.72	1,624.93							56,095.86
NAS1-9258	4,788.20	3,595.20	5,401.96	2,136.39	1,026.28	289.00				119,877.82
NAS1-9325	136.80			71.50	65.20					17,237.03
NAS1-9597						441.00				273.50
NAS1-10000	98,148.56	7,100.79	44,292.87	3,142.49	9.75	-1,434.97				441.00
NAS1-10172									-30.00	151,229.49
NAS1-10481	6,812.93		316.75							316.75
NAS1-10482			51.48		66.54		$ 116.59	90.00		7,137.54
NAS1-10483									3,643.80	3,643.80
NAS1-10484							365.37		864.00	1,229.37
NAS1-10500	10.50		716.20	6,056.69	1,566.13	107.73				8,457.25
NAS1-11400	78.39		38.22							116.61
NAS1-11859	7,679.04		17,835.61	290.13	6,777.02	1,145.81				33,727.61
NAS1-11867					16.51					16.51
NAS1-12500			11.49							11.49
NAS1-11000			8,892.51	10,164.19	168,059.58	21,437.63	15,106.48	14,398.64	-1,072.01	236,981.02
NAS1-13100					1,631.56					1,631.56
NAS1-14200					407.46	4,346.24	1,210.11		2,057.08	8,020.89
NAS1-14500								2,030.47		2,030.47
NAS1-14619									11.43	11.43
NAS1-14550									1,090.85	1,090.85
NAS1-15000									2,006.68	2,006.68
NAS1-15100								320.15	42,263.24	42,583.39
								5,988.59	14,143.05	20,131.64
PROGRAM 497										
NAS1-3493	15.65									($31,106.37)
NAS1-3698	509.12									15.65
NAS1-4325	670.34									509.12
NAS1-4794	3,302.00									670.34
NAS1-5592	11.45									3,302.00
NAS1-5610	6,642.29									11.45
NAS1-5880	637.50									6,642.29
NAS1-5883	6,388.11									637.50
NAS1-6020	11,912.69									6,388.11
NAS1-6935	1,017.22									11,912.69
										1,017.22

TABLE CXLII - IMPROVEMENTS - PHASE VI (178-192)

490-01-04 CHANGES

SS Requirements -
Fourth-Stage Instrumentation Ring

490-02 CHANGES

VEHICLE CHANGES

Apollo Standard Initiators
Autodestruct Module
Azimuth Alinement Tool
Cartridge Insertable Explosive Bolts
Deleted Base "A" Hydraulic Pressure Switch
Fin Tips - Large Area
First-Stage Harness
42-Inch Heat Shield
Improved H_2O_2 Components
Jet Vanes - Shape Material
Linear Shape Charges
Lower "D" Section Rearrangement
Middle "D" Section Redesign
New H_2O_2 Bladders
Power Control Relay Box
Roll and Yaw Compensation Unit
Safe/Arm Units
S-Band T/M Transmitter and Lightweight T/M Package
Separation Systems - 200 Series and EG Series
Spin Electrical Connection

GROUND SUPPORT EQUIPMENT

Apollo Standard Initiator Addition
Autodestruct Module Modification
Azimuth Alinement GSE Modifications
Cartridge Insertable Explosive Bolt Revision
Linear Shape Charge Modification
Power Control Relay Box Modification
Roll and Yaw Compensation Unit Addition
S-Band Telemetry Modification
Spin Motor Connector Modification

NEW PROPULSION

Algol IIB Nozzles - Rebuilt
High Pressure X-259 (Third Stage)

490-03 CHANGES

Algol III (First Stage)

TABLE CXLIII - SRT (STO) RESEARCH PROGRAMS
(180 FUNDS)

OLD NO.	NEW NO.	DESCRIPTION	FY 1971 and Prior	FY 1972	FY 1973	FY 1974	FY1975	FY1976	TOTAL OBLIGATION
05-01-01C		Destruct Module (RAS132)	$ 87,467	$ 0	$ 155	$ 0	$ 0	$ 0	$ 87,622
06-01-05C		Computer Program (RAS131)	108,445	0	0	0	0	0	108,445
06-06-07	06-52-02	Upgraded Scout (RAS142)(RAS180)	254,907	0	0	0	0	0	254,907
06-06-08C		Error Analysis (RAS151)	199,115	0	0	0	0	0	199,115
06-06-09	06-52-03	Trajectory Reconstruction (RAS181)	109,250	1	0	0	0	0	109,251
06-50-01		Low Thrust (RUP113)	0	36,321	0	0	0	0	36,321
06-50-02		Orbit Determination (RUQ106)	4,653	35,962	0	0	0	0	40,615
06-52-07		Trajectory Reconstruction	0	0	0	0	0	0	0
09-07-01C		Electrostatic Tests (RAS134)	79,727	0	0	0	0	0	79,727
11-03-01C		Large Heat Shield (RAS178)	73,500	0	0	0	0	0	73,500
17-01-01C		Azimuth Errors (RAS155)	117,042	0	0	0	0	0	117,042
17-01-02	17-50-01	Upper Stage Control (RAS187)	29,901	0	0	0	9,278	0	39,179
17-05-05	17-50-02	Guidance System Investigation (RAS198)	65,805	81,858	0	0	0	0	147,663
19-03-02C		Roll and Yaw Compensation (RAS152)	211,072	0	0	0	0	0	211,072
19-03-05C	19-50-01	Coast Control (RAS176)	57,575	0	0	0	0	0	57,575
24-04-01C		S-Band Antennae (RAS168)	118,088	0	0	0	0	0	118,088
24-04-03	24-52-02	Instrument Response (RAS170)	127,781	0	0	0	0	0	127,781
32-04-02	32-51-01	Payload Contamination (RAS199)	32,594	0	0	0	0	0	32,594
*32-05-02C		X-258 Propellant (Direct OSS)	274,294	0	0	0	0	0	274,294
32-05-04C		Accuracy (RAS129)	346,300	0	0	0	0	0	346,300
32-05-06		Velocity Package Motor Improvement	0	0	0	0	0	0	0
32-05-07C	32-51-02	Rocket Design (RAS182)	60,950	0	0	0	0	0	60,950
32-07-05C		Spin Motors (RAS121)	106,000	0	0	0	0	0	106,000
32-07-08C	32-09-01C	X-259 Load Tests (RAS133)	99,627	0	0	0	0	0	99,627
32-07-10C		Algol Pyrogen (RAS144)	250,000	0	0	0	0	0	250,000
32-07-11C	32-51-03	Apollo Initiators (RAS158)	283,092	0	0	0	0	0	283,092
32-07-13	32-51-04	Nondestructive Test Techs.(RAS169,401)(RBJ142)	264,552	0	12,183	32,524	78	0	309,337
32-07-14	32-51-05	Pyrotechnic Study (RUE124)(RAS403)(TGL110)(R3501)	216,812	46,065	7,189	21,832	7,234	0	299,132
32-08-04C		Photomechanical Algol (RAS130)(RDK233)	64,268	0	0	0	0	0	64,268
32-08-05	32-51-06	Improved Nozzle Material (RAS179)	260,128	42,851	17	16,474	2,075	0	321,545
32-08-06	32-51-07	Noz. Material Eval. (TGD108)(RQ0110)(RQ0117)	131,638	86,810	447	0	0	0	218,895
32-09-02C		Fiberglass Case (RAS156)	100,000	0	0	0	0	0	100,000
32-35-01	32-51-08	Jet Vane Study (RAS186)	189,175	0	0	0	0	0	189,175
59-04-01C		Cocooning (RAS154)	59,451	0	0	0	0	0	59,451
**72-50-01		Atmos. Efcts.Due to Rkt.Lch.(RUL120)(RYH103)(AEA109)	0	18,420	182,420	144,150	54,207	0	399,579
32-51-14		First-Stage Strapons (R5241)	0	0	589	0	1,128	25,021	26,738
		TOTAL OBLIGATED	$4,389,294	$348,670	$203,000	$214,980	$ 74,000	$25,021	$5,254,965

*STS Direct Funding, Contract NASW-1241.
C - Complete.
**Not Scout Project Office.

TABLE CXLIV - NAS1-10481 (CONTRACT HISTORY)

HERCULES INCORPORATED

X258 Rocket Motor Studies

	Est. Cost	Fee	Total
Contract (Funded) (24 Months)	$ 93,020	$ 6,976	$ 99,996
Task 1 Support X258 Shelf Life Extension	(2,000)		
Task 2 Hydrotest X258 Chamber	(9,100)		
Task 3 Pack & Ship (2) X259 Igniters	(300)		
Task 4 Insert Helicoils in (2) X259's	(10,600)		
MOD-1 Change of Manhours	0	0	0
MOD-2 12 Mos. Extension to 36 Mos.	0	0	0
MOD-3 12 Mos. Extension to 48 Mos.	0	0	0
MOD-4 New Scope	69,767	5,233	75,000
MOD-5 12 Mos. Extension to 60 Mos.	0	0	0
MOD-6 Government Owned Property Reporting	0	0	0
Task 5 Pack & Ship (2) X248's	(800)		
Task 6 Inspect & Test Fire (4) X259's	(31,300)		
Task 7 Pack & Ship X259 Motor	(1,950)		
Task 8 Clean & Ship (2) X259 Chambers	(1,500)		
Task 9 Static Fire R & H Motors w/Ceramic Inserts	(5,500)		
Task 10 X-258 H.E. Feasibility Study	(33,100)		
Task 11 Transfer Scout Tooling	(690)		
Task 12 Dispose of GFP	(1,370)		
Task 13 Adv. 4th Stage Design Optimiz. Studies	(48,615)		
MOD-7 24 Mos. Extension to 84 Mos.	134.998	10,800	145.798
MOD-8 Extension Completion Date	0	0	0
MOD-9 Schedule Change	0	0	0
TOTAL	$297,785	$ 23,009	$320,794
Total - Assigned Tasks	(146,825)		
Unassigned	(150,960)		

( )Assigned Tasks Budgetary

TABLE CXLV - NAS1-10482 (CONTRACT HISTORY)

THIOKOL CORPORATION/HUNTSVILLE

Castor Motor Studies

	Est. Cost	Fee	Total
Contract (Funded) (12 Months)	$ 91,697	$ 6,877	$ 98,574
MOD-1 12 Mos. Extension to 24 Mos.	0	0	0
Task 1 Review and Evaluate NDT Methods	(5,600)		
Task 2 Preparation Castor II Drawing and Spec. Trees			
MOD-2 12 Mos. Extension to 36 Mos.	0	0	0
MOD-3 12 Mos. Extension to 48 Mos.	0	0	0
MOD-4 12 Mos. Extention to 60 Mos.	0	0	0
MOD-5 Government-Owned Property Reporting	0	0	0
MOD-6 Increased Efforts in Review and Evaluate NDT Methods	95,902	7,193	103,095
MOD-7 Administrative Change	0	0	0
MOD-8 Administrative Change	0	0	0
MOD-9 Schedule Change	0	0	0
TOTAL	$187,599	$14,070	$201,669

Each motor contractor negotiated a task contract to support the motor production and processing. Tables CXLIII through CXLVII list these contracts. NAS1-10485 is omitted as only one first-stage Algol II was used in Phase VI.

Tables CXLVII through CLI depict many special contract items as major developments to minor modifications. Many of these can be found as a separate report in Appendix M.

TABLE CXLVI- NAS1-10483 (CONTRACT HISTORY)

HERCULES INCORPORATED

X-259 Rocket Motor Studies

	Est. Cost	Fee	Total
Contract (Funded) (12 Months)	$ 93,172	$ 6,522	$ 99,694
Task 1 Review and Evaluate NDT Methods			
Task 2 Review X-259 Inspection Reports			
Task 3 Study Extens. Shelf & Service Life X-259-B3 Motor			
Task 4 Preliminary Inspection 4th Stg. Motor and Improved X-259 Motor	(4,693)		
MOD-1 12 Mos. Extension to 24 Mos.	0	0	0
Task 5 Improved Igniter for X-259 Motor			
MOD-2 Increase in Manhours and Materials	45,004	3,150	48,154
Task 6 X-259 Rocket Motor Analysis	(114)		
Task 7 Delivery of One X-259 Igniter			
MOD-3 12 Mos. Extension to 48 Mos.	0	0	0
MOD-4 Additional Technical Support	70,091	4,909	75,000
Task 8 X-Ray X-259 Motor HIB-215	(1,593)		
MOD-5 12 Mos. Extension to 60 Mos.	0	0	0
MOD-6 Government Owned Property Reporting	0	0	0
Task 9 Packing, Crating, and Shipment of Tooling			
Task 10 Design Optimization Study Advanced Third-Stage Motor Chamber			
Task 11 CY1 Propellant Relative Quickness Test	(2,837)		
Task 12 Shipment Government Owned Tooling			
Task 13 Estab. Cast Date Antares IIA Igniters	(1,821)		
Task 14 Packaging and Shipment X-259 Motors	(7,590)		
MOD-7 24 Months Extension to 84 Months	119,258	8,944	128,202
MOD-8 Extension Completion Date	0	0	0
TOTAL	$327,525	$23,525	$351,050

TABLE CXLVII - NAS1-10484 (CONTRACT HISTORY)

UNITED TECHNOLOGIES CORPORATION

Algol IIC Nozzle, Algol III and FW4-S Motors Studies

	Est. Cost	Fee	Total
Contract (Funded) (12 Months)	$ 92,360	$ 6,500	$ 98,860
Task 1 Evaluate NDT Methods/Inspect. Criteria for Algol III and FW-4S Motors			
Task 2 Eval. High Energy Storable Hybrid Propellants			
MOD-1 Appropriation and Allotment Change	0	0	0
Task 3 Provide FW-4S Motor Case Samples			
Task 4 Audit FW-4S Motor Prod. History and Re-X-ray of Motor			
Task 5 Provide Drawings of Government Owned Tooling			
MOD-2 Additional 12 Mos. Effort	38,000	2,701	40,701
MOD-3 10 Mos. Extension to 34 Mos.	0	0	0
MOD-4 Additional 6 Man-Years of Effort	271,026	18,974	290,000
Task 6 Fabrication Algol III NDT Test Specimens			
Task 7 FW-4S Motor Segment			
Task 8 Tooling FW-4S Motors			
Task 9 Fabrication 5 Altair Motors			
MOD-5 Additional $1\frac{1}{2}$ Man-Year Effort	92,975	6,525	99,500
Task 10 FW-4S Nozzle Installation and Alinement			
Task 11 Qual. Altair III Igniter with SBASI			
MOD-6 12 Mos. Extension to 58 Mos.	0	0	0
MOD-7 Government Owned Property Reporting	0	0	0
MOD-8 Contractor Name Change	0	0	0
MOD-9 Correction Contractor Name Change	0	0	0
TOTAL	$494,361	$34,700	$529,061

TABLE CXLVIII - NAS1-10500 (CONTRACT HISTORY)
LTV Aerospace Corporation

TASK 1 - DESIGN, DEVELOPMENT, QUALIFICATION, AND PRODUCTION OF SCOUT PAYLOAD SEPARATION IGNITION TIMERS (9-17-71)

	66.000.052	RAS183	$200,000	
	66.000.099	RAS184	29,847	
M-1 (Administrative Change)			0	
M-2 (Timers)	66.000.243	RAS184	30,580	
M-3 (Timers)	66.000.418	R1246	20,791	
M-4 (Relays and P.C. Boards)	6600.0513	E7000Y	29,200	
M-5 (M4-Equitable Adjust.)	6600.0513	E7000Y	-1,202	
TOTAL				$309,216

TASK 2 - PHASE II STUDY OF IMPROVED MATERIALS FOR USE ON SCOUT ROCKET MOTOR NOZZLES (10-27-71)

	60.400.876	RAS179	$105,335	
M-1 (Nozzle Material Investigation)	66.000.220	RAS179	23,300	
M-2 (Nozzle Material Investigation)	66.000.220	RAS179	0	
M-3 (Nozzle Material Investigation)	66.000.220	RAS179	7,594	
M-4 (C.R. Report)			0	
M-5 (Extension Completion Date)			0	
TOTAL				$121,041

TASK 3 - DESIGN, PROCUREMENT, FABRICATION, TEST, AND STORAGE OF A SCOUT ATTITUDE CORRECTION SYSTEM (2-24-72)

	66.000.042	RAS190	$140,000	
	66.000.151	RAS184	148,500	
M-1 (Schedule Revision)			0	
M-2 (GFE Air Bearing)	66.000.042	RAS190	-2,227	
M-3 (Extension Completion Date)			0	
M-4 (Overrun)	66.000.323	R1246	47,107	
M-5 (Overrun)	66.000.361	R1246	60,520	
TOTAL				$393,900

TASK 4 - DESIGN AND FABRICATION OF LARGE DIAMETER PAYLOAD SEPARATION SYSTEM (6-20-73) (E-25)

	66.000.240	RAS196	$182,350	
M-1 (Five Bolt Cutter Assys.)			0	
M-2 (Icr. Electronic Interstage Connector Capability)			0	
M-3 (Administrative Change)			0	
M-4 (M-1,M-2)	66.000.326	R1258	37,123	
	66.000.331	R1258	5,652	
M-5 (Extension of Completion Date)			0	
TOTAL				$225,125
		TOTAL CONTRACT		$1,049,282

TABLE CXLIX - NAS1-12500, NAS1-15000, & NAS1-15100 (68-71)

STANDARD TASKS

NAS1-12500

OSCAR Mission Analysis and Orbital Studies, WA-3381/BFC	$ 3,277
Environmental Study - S-200, WA-3381/BGE	3,800
Vehicle Interface Drawing - S-192, WA-3381/BHA	463
Vehicle Interface Drawing - S-195 and S-197, WA-3381/BHE	2,196
GSE Interface Drawing - S-195 and S-197, WA-3381/BJH	2,759
Heat-Shield Design - S-192, WA-3381/BKC	923
Heat-Shield Design - S-195 and S-197, WA-3381/BKF	2,112
Preflight Planning, S-192, WA-3381/CAD	13,380
Preflight Planning, S-195, WA-3381/CAH	20,913
Preflight Review, S-199, WA-3381/CBA	840
Preflight Review, S-195, WA-3381/CBH	955
Final Flight Report, S-178, WA-3381/DDA	36,582
Heat-Shield Fit Check, S-192, WA-3381/HCC	2,756
Heat-Shield Fit Check, S-195, WA-3381/HCE	3,223
Heat-Shield Mod., S-192, WA-3381/HED	18,635
Heat-Shield Mod., S-195, WA-3381/HEG	22,044
Heat-Shield Mod., S-197, WA-3381/HEH	24,343
In-plant processing S-192, WA-3381/HFG	140,329
In-plant processing, S-195, WA-3381/HFJ	184,138
In-plant processing, S-197, WA-3381/HFL	167,476
In-plant processing, S-199, WA-3381/HFN	129,467
In-plant processing, S-200, WA-3381/HFP	28,739
Launch Support, S-195, WA-3381/HGE	79,021
Launch Support, S-179, WA-3381/HGG	83,771
Launch Support, S-197, WA-3381/HGJ	37,081
P76-5 Heat-Shield Design, WA-3381/BKH	2,140
P76-5 Heat-Shield Design, WA-3381/HEK	26,906
P76-5 Payload Dynamic Analysis, WA-3381/BGD	8,743
P76-5 Preliminary Trajectory, WA-3381/BEF	3,366
Environmental Study, WA-3381/BDG (S-195)	4,179
SUBTOTAL	$1,054,557

NAS1-15000

Preflight Planning, S-204, WA-3525/CDAD	$ 4,568
In-plant Vehicle Processing Support, S-204, WA-3525/EAAF	7,000*
R/S, Recert, B/U, MFC, C/O, S-204, WA-3525/HAG	173,000*
SUBTOTAL	$184,568

*Estimate.

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TABLE CL- NAS1-12500, NAS1-15000, & NAS1-15100 (68-71)

MISSION PECULIARS

Actuator Rework, S-192 and S-199, WA-3525/EAFA (1/3)	$ 13,785
Actuator Rework, S-204, S-205, and S-206, WA-3525/EAFB (3/5)	4,845
Inspection of AS360F316C6A Fittings, S-192, S-199, S-204, S-205, and S-206, WA-3525/EAFC (5/11)	15,980
H_2O_2 Bladder Tank Adhesion, S-192, WA3525/EAFD (1/2)	35,000*
Vehicle S-199 Special Fourth-Stage Instrumentation, R-75	35,183*
Vehicles S-192/199 Heat-Shield Rework, R-22	7,900
Vehicle S-192 Fourth-Stage Instrumentation, R-66	26,461
Vehicles S-192/199 Rework GFE R/Y and Vehicle Retest, R-83	30,959*
Incorporate Altair III-A in Vehicle S-199, R-63	43,970
•S-178 Spin Anomaly, R-18	5,793
Modification to Scout Vehicle S-179, R-49	491
Vehicles S-179 and S-192 Guidance Comp., Inspt., retest, R-91	24,365
Heat Shield Fit Checks (TIP-II), R-118	3,953
Incorporation of accumulated modifications to S-179, R-143	8,051
Retest of Vehicle S-179 components, R-164	7,370
Vehicle S-179 fourth-stage Telemetry System, R-163	41,399
Roll-Yaw Compensation Units, R-160	18,707
Mod Kit to Dummy Heat Shield, R-165 (S-179)	2,110
Heat Shield-to-Payload Fit Check, R-165 (S-179)	4,376
Reprogram and Retest Guidance System, R-165 (S-179)	20,525
Vehicle S-179 Payload Coordination and Preflight Planning, R-165	77,908
Performance Capability Study - TIP-III Mission, R-181	3,432
TIP-II/III Spacecraft Dynamic Loads Analysis, R-207	40,983
Vehicle S-192 Third-Stage Motor Change, R-191	16,460
SUBTOTAL	$490,006

*Estimate
•Phase VI

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TABLE CLI - NAS1-12500 & NAS1-15100 - DOD TASK R (68-71)

SPECIALS

Backup air system for VAFB, R-2	$ 6,745
X-259 embedded boot strain measurement test, R-8	1,876
*Incorporate new GFE power supplies into GSE at VAFB, R-12	12,296
*Install and check out specific GFE-GSE kits at VAFB, R-23	15,554
*Install explosive-proof wiring, Dynamic Balance Facility, R-32	4,392
*Modification to D-section cooling air in S^3T at VAFB, R-48	2,086
*VAFB ground support equipment remodifications, R-64	5,638
*Backup air supply at VAFB, R-65	26,904
Environmental control system for Scout payloads at VAFB, R-72	28,742
Environmental control system for Scout payloads at VAFB, R-83	45,964
*Scout GSE Mods for Guidance System Env. Test and SOP, R-92	38,584
*Phase Angle Voltmeter at VAFB, S-003	1,483
Roll and Yaw Compensation Units, R-160	18,706
Inspection of X-258 motors, R-202	26,056
Fabrication of roll and yaw compensation units, R-198	59,885
#TRANSAT Heat Shield Mod. and Fit Check, R-11	56,029
X-258 Nozzle Examination, R-43	59,178
S-199 Special Fourth-Stage Instrumentation, R-75	32,005
SUBTOTAL	$442,123

TABLE CLII - NAS1-12500 & NAS1-15100 - DOD TASK R (68-71)

*SHELF LIFE

•Shelf life testing of first and second-stage initiators, R-16	$ 1,778
*Explosive bolts shelf life extension, R-36	1,258
*Castor II shelf life extension, R-62	31,202
*X-259 rocket motor shelf life extension program, R-74	15,834
*Extension of TX-463-1 pyrogen shelf life, R-76	2,809
*Algol II shelf life extension program, R-88	55,601
*Procurement of Altair III shelf life materials, R-93	19,479
Static test firing X-258 motor, R-138	41,420
*Static test firing Castor IIA, R-195	12,686
*Qual. firing Antares IIA, R-179	24,936
#X-258 Motor Shelf Life Program, R-16	24,921
X-258 Igniter Shelf Life Analysis Program, R-19 (1/2)	4,284
Aging Study Rept.-Scout Motors, R-99	18,952
Algol IIC Motor Shelf Life, 78-17	19,000
Algol IIC Igniter Shelf Life, R-86	13,256
SUBTOTAL	$287,416

•Phase VI.
*50 percent NASA, 50 percent DOD.
#Begins New Contract NAS1-15100.

CHAPTER 9 - SCOUT PHASE VI RESULTS

The summary of results of the Scout Program is presented in tables CLIII through CLV. Each of the Scout Phase VI flights is detailed in table CLIV. Tables CLIII and CLIV detail the historical results of Phases I through V. Table CLV presents the flight parameters of each launch designated by flight number and mission. The Scout flight numbers for the Phase VI vehicles are as follows:

Flight No.	Vehicle No.	Flight No.	Vehicle No.	Flight No.	Vehicle No.
75	180	83	181	88	186
78	183	84	178	89	189
79	184	85	190	90	187
80	182	86	188	94	179
82	185	87	191	102	192

Tables CLVI through CLXX present the complete postflight data for each Scout vehicle including launch azimuth, launch elevation, motor serial numbers, heat-shield specifications, parameters, weight, etc. A few of the Phase VI Scouts are presented in figures 119 through 125.

Tables CLXXI through CLXXXIII present the summary of boost trajectory performance for most of the Phase VI launch vehicles. Table CLXXXIV presents a summary of conditions at fourth-stage burnout.

The pitch, yaw, and roll attitude errors are presented in tables CLXXXVII through CXCII. These data are telemetered from the output of the inertial reference package's miniature integrating gyros (MIG). The second- and third-stage attitude errors are usually biased to one side of the control system deadband during boost because of thrust misalinement. On all orbital missions the pitch and yaw zero-rate deadband is 0.802 degrees, plus or minus 10 percent. The roll zero-rate deadband is 1.432 degrees, plus or minus 10 percent.

The yaw displacement time history for vehicle S-181C includes approximately 35 percent of the rate gyro output. This anomaly was completely investigated.

The first-stage pitch program, maximum control surface deflections and all transients are presented in table CXCIII. This table also shows configuration and control gains for each Phase VI Scout flight. Fit check, jet vane and tip data are also included.

The disturbing pitch, yaw, and roll moment disturbances are presented in tables CXCIV through CXCVI. The pitch, yaw and roll attitude error and angular rate prior to second-stage ignition are presented in table CXCVII. The rigid body rate changes due to ignition transients and separation disturbances are also shown with the maximum attitude error and rate attained during the control system capture maneuver. The third stage is shown in table CCVIII.

The time histories by vehicle of second- and third-stage pitch and yaw thrust misalinement and moment disturbance are presented in table CCIX. Total thrust misalinement by vehicle is shown in tables CCX and CCXI. Tables CCXII and CCXIII show additional pitch and yaw second- and third-stage thrust misalinement.

TABLE CLIII(a) - SUMMARY OF RESULTS (Phases I, II, and III).

PAYLOADS	(23)	(5)	(7)	(2-A.E.C.)								
TOTAL LAUNCHES	NASA	NAVY	AF	CONF.	LAUNCH SITE WALLOPS	LAUNCH SITE WTR	VEH. NO.	LAUNCH FY	LAUNCH DATE	LAUNCH TYPE	LAUNCH RESULT	
1	1			X-1	1		ST1	61-1	7-1-60	P	S	PHASE I
2	2			X-1	2		ST2	61-2	10-4-60	P	S	
3	3			X-1	3		ST3	61-3	12-4-60	O	F	
4	4			X-1	4		ST4	61-4	2-16-61	O	S	
5	5			X-1	5		ST5	61-5	6-30-61	O	F	
6	6			X-1	6		ST6	62-1	8-25-61	O	F	
7	7			X-1	7		ST7	62-2	10-19-61	P	S	
8	8			X-1A	8		ST8	62-3	3-1-62	Re	S	
9	9			X-2	9		ST9	62-4	3-29-62	P	S	
10		S-1		X-2		1	111	62-5	4-26-62	O	F	PHASE II
11			1*	X-2M		2	112	62-6	5-24-62	O	F	
12			2*	X-2M		3	117	63-1	8-23-62	O	S	
13	10			X-3A	10		114	63-2	8-31-62	Re	F	
14	11			X-3	11		115	63-3	12-16-62	O	S	
15		1		X-3		4	118	63-4	12-18-62	O	S	
16			3*	X-3M		5	126	63-5	2-19-63	O	S	
17		2		X-3		6	119	63-6	4-5-63	O	F	
18			4*	X-2M		7	121	63-7	4-26-63	O	F	
19(AEC-1)		**		X-3	12		116	63-8	5-22-63	Re	S	
20		3		X-3		8	120	63-9	6-15-63	O	S	
21			5	X-4	13		113	63-10	6-28-63	O	S	
22	12			X-3A	14		110	64-1	7-20-63	Re	F	
23			6	X-2B		9	132	64-2	9-27-63	O	F	
24	13			X-4		10	122R	64-3	12-19-63	O	S	PHASE III
25	14			X-3	15		127R	64-4	3-27-64	O	S	
26		4		X-4		11	125R	64-5	6-3-64	O	S	
27			7	X-4		12	128R	64-6	6-25-64	O	F	
28	15			X-4	16		124R	65-1	7-20-64	P	S	
29	16			X-4A	17		129R	65-2	8-18-64	Re	S	
30	17			X-4		13	134R	65-3	8-25-64	O	S	
31(AEC-2)				X-3C	18		130R	65-4	10-9-64	Re	S	
32	18			X-4		14	123RR	65-5	10-9-64	O	S	
33	19			X-4	19		133R	65-6	11-6-64	O	S	
34	20			X-4		15	135R	65-7	11-21-64	O	S	
35	21(SM)			X-4	20		137R	65-8	12-15-64	O	S	
36	22			X-4	21		136R	65-9	4-29-65	O	S	
37(A)	23(EV)			B	22		131R	66-1	8-10-65	O	S	

CODE:
- *Not NASA procured.
- **AEC purchased from the Navy.
- A - Army payload on NASA vehicle.
- AEC - Atomic Energy Commission.
- AF - Air Force.
- EV - Evaluation vehicle.
- F - Failure.
- O - Orbit.
- P - Probes.
- R - Recertification.
- Re - Reentry.
- RR - Double recertification.
- S - Success.
- SM - San Marco.
- ST - Development vehicles.

TABLE CLIII(b) - SUMMARY OF RESULTS (Phases IV and V).

PAYLOADS	(24)	(10)	(6)									
					LAUNCH SITE			LAUNCH				
TOTAL LAUNCHES	NASA	NAVY	AF	CONF.	WALLOPS	WTR	VEH. NO.	FY	DATE	TYPE	RESULT	
38	24			X-4	23		138R	66-2	11-18-65	0	S	
39(FR)	25			X-4		16	139R	66-3	12-06-65	0	S	
40		5		A		17	140C	66-4	12-21-65	0	S	
41		6		A		18	142C	66-5	1-28-66	0	S	
42	26			X-4A	24		141C	66-6	2-09-66	Re	S	
43		7		A		19	143C	66-7	3-25-66	0	S	
44			8	B		20	145C	66-8	4-22-66	0	S	
45		8		A		21	146C	66-9	5-18-66	0	S	
46			9	B	25		147C	66-10	6-09-66	0	S	
47			10	B		22	148C	67-1	8-04-66	0	S	
48		9		A		23	149C	67-2	8-17-66	0	S	PHASE IV
49			11	B		24	150C	67-3	10-28-66	0	S	
50			12	B		25	151C	67-4	1-31-67	0	F	
51		10		A		26	154C	67-5	4-13-67	0	S	
52	27(SM)			B	Africa-1		153C	67-6	4-26-67	0	S	
53	28			A		27	155C	67-7	5-05-67	0	S	
54		11		A		28	156C	67-8	5-18-67	0	S	
55	29			B		29	152C	67-9	5-29-67	0	F	
56		12		A		30	157C	68-1	9-25-67	0	S	
57	30			B	26		159C	68-2	10-19-67	Re	S	
58			13	B		31	158C	68-3	12-04-67	0	S	
59		13		A		32	162C	68-4	3-01-68	0	S	
60	31			B	27		160C	68-5	3-05-68	0	S	
62	33			B		33	161C	68-7	5-16-68	0	S	
73	43			B	32		144CR	71-6	6-20-71	Re	S	
61	32			X-5C	28		164C	68-6	4-27-68	Re	S	
63	34			B		34	165C	69-1	8-08-68	0	S	
64	35			B	29		168C	69-2	8-22-68	Re	S	
65	36			B		35	167C	69-3	10-03-68	0	S	
66(ESRO)	37			B		36	172C	70-1	10-01-69	0	S	
67	38			B		37	169C	70-2	11-07-69	0	S	PHASE V
68		14		A		38	176C	71-1	8-27-70	0	S	
69	39			B	30		171C	71-2	9-30-70	Re	S	
70	40			B	31		174C	71-3	11-09-70	0	S	
71	41			B	Africa-2		175C	71-4	12-12-70	0	S	
72	42(SM)			B	Africa-3		173C	71-5	4-24-71	0	S	
74	44			B	33		177C	72-1	7-08-71	0	S	
76	46			B	35		166C	72-3	9-20-71	P	S	
77	47			B	Africa-4		163CR	72-4	11-15-71	0	S	
81	50			D	Africa-5		170CR	73-3	11-16-72	0	S	

CODE:
- A - Configuration A
- AF - Air Force
- B - Configuration B
- C - Certified
- D - Configuration D
- F - Failure
- FR - French
- FY - Fiscal Year
- 0 - Orbit
- P - Probe
- R - Recertification
- Re - Reentry
- S - Success
- SM - San Marco
- X - Configuration X

TABLE CLIV - LAUNCH SUMMARY (PHASE VI)
(NAS1-12500)

VEH. NO.	PAYLOAD	LAUNCH SITE	DATE
S-190	S/M-C^2	SAN MARCO	FEB '74
S-188	UKX-4	VAFB	MAR '74
S-191	NPE	VAFB	JUN '74
S-186	AEROS-B	VAFB	JUL '74
S-189	ANS-A	VAFB	AUG '74
S-187	UK-5	SAN MARCO	OCT '74
S-194	SAS-C	SAN MARCO	MAY '75
S-195	TIP-11	VAFB	OCT '75
S-196	DAD	VAFB	DEC '75
S-179	P76-5	VAFB	MAY '76
S-193	GP-A	WFC	JUN '76
S-197	TIP-111	VAFB	SEP '76

12 LAUNCHES - ONE FAILURE

OVERALL SUCCESS RATIO = 94.5% (SINCE RECERT)

37 CONSECUTIVE SUCCESSES

TABLE CLV - SCOUT FLIGHT SUMMARY (Operational)

Flt. No.	Vehicle No.	Launch Site	Date	Mission	Apogee (pred.)	Perigee (pred.)	Incl. (deg.)	Vehicle Perform.	Experiment	Remarks
9	ST-9	WI(9)	3-29-62	Probe	3291.7 (3391.3)			Success	P21A-GSFC ionosphere experiment plus fourth-stage performance instrumentation.	First flight of X-259 motor.
- - - New Mark II complex at WTR (A. F. launch crew) - - -										
10	S-111	WTR	4-26-62	Orbital				Failure	NRL Solrad payload.	First flight of vehicle with a 34-inch heatshield and an autodestruct system (WTR only). GSE leak defueled third-stage control before liftoff. Initiated change to fueling system design and procedures.
11	S-112	WTR	5-24-62	Orbital				Failure	Special A. F. Scout.	Vehicle self-destructed 0.3 second after second-stage ignition. Most probable cause an electrical wiring short and/or destruct system design deficiency. Initiated design change to lanyard switch and modified processing and inspection procedures.
12	S-117	WTR	8-23-62	Orbital				Success	Special A.F. Scout.	
13	S-114	WI(10)	8-31-62	Reentry 314 lbs				Failure	R-2-LRC reentry heating experiment, plus boundary layer noise secondary experiment (successful), with NOTS-17 fifth stage.	First flight Algol IIA motor (successful). Mission failure due to electrical short which delayed ignition of third-stage motor. Conducted all-systems design/quality review. Initiated complete wiring system refurbishment. Upgraded ignition system and heatshield design.
- - - 3-Month Investigation - Electrical connector rework heatshield and ignition system changes - - -										
14	S-115	WI(11)	12-16-62	Orbital 155 lbs	639.02 (593.5)	412.1 (393.5)	52.00 (51.43)	Success	Explorer XVI - S55B-LRC micrometeoroid experiment plus boundary-layer noise secondary experiment. Period 104.37 min.	
15	S-118	WTR	12-18-62	Orbital	396.6 (470.9)	380.6 (396.6)	90.62 (90.0)	Success	Navy. Period 99.2 min.	
16	S-126	WTR	2-19-63	Orbital 177.38 lbs				Success	Special A. F. Vehicle. Period 100.5 min.	

( ) NASA Launches ( ) Predicted

WI - Wallops Island, Virginia
WTR - Western Test Range, Lompoc, California

(Continued on next page.)

TABLE CLV Continued - SCOUT FLIGHT SUMMARY (Operational)

Flt. No.	Vehicle No.	Launch Site	Date	Mission	Apogee (pred.)	Perigee (pred.)	Incl. (deg.)	Vehicle Perform.	Experiment	Remarks
17	S-119	WTR	4-5-63	Orbital 132 lbs				Failure	Navy.	Excessive peroxide leak in third-stage coast control system. Requalified peroxide components and modified system assembly procedures and reliability assurance programs in accordance with existing knowledge of environment, upgraded procedures and acceptance criteria on components and systems.
18	S-121	WTR	4-26-63	Orbital				Failure	Special A. F. Vehicle.	Third-stage thrust terminated by inadvertent destruct action. Action attributed to electrical arcing and/or flame attenuation of R.F. destruct command system resulting in capture and triggering of system by random transmissions. Changed range procedures to retain captivity of vehicle receivers throughout flight and initiated design and qualification of filters to reduce susceptibility of coding system to random R.F. transmissions.
19	S-116	WI	5-22-63	Reentry 482 lbs	65.46 (66.5)			Success	RFD-1 reentry evaluation experiment. (A.E.C.) - 19,928.0 ft/sec	First vehicle to cycle through 16 countdowns before obtaining satisfactory downrange weather to meet payload optical constraints.
20	S-120	WTR	6-15-63	Orbital 133.4 lbs	413.98 (459.61)	395.2 (397.53)	90.01 (90.01)	Success	Navy - Period 99.71 min.	
21	S-113	WI	6-28-63	Orbital 221.8 lbs	710.5 (672.91)	227.6 (220.98)	49.71 (50.02)	Success	Cambridge Research Lab. experiment. Period 102.15 min.	First flight of ABL X-258 fourth-stage motor.
22	S-1'0	WI (12)	7-20-63	Reentry 310 lbs				Failure	R-3-LRC reentry heating experiment plus ram pods and ablative materials secondary experiments, with NOTS-17 fifth stage.	First-stage Algol II-A nozzle failed structurally after liftoff. Initiated tests and refurbishment of existing nozzles plus development and qualification of backup II-B nozzle having increased design margin.
23	S-132	WTR	9-27-63	Orbital				Failure	DOD mission.	Third-stage attitude control failed during coast due to excessive temperature environment created by rocket motor nozzle. Completed ad hoc and comprehensive all-systems design, reliability, quality and processing procedures review. Conducted vehicle test and recertification program. Reassessed vehicle environment. Incorporated nozzle radiation shield. Streamlined field procedures provided operational surveillance teams (OST) to monitor processing.

( ) NASA Launches ( ) Predicted

(Continued on next page.)

89

TABLE CLV Continued - SCOUT FLIGHT SUMMARY (Operational)

Flt. No.	Vehicle No.	Launch Site	Date	Mission	Apogee (pred.)	Perigee (pred.)	Incl. (deg.)	Vehicle Perform.	Experiment	Remarks
Recertification Program										
24	S-122R	WTR(13)	12-19-63	Orbital 93.93 lbs	1289.34 (1616.44)	321.05 (322.08)	78.62 (78.50)	Success	Explorer XIX. S56B-LRC air density experiment (12-foot balloon). Period 115.79 min.	First flight of refurbished and factory-recertified vehicle.
25	S-127R	WI(14)	3-27-64	Orbital 177.38 lbs	732.3 (823.0)	160 (152)	51.67 (52.03)	Success	Ariel II (UK/GSFC). Period 101.28 min.	Decayed 11-18-67.
26	S-125R	WTR	6-3-64	Orbital 133.43 lbs	520.5 (591.5)	465.4 (479.8)	90.48 (90.01)	Success	Navy. Period 103.138 min.	
27	S-128R	WTR	6-25-64	Orbital 175.97 lbs				Failure	Cambridge Research Lab. experiment.	Inadvertent autodestruct at second-stage ignition due to wiring shorted by fractured diaphragm separation. Conducted failure mode demonstration test program. Isolated autodestruct batteries, incorporated blast shield and eliminated proximity of destruct wiring to ignition circuits in stage disconnects. Incorporated blast shield to isolate components from high temperatures and debris. Initiated design of backup autodestruct pod design for increased flight assurance.
New Mark II complex at Wallops Station										
28	S-124R	WI(15)	7-20-64	Probe 386.6 lbs	252.0 (252.09)			Success	SERT-Lewis/Hughes ion engine experiment. (20786.0 ft/sec)	First flight of Algol II-B nozzle. First flight from new launcher facility. Prime contractor delegated responsibility for changes and configuration control. Initiated standardization program.
29	S-129R	WI(16)	8-18-64	Reentry 370.56 lbs	87.06 (82.45)			Success	R-4-LRC 5-stage reentry experiment to support Apollo (22,921.6 ft/sec), with NOTS-17 fifth stage.	
30	S-134R	WTR(17)	8-25-64	Orbital 112.5 lbs	556.4 (542.2)	472.8 (537.86)	79.87 (80.02)	Success	Explorer XX. S-48-GSFC. Period 103.944 min.	First flight of modified autodestruct.
31	S-130R	WI	10-9-64	Reentry 479.5 lbs	76.47 (70.47)		128.05 (129.87)	Success	RFD-2 reentry evaluation experiment (A.E.C.). (18,809.0 ft/sec)	First 3-stage launch (480 lb/18,800 fps) supported Italian launch crew training program (San Marco).
32	S-123RR	WTR(18)	10-9-64	Orbital 130 lbs	588.5 (519.6)	483.4 (491.5)	79.69 (80.0)	Success	Explorer XXII. S66A-GSFC. Period 104.702 min.	

( ) NASA Launches ( ) Predicted

(Continued on next page.)

P10

TABLE CLV Continued - SCOUT FLIGHT SUMMARY (Operational)

Flt. no.	Vehicle no.	Launch site	Date	Mission	Apogee (pred.)	Perigee (pred.)	Incl. (deg.)	Vehicle perform.	Experiment	Remarks
33	S-133R	WI(19)	11-6-64	Orbital 208 lbs	532.86 (539.76)	254.78 (247.48)	51.938 (51.992)	Success	Explorer XXIII. S55-LRC micrometeoroid experiment plus vehicle loads evaluation experiment. Period 99.2 min.	Supported Italian launch crew training program.
34	S-135R	WTR(20)	11-21-64	Orbital 136.67 lbs	1352.0 (1301.6)	289.6 (285.0)	81.35 (81.72)	Success	Explorer XXIV and XXV. LRC/SUI Injun/Air Density experiment. Period 116.21 min.	First NASA dual launch. Explorer XXIV decayed 10-18-68.
35	S-137R	WI(21)	12-15-64	Orbital 254.2 lbs	444.0 (365.6)	112.8 (115.3)	37.775 (37.691)	Success	Italian (San Marco). Period 95.0 min.	First Italian assembled and launched Scout vehicle. Decayed 9-13-65.
36	S-136R	WI(22)	4-29-65	Orbital 134.0 lbs	715.1 (676.7)	509.4 (548.3)	41.169 (40.979)	Success	Explorer XXVII. Beacon Explorer-S66B (BE-C). Period 107.88.	
37	S-131R	WI(23)	8-10-65	Orbital 44.0 lbs	1314.3 (1505.9)	618.1 (613.3)	69.25 (69.330)	Success	Primary experiment: systems evaluation (SEV). Secondary experiment: SECOR-5 (Army). Period 122.2 min.	Fourth-stage interchangeability and air transport demonstration. First flight: Castor IIA, FW4-S, 75 KS spin motors, Vega Beacon, Autodestruct Module, Dogleg, Transition "E", Ignition monitor and electrostatic experiment. Config. B.
38	S-138R	WI(24)	11-18-65	Orbital	481.3 (542.6)	387.4 (383.7)	59.716 (60.188)	Success	Explorer XXX. Solar Explorer A-1QSY-NRL. Period 102.8 min.	First X-258E6 motor with elastometric joint in nozzle. Seven month field standby prior to launch. Equipped with "E" section and was doglegged.
INCENTIVE CONTRACT (SYSTEMS MANAGEMENT)										
39	S-139R	WTR(25)	12-6-65	Orbital	421.6 (404.32)	401.3 (402.02)	75.9 (75.70)	Success	French experiment. Period 99.99 min.	First air transport from WI to WTR. First launch using new standard launch complex.
40	S-140C	WTR	12-21-65	Orbital	590.0 (535.4)	495.7 (506.2)	89.104 (89.996)	Success	Navy. Period 105.033 min.	First configuration A.
41	S-142C	WTR	1-28-66	Orbital	660.6 (531.7)	470.2 (487.14)	89.7 (90.0)	Success	Navy. Period 105.95 min.	
42	S-141C	WI(26)	2-9-66	Reentry				Success	Re-E'- LRC five-stage reentry materials test. (26,854 ft/sec)	

( ) NASA launches ( ) Predicted

(Continued on next page.)

WI - Wallops Island, Virginia.
WTR - Western Test Range, Point Arguello, California (formerly PMR).

TABLE CLV Continued - SCOUT FLIGHT SUMMARY (Operational)

Flt. no.	Vehicle no.	Launch site	Date	Mission	Apogee (pred.) n.m.	Perigee (pred.) n.m.	Incl. (deg.)	Vehicle perform.	Experiment	Remarks
43	S-143C	WTR	3-25-66	Orbital	613.4 (529.3)	486.0 (482.9)	89.73 (90.0)	Success	Navy - Period 105.33 min.	
44	S-145C	WTR	4-22-66	Orbital	3102.3 (3114.7)	195.2 (200.5)	82.46 (82.0)	Success	Air Force - Radiation Research satellite. Period 151.7 min.	Air-transported to WTR. First configuration B from WTR.
45	S-146C	WTR	5-18-66	Orbital	534.6 (547.3)	469.1 (491.9)	90.00 (90.0)	Success	Navy - Period 103.4 min.	
46	S-147C	WI	6-9-66	Orbital	2558.3 (2519.6)	351.5 (348.8)	40.82 (40.99)	Success	Air Force - Radiation Research satellite. Period 143.2 min.	
47	S-148C	WTR	8-4-66	Orbital	2423.8 (2439.4)	200.4 (198.6)	81.47 (82.00)	Success	Air Force - Radiation Research satellite. Period 136.92 min.	
48	S-149C	WTR	8-17-66	Orbital	602.3 (619.0)	571.5 (577.2)	88.85 (90.0)	Success	Navy - Period 106.77 min.	
49	S-150C	WTR	10-28-66	Orbital	868.2 (867.6)	176.4 (178.7)	81.98 (82.10)	Success	Air Force - Environmental Science experiment. Period 104.17 min.	
50	S-151C	WTR	1-31-67	Orbital				Failure	Air Force - Cambridge Research Lab. experiment.	FW-4S nozzle failure. Conducted nozzle test program. Redesigned nozzle insert.
51	S-154C	WTR	4-13-67	Orbital	592.2 (625.1)	566.8 (577.1)	90.25 (90.00)	Success	Navy - Period 106.51 min.	New N_2 stainless tubing.
52	S-153C	Africa (27)	4-26-67	Orbital	404.50 (432.3)	118.13 (117.0)	2.892 (2.92)	Success	San Marco. Period 94.28 min.	First FW-4S with new nozzle insert. First equatorial launch from water platform. Launched by Italian crew. Decayed 10-14-67.
53	S-155C	WTR(28)	5-5-67	Orbital	328.7 (289.5)	271.5 (279.4)	80.18 (80.00)	Success	Ariel III (UK/GSFC) - Period 94.5 min.	Not standard separation system, special timer.
54	S-156C	WTR	5-18-67	Orbital	595 (626.081)	578 (578.825)	89.5 (90.0)	Success	Navy - Period 107.6 min.	
55	S-152C	WTR(29)	5-29-67	Orbital				Failure	ESRO-IIA.	Third-stage thrust termination. Investigation in process.

( ) NASA launches ( ) Predicted

(Continued on next page.)

WI - Wallops Island, Virginia.
WTR - Western Test Range, Point Arguello, California (formerly PMR).

P13

TABLE CLV Continued - SCOUT FLIGHT SUMMARY (Operational)

Flt. No.	Vehicle No.	Launch Site	Date	Mission	Apogee (pred.) n.m.	Perigee (pred.) n.m.	Incl. (deg.)	Vehicle Perform.	Experiment	Remarks
56	S-157C	WTR	9-25-67	Orbital	604.5 (620.3)	565.8 (567.8)	89.28 (90.0)	Success	Navy. Period 106.78 min.	
57	S-159C	WI(30)	10-19-67	Reentry				Success	RAM-C-A. LRC Communications Measurements. (25,008 ft/sec)	
58	S-158C	WTR	12-4-67	Orbital	241.91 (242.8)	226.33 (237.49)	90.67 (90.00)	Success	Air Force Radiation Research Satellite. Period 93.05 min.	Decayed 3-9-69.
59	S-162C	WTR	3-1-68	Orbital	614.5 (627.5)	557.79 (581.2)	89.99 (90.0)	Success	Navy. Period 107.08 min.	
60	S-160C	WI(31)	3-5-68	Orbital	474.4 (461.8)	281.8 (460.0)	59.42 (60.0)	Success	Explorer XXXVII SOLRAD. Period 98.77 min.	First Stage defect at 33 sec. Algol nozzle manufacturing defect. Algol nozzle redesigned.
61	S-164	WI(32)	4-27-68	Reentry				Success	Reentry-F. LRC Nose Cone (19,572 ft/sec)	First Phase V vehicle from Wallops Station.
62	S-161C	WTR(33)	5-16-68	Orbital	589.8 (593.8)	181.7 (190.4)	97.20 (98.20)	Success	Explorer XXXVIII ESRO-IIB. Period 98.91 min.	"E" Section timer defect discovered prior to launch. Redesign has been initiated.
63	S-165	WTR(34)	8-8-68	Orbital	1370 (1318)	370.1 (376.4)	80.66 (82)	Success	Explorers XXXIX and XL Air Density Experiment and Injun. Period 118.2 min.	Second dual launch. First Algol IIC nozzle; first Phase V vehicle from WTR.
64	S-168	WI(35)	8-22-68	Reentry				Success	RAM-C-B. LRC Communications Measurements. (24,986 ft/sec)	
65	S-167	WTR(36)	10-3-68	Orbital	831.7 (809.4)	142.5 (146.8)	93.758 (93.999)	Success	Explorer XLI. Period 102.8 min. ESRO-1A	
66	S-172	WTR(37)	10-1-69	Orbital	212.2 (237.85)	164.7 (216.0)	85.13 (86.0)	Success	ESRO-1B Borealis. Period 92.0 min. Ionospheric & Auroral Experiment.	First reimbursable International Scout. Slight pitch-down thrust 3rd-stage misalinement and .81% lower performing FW4S. Decayed 11-23-69.
67	S-169C	WTR(38)	11-7-69	Orbital	1704.3 (1744.4)	213.4 (214.8)	102.975 (102.670)	Success	GRS-A - AZUR. Period 121.8. (Seven experiments)	

( ) NASA Launches ( ) Predicted

(Continued on next page.)

WI - Wallops Island, Virginia.
WTR - Western Test Range, Point Arguello, California (formerly PMR).

TABLE CLV Continued - SCOUT FLIGHT SUMMARY (Operational)

Flt. No.	Vehicle No.	Launch Site	Date	Mission	Apogee (pred.) km	Perigee (pred.) km	Incl. (deg.)	Vehicle Perform.	Experiment	Remarks
68	S-176	WTR	8-27-70	Orbital	1,230.84 (1,161.44)	962.76 (1,085.31)	90.02 (90.00)	Success	Navy. Period 107.0 min.	First Roll-Yaw Compensator. Improved D-section spin bearing rotational joint stiffness evaluation.
69	S-171	WI(39)	9-30-70	Reentry				Success	RAM-C-C. LRC Communications Measurements. (24,032 ft/sec.) Flight Path Angle-15.42°	Altitude 465,000 ft.
70	S-174	WI(40)	11-9-70	Orbital	535.12 (254.52)	307.27 (314.25)	37.424 (37.686)	Success	OFO. Period 92.82 min.	First with frogs aboard. Early firing of timer.
71	S-175	Africa(41)	12-12-70	Orbital	571.58 (558.51)	532.30 (535.80)	3.036 (2.914)	Success	SAS-A. Period 95.69. Explorer XLII,	First American satellite from San Marco platform.
72	S-173	Africa(42)	4-24-71	Orbital	723.02 (785.99)	222.24 (213.35)	3.24 (2.91)	Success	San Marco-C. Period 94.1 min.	
73	S-144	WI(43)	6-20-71	Reentry				Success	PAET-A. 21,050 ft/sec.	First 42-inch Heat Shield. (H.S. Instrumented.)
74	S-177	WI(44)	7-8-71	Orbital	639.46 (599.01)	442.52 (564.49)	51.05 (51.43)	Success	Explorer XLIV. SOLRAD-10(C). Period 95.3	Third in series in NASA/NRL cooperative program. Included analog current sensors.
+75	S-180	WI(45)	8-16-71	Orbital	913.65 (899.85)	684.84 (895.18)	50.16 (50.0)	Success	EOLE. (CAS-A). Period 101 min. E-Section T/M	First vehicle of Phase VI. First Algol IIC nozzle, first S-band D-section T/M system temperature inst. veh. Anomaly roll rate gyro.
76	S-166	WI(46)	9-20-71	Probe			58.97 (58.90)	Success	GRP-A. *Actuals: Lat.-6.93°N; Long.-74.40°W; Alt.-16,997 n.m. (SAT-B) Vel.= 31,337 fps : Flt. Time 12,831.6 sec	First Algol IIC Nozzle. 17 Countdowns due to weather conditions at downrange sites. Barium release at 17,574.8 n.m. slant range
77	S-163	Africa(47)	11-15-71	Orbital	26912.3 (28582.29)	220.9 (222.4)	3.6 (3.5)	Success	SSS-A. Period 469 min. Explorer XLV.	First E-G Section. First 34-inch -40 sta. heat shield.
+78	S-183	WTR(48)	12-11-71	Orbital	599.3 (555.1)	484.6 (550.0)	83.0 (83.0)	Success	UK-4. Period 95.2 min.	
+79	S-184	WI(49)	8-13-72	Orbital	822.1 (792.5)	498.7 (488.2)	37.685	Success	MTS-A. Period 97.836 min. Explorer XLVI.	First Algol III, New Jet Vane, Fins, Fourth Stage T/M Rings, First use of four IKS75 motors.
+80	S-182	WTR	9-2-72	Orbital	847.44 (915.89)	750.65 (833.23)	90.13	Success	INS-1. Period 100.639 min.	First Scout experience with RTG.
81	S-170	Africa(50)	11-16-72	Orbital	631.8 (555.3)	444.3 (554.1)	1.896 (1.770)	Success	SAS-B. Period 95.4 min.	First Algol III with large heat shield. Exceeded continuous successful launches of any NASA vehicle (26).

( ) NASA Launches.

(Continued on next page.)

WI - Wallops Island, Virginia.
WTR - Western Test Range, Point Arguello, California (formerly PMR).
*Three-station triangulation of actual release sighting.
+Phase VI launches.
NOTE: Attitude based on a mean earth radius of 3439.57 N. Mi.

R15

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TABLE CLV Continued - SCOUT FLIGHT SUMMARY (Operational)

Flt. No.	Vehicle No.	Launch Site	Date	Mission	Apogee (Pred.) (km)*	Perigee (Pred.) (km)*	Incl. (Pred.) (Deg.)	Vehicle Perform.	Experiment	Remarks
82	S-185	WTR(51)	11-21-72	Orbital	1184.2 (1099.1)	251.5 (280.2)	91.1 (90.8)	Success	ESRO-IV. 1972-92 alpha. Period 99.025 minutes.	Second reimbursable launch. 27th continuous success.
83	S-181	WTR(52)	12-16-72	Orbital	603.66 (797.88)	239.09 (239.87)	97.2 (97.2)	Success	AEROS-A. Period 95.6 minutes.	28th continuous success.
84	S-178	WTR	10-29-73	Orbital	1153.6 (1151.8)	907.3 (1074.2)	90.2 (90.02)	Success	Navy-Period 105.59 minutes.	29th continuous success.
85	S-190	Africa(53)	2-18-74	Orbital	933.4 (849.8)	232.5 (228.0)	2.9 (2.92)	Success	San Marco C-2. Period 96.305 minutes.	30th continuous success.
86	S-188	WTR(54)	3-8-74	Orbital	760.07 (750.3)	749.95 (750.0)	98.4 (98.4)	Success	UK-X4. Period 99.7 minutes.	31st continuous success.
87	S-191	WTR(55)	6-3-74	Orbital	125570.26 (102015.25)	467.22 (499.13)	89.784 (90.0)	Success	Hawkeye. Period 3032.4 minutes. Explorer LII.	First 5-stage (BE-3). First H.P. 259 (Antares IIB) 3rd stage. First 5th-stage Attitude correction system. 32nd continuous success. Base A control surface anomaly.
88	S-186	WTR(56)	7-16-74	Orbital	879.5 (900.3)	221.0 (230.0)	97.4 (96.8)	Success	AEROS-B. Period 95.65 min.	First German reimbursable.
89	S-189	WTR(57)	8-30-74	Orbital	1174.7 (560.1)	266.0 (509.7)	98.04 (97.80)	Success	ANS-A. Period 99.20 min.	First Thiokol fourth-stage motor, fourth-stage PCM. Diode failure.
90	S-187	Africa(58)	10-15-74	Orbital	569.5 (500.3)	502.02 (498.32)	2.864 (2.921)	Success	UK-5. Period 95.36 min.	First non-Italian foreign payload from San Marco.
91	S-194	Africa(59)	5-8-75	Orbital	523.4 (502.1)	502.2 (501.9	3.00 (2.92)	Success	SAS-C. Period 94.88 min.	First of Phase VII vehicles. First F-Scout (Antares IIB) and first Phase VII vehicle.
92	S-195	WTR	10-12-75	Orbital	719.6 (717.4)	358.8 (363.8)	90 (90.74)	Success	Navy. (TIP II) Period 95.45 minutes	Payload did not despin properly.
93	S-196	WTR (60)	12-5-75	Failure				Failure	DAD	Control lost during third-stage burn. Antares IIB motor nozzle failed.
94	S-179	WTR	5-22-76	Orbital	1068.8 (1173.8)	993.4 (1001.9)	99.88 (99.67)	Success	Air Force (P76-5). Period 105.78 min	Reverted to Antares IIA. Scout D-1 configuration.
95	S-193	WFC	6-18-76	Probe	10247 (10306.2)	-	-	Success	GP-A.	Scout D-1 configuration.
96	S-197	WTR	9-1-76	Orbital	793.5 (864.1)	347.4 (340.6)	90.3 (90.0)	Success	Navy. (TIP-III). Period 96.04 min.	Scout D-1 configuration. Payload/Solar panels did not deploy properly.
97	S-200	WTR	10-27-77	Orbital	1110.5 (1112.3)	1066.1 (1111.2)	89.9 (90.0)	Success	Navy. (TRANSAT. Period 106.99 min.	Scout D-1 configuration. Instrumentation to measure turn rates.

( ) - NASA Launches.
WI - Wallops Island, Virginia.
WTR - Western Test Range, Point Arguello, California (formerly PMR).

TABLE CLV Concluded - SCOUT FLIGHT SUMMARY (Operational)

Flt. No.	Vehicle No.	Launch Site	Date	Mission	Apogee (Pred.) (km)*	Perigee (Pred.) (km)*	Incl. (Pred.) (Deg.)	Vehicle Perform.	Experiment	Remarks
98	S-201	WTR	4-26-78	Orbital	638.2 (620.6)	583.4 (619.9)	97.6 (97.9)	Success	HCMM. Heat Capacity Mapping Mission Period - 96.9 minutes.	Scout D-1 configuration.
99	S-202	WFC	2-18-79	Orbital	657.4 (601.0)	559.7 (599.99)	54.94 (54.98)	Success	SAGE. Stratospheric Aerosol and Gas Experiment. Investigate for possible deterioration of the protective ozone layer. Period - 96.9 minutes.	First launch to track stage four with radar. Also first to combine roll compensation with yaw maneuver during third-stage coast. Coldest day ever launched--chill factor of -12°.
100	S-198	WFC	6-2-79	Orbital	655.9 (656)	507.0 (608)	55.03 (55.04)	Success	UK-6. Measure heavy cosmic articles and x-rays. Period-97.3	First Scout use of new captive explosive nut. Last NASA WFC launch.
101	S-203	WTR	10-30-79	Orbital	578.5 (561)	351.0 (356)	96.791 (97.01)	Success	A-0. Period 93.894 minutes. MAGSAT experiment.	First launch of Antares IIIA. Third launch of A-0 series. Last NASA Scheduled launch from WTR. First flight of G-1 configuration.
102	S-192	WTR	5-14-81	Orbital	945.4 (951.6)	354.7 (369.5)	90.16 (90.01)	Success	NOVA-1. Navigation Satellite. Period 97.7 minutes.	Scout G-1 configuration. Vehicle radar beacon anomaly (VEGA Beacon).

Wi - Wallops Island, Virginia.
WTR - Western Test Range, Point Arguello, California (formerly PMR).

TABLE CLVI - POSTFLIGHT SUMMARY, SCOUT S-178C

LAUNCH DATA

SCOUT LAUNCH NO.	LAUNCH TIME (LOCAL)	LAUNCH DATE	LAUNCH SITE	
84	1637 PST	29 October 1973	SLC-5 VAFB, California	S

PAYLOAD TYPE	PAYLOAD WEIGHT LBS	MISSION TYPE	SCOUT MISSION TYPE NO	SUCCESS RATIO*
N-15	130.78	1973 - 081A	66	58/61 = 0.951

COUNTDOWN

LAUNCH AZIMUTH (TRUE), DEG	LAUNCH ELEVATION, DEG	WIND DIRECTION DEG	WIND SPEED, KNOTS
182.0	90.0	004	4
RELATIVE HUMIDITY, %	**VISIBILITY, STATUTE MILES**	**TEMPERATURE, °F**	**BAROMETER, "HG**
63	20	63.5	29.560

REMARKS

Count was begun at 0908 Hours and proceeded normally until lift-off with no holds encountered.

CONFIGURATION

HEAT SHIELD	SPIN MOTORS	"E" SECTION T M
34/-25, A-50	(4) 1.0KS40	No

FIRST-STAGE MOTOR	SECOND-STAGE MOTOR	THIRD-STAGE MOTOR	FOURTH-STAGE MOTOR
ALGOL IIC S/N 86	CASTOR IIA S/N 194	ANTARES IIA S/N HIB-310	ALTAIR II S/N ABL-150

INSTRUMENTATION

This was first Scout to utilize S-Band telemetry. There were five additional temperature sensors in the "D"-section Telemetry.

PERFORMANCE

PARAMETER	PREDICTED	ACTUAL	DEVIATION FROM PREDICTED
APOGEE, N. MI.	621.9	622.9	+1.0
PERIGEE, N. MI.	580.0	489.9	-90.1
INCLINATION, DEG	90.02	90.2	+0.18
MAXIMUM VELOCITY FPS	23924.7	23704.5	-220.2
ALTITUDE, N. MI.	604.4	618.9	+14.5
SPIN RATE AT SEPARATION RPM	161.3	166.7	+5.4 (3.3 %)

H_2O_2 ON BOARD AT LIFT OFF LBS	
2ND STAGE	3RD STAGE
183.0	19.2
H_2O_2 CONSUMED, LBS	
2ND-STAGE BOOST	3RD-STAGE BOOST
42.5	1.7
2ND-STAGE COAST	3RD-STAGE COAST
6.3	2.7
	RETRO
	13.8
SPIN BEARING TORQUE, IN-LBS	

TELEMETRY COVERAGE

Vandenberg AFB and San Nicolas Island provided telemetry coverage with both receiving through third-stage separation from fourth-stage/payload.

REMARKS AND/OR ANOMALIES

1. A voltage bias was observed on the telemetered small pitch motor matrix.
2. A similar voltage bias occurred on the upper roll motor matrix.
3. The middle "D" section spin appeared to have terminated at separation of the third-stage from the fourth-stage.

DOCUMENTATION

X NASA PREFLIGHT PLANNING REPORT / AF FLIGHT TEST PLAN	TRANSMITTAL LETTER
LTV-VSD-T Report 3-34100/1R-1 dated 11 January 1971 Revision C dated 1 October 1973	3-56000/1AVO-8 dtd 15 January 1971 2M-16000/3L-4033 dtd 3 October 1973
FINAL FLIGHT REPORT	**TRANSMITTAL LETTER**
LTV-VSD-T Report 2-16000/4R-4 dated 18 February 1974, Addendum A dtd 22 March 1974	2M-16000/4L-3250 dtd 20 February 1974 2M-16000/4L-3423 dtd 27 March 1974

* VEHICLE SUCCESS RATIO SINCE RECERTIFICATION

TABLE CLVII - POSTFLIGHT SUMMARY, SCOUT S-179C

LAUNCH DATA

SCOUT LAUNCH NO.	LAUNCH TIME (LOCAL)	LAUNCH DATE	LAUNCH SITE
94	0042 PDT	22 May 1976	SLC-5, VAFB, California

PAYLOAD TYPE	PAYLOAD WEIGHT LBS	MISSION TYPE	SCOUT MISSION TYPE NO.	SUCCESS RATIO*
P76-5	151.64	1976-047A	76	67/71 = 0.9437

COUNTDOWN

LAUNCH AZIMUTH (TRUE), DEG	LAUNCH ELEVATION, DEG	WIND DIRECTION, DEG	WIND SPEED, KNOTS
193.828	90.0	064	4
RELATIVE HUMIDITY, %	**VISIBILITY, STATUTE MILES**	**TEMPERATURE, °F**	**BAROMETER, "HG**
86	7	53	29.693

REMARKS

T-0 was delayed approximately two minutes due to a train in the area.

CONFIGURATION

HEAT SHIELD	SPIN MOTORS	4TH-STAGE T/M
34/-40,S/NA-409	(4) 1.0KS40	Yes

FIRST-STAGE MOTOR	SECOND-STAGE MOTOR	THIRD-STAGE MOTOR	FOURTH-STAGE MOTOR
ALGOL IIC S/N 83	CASTOR IIA S/N 193	ANTARES IIA S/N HIB-402	ALTAIR IIIA S/N E-21

INSTRUMENTATION

Eight temperature measurements and one vibration measurement were added to "D"-section T/M.

PERFORMANCE

PARAMETER	PREDICTED	ACTUAL	DEVIATION FROM PREDICTED
APOGEE, N. MI.	633.75	577.09	-56.66
PERIGEE, N. MI.	540.99	536.42	- 4.57
INCLINATION, DEG	99.88	99.67	- 0.21
MAXIMUM VELOCITY FPS	24248.7	24183.2	-65.5
ALTITUDE, N. MI.	541.19	536.99	- 4.20
SPIN RATE AT SEPARATION RPM	152.4	161.2	+ 8.8 (5.8 %)

H_2O_2 ON BOARD AT LIFT OFF LBS	
2ND STAGE	3RD STAGE
184.0	18.1
H_2O_2 CONSUMED, LBS	
2ND-STAGE BOOST	3RD-STAGE BOOST
26.0	3.0
2ND-STAGE COAST	3RD-STAGE COAST
11.5	1.3
	RETRO
	12.8
SPIN BEARING TORQUE, IN-LBS	
54.7	

TELEMETRY COVERAGE

VAFB (TRS) had good "D"-section T/M to 743 sec except for 30 sec at 3rd-stage ignition and Pt. Mugu from T + 22 to T + 750 seconds. VAFB (TRS) had good 4th-stage T/M from T-0 to T + 843 except for 30 sec at 3rd-stage ignition and Pt. Mugu from T + 9 to T + 842 seconds.

REMARKS AND/OR ANOMALIES

A lower injection altitude was caused by the effects of lower than predicted altitude, velocity and path angle at 3rd-stage burnout, propagated through the long (about 535 sec) 3rd-stage coast phase. About 27% of the injection velocity deviation resulted from lower stage performance; the remaining 73% was caused by lower 4th-stage motor performance. The deviations in injection path angle and azimuth are attributed to pitch-up and yaw-left tip-off disturbances at fourth-stage ignition.

DOCUMENTATION

[X] NASA PRE-FLIGHT PLANNING BROCHURE / [ ] AF FLIGHT TEST PLAN	TRANSMITTAL LETTER
Vought Corp. Report No. 2-16000/6R-9 dtd 6 April 1976	2M-16000/6L-3388 dtd 12 April 1976
FINAL FLIGHT REPORT	**TRANSMITTAL LETTER**
Vought Corp. Report No. 2-16000/6R-24 dtd 21 September 1976	2M-16000/6L-4050 dtd 24 September 1976

* VEHICLE SUCCESS RATIO SINCE RECERTIFICATION

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TABLE CLVIII - POSTFLIGHT SUMMARY, SCOUT S-180C

LAUNCH DATA

SCOUT LAUNCH NO.	LAUNCH TIME (LOCAL)	LAUNCH DATE	LAUNCH SITE	
75	1439 EDT	16 Aug 1971	Mark II Launcher Wallops Island, Va.	S

PAYLOAD TYPE	PAYLOAD WEIGHT LBS	MISSION TYPE	SCOUT MISSION TYPE NO.	SUCCESS RATIO*
CAS-A	179.38	1971-71A	58	49/52=0.942

COUNTDOWN

LAUNCH AZIMUTH (TRUE), DEG	LAUNCH ELEVATION, DEG	WIND DIRECTION, DEG	WIND SPEED, KNOTS
126.47	89.91	065	13
RELATIVE HUMIDITY, %	**VISIBILITY, STATUTE MILES**	**TEMPERATURE, °F**	**BAROMETER, "HG**
75	4	77	30.100

REMARKS Countdown started at 0515 EDT, 16 August, and except for holds of 56 and 12 minutes to check separation squib line voltage and for range safety, respectively, the countdown proceeded normally.

CONFIGURATION

HEAT SHIELD	SPIN MOTORS	"E" SECTION T M
34/-25, S/N A-60	(2) 1.0 KS 40 (2) 1.0 KS 75	Yes

FIRST-STAGE MOTOR	SECOND-STAGE MOTOR	THIRD-STAGE MOTOR	FOURTH-STAGE MOTOR
Algol IIC, S/N 78	Castor IIA, S/N 186	X259-B3, Antares II S/N HIB-314	FW-4S, Altair III S/N 2223-15

INSTRUMENTATION Standard S-Band "D" section T/M Instrumentation, and "E" section T/M instrumentation utilized. First vehicle flown with S-Band T/M. Special instrumentation added for separation system information

PERFORMANCE

PARAMETER	PREDICTED	ACTUAL	DEVIATION FROM PREDICTED
APOGEE, N. MI.	485.88	493.33	+7.45
PERIGEE, N. MI.	483.36	369.80	-113.56
INCLINATION, DEG	50.00	50.16	+0.16
MAXIMUM VELOCITY FPS	-	-	-
ALTITUDE, N. MI.	-	-	-
SPIN RATE AT SEPARATION RPM	179.8	180.0	+0.20 (+0.11%)

H_2O_2 ON BOARD AT LIFT OFF LBS	
2ND STAGE	3RD STAGE
185.5	19.5
H_2O_2 CONSUMED, LBS	
2ND STAGE BOOST	3RD STAGE BOOST
26.4	2.9
2ND STAGE COAST	3RD STAGE COAST
11.1	2.6
	RETRO
	12.9
SPIN BEARING TORQUE, IN-LBS	
66.64	

TELEMETRY COVERAGE W.I. and Bermuda stations provided good combined "D" section T/M coverage from launch to 1003 seconds flight time. W.I. and Antigua stations provided good combined "E" section T/M coverage from launch to 1273 seconds. Normal loss of signal during 2nd- & 3rd-stage burns from W. I.

REMARKS AND/OR ANOMALIES

1. All vehicle systems performed normally, except for roll rate gyro malfunction during periods of high acceleration; attributed to damping fluid contamination causing "hang-up". Disturbance noted on accelerometers 14 times during 4th-stage coast - caused by cracking nozzle cone exit liner.
2. W.I. and Bermuda AN/FPS-16 and AN/FPQ-6 radars provided combined coverage from launch to 887 seconds flight time.

DOCUMENTATION

☒ NASA PREFLIGHT PLANNING REPORT ☐ AF FLIGHT TEST PLAN	TRANSMITTAL LETTER
LTV RPT. 3-34100/1R-42, DTD 15 June 1971 W/Rev A DTD 28 July 1971	LTV LTRS 3-34100/1L-3626 and - 3799, dated 21June 1971 and 29 July 1971, respectively.
FINAL FLIGHT REPORT	**TRANSMITTAL LETTER**
LTV RPT. 3-34100/2R-13, DTD 10 Mar 1972 W/Rev A Dated 18 May 1972	LTV LTRS 3-34100/2L-3300 and -3508 dated 17 March 1972 and 29 May 1972, respectively.

* VEHICLE SUCCESS RATIO SINCE RECERTIFICATION

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TABLE CLIX - POSTFLIGHT SUMMARY, SCOUT S-181C

LAUNCH DATA

SCOUT LAUNCH NO.	LAUNCH TIME (LOCAL)	LAUNCH DATE	LAUNCH SITE	
83	0324 PST	16 December 1972	SLC-5, SVAFB, Calif.	S
PAYLOAD TYPE	**PAYLOAD WEIGHT LBS**	**MISSION TYPE**	**SCOUT MISSION TYPE NO.**	**SUCCESS RATIO***
AEROS	279.72	1972-100A	65	57/60 = 0.950

COUNTDOWN

LAUNCH AZIMUTH (TRUE), DEG	LAUNCH ELEVATION, DEG	WIND DIRECTION DEG	WIND SPEED, KNOTS
190.82	90.00	110	9
RELATIVE HUMIDITY, %	**VISIBILITY, STATUTE MILES**	**TEMPERATURE, °F**	**BAROMETER, "HG**
65	10	51	29.851

REMARKS

Countdown was begun at 2025 PST, 15 December, and proceeded to launch time with three holds encountered. The first hold (10 minutes) was due to a weak signal at the telemetry ground station; the second (20 minutes), to clear the pad of non-essential personnel; and the third, at the conclusion of Task 6 until the scheduled start of Task 7. Wind aiming correction of +0.19 degree in launch azimuth.

CONFIGURATION

HEAT SHIELD	SPIN MOTORS		4TH-STAGE MODULE T/M
42/-45,S/N A-504	(4) 1.0 KS 75		Yes
FIRST-STAGE MOTOR	**SECOND-STAGE MOTOR**	**THIRD-STAGE MOTOR**	**FOURTH-STAGE MOTOR**
ALGOL III S/N 5502-4	CASTOR IIA, S/N 191	X259-B3, ANTARES II S/N HIB-313	FW-4S ALTAIR III S/N 2376-2

INSTRUMENTATION

Standard "D" section T/M instrumentation included a 50 "g" peak-to-peak ALGOL III vibrometer system and ten additional temperature sensors. Fourth-stage T/M system was the third S-band T/M system to be used, and included instrumentation of the Payload Separation Timer Start Switch Temperature. Payload separation was also recorded by fourth-stage T/M system.

PERFORMANCE

PARAMETER	PREDICTED	ACTUAL	DEVIATION FROM PREDICTED	H_2O_2 ON BOARD AT LIFT OFF LBS	
				2ND STAGE	3RD STAGE
APOGEE, N. MI.	433.9	474.2	+40.3	184.0	19.4
				H_2O_2 CONSUMED, LBS	
PERIGEE, N. MI.	129.1	124.1	-5.0	2ND-STAGE BOOST	3RD-STAGE BOOST
INCLINATION, DEG	97.2	96.9	-0.3	41.0	4.9
				2ND-STAGE COAST	3RD-STAGE COAST
MAXIMUM VELOCITY FPS	–	–	–	36.6	0.6
					RETRO
ALTITUDE, N. MI.	–	–	–		12.9
				SPIN BEARING TORQUE, IN-LBS	
SPIN RATE AT SEPARATION RPM	146.4	142.1	-4.3 (-2.9 %)	54.3	

TELEMETRY COVERAGE

VAFB(TRS), the primary source of T/M data, provided good data to 431 seconds flight time for "D" section and to 461 seconds flight time for fourth-stage module. Pt. Mugu "D" section and fourth-stage module telemetry data quality was good from 9 to 374 seconds flight time and from 19 to 400 seconds flight time, respectively. Aircraft telemetry coverage, used to determine fourth-stage separation from payload, was acquired at 347 seconds and was good during the periods 360 to 500 seconds, 556 to 612 seconds, and 659 to 710 seconds flight time.

REMARKS AND/OR ANOMALIES

The differences between commanded and actual fin deflections are attributed to anomalies in the pitch rate gain and the telemetered yaw displacement gyro output. The investigation of these anomalies will appear as an addendum to the Post Flight Report for this vehicle.

DOCUMENTATION

[X] NASA PREFLIGHT PLANNING REPORT / [ ] AF FLIGHT TEST PLAN	TRANSMITTAL LETTER
LTV Report 3-34100/2R-61 dated 13 Nov 1972	3-34100/2L-4205 dated 14 Nov 1972 2-56100/3AVO-176 dated 14 Nov 1972
FINAL FLIGHT REPORT	**TRANSMITTAL LETTER**
LTV Report 2-16000/3R-27, dated 13 June 1972	2-16000/3L-3740 dated 18 June 1973 2-56100/3AVO-135 dated 18 June 1973

* VEHICLE SUCCESS RATIO SINCE RECERTIFICATION

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TABLE CLX - POSTFLIGHT SUMMARY, SCOUT S-182C

LAUNCH DATA

SCOUT LAUNCH NO.	LAUNCH TIME (LOCAL)	LAUNCH DATE	LAUNCH SITE	
80	1050 PDT	2 September 1972	SLC-5, SVAFB, Calif.	S

PAYLOAD TYPE	PAYLOAD WEIGHT LBS	MISSION TYPE	SCOUT MISSION TYPE NO	SUCCESS RATIO*
INS-1(RTG)	206.44	1972 - 69A	62	54/57 = 0.947

COUNTDOWN

LAUNCH AZIMUTH (TRUE), DEG	LAUNCH ELEVATION, DEG	WIND DIRECTION, DEG	WIND SPEED, KNOTS
182.028	90.00	258	5
RELATIVE HUMIDITY, %	**VISIBILITY, STATUTE MILES**	**TEMPERATURE, °F**	**BAROMETER, "HG**
94	1	68	29.550

REMARKS

Countdown was begun at 0320 PDT, 2 September, and except for an eleven-minute hold to await Range support and a seven-minute hold to let telemetry van recover telemetry signal, proceeded normally. No wind aiming correction required since vehicle was equipped with Roll-Yaw Compensation Unit.

CONFIGURATION

HEAT SHIELD	SPIN MOTORS	4TH-STAGE MODULE T/M
34/-40,A-404	(2) 0.6 KS 40 (2) 1.0 KS 75	No

FIRST-STAGE MOTOR	SECOND-STAGE MOTOR	THIRD-STAGE MOTOR	FOURTH-STAGE MOTOR
ALGOL IIC,S/N 84	CASTOR IIA S/N 197	X259-B3,ANTARES II S/N HIB-311	FW-4S, ALTAIR III S/N 2376-1

INSTRUMENTATION

Standard "D" section T/M instrumentation. Second vehicle to incorporate a roll-yaw compensation device in the guidance system.

PERFORMANCE

PARAMETER	PREDICTED	ACTUAL	DEVIATION FROM PREDICTED	H_2O_2 ON BOARD AT LIFT OFF LBS	
APOGEE, N. MI.	494.54	457.58	-36.96	2ND STAGE 180.0	3RD STAGE 18.8
PERIGEE, N. MI.	449.91	405.32	-44.59	H_2O_2 CONSUMED, LBS	
INCLINATION, DEG	90.0	90.1	+0.1	2ND-STAGE BOOST 38.6	3RD-STAGE BOOST 2.16
MAXIMUM VELOCITY FPS	-	-	-	2ND-STAGE COAST 5.2	3RD-STAGE COAST 2.64
ALTITUDE, N. MI.	-	-	-		RETRO 12.9
SPIN RATE AT SEPARATION RPM	167.8	169.4	+1.6 (0.9 %)	SPIN BEARING TORQUE, IN-LBS 62.4	

TELEMETRY COVERAGE

Scout S-182C was not equipped with a fourth-stage module T/M system. Good quality "D" section telemetry data was received by VAFB(TRS), with the exception of dropout during most of third-stage burn period; data recovery was good from then until loss of signal at about 838 seconds flight time. SNI coverage was good from 13 seconds to 641 seconds flight time.

REMARKS AND/OR ANOMALIES

1. Around 48 seconds flight time the pressure transducer signal changed slope and began to lag the decreasing pressure. At 49.55 seconds flight time the signal abrupty dropped about 25 psia to a level in line with the slope prior to 48 seconds and followed the original slope. This anomaly is attributed to a temporary slight increase of friction within the transducer.
2. During third-stage coast the pulse amplitude of segments 3, 13, and 23 of the 52.5kHz telemetry channel decreased to a level lower than the proper level. This condition lasted for 0.8 second, and was subsequently attributed to the presence of motor exhaust gases at J69 and J70 (heatshield jumper connectors).
3. Vehicle's heatshield was modified to provide additional cooling for the INS-1 Spacecraft due to the Radioisotope Thermal Generator.

C-6

DOCUMENTATION

	TRANSMITTAL LETTER
☐ NASA PREFLIGHT PLANNING REPORT ☒ AF FLIGHT TEST PLAN VMSC-T Rept 3-34100/2R-39 dated 7/20/72, Rev. A dated 8/7/72	3-56000/2AVO-88 dated 24 July 1972 3-34100/2L-3732 dated 24 July 1972 3-56000/2AVO-115 dated 14 Aug 1972 ~~3-34100/2L-3814 dated 11 Aug 1972~~
FINAL FLIGHT REPORT	**TRANSMITTAL LETTER**
LTV Rept 2-16000/3R-8 dated 23 Feb 1973 Rev. A dated 25 April 1973	2-56100/3AVO-47 dated 7 Mar 1973 2-16000/3L-3147 dated 8 Mar 1973 2-56100/3AVO-93 dated 25 April 1973 2-16000/3L-3373 dated 30 April 1973

* VEHICLE SUCCESS RATIO SINCE RECERTIFICATION

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TABLE CLXI - POSTFLIGHT SUMMARY, SCOUT S-183C

LAUNCH DATA

SCOUT LAUNCH NO.	LAUNCH TIME (LOCAL)	LAUNCH DATE	LAUNCH SITE	
78	1247 PST	11 December 1971	SLC-5, SVAFB, Calif	S

PAYLOAD TYPE	PAYLOAD WEIGHT LBS	MISSION TYPE	SCOUT MISSION TYPE NO.	SUCCESS RATIO*
UK-4	226.38	1971-109A	60	52/55 = .945

COUNTDOWN

LAUNCH AZIMUTH (TRUE), DEG	LAUNCH ELEVATION, DEG	WIND DIRECTION, DEG	WIND SPEED, KNOTS
173.85	90.00	290	12
RELATIVE HUMIDITY, %	**VISIBILITY, STATUTE MILES**	**TEMPERATURE, °F**	**BAROMETER, "HG**
69	15	52	29.825

REMARKS Countdown started at 0545 PDT, 11 December, and proceeded normally. Wind aiming correction of +0.28-deg in launch azimuth. First vehicle launched from VAFB by VMSC-T field crew personnel.

CONFIGURATION

HEAT SHIELD	SPIN MOTORS	"E" SECTION T M
34/-25, S/N A-63	(2) 1.0 KS 40 (2) 1.0 KS 75	No

FIRST-STAGE MOTOR	SECOND-STAGE MOTOR	THIRD-STAGE MOTOR	FOURTH-STAGE MOTOR
Algol IIC, S/N 89	Castor IIA, S/N 192	X259-B3, Antares II S/N HIB-302	FW-4S, Altair III S/N 2223-12

INSTRUMENTATION Standard S-Band "D" section T/M instrumentation utilized. First Scout vehicle flown from VAFB with S-Band T/M.

PERFORMANCE

PARAMETER	PREDICTED	ACTUAL	DEVIATION FROM PREDICTED
APOGEE, N. MI.*	299.7	323.6	+23.9
PERIGEE, N. MI.	297.0	261.7	-35.3
INCLINATION, DEG	83.0	83.0	0
MAXIMUM VELOCITY FPS			
ALTITUDE, N. MI.			
SPIN RATE AT SEPARATION RPM	154.8	156.3	+1.5 (+0.97%)

H_2O_2 ON BOARD AT LIFT OFF LBS	
2ND STAGE	3RD STAGE
180.0	19.0
H_2O_2 CONSUMED, LBS	
2ND STAGE BOOST	3RD STAGE BOOST
39.9	4.1
2ND STAGE COAST	3RD STAGE COAST
39.3	1.7
	RETRO 13.2
SPIN BEARING TORQUE, IN-LBS	
47.8	

TELEMETRY COVERAGE VAFB(TRS), VAFB(NASA), PMR(SNI) and downrange Aircraft receiving stations provided satisfactory combined T/M coverage from launch through 699 seconds flight time. Nominal amount of signal dropouts experienced during flight coverage.

REMARKS AND/OR ANOMALIES

1. All vehicle systems performed normally. Command Destruct Receiver signal strength was erratic when vehicle was under control of SNI AN/FRW-2 transmitter from 80 to 297 and 487 to 593 seconds flight time.
2. VAFB and SNI AN/FPS-16 radars provided satisfactory combined tracking coverage from 5 to 699 seconds flight time.

DOCUMENTATION

☒ NASA PREFLIGHT PLANNING REPORT ☐ AF FLIGHT TEST PLAN	TRANSMITTAL LETTER
LTV RPT 3-34100/1R-73, Dated 5 Nov 1971 w/Pagel-1 Rev. 11 Nov 1971	LTV LTRS 3-34100/1L-4221 and-4252, DTD 5 November 1971 and 12 November 1971, respectively.
FINAL FLIGHT REPORT	**TRANSMITTAL LETTER**
LTV RPT 3-34100/2R-31, Dtd 31 May 1972 W/Rev A dated 20 October 1972	LTV LTRS 3-34100/2L-3543 & -4114, DTD 1 June 1972 & 26 Oct. 1972, respectively.

* VEHICLE SUCCESS RATIO SINCE RECERTIFICATION

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TABLE CLXII - POSTFLIGHT SUMMARY, SCOUT S-184C

LAUNCH DATA

SCOUT LAUNCH NO.	LAUNCH TIME (LOCAL)	LAUNCH DATE	LAUNCH SITE	
79	1110 EDT	13 August 1972	Mark II Launcher Wallops Island, Va.	S

PAYLOAD TYPE	PAYLOAD WEIGHT LBS	MISSION TYPE	SCOUT MISSION TYPE NO	SUCCESS RATIO*
MTS-A	370.51	1972 - 61A	61	53/56 = 0.946

COUNTDOWN

LAUNCH AZIMUTH (TRUE), DEG	LAUNCH ELEVATION, DEG	WIND DIRECTION DEG	WIND SPEED, KNOTS
90.17	89.98	170	8
RELATIVE HUMIDITY %	**VISIBILITY, STATUTE MILES**	**TEMPERATURE, °F**	**BAROMETER, "HG**
79	7	76	30.11

REMARKS

Countdown was begun at 0345 EDT, 13 August, and except for a brief hold to allow the Range Firing Console Operator to review the permissive relay R100 circuit, proceeded normally. Azimuth correction due to winds not necessary.

CONFIGURATION

HEAT SHIELD	SPIN MOTORS	4TH-STAGE MODULE T/M
34/-40,S/N A402	(4) 1.0 KS 75	Yes

FIRST-STAGE MOTOR	SECOND-STAGE MOTOR	THIRD-STAGE MOTOR	FOURTH-STAGE MOTOR
ALGOL III S/N 5502-2	CASTOR IIA,S/N 187	X259-B3,ANTARES II S/N HIB-303	FW-4S, ALTAIR III S/N 2376-8

INSTRUMENTATION Standard "D" section T/M instrumentation system. First Scout to fly with an ALGOL III first-stage motor and the first to fly with four 1.0KS75 spin motors to spin-stabilize the payload and fourth-stage motor prior to third-stage separation. Also, the first Scout to be launched from Wallops Island with fourth-stage module telemetry. Special instrumentation, including thermistors and vibrometers, was installed to determine the effect of the ALGOL III motor on vehicle environment.

PERFORMANCE

PARAMETER	PREDICTED	ACTUAL	DEVIATION FROM PREDICTED	H_2O_2 ON BOARD AT LIFT OFF LBS	
				2ND STAGE	3RD STAGE
APOGEE, N. MI.	427.9	443.9	16.0	181.0	19.0
				H_2O_2 CONSUMED, LBS	
PERIGEE, N. MI.	263.6	269.3	+5.7	2ND-STAGE BOOST	3RD-STAGE BOOST
INCLINATION, DEG	37.7	37.7	0	51.0	4.2
				2ND-STAGE COAST	3RD-STAGE COAST
MAXIMUM VELOCITY FPS	-	-	-	20.1	1.5
					RETRO
ALTITUDE, N. MI.	-	-	-		12.3
				SPIN BEARING TORQUE, IN-LBS	
SPIN RATE AT SEPARATION RPM	166.6	167.0	+0.4 (+0.2 %)	66.6	

TELEMETRY COVERAGE

Performance data were recorded from "D" section and fourth-stage telemetry systems at Wallops Is., Bermuda Is., and Ascension Is. This was the first use of S-band frequency telemetry for both systems. Coverage of both systems at Wallops Island was characterized by numerous dropouts; however, signal was not lost until about 620 seconds flight time for both systems. Fourth-stage module coverage by Bermuda was good from shortly after acquisition (115 seconds) until about 724 seconds flight time. Ascension Island acquired the fourth-stage module telemetry at about 1279 seconds and coverage was generally intermittent throughout until about 1717 seconds flight time.

REMARKS AND/OR ANOMALIES

All vehicle systems performed as predicted with the single exception of a momentary malfunction of of the solid-state commutator in the "D" section telemetry system.

DOCUMENTATION

	TRANSMITTAL LETTER
[X] NASA PREFLIGHT PLANNING REPORT [ ] AF FLIGHT TEST PLAN LTV Rept 3-34100/2R-40 dated 7/21/72 Rev A dated 8/7/72	3-56000/2AVO-89 dated 24 July 1972 3-34100/2L-3729 dated 24 July 1972 3-56000/2AVO-112 dated 8 Aug 1972 3-34100/2L-3197 dated 8 Aug 1972
FINAL FLIGHT REPORT	**TRANSMITTAL LETTER**
LTV Rept 3-34100/2R-67 dated 12/22/72 Rev A dated 13 April 1973	3-56000/2AVO-199 dated 22 Dec 1972 3-34100/2L-4373 dated 22 Dec 1972 3-56100/3AVO-89 dated 16 April 1973 2-16000/3L-3345 dated 19 April 1973

* VEHICLE SUCCESS RATIO SINCE RECERTIFICATION

TABLE CLXIII- POSTFLIGHT SUMMARY, SCOUT S-185C

LAUNCH DATA

SCOUT LAUNCH NO.	LAUNCH TIME (LOCAL)	LAUNCH DATE	LAUNCH SITE	
82	1617 PST	21 November 1972	SLC-5, SVAFB, Calif.	S

PAYLOAD TYPE	PAYLOAD WEIGHT LBS	MISSION TYPE	SCOUT MISSION TYPE NO	SUCCESS RATIO*
ESRO IV	254.10	1972 - 92A	64	56/59 = 0.949

COUNTDOWN

LAUNCH AZIMUTH (TRUE), DEG	LAUNCH ELEVATION, DEG	WIND DIRECTION DEG	WIND SPEED, KNOTS
183.131	90.00	300	7
RELATIVE HUMIDITY %	**VISIBILITY, STATUTE MILES**	**TEMPERATURE, °F**	**BAROMETER, "HG**
78	10	59	29.770

REMARKS
First countdown was begun at 0915 PST, 20 November, with only a 21-minute hold to await Range support. When Sequencer Step 13 did not respond, and when an attempt to command Fourth-Stage Module T/M Internal Power was unsuccessful, the countdown was aborted. The second countdown was begun at 0917 PST, 21 November. A 43-minute hold to await Range support was the only hold encountered. Launch proceeded normally. Wind aiming correction of +0.23 degree in launch azimuth.

CONFIGURATION

HEAT SHIELD	SPIN MOTORS	4TH-STAGE MODULE T/M
34/-40,S/N A-403	(2) 1.0 KS 40 (2) 1.0 KS 75	Yes

FIRST-STAGE MOTOR	SECOND-STAGE MOTOR	THIRD-STAGE MOTOR	FOURTH-STAGE MOTOR
ALGOL III,S/N5502-3	CASTOR IIA,S/N 188	X259-B3,ANTARES II S/N HIB-312	FW-4S,ALTAIR III S/N 2223-13

INSTRUMENTATION
Standard "D" section T/M instrumentation included the ±25 "g" ALGOL III vibrometer system and ten temperature sensors; incorporated in the fourth-stage module telemetry system were the FW-4S lateral ±25 "g" vibrometer and the FW-4S longitudinal ±25 "g" vibrometer. Payload separation was to be recorded on IRIG Channel 13 of the fourth-stage module telemetry system.

PERFORMANCE

PARAMETER	PREDICTED	ACTUAL	DEVIATION FROM PREDICTED
APOGEE, N. MI.	593.5	639.4	+45.9
PERIGEE, N. MI.	151.3	135.8	-15.5
INCLINATION, DEG	90.8	91.1	+0.3
MAXIMUM VELOCITY FPS	-	-	-
ALTITUDE, N. MI.	-	-	-
SPIN RATE AT SEPARATION RPM	145.5	147.0	+1.5(+1.0 %)

H_2O_2 ON BOARD AT LIFT OFF LBS	
2ND STAGE	3RD STAGE
182.5	19.4
H_2O_2 CONSUMED, LBS	
2ND-STAGE BOOST	3RD-STAGE BOOST
33.2	4.8
2ND-STAGE COAST	3RD-STAGE COAST
30.1	0.7
	RETRO
	12.9
SPIN BEARING TORQUE, IN-LBS	
48.2	

TELEMETRY COVERAGE
VAFB(TRS), the primary source of telemetry data, had good coverage of "D" section telemetry from prior to launch to 408 seconds flight time, and good coverage of fourth-stage module telemetry from lift-off to 458 seconds flight time with two brief data losses during first-stage operation. Coverage of "D" section at San Nicholas Island was essentially good (excluding the periods from 80 to 191 seconds and from 432 to 452 seconds flight time) from 13 to 492 seconds flight time. SNI fourth-stage module T/M coverage was good from 11 to 418 seconds flight time.

REMARKS AND/OR ANOMALIES

1. Payload separation event was to be recorded. Neither VAFB nor SNI ground station, however, received telemetry data up to the predicted time of payload separation event. Aircraft coverage of fourth-stage T/M data was not available.
2. Around 356 seconds flight time the pulse amplitude of segments 3, 13, and 23 of the 52.5kHz telemetry channel decreased to a level lower than the proper level. This condition lasted for 0.7 second, and was attributed to the presence of motor exhaust gases at J69 and J70 (heatshield jumper connectors). Further investigation established that this anomaly has occurred on five of six vehicles launched after S-178C, and would not affect vehicle performance.

DOCUMENTATION

[X] NASA PREFLIGHT PLANNING REPORT / [ ] AF FLIGHT TEST PLAN	TRANSMITTAL LETTER
VMSC-T Report 3-34100/2R-56 dated 20 October 1972	3-56000/2AVO-162 dated 20 October 1972 3-34100/2L-4095 dated 20 October 1972
FINAL FLIGHT REPORT	**TRANSMITTAL LETTER**
VSD Report 2-16000/3R-14 dated 30 November 1973	2-56100/3AVO-62 dated 2 April 1973 2-16000/3L-3264 dated 3 April 1973

* VEHICLE SUCCESS RATIO SINCE RECERTIFICATION

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TABLE CLXIV - POSTFLIGHT SUMMARY, SCOUT S-186C

LAUNCH DATA

SCOUT LAUNCH NO.	LAUNCH TIME (LOCAL)	LAUNCH DATE	LAUNCH SITE	
88	0451 PDT	16 July 1974	SLC-5 VAFB, California	S
PAYLOAD TYPE	**PAYLOAD WEIGHT LBS**	**MISSION TYPE**	**SCOUT MISSION TYPE NO**	**SUCCESS RATIO***
AEROS-B	280.65	1974 - 055A	70	62/65 = 0.954

COUNTDOWN

LAUNCH AZIMUTH (TRUE), DEG	LAUNCH ELEVATION, DEG	WIND DIRECTION DEG	WIND SPEED, KNOTS
190.314	90.0	35	3
RELATIVE HUMIDITY %	**VISIBILITY, STATUTE MILES**	**TEMPERATURE, °F**	**BAROMETER, "HG**
87	7	55	29.556

REMARKS

The countdown proceeded normally until T - 3 minutes at which time there was a hold of 4 minutes due to a train on the range.

CONFIGURATION

HEAT SHIELD	SPIN MOTORS		4TH-STAGE MODULE
42/-45,S/N 507	(4) 1.0KS75		T/M Yes
FIRST-STAGE MOTOR	**SECOND-STAGE MOTOR**	**THIRD-STAGE MOTOR**	**FOURTH-STAGE MOTOR**
ALGOL IIIA S/N 5502-9	CASTOR IIA S/N 200	ANTARES IIA S/N HIB-315	ALTAIR IIIA S/N 2376-6

INSTRUMENTATION

Second Scout to have "Add-On" PCM system in "D"-section; eight additional Base "A" temperature sensors in "D"-section. S-Band 4th-stage T/M system.

PERFORMANCE

PARAMETER	PREDICTED	ACTUAL	DEVIATION FROM PREDICTED	H_2O_2 ON BOARD AT LIFT OFF LBS	
APOGEE, N. MI.	486.1	474.9	-11.2	2ND STAGE 181.0	3RD STAGE 19.2
PERIGEE, N. MI.	124.2	119.3	-4.9	H_2O_2 CONSUMED, LBS	
INCLINATION, DEG	96.8	97.4	+0.64	2ND-STAGE BOOST 29.5	3RD-STAGE BOOST 3.6
MAXIMUM VELOCITY FPS	26088.6	26092.5	+3.9	2ND-STAGE COAST 28.5	3RD-STAGE COAST 0.4
ALTITUDE, N. MI.	124.2	120.0	-4.2		RETRO 14.2
SPIN RATE AT SEPARATION RPM	145.9	145.2	-0.7 (0.5%)	SPIN BEARING TORQUE, IN-LBS 52.0	

TELEMETRY COVERAGE

VAFB (TRS) and San Nicolas Island received and recorded telemetry data until after fourth-stage separation. AN/FPS-16 radar data were acquired at VAFB (Site 2) from T + 2.87 to T + 443.07 seconds flight time.

REMARKS AND/OR ANOMALIES

All systems performed as expected with no major anomalies. The two Base "A" Barrier Temperature sensors failed at 42 and 43 seconds flight time, respectively. All other temperature sensors functioned as expected.

DOCUMENTATION

X NASA PREFLIGHT PLANNING REPORT / ☐ AF FLIGHT TEST PLAN	TRANSMITTAL LETTER
LTV-VSD-T Report 2-16000/4R-15 dated 18 June 1974.	2M-16000/4L-3930 dtd 26 June 1974
FINAL FLIGHT REPORT	**TRANSMITTAL LETTER**
LTV-VSD-T Report No. 2-16000/4R-31 dtd 20 Nov 1974; Rev. A, dted 19 Feb 1975	2M-16000/4L-4643 dtd 26 November 1974 2M-16000/4L-3236 dtd 24 February 1975

* VEHICLE SUCCESS RATIO SINCE RECERTIFICATION

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TABLE CLXV- POSTFLIGHT SUMMARY, SCOUT S-187C

LAUNCH DATA

SCOUT LAUNCH NO.	LAUNCH TIME (LOCAL)	LAUNCH DATE	LAUNCH SITE	
90	1047	15 October 1974	San Marco Platform, Kenya, Africa	S

PAYLOAD TYPE	PAYLOAD WEIGHT LBS	MISSION TYPE	SCOUT MISSION TYPE NO	SUCCESS RATIO*
UK-5	288.35	1974 - 077A	72	64/67 = 0.955

COUNTDOWN

LAUNCH AZIMUTH (TRUE), DEG	LAUNCH ELEVATION, DEG	WIND DIRECTION DEG	WIND SPEED, KNOTS
90.0	90.0	170	13
RELATIVE HUMIDITY %	**VISIBILITY, STATUTE MILES**	**TEMPERATURE, °F**	**BAROMETER,**
71	18.6	79.5	1014.7 mb

REMARKS

CONFIGURATION

HEAT SHIELD	SPIN MOTORS	4TH-STAGE MODULE
42/-45, S/N A505	(4) 1.0KS75	T/M S/N 009

FIRST-STAGE MOTOR	SECOND-STAGE MOTOR	THIRD-STAGE MOTOR	FOURTH-STAGE MOTOR
ALGOL IIC S/N 79	CASTOR IIA S/N 189	ANTARES IIA S/N HIB-307	ALTAIR IIIA S/N TCC/E-13

INSTRUMENTATION

Standard PAM/FM/FM "D"-section and 4th-stage module telemetry systems. There were six special temperature measurements - 5 on 4th-stage and 1 on Base "A".

PERFORMANCE

PARAMETER	PREDICTED	ACTUAL	DEVIATION FROM PREDICTED
APOGEE, N. MI.	270.16	307.51	+37.35
PERIGEE, N. MI.	269.07	271.07	+2.00
INCLINATION, DEG	2.92	2.86	-0.06
MAXIMUM VELOCITY FPS	24973.38	25012.50	+39.12
ALTITUDE, N. MI.	270.16	274.13	+3.97
SPIN RATE AT SEPARATION RPM	136.8	136.3	-0.5 (0.4 %)

H_2O_2 ON BOARD AT LIFT OFF LBS	
2ND STAGE	3RD STAGE
190.0	19.5
H_2O_2 CONSUMED, LBS	
2ND-STAGE BOOST	3RD-STAGE BOOST
33.7	1.5
2ND-STAGE COAST	3RD-STAGE COAST
23.3	1.7
	RETRO
	15.3
SPIN BEARING TORQUE, IN-LBS	
46.3	

TELEMETRY COVERAGE

Good T/M data was received thru 625 seconds by Santa Rita and from 650 to930 seconds by the Seychelles receiving stations. Radar data was provided by the San Marco Range from 1.10 to 379.70 and 434.7 to 463.7 seconds flight time.

REMARKS AND/OR ANOMALIES

A voltage bias anomaly equivalent to the pitch down motor valve command function occurred at 121.5 sec flight time. Vehicle motion indicated the problem was in the T/M system. At 3rd-stage ignition (155.1 sec), the telemetered signal returned to its normal level.

DOCUMENTATION

[X] NASA PREFLIGHT PLANNING REPORT / [ ] AF FLIGHT TEST PLAN	TRANSMITTAL LETTER
LTV-VSD-T Report No. 2-16000/4R-22 dated 14 August 1974, Revision A dated 3 October 1974	2M-16000/4L-4233 dtd 20 August 1974 2M-16000/4L-4418 dtd 8 October 1974
FINAL FLIGHT REPORT	**TRANSMITTAL LETTER**
LTV-VSD Report No. 2-16000/5R-7 dated 7 May 1975	2M-16000/5L-3578 dtd 15 May 1975

* VEHICLE SUCCESS RATIO SINCE RECERTIFICATION

TABLE CLXVI - POSTFLIGHT SUMMARY, SCOUT S-188C

LAUNCH DATA

SCOUT LAUNCH NO.	LAUNCH TIME (LOCAL)	LAUNCH DATE	LAUNCH SITE	
86	1922 PDT	8 March 1974	SLC-5 VAFB, California	S

PAYLOAD TYPE	PAYLOAD WEIGHT LBS	MISSION TYPE	SCOUT MISSION TYPE NO.	SUCCESS RATIO*
(UK) X-4	193.76	1974 - 013A	68	60/63 = 0.9524

COUNTDOWN

LAUNCH AZIMUTH (TRUE), DEG	LAUNCH ELEVATION, DEG	WIND DIRECTION, DEG	WIND SPEED, KNOTS
192.157	90.0	326	11
RELATIVE HUMIDITY %	**VISIBILITY, STATUTE MILES**	**TEMPERATURE, °F**	**BAROMETER, "HG**
79	7	47	29.550

REMARKS

Countdown #1 was aborted due to failure of pitch rate gyro (27 Feb.). The vehicle was launched 8 March with one hold encountered at T - 12 minutes due to Range clearance.

CONFIGURATION

HEAT SHIELD	SPIN MOTORS	4TH-STAGE MODULE T/M
42/-45, S/N A506	(2) 1.OKS75 and (2) 1.OKS40	Yes

FIRST-STAGE MOTOR	SECOND-STAGE MOTOR	THIRD-STAGE MOTOR	FOURTH-STAGE MOTOR
ALGOL IIIA S/N 5502-7	CASTOR IIA S/N 198	ANTARES IIA S/N HIB-308	ALTAIR IIIA S/N 2376-7

INSTRUMENTATION Had first of two "Add-On" PCM T/M systems. Second Scout with ALGOL IIIA first-stage motor to have increased clearances between jet vane bonnet and Base "A" flame barrier.

PERFORMANCE

PARAMETER	PREDICTED	ACTUAL	DEVIATION FROM PREDICTED	H_2O_2 ON BOARD AT LIFT OFF LBS	
				2ND STAGE	3RD STAGE
APOGEE, N. MI.	405.13	501.31	+96.18	183.0	19.4
PERIGEE, N. MI.	404.97	391.91	-13.06	H_2O_2 CONSUMED, LBS	
				2ND-STAGE BOOST	3RD-STAGE BOOST
INCLINATION, DEG	98.40	97.80	-0.60	43.5	6.5
				2ND-STAGE COAST	3RD-STAGE COAST
MAXIMUM VELOCITY FPS	24547.9	24697.4	+149.5	23.5	1.2
					RETRO
ALTITUDE, N. MI.	404.97	402.06	-2.91		10.7
SPIN RATE AT SEPARATION RPM	154.9	154.6	-0.3 (0.2 %)	SPIN BEARING TORQUE, IN-LBS 64.1	

TELEMETRY COVERAGE

VAFB and Point Mugu receiving stations provided telemetry coverage thru 760 seconds of flight. Radar data were acquired by AN/FPS-16 at VAFB (Site 1) and Pt. Mugu (Site 3) from T - 0.334 to T + 223.566 and T + 219.666 to T + 645.066 seconds flight time, respectively.

REMARKS AND/OR ANOMALIES

All systems performed as predicted with no anomalies noted.

DOCUMENTATION

[X] NASA PREFLIGHT PLANNING REPORT / [ ] AF FLIGHT TEST PLAN	TRANSMITTAL LETTER
LTV-VSD-T Report No. 2-16000/4R-2 dtd 10 January 1974, Revision A dated 14 February 1974	2M-16000/4L-3046 dtd 14 January 1974 2M-16000/4L-3251 dtd 20 February 1974
FINAL FLIGHT REPORT	**TRANSMITTAL LETTER**
LTV-VSD-T Report No. 2-16000/4R-25 dated 23 September 1974 Revision A dated 11 November 1974	2M-16000/4L-4376 dtd 27 September 1974 2M-16000/4L-4631 dtd 21 November 1974

* VEHICLE SUCCESS RATIO SINCE RECERTIFICATION

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TABLE CLXVII - POSTFLIGHT SUMMARY, SCOUT S-189C

LAUNCH DATA

SCOUT LAUNCH NO.	LAUNCH TIME (LOCAL)	LAUNCH DATE	LAUNCH SITE
89	0707 PDT	30 August 1974	SLC-5 VAFB, California S

PAYLOAD TYPE	PAYLOAD WEIGHT LBS	MISSION TYPE	SCOUT MISSION TYPE NO.	SUCCESS RATIO*
ANS-A	286.01	1974 - 070A	71	63/66 = 0.9545

COUNTDOWN

LAUNCH AZIMUTH (TRUE), DEG	LAUNCH ELEVATION, DEG	WIND DIRECTION DEG	WIND SPEED KNOTS
191.88	90.0	341	5
RELATIVE HUMIDITY %	VISIBILITY, STATUTE MILES	TEMPERATURE, °F	BAROMETER, "HG
99	1/4	55	29.490

REMARKS

Countdown #1 (27 August 1974) At T - 10 the payload umbilical did not eject when commanded. The umbilical was commanded several times and finally ejected. At T - 2 the sequencer stopped due to upper fin being past 1.5 deg maximum tolerance. Launch was aborted. Countdown #2 (30 August 1974) One hold in Task 7 was encountered due to excessive open circuit voltage on destruct system prior to arming.

CONFIGURATION

HEAT SHIELD	SPIN MOTORS	4TH-STAGE MODULE T/M
34/-40, S/N A406	(2) 1.0KS40 and (2) 1.0KS75	Yes

FIRST-STAGE MOTOR	SECOND-STAGE MOTOR	THIRD-STAGE MOTOR	FOURTH-STAGE MOTOR
ALGOL IIIA S/N 5502-10	CASTOR IIA S/N 201	ANTARES IIA S/N HIB-316	ALTAIR IIIA S/N TC/E-14

INSTRUMENTATION

First total PCM T/M system in fourth-stage module. Eight special temperature sensors were located in Base "A". First vehicle to use a Thikol ALTAIR IIIA fourth-stage motor.

PERFORMANCE

PARAMETER	PREDICTED	ACTUAL	DEVIATION FROM PREDICTED
APOGEE, N. MI.	302.4	634.3	+331.9
PERIGEE, N. MI.	275.2	143.6	-131.6
INCLINATION, DEG	97.8	98.04	+0.76
MAXIMUM VELOCITY FPS	25003.5	25792.0	+788.5
ALTITUDE, N. MI.	275.25	205.42	-69.83
SPIN RATE AT SEPARATION RPM	152.0	152.1	+0.1 (0.06%)

H_2O_2 ON BOARD AT LIFT OFF LBS	
2ND STAGE	3RD STAGE
183.0	18.8
H_2O_2 CONSUMED, LBS	
2ND-STAGE BOOST	3RD-STAGE BOOST
33.1	5.2
2ND-STAGE COAST	3RD-STAGE COAST
22.7	1.9
	RETRO
	10.8
SPIN BEARING TORQUE, IN-LBS	
47.9	

TELEMETRY COVERAGE

VAFB (TRS) received good "D"-Section to 610 sec and 4th-stage telemetry to 550 seconds flight time with some noise during third-stage burn. San Nicolas Island received good telemetry signal to 555 and 540 seconds flight time for "D"-section and 4th-stage, respectively. Radar data were acquired by the AN/FPS-16 at VAFB (Site 2) from T + 0.3 to T + 570.1 seconds flight time.

REMARKS AND/OR ANOMALIES

Three anomalies occurred during the flight: (1) the third pitch rate command event ($\dot{\theta}_{c_3}$) did not occur as programmed; (2) the roll rate gyro was erratic during high longitudinal acceleration portions of second and third-stage boost; and (3) third-stage retro occurred 7.611 seconds later than programmed. Anomalies (1) and (3) were both related to a faulty intervalometer and (2) was caused by a faulty gyro.

DOCUMENTATION

[x] NASA PREFLIGHT PLANNING REPORT [ ] AF FLIGHT TEST PLAN LTV-VSD-T Report No. 2-16000/4R-20 dtd 26 July 1974, Revision A dtd 18 September 1974	TRANSMITTAL LETTER 2M-16000/4L-4105 dtd 31 July 1974 2M-16000/4L-4363 dtd 25 September 1974
FINAL FLIGHT REPORT LTV-VSD-T Report No. 2-16000/5R-12 dated 7 April 1975	TRANSMITTAL LETTER 2M-16000/5L-3431 dtd 10 April 1975

* VEHICLE SUCCESS RATIO SINCE RECERTIFICATION

TABLE CLXVIII. - POSTFLIGHT SUMMARY, SCOUT S-190C

LAUNCH DATA

SCOUT LAUNCH NO.	LAUNCH TIME (LOCAL)	LAUNCH DATE	LAUNCH SITE	
85	1305	18 February 1974	San Marco Platform Kenya, Africa	S

PAYLOAD TYPE	PAYLOAD WEIGHT LBS	MISSION TYPE	SCOUT MISSION TYPE NO	SUCCESS RATIO*
San Marco C-2	361.22	1974 - 009A	67	59/62 = 0.9516

COUNTDOWN

LAUNCH AZIMUTH (TRUE), DEG	LAUNCH ELEVATION, DEG	WIND DIRECTION DEG	WIND SPEED, KNOTS
90.0	90.0	045	9
RELATIVE HUMIDITY, %	VISIBILITY, STATUTE MILES	TEMPERATURE, °F	BAROMETER, "HG
71	21.7	81.4	29.919

REMARKS
Countdown was accomplished without any anomalies. A hold of 2 hours and 25 minutes was requested at T - 20 minutes due to weather conditions.

CONFIGURATION

HEAT SHIELD	SPIN MOTORS	4TH-STAGE MODULE T/M
34/-25,S/N A-66	(2) 1.0KS75 and (2) 1.0KS40	Yes

FIRST-STAGE MOTOR	SECOND-STAGE MOTOR	THIRD-STAGE MOTOR	FOURTH-STAGE MOTOR
ALGOL IIIA S/N 5506-2	CASTOR IIA S/N 190	ANTARES IIA S/N HIB-306	ALTAIR IIIA S/N 2376-4

INSTRUMENTATION First S-Band "D"-Section and Fourth-Stage Module T/M. Special "D"-Section temperature measurements were Base "A" Barrier and Fin 3 Actuator. Five temperature measurements were located in 4th-stage module T/M.

PERFORMANCE

PARAMETER	PREDICTED	ACTUAL	DEVIATION FROM PREDICTED
APOGEE, N. MI.	458.87	504.00	+45.13
PERIGEE, N. MI.	123.13	125.55	+4.48
INCLINATION, DEG	2.92	2.90	-0.02
MAXIMUM VELOCITY FPS	26051.2	26109.4	+58.2
ALTITUDE, N. MI.	123.13	125.56	+2.43
SPIN RATE AT SEPARATION RPM	140.1	143.3	+3.2 (2.3%)

H_2O_2 ON BOARD AT LIFT OFF LBS	
2ND STAGE	3RD STAGE
180.5	17.8
H_2O_2 CONSUMED, LBS	
2ND-STAGE BOOST	3RD-STAGE BOOST
36.0	3.7
2ND-STAGE COAST	3RD-STAGE COAST
26.5	0.8
	RETRO
	12.3
SPIN BEARING TORQUE, IN-LBS	
46.0	

TELEMETRY COVERAGE
The Santa Rita telemetry receiving station received good telemetry signal through fourth-stage burnout with no drop-outs.

REMARKS AND/OR ANOMALIES

All four stages indicated greater than predicted performance.

DOCUMENTATION

X NASA PREFLIGHT PLANNING REPORT ☐ AF FLIGHT TEST PLAN LTV-VSD-T Report No. 2-16000/3R-51 dated 7 December 1973 Revision A dated 31 January 1974	TRANSMITTAL LETTER 2M-16000/3L-4311 dtd 12 December 1973 2M-16000/4L-3171 dtd 1 February 1974
FINAL FLIGHT REPORT LTV-VSD-T Report No. 2-16000/4R-16 dated 21 June 1974	TRANSMITTAL LETTER 2M-16000/4L-3944 dtd 28 June 1974

* VEHICLE SUCCESS RATIO SINCE RECERTIFICATION

TABLE CLXIX - POSTFLIGHT SUMMARY, SCOUT S-191C

LAUNCH DATA

SCOUT LAUNCH NO.	LAUNCH TIME (LOCAL)	LAUNCH DATE	LAUNCH SITE	
87	1609 PDT	3 June 1974	SLC-5 VAFB, California	S

PAYLOAD TYPE	PAYLOAD WEIGHT LBS	MISSION TYPE	SCOUT MISSION TYPE NO	SUCCESS RATIO*
NPE HAWKEYE	58.56	1974 - 040A 1974 - 040B	69	61/64 = 0.9531

COUNTDOWN

LAUNCH AZIMUTH (TRUE), DEG	LAUNCH ELEVATION, DEG	WIND DIRECTION DEG	WIND SPEED, KNOTS
182.076	90.0	340	7
RELATIVE HUMIDITY %	**VISIBILITY, STATUTE MILES**	**TEMPERATURE, °F**	**BAROMETER, "HG**
88	2 (Fog)	55.0	29.62

REMARKS

Countdown was normal with no major problems encountered.

CONFIGURATION

HEAT SHIELD	SPIN MOTORS	4TH-STAGE MODULE T/M	5TH-STAGE T/M
34/-40, S/N A405	(2) 1.0KS75 and (2) 1.0KS40	Yes	Yes

FIRST-STAGE MOTOR	SECOND-STAGE MOTOR	THIRD-STAGE MOTOR	FOURTH-STAGE MOTOR
ALGOL IIIA S/N 5502-8	CASTOR IIA S/N 199	ANTARES IIB S/N HIB-401	ALTAIR IIIA S/N 2376-3

INSTRUMENTATION	FIFTH-STAGE MOTOR
There were nine special temperature sensors and two vibrometer systems added to "D"-Section T/M to monitor 3rd-stage motor. Fourth-stage T/M included seven measurements for the 4th-stage ACS. The 5th-stage T/M used the spacecraft antenna & transmitter.	ALCYONE IA S/N AN09/003

PERFORMANCE

PARAMETER	PREDICTED	ACTUAL	DEVIATION FROM PREDICTED	H_2O_2 ON BOARD AT LIFT OFF LBS	
APOGEE, Earth radii	15.993	19.516	+3.523	2ND STAGE 181.0	3RD STAGE 19.1
PERIGEE, N. MI.	269.51	252.28	-17.23	H_2O_2 CONSUMED, LBS	
INCLINATION, DEG	90.0	89.79	-0.21	2ND-STAGE BOOST 44.3	3RD-STAGE BOOST 3.9
MAXIMUM VELOCITY FPS	34229.26	34465.66	+236.40	2ND-STAGE COAST 34.8	3RD-STAGE COAST 1.8
ALTITUDE, N. MI.	274.42	262.21	-12.21		RETRO 12.4
SPIN RATE AT SEPARATION RPM	170.3	169.5	-0.8 (0.5 %)	SPIN BEARING TORQUE, IN-LBS 40.0 (Average)	

TELEMETRY COVERAGE

Good T/M data were received by VAFB (TRS) and San Nicolas Island for the "D"-Section and 4th-Stage Module to 550 and 570 seconds respectively. The aircraft acquired data at 330, 340 and 350 seconds for the 3 T/M systems and for 4th and 5th-stage T/M had good data to T + 1000 seconds flight time. Radar data by AN/FPS-16 at VAFB (Site 2) was acquired from T + 3.50 to T + 530.00 seconds flight time.

REMARKS AND/OR ANOMALIES

First time configuration components or arrangements were (1) 4th-stage Attitude Correction System, (2) ANTARES IIB 3rd-stage motor, (3) ALCYONE IIA (BE-3) 5th-stage motor, (4) 60-lb pitch and yaw control motors in "C" section, and new 5th-stage transition section. All vehicle systems performed as expected except that Fin 4 appeared to have stalled at approximately 70 seconds flight time and the spin motion monitor failed to indicate relative motion between 3rd and 4th-stages.

DOCUMENTATION

[X] NASA PREFLIGHT PLANNING REPORT / [ ] AF FLIGHT TEST PLAN	TRANSMITTAL LETTER
LTV-VSD-T Report No. 2-16000/4R-8 dated 11 April 1974, Rev. A dtd 20 May & Rev. B dtd 29 May 1974	2M-16000/4L3480 dtd 18 April 1974, 2M-16000/4L-3657, 5/23/74 & 4L-3786, 5/30/74
FINAL FLIGHT REPORT	**TRANSMITTAL LETTER**
LTV-VSD-T Report No. 2-16000/4R-28 dated 5 November 1974, Revision A dated 4 February 1975	2M-16000/4L-4571 dtd 8 November 1974 2M-16000/5L-3185 dtd 14 February 1975

* VEHICLE SUCCESS RATIO SINCE RECERTIFICATION

TABLE CLXX - POSTFLIGHT SUMMARY, SCOUT S-192C

LAUNCH DATA

SCOUT LAUNCH NO.	LAUNCH TIME (LOCAL)	LAUNCH DATE	LAUNCH SITE
102	2307 PDT	14 May 1981	SLV-5 VAFB, California S

PAYLOAD TYPE	PAYLOAD WEIGHT LBS	MISSION TYPE	SCOUT MISSION TYPE NO	SUCCESS RATIO*
NOVA-1	365.11	198144A	83	75/79 = 0.9494

COUNTDOWN

LAUNCH AZIMUTH (TRUE), DEG	LAUNCH ELEVATION, DEG	WIND DIRECTION DEG	WIND SPEED, KNOTS
182.10	90.0	360	Gusting 20 knots

RELATIVE HUMIDITY, %	VISIBILITY, STATUTE MILES	TEMPERATURE, °F	BAROMETER, "HG
75	7	50.0	29.629

REMARKS

Second flight of Antares IIIA.

CONFIGURATION

HEAT SHIELD	SPIN MOTORS	"E" SECTION T/M
34-40 A-414	(2) 0.6KS40, (2) 1.0KS75	"D" T/M

FIRST-STAGE MOTOR	SECOND-STAGE MOTOR	THIRD-STAGE MOTOR	FOURTH-STAGE MOTOR
ALGOL IIIA S/N 5504-5	CASTOR IIA S/N 385	ANTARES IIIA S/N E-2	ALTAIR IIIA S/N E-25

INSTRUMENTATION

Special instrumentation kit for Antares IIIA.

PERFORMANCE

PARAMETER	PREDICTED	ACTUAL	DEVIATION FROM PREDICTED
APOGEE, N. MI.	951.6	945.4	-6.2
PERIGEE, N. MI.	369.5	354.7	-14.80
INCLINATION, DEG	90.01	90.16	.15
MAXIMUM VELOCITY FPS	25732.0	25766.8	34.8
ALTITUDE, N. MI.	199.53	191.82	-7.71
SPIN RATE AT SEPARATION RPM	135.7	137.8	2.1(1.5 %)

H_2O_2 ON BOARD AT LIFT OFF LBS	
2ND STAGE	3RD STAGE
119.3	18.4

H_2O_2 CONSUMED, LBS	
2ND-STAGE BOOST	3RD-STAGE BOOST
34.9	3.5
2ND-STAGE COAST	3RD-STAGE COAST
17.7	2.0
	RETRO
	12.0

SPIN BEARING TORQUE, IN-LBS: 43.1

TELEMETRY COVERAGE

VAFB was the primary site with secondary site at Point Mugu. An ARIA aircraft was also positioned at 6°16' N, 120°25.7' west for third and fourth stage coverage. FPS 16 at VAFB (site 023002) was the primary radar. Data required was usable but had to be hand faired due to obvious tracking errors.

REMARKS AND/OR ANOMALIES

Radar Beacon failed during second-stage coast (140 sec.). Nozzle shield thermistor (third stage) failed during third-stage coast. Two of the four vibrometers experienced erratic behavior throughout the flight. Data also indicated vibrometer data on 203 may also be suspect.

DOCUMENTATION

	TRANSMITTAL LETTER
☒ NASA PREFLIGHT PLANNING REPORT Brochure ☐ AF FLIGHT TEST PLAN Vought Corporation Report No. 2 19200/1R-11 Dated April 20, 1981	2-19200/1L-3291 Dated April 27, 1981
FINAL FLIGHT REPORT Vought Corporation Report No. 2-19200/ 1R-26, REV. A, Dated 11/11/81	TRANSMITTAL LETTER 2-19200/1L-3621 Dated Oct. 1, 1981 2-19200/1L-3692 Dated Oct. 29, 1981

* VEHICLE SUCCESS RATIO SINCE RECERTIFICATION

TABLE CLXXI - SUMMARY OF BOOST TRAJECTORY PERFORMANCE FOR S-178

STAGE	FLIGHT TIME sec	DEVIATIONS FROM PREDICTED ALTITUDE ft*	RELATIVE VELOCITY fps	RELATIVE PATH ANGLE deg	RELATIVE AZIMUTH deg	CONCLUSIONS (Determined during post-flight analysis)
1 Boost	73.06 (Stage 2 Ignition)	+3800	+2	+0.75	+0.19	Total impulse and ideal velocity for the first-stage motor was very close to predicted; however, because of shorter web burn time with associated higher thrust level, about 90% of the altitude and path angle deviations are attributed to motor performance. It was not possible to isolate the cause of the azimuth deviation. This error is small and could be the combined result of winds and other yaw disturbances. The azimuth deviation due to winds measured near launch time was +0.04 degree.
2 Boost	119.11 (Stage 3 Ignition)	+6640	-18	+0.27	-0.30	Motor performance was lower than predicted. A yaw left disturbance caused the azimuth deviation to shift from right to left of predicted. The path angle deviation decreased as it was propagated through second-stage boost because the thrust vector was along the predicted pitch reference axis (pitch-up disturbances during second-stage operation were very close to the pitch-up body attitude bias predicted for this stage). The altitude deviation continued to increase because of the higher-than-predicted path angle.
3 Boost	160.00 (After Stage 3 Burnout)	+9940 (1.6 n. mi.)	-29	+0.72	-0.08	A pitch-up disturbance increased path angle, altitude and velocity deviations. (A pitch-down body attitude bias was predicted for this stage.) A yaw-right disturbance decreased the azimuth deviation. Third-stage motor performance was essentially as repredicted. The increase in velocity deviation resulted from velocity losses due to the effects of gravity because of the higher path angle and to additional stage weight because control motor fuel consumption was 2.6 lb less than predicted.
3 Coast	754.67 (Stage 4 Ignition)	+15.3 n. mi.	-180	+0.52	-0.02	Higher than predicted path angle caused altitude and velocity (trade-off) deviations to increase, with path angle deviation decreasing as a result.
4 Boost	Injection (Stage 4 Burnout)	+15.9 n. mi.	-204	+0.03	+0.22	A pitch-down body attitude deviation of 0.54 degree at fourth-stage ignition was required to match the injection conditions calculated from Goddard Space Flight Center Bulletin data. About -0.36 deg is attributed to lower stage effects and the remainder to disturbances at stage 3 separation/stage 4 ignition and/or boost. A yaw-right body attitude deviation of +0.52 degree at fourth-stage ignition was required to match the observed inclination angle; all attributed to stage 4 operation. Fourth-stage motor performance was lower than predicted, increasing the velocity deviation. The altitude deviation increased because of the high initial path angle.

*Unless otherwise specified.

TABLE CLXXII - SUMMARY OF BOOST TRAJECTORY PERFORMANCE FOR S-179

STAGE	FLIGHT TIME sec	TRAJECTORY PARAMETER DEVIATIONS: ALTITUDE ft	RELATIVE (INERTIAL) VELOCITY fps	RELATIVE (INERTIAL) PATH ANGLE deg	RELATIVE (INERTIAL) AZIMUTH deg	CONCLUSIONS (Determined during post-flight analysis)
1 BOOST	74.16 (Stage 2 Ignition)	-950	-7 (-9)	+0.06 (+0.11)	+0.22 (+0.08)	First-stage motor ideal velocity was about 14 ft/sec lower than predicted. Velocity loss due to jet vane drag was computed to be 7 ft/sec lower, resulting in a net velocity deviation of -7 ft/sec. About 50% of the altitude deviation and the path angle deviation are attributed to the effects of longer web burn time (+0.38 sec). Reasons for the remainder of the altitude loss were not determined; the trajectory reconstruction was 770 ft. higher in altitude and 0.20 deg. higher in path angle than indicated by radar. The azimuth deviation appeared to result from counterclockwise roll disturbances and yaw right disturbances. The effect of measured winds was to produce a yaw left azimuth deviation. The trajectory reconstruction was 0.34 deg. to the left of radar azimuth. The differences between the trajectory reconstruction and observed data appeared to be the cumulative effects of small inaccuracies in T/M, radar and meteorological data.
2 BOOST	*122.51 (Stage 3 Ignition)	-790	-21 (-21)	0.00 (0.00)	+0.01 (-0.02)	The altitude deviation decreased slightly because path angle at ignition was higher than predicted. The velocity deviation increased because of lower motor performance and lower peroxide consumption (more inert weight). The path angle and azimuth deviations decreased as they were propogated through the boost phase because the vehicle body attitude was essentially as predicted at ignition; the combined effect of second-stage roll and yaw disturbances was only about +0.02 deg. in azimuth deviation.
3 BOOST	165.00 (After Stage 3 Burnout)	-1510	-43 (-46)	-0.05 (-0.04)	+0.19 (+0.19)	Measured web time for the third-stage motor was 0.61 sec. longer than predicted. The resulting lower thrust level caused the altitude and path angle deviations to increase. The velocity deviation increased because of lower motor performance and lower peroxide consumption. A yaw right disturbance combined with counterclockwise roll disturbances to increase the azimuth deviation.
3 COAST	691.52 (Stage 4 Ignition)	-4.22 nmi	-13 (-18)	-0.25 (-0.25)	+0.17 (+0.17)	Third-stage burnout errors were propogated to fourth-stage ignition, resulting in increased altitude and path angle deviations. The velocity deviation decreased because of altitude/velocity trade-off.
4 BOOST	Injection	-4.47 nmi	-73 (-67)	+0.12 (+0.12)	-0.21 (-0.23)	The velocity deviation increased because of lower motor performance and higher velocity loss due to angle-of-attack. The ideal velocity for the fourth-stage motor was computed to be 53 ft/sec lower than predicted. An estimated pitch-up tip-off of 0.80 deg. at ignition changed the path angle error from below predicted at ignition to above predicted at injection. The azimuth deviation shift from right to left of predicted is attributed to a yaw left tip-off of 0.85 deg. at ignition.

* Stage 3 ignition was predicted to occur at 122.81 sec. flight time; comparison between predicted and observed data are made at 122.51 sec.

TABLE CLXXIII - SUMMARY OF BOOST TRAJECTORY PERFORMANCE FOR S-180

STAGE	FLIGHT TIME sec	DEVIATIONS FROM PREDICTED ALTITUDE ft*	RELATIVE VELOCITY fps	RELATIVE PATH ANGLE deg	RELATIVE AZIMUTH deg	CONCLUSIONS (Determined during post-flight analysis)
1 Boost	77.80 (Stage 2 Ignition)	+5578.	-13.	+0.73	+0.45	The positive path angle deviation is a result of the higher-than-predicted thrust levels. This produces the altitude deviation. The negative velocity deviation is due to a combination of increased gravity effects from the higher path angle, higher velocity losses due to drag, and the shorter web burn time.
2 Boost	126.9 (Stage 3 Ignition)	+7937.	-50.	+0.51	+0.17	The loss in velocity is due to a low-performing motor. The altitude increase is due to the higher path angle. Path angle and azimuth deviations are propagated from first-stage operation.
3 Boost	164.0 (After Stage 3 Burnout)	+10559.	-95.	+0.46	-0.44	The velocity loss is the result of a low-performing motor. The increase in altitude is due to the higher path angle. The change in azimuth deviation results from a yaw-left disturbance.
3 Coast	674.1 (Stage 4 Ignition)	+26224.	-149.	0.00	-0.34	Deviations at third-stage burnout were propagated to fourth-stage ignition.
4 Boost	709.7 (Stage 4 Burnout)	+31179.	-197.* (-200.)	-0.25* (-0.23)	+0.10* (+0.07)	The velocity decrease results from a low-performing motor. The path angle and azimuth deviations are the result of a tip-off that is to the right and down.

* Injection deviations are given here for geodetic altitude and relative velocity, path angle, and azimuth to compare with lower-stage radar data. These differ from deviations given for inertial values Deviations of inertial values are shown in parenthesis below the relative values for reference.

TABLE CLXXIV - SUMMARY OF BOOST TRAJECTORY PERFORMANCE FOR S-181

STAGE	FLIGHT TIME sec	DEVIATIONS FROM PREDICTED				CONCLUSIONS (Determined during post-flight analysis)
		ALTITUDE ft*	RELATIVE VELOCITY fps	RELATIVE PATH ANGLE deg	RELATIVE AZIMUTH deg	
1 Boost	87.01 (Stage 2 Ignition)	-1160.	+49.	-0.40	+0.17	The velocity deviation and about 70% of the altitude deviation were caused by first-stage motor performance deviations. A pitch-down disturbance caused most of the path angle deviation and about 30% of the altitude deviation. The azimuth deviation resulted from yaw-right disturbances not attributed to wind effects.
2 Boost	130.00 (After Stage 2 Burnout)	-1245.	+47.	-0.22	-0.04	Motor performance was slightly lower than predicted. A yaw-left disturbance decreased the azimuth deviation. The path angle deviation decreased as it was propagated through second-stage boost because the thrust vector was along the predicted pitch reference axis.
2 Coast	185.92 (Stage 3 Ignition)	-2630.	+53.	-0.16	-0.05	Lower path angle increased altitude and velocity (trade-off) deviations, with path angle deviation decreasing as a result.
3 Boost	225.00 (After Stage 3 Burnout)	-3980.	+31.	-0.26	-0.38	Lower third-stage motor performance decreased the velocity deviation and increased the altitude and path angle deviations. A yaw-left disturbance increased the azimuth deviation.
3 Coast	365.80 (Stage 4 Ignition)	-2.32 n.mi.	+52.	-0.19	-0.31	Lower path angle increased the altitude and velocity deviations with the path angle deviation decreasing, as during second-stage coast.
4 Boost	Stage 4 Burnout (Injection)	-2.94 n.mi.	+70.	-0.39	-0.31	A pitch-down disturbance at fourth-stage ignition increased the path angle and altitude deviations. Higher fourth-stage motor performance combined with reduced velocity losses due to gravity effects to increase the velocity deviation. A yaw-left attitude disturbance at fourth-stage ignition maintained the yaw-left azimuth deviation obtained from the third-stage.

* Unless otherwise specified.

TABLE CLXXV - SUMMARY OF BOOST TRAJECTORY PERFORMANCE FOR S-182

STAGE	FLIGHT TIME sec	DEVIATIONS FROM PREDICTED				CONCLUSIONS (Determined during post-flight analysis)
		ALTITUDE ft*	RELATIVE VELOCITY fps	RELATIVE PATH ANGLE deg	RELATIVE AZIMUTH deg	
1 Boost	74.85 (Stage 2 Ignition)	+3,057.	-16.	+0.60	-0.11	The ALGOL IIC motor performance was slightly lower than predicted. The path angle deviation was due to head winds, shorter web burn time/higher thrust level, and pitch-up disturbances. The left-of-predicted azimuth deviation was due to winds but a predominant yaw-right disturbance off-set most of the wind effect.
2 Boost	118.24 (Stage 3 Ignition)	+2,558.	-52.	+0.26	-0.04	The velocity deviation became more negative primarily due to the low CASTOR IIA motor performance and some additional loss due to a higher flight profile. Path angle deviation reduced because the pitch body attitude was near predicted. The altitude deviation decreased due to the overriding effects of the low motor performance.
3 Boost	160.00 (After Stage 3 Burnout)	+6,866.	-83.	+0.57	-0.36	The ANTARES II motor performance was lower than predicted. The velocity deviation became more negative due to low motor performance, less hydrogen peroxide usage, and due to a high flight profile. The third-stage pitch attitude bias was predicted to be pitch down but a pitch-up bias was observed during boost. The path angle and altitude deviations increased due to the high path angle. A yaw-left disturbance caused azimuth deviation to become more negative.
3 Coast	642.54 (Stage 4 Ignition)	+7.24 n.mi.	-168.	+0.20	-0.30	The large path angle deviation at third-stage burnout was the primary reason the altitude deviation increased. The velocity loss due to gravity during coast was 87 fps more than predicted.
4 Boost	673.32 (Stage 4 Burnout)	+7.62 n.mi.	-173.	-0.03	+0.15	The ALTAIR III motor performance was very near predicted. The pitch-plane disturbances at separation and/or during fourth-stage boost were quite small. The pitch body-attitude orientation relative to the velocity vector resulted in decreasing the path angle error to almost zero. Yaw-right disturbances caused azimuth deviation to shift from left to right of predicted during fourth-stage operation.

* Unless otherwise specified.

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TABLE CLXXVI - SUMMARY OF BOOST TRAJECTORY PERFORMANCE FOR S-183

STAGE	FLIGHT TIME sec	DEVIATIONS FROM PREDICTED				CONCLUSIONS (Determined during post-flight analysis)
		ALTITUDE ft*	RELATIVE VELOCITY fps	RELATIVE PATH ANGLE deg	RELATIVE AZIMUTH deg	
1 Boost	81.92 (Stage 2 Ignition)	+3070.	+3.	+0.83	+1.02	The higher thrust level first-stage motor contributed about 1900 feet to the altitude deviation and 0.20 deg to the path angle deviation. Most of the path angle deviation is attributed to unexplained pitch moments and the yaw deviation to unexplained yaw moments.
2 Boost	143.39 (Stage 3 Ignition)	+3860.	-33.	+0.13	+0.25	Lower motor performance caused a velocity loss. Pitch-up disturbances occurred during boost but these had been accounted for in the predicted trajectory. The altitude deviation increased because path angle was higher than predicted through the boost phase. First-stage azimuth and path angle deviations decreased as they were propagated through second-stage boost.
3 Boost	185.00 (After Stage 3 Burnout)	+2310.	-78.	-0.36	-0.02	Third-stage motor performance was lower than predicted. A pitch-down disturbance caused path angle to fall below predicted and the altitude deviation to decrease. A yaw-left disturbance shifted the azimuth deviation from right to left.
3 Coast	549.59 (Stage 4 Ignition)	-7.99 n.mi.	+6.	-0.56	-0.01	Altitude and path angle deviations increased as they were propagated through the coast phase while velocity increased, approaching predicted as a result of altitude/velocity trade-off.
4 Boost	584.75 (Predicted Injection)	-9.58 n.mi.	+46.	-0.47	+0.01	Fourth-stage motor performance was higher than predicted. A pitch-down disturbance at ignition or during fourth-stage boost sustained most of the ignition path angle deviation. There was essentially no azimuth disturbance during this stage operation. Altitude continued to decrease because of the lower path angle.

* Unless otherwise specified.

TABLE CLXXVII - SUMMARY OF BOOST TRAJECTORY PERFORMANCE FOR S-184

STAGE	FLIGHT TIME sec	DEVIATIONS FROM PREDICTED				CONCLUSIONS (Determined during post-flight analysis)
		ALTITUDE ft*	RELATIVE VELOCITY fps	RELATIVE PATH ANGLE deg	RELATIVE AZIMUTH deg	
1 Boost	82.18 (Stage 2 Ignition)	+3,750.	+31.	+0.22	+0.30	The higher first-stage motor thrust level caused the altitude and path angle deviations, and combined with higher total impulse, resulted in a higher velocity. The azimuth deviation is attributed to unexplained yaw moments. Winds had no effect on heading angle.
2 Boost	163.04 (Stage 3 Ignition)	+9,110.	+27.	+0.29	+0.17	A pitch-up attitude bias had been simulated in the predicted trajectory. The body-attitude displacements measured by T/M indicated a greater-than-predicted pitch-up disturbance. Altitude increased because of the higher path angle; very little velocity loss occurred because second-stage motor performance was very near predicted. First-stage azimuth deviation decreased as it was propagated through second-stage boost and also because of a small yaw-left thrust misalignment.
3 Boost	203.00 (After Stage 3 Burnout)	+12,965.	+1.	+0.21	+0.37	Third-stage motor performance was lower than predicted, decreasing the velocity deviation. The pitch-down disturbance that occurred during stage 3 boost had been accounted for in the predicted trajectory so that the path angle deviation did not decrease significantly from the previous stage. A yaw-right disturbance increased the azimuth deviation. Altitude continued to increase because of the higher path angle.
3 Coast	565.63 (Stage 4 Ignition)	+5.97 n.mi.	-35.	+0.26	+0.38	The altitude deviation increased almost 4 n. mi. and velocity fell below predicted as a result of altitude/velocity trade-off. Azimuth and path angle deviations were essentially unchanged.
4 Boost	597.89 (Stage 4 Burnout)	+6.45 n.mi.	-11.	+0.26	+0.34	Fourth-stage motor performance was higher than predicted, decreasing the velocity deviation. A pitch-up disturbance during separation maintained the ignition path angle deviation, increasing the altitude deviation.

* Unless otherwise specified.

TABLE CLXXVIII - SUMMARY OF BOOST TRAJECTORY PERFORMANCE FOR S-185

STAGE	FLIGHT TIME sec	DEVIATIONS FROM PREDICTED ALTITUDE ft*	RELATIVE VELOCITY fps	RELATIVE PATH ANGLE deg	RELATIVE AZIMUTH deg	CONCLUSIONS (Determined during post-flight analysis)
1 Boost	83.77 (Stage 2 Ignition)	-2060.	+48.	-0.50	+0.25	Most of the altitude and velocity deviations and about 25% of the path angle deviation were caused by deviation in first-stage motor performance; pitch-down disturbances contributed the remainder. The azimuth deviation resulted from roll disturbances.
2 Boost	125.00 (After Stage 2 Burnout)	-1620.	+50.	-0.25	+0.24	Pitch-up disturbances decreased the altitude and path angle deviations Motor performance was essentially as predicted. Velocity increased because losses due to gravity effects were less than predicted as a result of the lower path angle. The azimuth deviation at ignition was sustained by first-stage roll-yaw coupling effects and second-stage roll disturbances.
2 Coast	183.72 (Stage 3 Ignition)	-2710.	+56.	-0.19	+0.22	Lower path angle increased altitude and velocity (trade-off) deviations,with path angle deviation decreasing slightly as a result.
3 Boost	225.00 (After Stage 3 Burnout)	-3750.	+34.	-0.29	+0.16	Pitch-down disturbances and lower velocity increased the altitude and path angle deviations. A net velocity loss resulted from lower motor performance and higher losses due to angle-of-attack effects. The azimuth deviation decreased because of yaw-left and roll-left disturbances.
3 Coast	361.36 (Stage 4 Ignition)	-2.45 n.mi	+53.	-0.20	+0.15	Lower path angle increased the altitude and velocity deviations, with the path angle deviation decreasing, as during second-stage coast.
4 Boost	(Stage 4 Burnout)	-3.69 n.mi	+80.	-1.14	+0.32	The altitude deviation increased because of the increase in path angle deviation caused by pitch-down disturbances at fourth-stage ignition. The lower path angle reduced velocity losses due to gravity effects which combined with higher motor performance to increase the velocity deviation. Yaw-right disturbances at ignition combined with lower stage effects to increase the azimuth deviation.

* Unless otherwise specified.

TABLE CLXXIX - SUMMARY OF BOOST TRAJECTORY PERFORMANCE FOR S-186

STAGE	FLIGHT TIME sec	TRAJECTORY PARAMETERS ALTITUDE ft	RELATIVE (INERTIAL) VELOCITY fps	RELATIVE (INERTIAL) PATH ANGLE deg	RELATIVE (INERTIAL) AZIMUTH deg	CONCLUSIONS (Determined during post-flight analysis)
1 BOOST	88.86 (Stage 2 Ignition)	-500.	-33. (-53.)	-0.27 (-0.09)	+1.15 (+1.00)	The altitude deviation was caused by pitch-down disturbances and lower velocity. The ideal velocity for the first-stage motor was lower than predicted; this combined with higher velocity losses resulting from atmospheric and wind effects to produce the velocity deviation. Jet vane drag was less than predicted. Pitch-down disturbances were the primary cause of the path angle deviation. Roll moments contributed about 45% of the azimuth deviation; reasons for the remaining 55% of the error were not isolated (see section 3.4). Yaw-body attitude at second-stage ignition was to the right of predicted and the pitch body attitude was slightly below predicted.
2 BOOST	187.23 (Stage 3 Ignition)	-4500.	-22. (-42.)	-0.26 (-0.22)	+0.90 (+0.90)	Second-stage pitch-up disturbances were close to the predicted body attitude bias. Because of lower velocity and a pitch-down body attitude at ignition, the path angle deviation did not decrease. Second-stage ideal velocity was slightly higher than predicted, causing the velocity deviation to decrease. The altitude deviation increased because path angle was below predicted. Roll and yaw disturbances did not affect the azimuth deviation which decreased as it was propagated through the boost phase, as did the initial yaw-body attitude deviation to the right.
3 BOOST	228.00 (After Stage 3 Burnout)	-7650.	+8. (-15.)	-0.31 (-0.30)	+0.97 (+0.99)	The altitude deviation continued to increase negatively because of the lower path angle. Higher third-stage ideal velocity caused the relative velocity deviation to shift from lower to higher than predicted. Pitch-down disturbances were close to the predicted pitch-down attitude bias; the path angle deviation increased slightly because of a lower pitch attitude at ignition. Predominantly yaw-right disturbances increased the azimuth deviation.
3 COAST	368.71 (Stage 4 Ignition)	-20,400. (-3.36 n. mi.)	+31. (+9.)	-0.30 (-0.30)	+0.91 (+0.93)	Third-stage burnout errors were propagated to fourth-stage ignition. The altitude deviation increased because path angle remained below predicted, with resulting increase in velocity deviation.
4 BOOST	Injection	-25,580. (-4.21 n. mi.)	+21. (+4.)	-0.24 (-0.24)	+0.68 (+0.69)	Lower than predicted path angle during fourth-stage operation caused the altitude deviation to increase. The velocity deviation decreased because fourth-stage ideal velocity was lower than predicted. The decrease in path angle and azimuth deviations is attributed to pitch-up and yaw-left disturbances at third/fourth-stage separation, ignition and/or during boost. If considered as "tip-off", the deviations in the pitch and yaw planes are approximately +0.24 and -0.20 deg, respectively.

TABLE CLXXX - SUMMARY OF BOOST TRAJECTORY PERFORMANCE FOR S-187

STAGE	FLIGHT TIME sec	DEVIATIONS FROM POST-FLIGHT PREDICTED: ALTITUDE ft*	RELATIVE (INERTIAL) VELOCITY fps	RELATIVE (INERTIAL) PATH ANGLE deg	RELATIVE (INERTIAL) AZIMUTH deg	CONCLUSIONS (Determined during post-flight analysis)
1 BOOST	78.22 (Stage 2 Ignition)	+1390	+3 (-1)	+0.37 (+0.27)	+0.50 (+0.31)	Higher than predicted thrust level during the first 42 seconds of boost caused about 85% of the altitude deviation and 35% of the path angle deviation. Pitch-up disturbances and winds contributed 36% and 29% respectively, of the path-angle deviation and the remainder of the altitude deviation. The small increase in velocity is attributed to decreased jet vane drag which was lower than predicted. Roll disturbances caused the azimuth deviation, and a yaw body-attitude deviation of about 0.40 deg yaw right. Second-stage ignition was programmed to occur before predicted first-stage burnout. For the actual boost time, ideal velocity was slightly lower while total impulse was slightly higher than predicted because of different burning characteristics.
2 BOOST	155.15 (Stage 3 Ignition)	+2230	0 (0)	-0.01 (-0.01)	+0.38 (+0.32)	The altitude deviation increased slightly because path-angle remained higher than predicted during the first 25 seconds of the boost phase. Second-stage ideal velocity was as predicted. The small velocity decrease during this stage resulted primarily from increased velocity losses due to gravity effects and decreased control fuel consumption. The path-angle deviation was virtually eliminated because the pitch body-attitude at ignition was lower than predicted, causing the initial path-angle error to decrease significantly and because pitch-up disturbances were slightly less than the predicted pitch-up attitude bias. About 25% of the decrease in azimuth error was caused by second-stage roll disturbances; the remainder resulted from the decrease observed when an angular error is propagated through a boost phase. At third-stage ignition, the yaw body-attitude error of 0.40 deg right propagated from first-stage operation was reduced to about 0.35 deg right.
3 BOOST	193.00 (After Stage 3 Burnout)	+2200	+8 (+7)	+0.23 (+0.23)	+0.04 (+0.03)	(T/M data were not available during most of the boost phase and radar data were scattered.) The altitude deviation remained about the same because path-angle was close to predicted through the first half of the boost phase. Slightly higher motor performance caused the velocity deviation. Reasons for the path-angle deviation could include (1) pitch-down disturbances of smaller magnitude than the predicted pitch-down attitude bias, (2) motor burn characteristics different from predicted, and (3) higher than predicted initial pitch attitude reference. The decrease in azimuth deviation is attributed to a yaw-left disturbance of about 0.60 deg during boost. This disturbance combined with the yaw-right body-attitude deviation propagated from the first-stage operation reproduced the azimuth history indicated by radar.
3 COAST	539.54 (Stage 4 Ignition)	+24,900	-29 (-28)	+0.29 (+0.26)	-0.02 (-0.02)	Third-stage burnout errors were propagated to fourth-stage ignition. The altitude deviation increased because path-angle was higher than predicted, with resulting change in velocity deviation from higher to lower than predicted.
4 BOOST	Injection	+27,600	+42 (+44)	+0.20 (+0.19)	0 (0)	Higher than predicted path-angle caused the altitude deviation to increase and higher motor performance resulted in a shift in velocity deviation from below predicted to above predicted. Tip-off errors at ignition were computed to be about 0.20 deg pitch down and 0.18 deg yaw left. The pitch-down deviation decreased the path-angle error. The yaw-left deviation, combined with the yaw-right attitude error propagated from the lower stages for a net yaw-right deviation that compensated for the small azimuth error at ignition.

* Unless otherwise specified.

TABLE CLXXXI - SUMMARY OF BOOST TRAJECTORY PERFORMANCE FOR S-188

STAGE	FLIGHT TIME sec	DEVIATIONS FROM POST-FLIGHT PREDICTED ALTITUDE ft*	RELATIVE (INERTIAL) VELOCITY fps	RELATIVE (INERTIAL) PATH ANGLE deg	RELATIVE (INERTIAL) AZIMUTH deg	CONCLUSIONS (Determined during post-flight analysis)
1 Boost	82.15 (Stage 2 Ignition)	-920	+25 (+23)	-0.52 (-0.52)	-0.10 (+0.23)	First-stage motor performance was close to predicted. The velocity deviation resulted from decreased velocity losses (atmospheric and jet vane drag) and tail wind effects. Lower thrust level due to longer web burn time, tail wind effects and pitch-down disturbances caused the path angle and altitude deviations. The azimuth deviation resulted from side wind components; roll and yaw disturbances were in a direction to move azimuth to the right of predicted.
2 Boost	125.00 (After Stage 2 Burnout)	-2330	+47 (+48)	-0.20 (-0.21)	-0.12 (-0.06)	Slightly higher motor performance, increased peroxide consumption and decreased velocity losses (gravity effects on lower trajectory) caused the velocity deviation to increase. A predominately yaw left disturbance was compensated by a yaw attitude bias of about +0.11 deg (right) which resulted from first-stage roll-yaw coupling effects, leaving the azimuth deviation essentially unchanged. The altitude deviation increased because of the lower path angle through boost and lower thrust level which resulted from a longer web burn time. Pitch-up disturbances (displacements) were higher than the predicted pitch-up attitude bias.
2 Coast	180.68 (Stage 3 Ignition)	-2500	+48 (+50)	-0.19 (-0.18)	-0.12 (-0.06)	The altitude deviation increased because of the lower path angle with an increase in velocity deviation and decrease in path angle deviation because of trade-offs.
3 Boost	220.00 (After Stage 3 Burnout)	-4800	+82 (+89)	-0.29 (-0.32)	-0.37 (-0.34)	Higher third-stage motor performance, increased peroxide consumption and decreased velocity losses (gravity effects) increased the velocity deviation. Pitch-down disturbances were close to the predicted pitch-down attitude bias. The altitude deviation increased because of the lower flight path angle. Yaw-left disturbances increased the azimuth deviation.
3 Coast	636.80 (Stage 4 Ignition)	-2.32 n. mi.	+101 (+110)	+0.01 (+0.01)	-0.35 (-0.32)	Deviations at third-stage burnout were propagated through coast, with the path angle deviation decreasing as the altitude deviation increased with resulting increase in velocity deviation (trade-off).
4 Boost	Injection	-3.38 n. mi.	+126 (+144)	-0.48 (-0.49)	-0.64 (-0.62)	Fourth-stage motor performance was higher than predicted. Pitch-down disturbances at separation and/or during boost increased the path angle deviation while yaw left disturbances increased the aximuth deviation.

*Feet unless otherwise specified.

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TABLE CLXXXII - SUMMARY OF BOOST TRAJECTORY PERFORMANCE FOR S-189

TRAJECTORY PARAMETER DEVIATIONS ATTRIBUTED TO VEHICLE ERRORS OTHER THAN THE PITCH PROGRAM ANOMALY

STAGE	FLIGHT TIME seconds	DEVIATIONS FROM POST-FLIGHT PREDICTED* TRAJECTORY PARAMETERS: ALTITUDE ft (n. mi.)	RELATIVE (INERTIAL) VELOCITY fps	RELATIVE (INERTIAL) PATH ANGLE deg	RELATIVE (INERTIAL) AZIMUTH deg	CONCLUSIONS (Determined During Post-Flight Analysis)
1 BOOST	82.23 (Stage 2 Ignition)	+420.	-26. (-21.)	-0.13 (-0.17)	-0.24 (-0.33)	The higher altitude is attributed to higher thrust level between 20 seconds and 45 seconds burn time. Lower ideal velocity caused the velocity deviation. The lower path angle resulted from pitch-down disturbances. Winds appeared to be the primary cause of the azimuth deviation.
2 BOOST	140.69 (Stage 3 Ignition)	-980.	-35. (-34.)	-0.12 (-0.13)	-0.02 (-0.03)	The altitude deviation shifted below predicted because of lower thrust level (longer motor web burn time) and lower than predicted path angle through the boost phase. Peroxide consumption was lower than predicted; the effects of this increased weight and slightly lower ideal velocity caused the velocity deviation to increase. The path angle deviation did not decrease significantly because pitch-up disturbances were slightly higher than the predicted pitch-up attitude bias. Yaw-right disturbances were the primary cause of the decrease in azimuth deviation.
3 BOOST	180.00 (After Stage 3 Burnout)	-3670.	-34. (-39.)	-0.15 (-0.14)	+0.25 (+0.25)	The altitude deviation continued to increase because of lower than predicted path angle during boost. The magnitude of pitch-down disturbances was greater than the predicted pitch-down attitude bias, causing the path angle deviation to increase. Yaw-right disturbances resulted in a shift in azimuth deviation from left to right of predicted. The velocity deviation decreased slightly because of increased peroxide consumption combined with a decrease in velocity losses due to the effects of gravity.
3 COAST	546.96 (Stage 4 Ignition)	-28,130. (-4.63)	+1. (-5.)	-0.23 (-0.23)	+0.20 (+0.21)	Third-stage burnout errors were propagated to fourth-stage ignition. The altitude deviation increased because path angle was lower than predicted, with resulting decrease in velocity deviation. The path angle deviation increased because velocity was lower than predicted through most of the coast phase.
4 BOOST	Injection	-31,070. (-5.11)	+68. (+61.)	-0.05 (-0.05)	+0.26 (+0.28)	Lower than predicted path angle during fourth-stage boost caused the altitude deviation to increase. Higher ideal velocity for the fourth-stage motor caused the velocity deviation to be above the predicted value. The decrease in path angle deviation and increase in azimuth deviation are attributed to pitch-up and yaw-right disturbances at third/fourth-stage separation, fourth-stage ignition and/or during fourth-stage boost. If considered as "tip-off", the deviations in the pitch and yaw planes would be approximately 0.40 deg pitch up and 0.41 deg yaw right.

* Pre-flight trajectory (reference 1-1) with lift-off weights (Appendix A) and pitch program anomaly (third commanded pitch rate by-passed) incorporated.

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TABLE CLXXXIII - SUMMARY OF BOOST TRAJECTORY PERFORMANCE FOR S-190

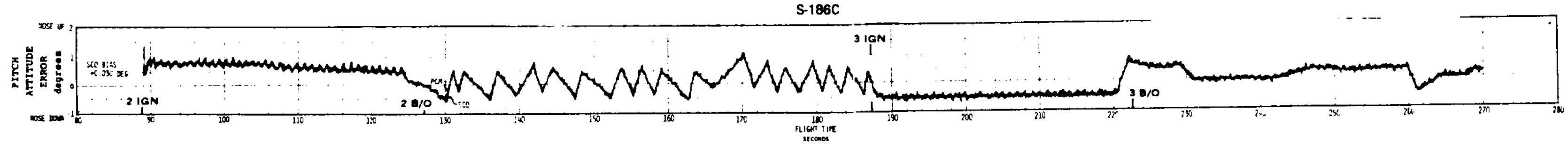
STAGE	FLIGHT TIME sec	DEVIATIONS FROM POST-FLIGHT PREDICTED				CONCLUSIONS (Determined during post-flight analysis)
		ALTITUDE ft	RELATIVE (INERTIAL) VELOCITY fps	RELATIVE (INERTIAL) PATH ANGLE deg	RELATIVE (INERTIAL) AZIMUTH deg	
1 Boost	86.23 (Stage 2 Ignition)	+2030	+24 (+23)	+0.02 (+0.06)	+0.58 (+0.41)	Total impulse and ideal velocity for the first-stage motor were higher than predicted which is confirmed by the higher than predicted altitude and velocity at second-stage ignition. The effect on path angle due to the higher motor performance was off-set by a pitch-down thrust misalignment. There was some yaw-right thrust misalignment but most of the azimuth deviation was due to the biased counterclockwise-roll moment which coupled with a negative pitch rate, induced a yaw body attitude "shift" of +0.5 deg. The azimuth deviation due to winds was negligible.
2 Boost	130.00 (After Stage 2 Burnout)	+5730	+35 (+33)	+0.23 (+0.22)	+0.42 (+0.36)	Slightly higher total impulse and ideal velocity again caused the altitude and velocity deviations to increase. A shorter web burn time magnified the net altitude deviation and contributed half of the net path angle deviation. The pitch-up body attitude displacements were higher than predicted resulting in a higher path angle deviation. The azimuth deviation decreased slightly due to a yaw-left disturbance. The yaw-right body attitude shift (due to first stage) would have caused azimuth deviation to remain unchanged.
2 Coast	186.21 (Stage 3 Ignition)	+7060	+34 (+33)	+0.19 (+0.18)	+0.42 (+0.36)	Altitude deviation increased due to propagating a higher path angle and velocity deviation at the start of the coast.
3 Boost	225.00 (After Stage 3 Burnout)	+8560	+54 (+55)	+0.11 (+0.10)	-0.07 (-0.06)	The trajectory was "shaped" during third-stage boost. The higher motor performance alone would have decreased the altitude deviation, but the path angle deviation was positive throughout third-stage boost resulting in a net altitude deviation increase. The effect of the higher ideal velocity was reduced somewhat by the increased "angle-of-attack losses". A biased yaw-left disturbance caused azimuth deviation to switch from right to left of predicted. Radar azimuth becomes questionable after third-stage ignition.
3 Coast	329.75 (Stage 4 Ignition)	+13100 (+2.16 n.mi.)	+47 (+48)	+0.19 (+0.18)	-0.07 (-0.06)	Again propagating a higher path angle and velocity deviation results in increasing the altitude deviation.
4 Boost	Injection (Stage 4 Burnout)	+13500 (+2.22 n.mi.)	+51 (+51)	+0.02 (+0.02)	+0.08 (+0.07)	Fourth-stage motor performance was slightly higher than predicted. Pitch-down disturbances at separation and/or during boost resulted in a reduction of the path angle deviation to almost zero. The azimuth deviation shifted from left to right of predicted due to yaw-right disturbances.

TABLE CLXXXIV - SCOUT CONDITIONS AT FOURTH-STAGE BURNOUT

VEHICLE	ALTITUDE n. mi.			VELOCITY fps			PATH ANGLE deg			FLIGHT AZIMUTH deg		
	PREDICTED	OBSERVED	DEVIATION	PREDICTED	OBSERVED	DEVIATION	PREDICTED	OBSERVED	DEVIATION	PREDICTED	OBSERVED	DEVIATION
S-178C	604.4	618.9	+14.5	23925	23705	-220	-0.29	-0.32	-0.03	180.02	180.19	+0.17
S-180C	486.0	490.7	+4.7	24294	24092	-202	0.00	-0.24	-0.24	135.5	135.6	+0.1
S-181C	129.5	126.2	-3.4	25988	26073	+84	0.00	-0.41	-0.41	187.78	187.50	-0.28
S-182C	449.9	457.5	+7.6	24476	24299	-177	0.01	-0.02	-0.03	180.00	180.13	+0.13
S-183C	297.0	287.8	-9.2	24300	24947	+47	0.00	-0.47	-0.47	172.74	172.74	0.00
S-184C	263.5	269.5	+6.0	25281	25273	-8	-0.07	+0.19	+0.26	106.66	106.98	+0.32
S-185C	151.2	147.6	-3.5	26127	26198	+71	0.00	-1.14	-1.14	180.86	181.20	+0.34
S-186C	124.2	120.0	-4.2	26088	26092	+4	0.006	-0.233	-0.239	187.34	188.03	+0.69
S-187C	270.2	274.1	+3.9	24973	25012	+39	0.000	+0.155	+0.155	89.026	89.027	+0.001
S-188C	405.0	402.1	-2.9	24548	24697	+149	0.00	-0.47	-0.47	188.65	188.03	-0.62
S-189C	275.2	205.4	-69.8	25004	25792	+788	-0.005	-2.437	-2.432	188.038	188.260	+0.222
S-190C	123.1	125.5	+2.4	26051	26109	+58	0.00	+0.03	+0.03	89.37	89.44	+0.07
S-191C	215.2	215.8	+0.6	25419	25465	+46	-0.689	-1.245	-0.556	179.896	179.692	-0.204

TABLE CLXXXV - PITCH ATTITUDE ERROR - SCOUTS 186 THRU 189

S-186C



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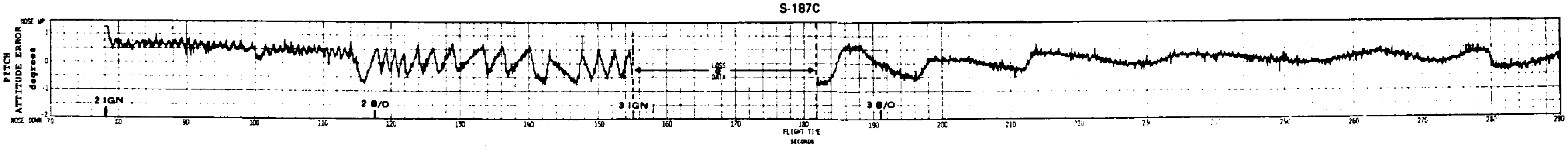
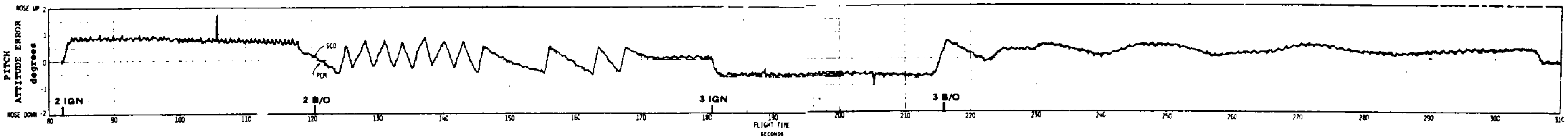


S-188C



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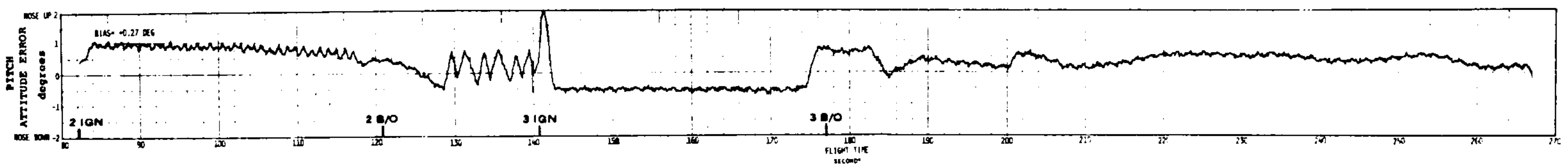
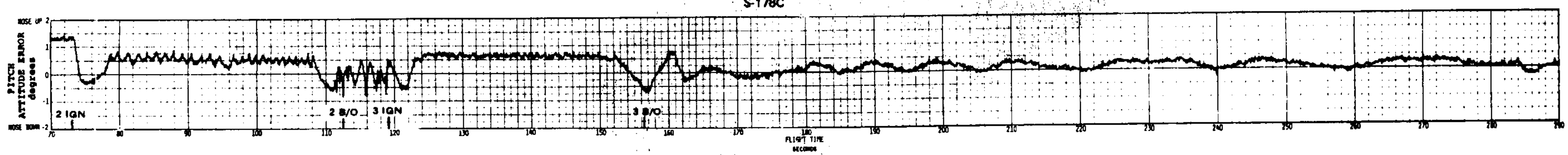


TABLE CLXXXVI - PITCH ATTITUDE ERRORS - SCOUTS 178, 190, 191

S-178C



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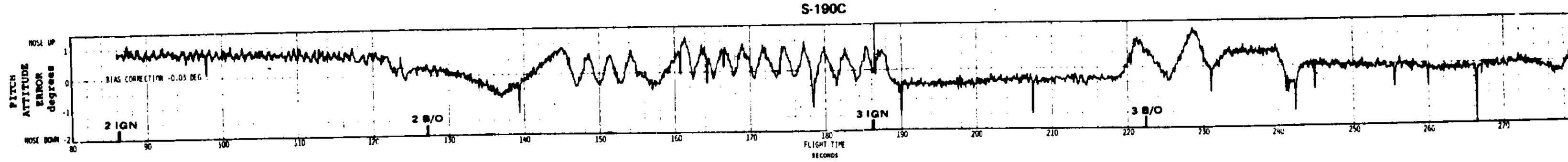


S-191C

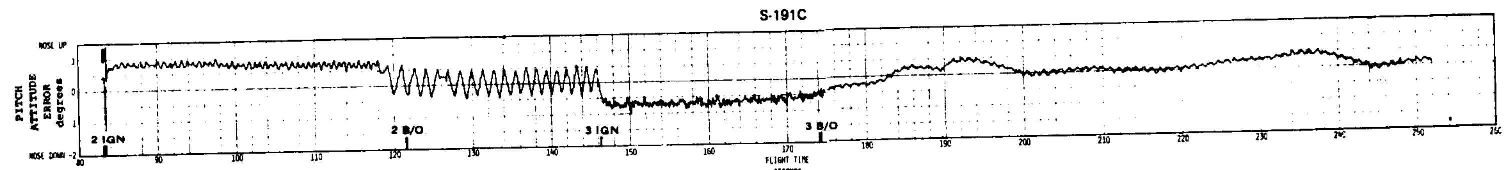
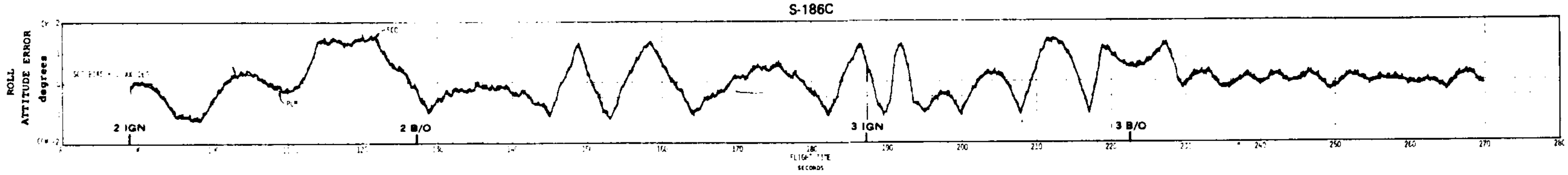


TABLE CLXXXVII - ROLL ATTITUDE ERROR - SCOUTS 186 THRU 189

S-186C



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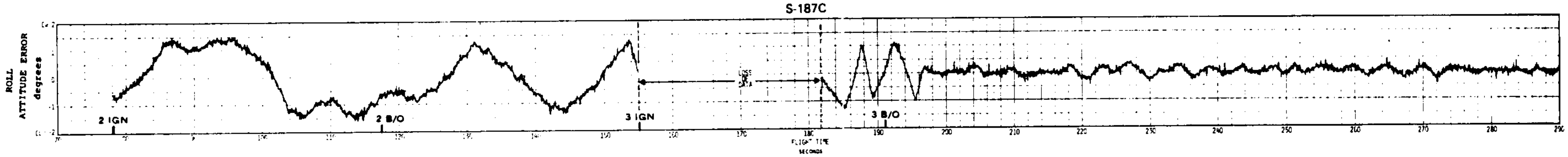

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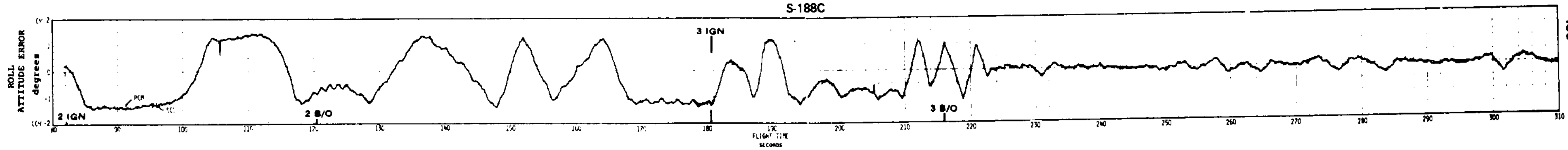

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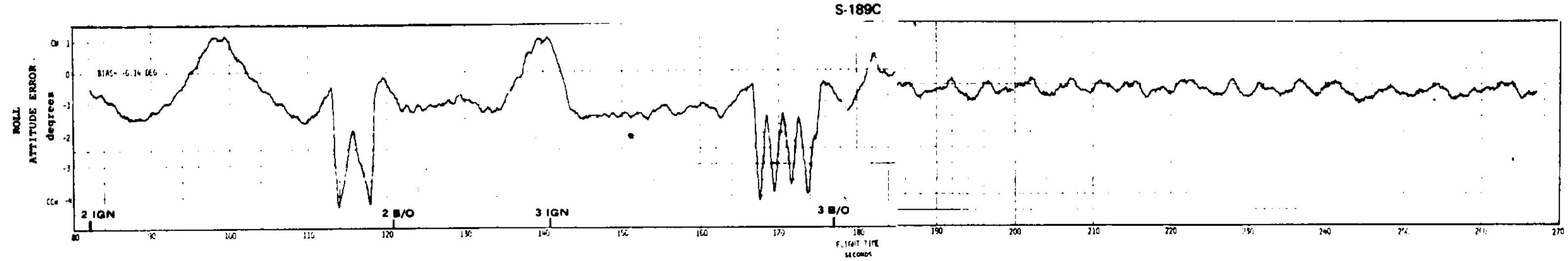
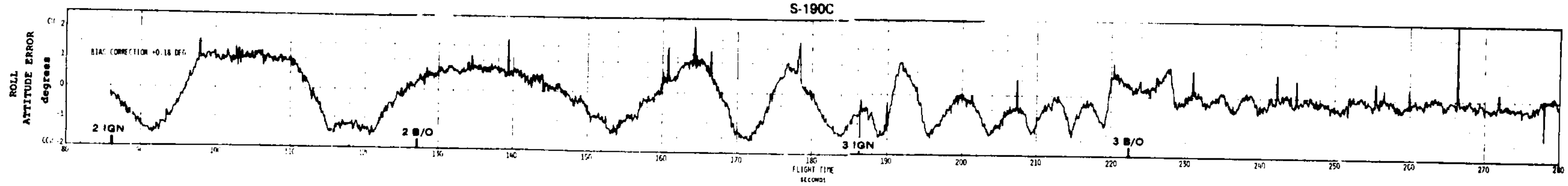


TABLE CLXXXVIII - ROLL ATTITUDE ERROR - SCOUTS 190, 191, 178

S-190C



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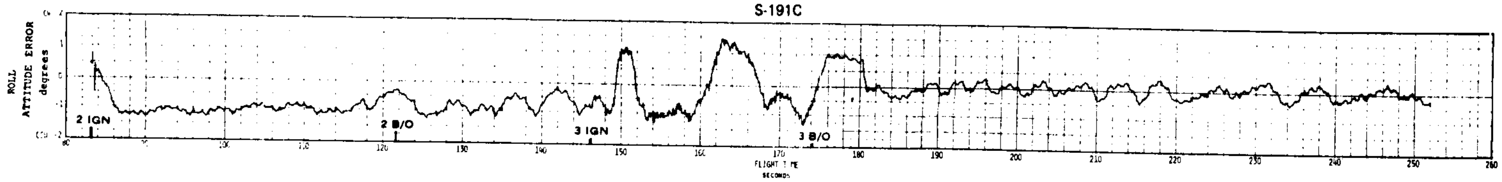

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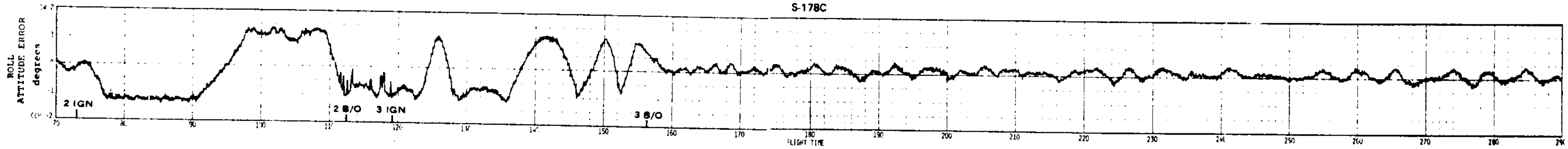
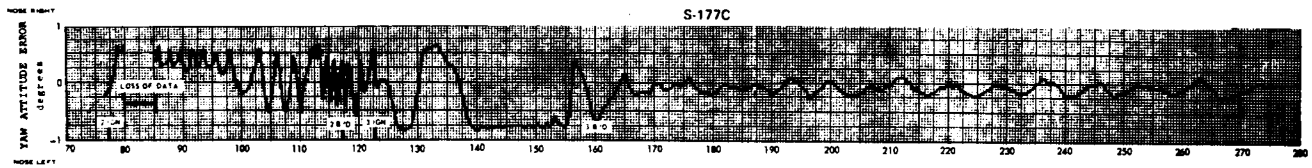


TABLE CLXXXIX - YAW ATTITUDE ERROR - SCOUTS 177, 178, 180

S-177C



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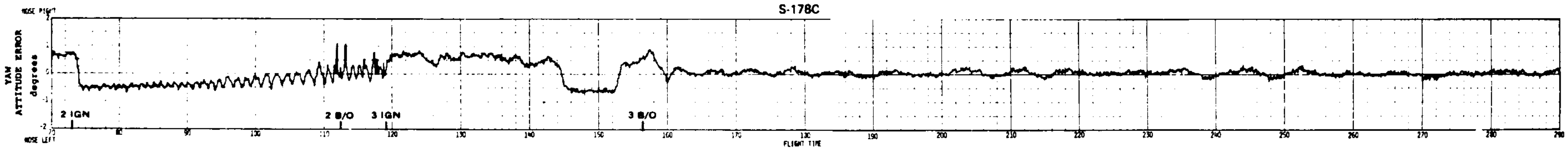
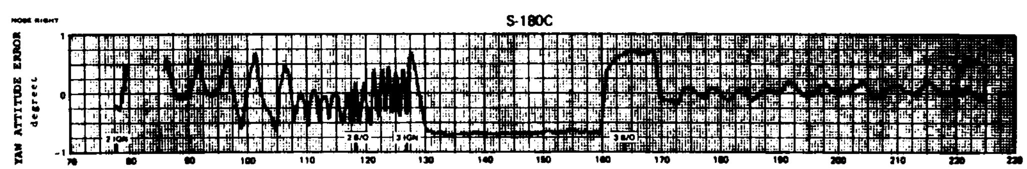
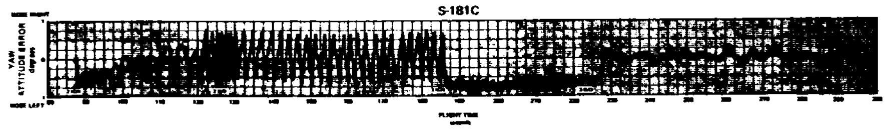


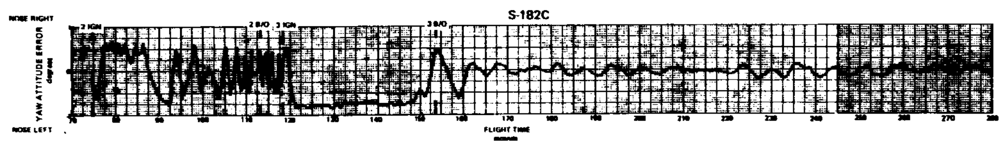
S-180C

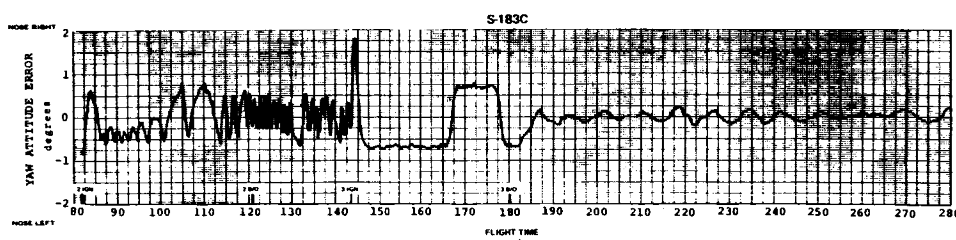


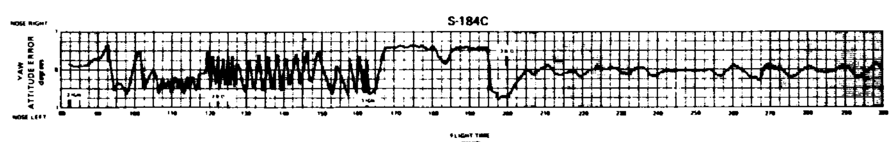
FLIGHT TIME - SECONDS

TABLE CXC - YAW ATTITUDE ERROR - SCOUTS 181 THRU 185









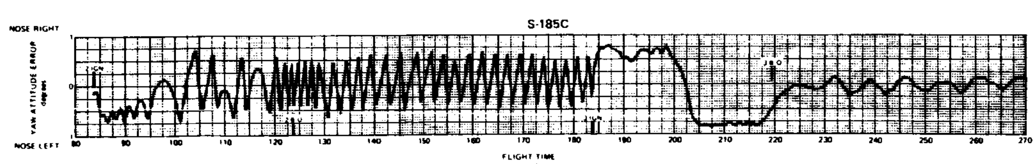
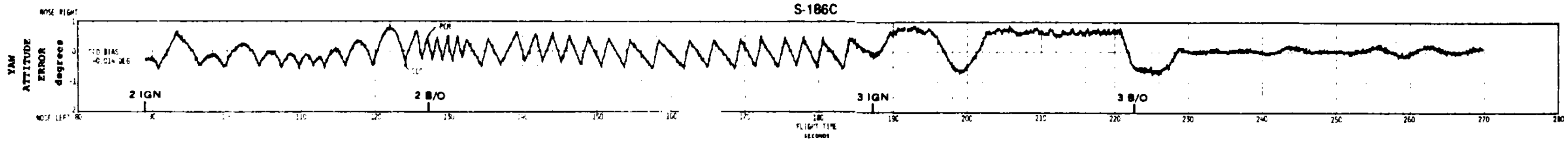


TABLE CXCI - YAW ATTITUDE ERROR - SCOUTS 186 THRU 189

S-186C



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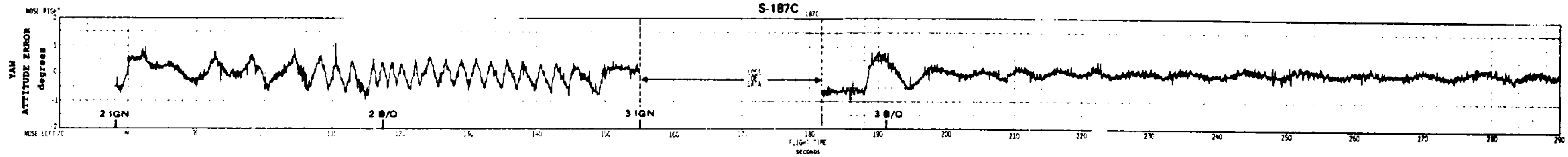

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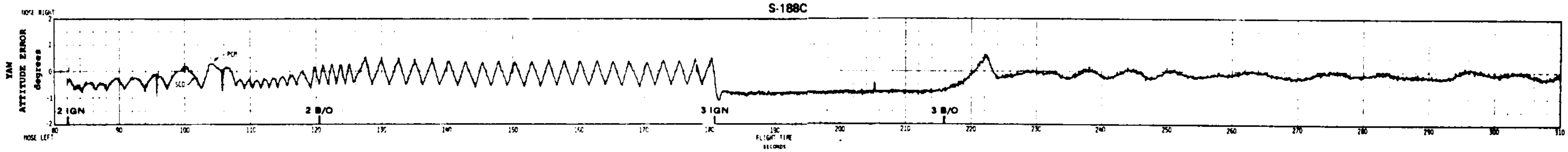

S-189C

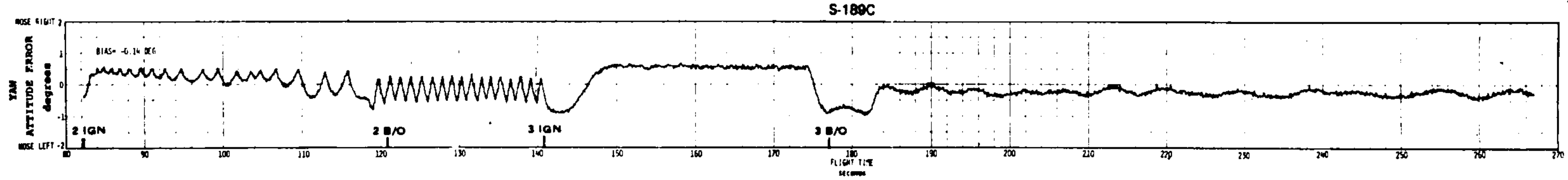

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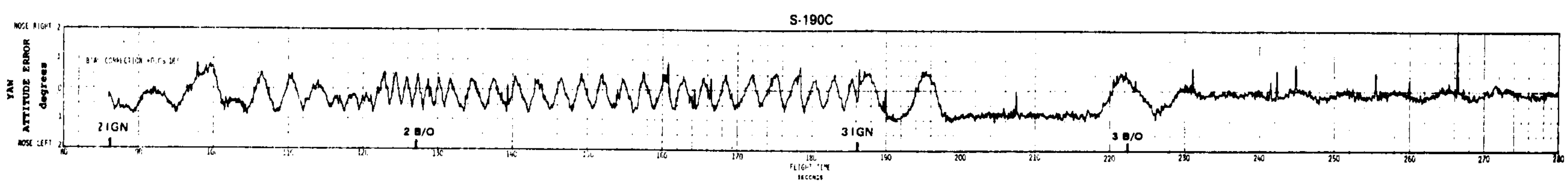
TABLE CXCII - ROLL ATTITUDE ERROR - SCOUTS 190-191



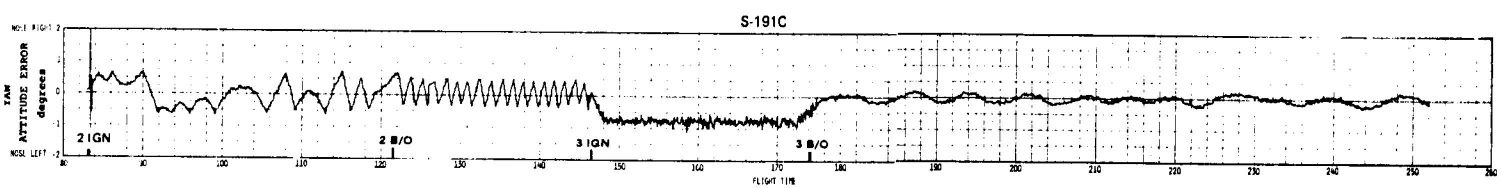


TABLE CXCIII - FIRST STAGE PITCH PROGRAM

VEHICLE	ALGOL	CONTROL GAIN (deg/deg)		HEAT-SHIELD	PITCH AT LIFT-OFF		FIRST-STAGE PITCH PROGRAM				MAXIMUM CONTROL SURFACE DEFLECTIONS								ROLL TRANSIENTS AFTER IGNITION		
							MAXIMUM COMMANDED RATE		MAXIMUM PITCH CONTROL DEFLECTION DURING MAXIMUM RATE		PITCH				YAW						
											BOOST		COAST*		BOOST		COAST*				
		PITCH-YAW	ROLL		DEG.	FLIGHT TIME SEC.	RATE DEG/SEC	FLIGHT TIME SEC.	DEG.	SEC.	DEFL. DEG.	FLIGHT TIME SEC.	DEFL. DEG.	FLIGHT TIME SEC.	DEFL. DEG.	FLIGHT TIME SEC.	DEFL. DEG.	FLIGHT TIME SEC.	MAX ANGLE DEGREE	MAX MOM'T FT-LBS.	FLIGHT TIME SEC.
S-178C	II	5.0	2.0	34/-25	- .15	0.5	-2.24	3.01 - 8.14	+9.2	4.3	+9.2	4.3	+7.6	62.2	-2.7	18.8	+4.4	68.	-	+ .25	0.5
S-180C	II	5.0	2.0	34/-25	+0.20	1.08	-1.51	1.85 - 7.37	+6.5	3.0	+8.0	37.8	+5.2	67.5	+4.9	38.0	-2.2	73.0	-	- 90	2.5
S-181C	III	7.3	3.0	42/-45	+0.11	0.25	-2.29	0.98 - 5.98	+8.6	2.0	+8.6	2.0	+6.8	86.8	-5.5	46.0	+3.5	81.0	-	- 30	0.5
S-182C	II	5.0	2.0	34/-40	-0.11	1.50	-2.02	2.04 - 8.01	+8.3	3.5	+8.3	3.5	+9.3	74.9	-4.0	17.0	-2.1	68.0	-	- 25	0.9
S-183C	II	5.0	2.0	34/-25	-0.12	0.10	-2.16	2.00 - 7.00	+13.3	3.5	+13.3	3.5	+9.1	81.0	+9.5	29.8	-4.0	81.8	-	+ 23	1.0
S-184C	III	6.75	3.0	34/-40	-0.13	0.31	-2.15	0.98 - 5.98	+8.7	1.9	+8.7	1.9	+3.9	78.3	-3.0	25.5	-3.5	77.0	-	-190	1.5
S-185C	III	6.75	3.0	34/-40	-0.14	0.78	-2.09	0.98 - 5.98	+8.0	2.0	+8.0	2.0	+5.0	83.8	+5.7	27.5	-1.0	56.6	-	-110	1.0
S-186C	III	7.3	3.0	42/-45	- .06	0.5	-2.15	1.0 - 6.0	+8.8	1.8	+8.8	1.8	+2.8	82.0	-2.6	47.0	-3.7	86.0	-	-160	0.5
S-187C	II	6.75	2.0	42/-45	+ .38	2.0	-3.0	3.0 - 7.2	+13.0	4.0	+13.0	4.0	+11.0	72.0	+5.2	14.0	+4.5	74.0	-	- 80	0.5
S-188C	III	7.3	3.0	42/-45	+ .08	0.4	-1.91	0.99 - 5.99	+7.0	2.0	+7.0	2.0	+5.7	57.5	-5.0	54.0	-3.0	80.0	-	N/A	N/A
S-189C	III	7.3	3.0	34/-40	- .11	0.3	-2.20	1.0 - 5.99	+9.0	2.0	+9.0	2.0	+2.0	75.0	+4.0	38.5	+1.1	58.5	-	- 75	0.5
S-190C	III	6.75	3.0	34/-25	- .17	0.5	-2.35	1.05 - 6.05	+9.7	2.0	+9.7	2.0	+4.0	76.0	-4.9	20.0	+3.7	83.0	-	-200	2.5
S-191C	III	6.75	3.0	34/-40	- .10	0.5	-2.79	0.98 - 5.98	+10.8	2.0	+10.8	2.0	+4.0	80.0	+3.4	13.2	-1.5	78.0	-	+ 80	1.0

N/A - NOT AVAILABLE

RATES & DISPLACEMENTS:
PITCH, +=NOSE UP
YAW, +=NOSE RIGHT
ROLL, +=CLOCKWISE (VIEWED FROM REAR)

CONTROL SURFACE DEFLECTIONS:
PITCH, +=TRAILING EDGE DOWN
YAW, +=TRAILING EDGE LEFT

MOMENT DISTURBANCE:
ROLL, +=CLOCKWISE (VIEWED FROM REAR)

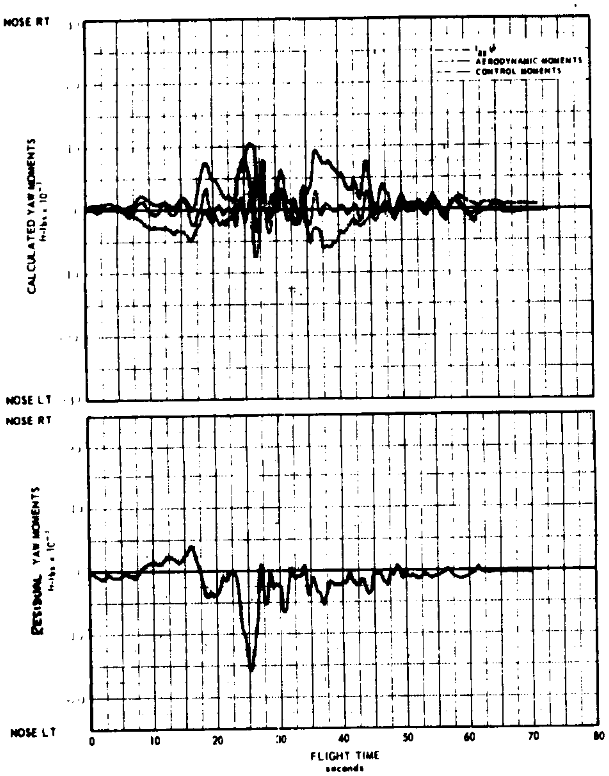
* COAST REFERS TO AFTER WEB BURN TIME

SCOUT CONFIGURATION DATA

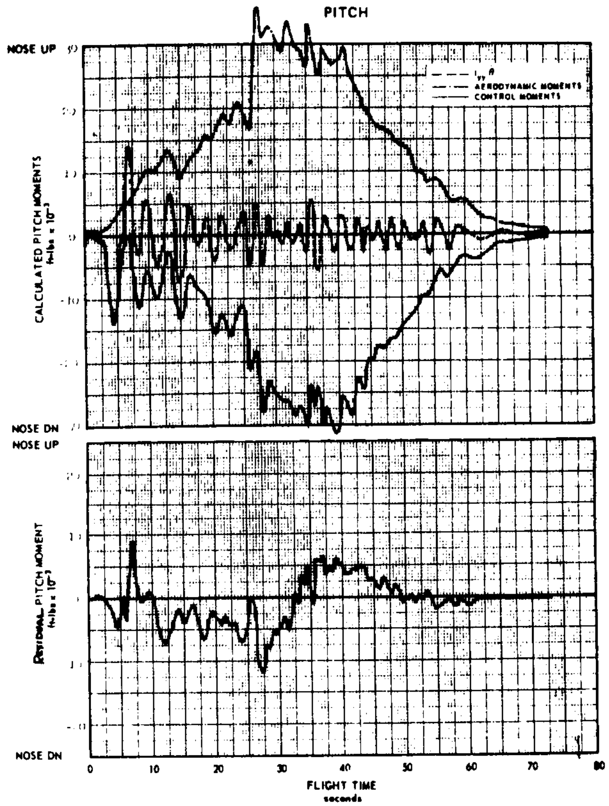
CONFIGURATION	ALGOL II	ALGOL III
34 INCH DIAMETER HEATSHIELD -25 INCH NOSE STATION	45 in^2 FIN TIPS 33 in^2 JET VANES 4.5 ft^2 fin	78 in^2 FIN TIPS 38.9 in^2 JET VANES 4.73 ft^2 FIN
34 INCH DIAMETER HEATSHIELD -40 INCH NOSE STATION	45 in^2 FIN TIPS 33 in^2 JET VANES 4.5 ft^2 FIN	78 in^2 FIN TIPS 38.9 in^2 JET VANES 4.73 ft^2 FIN
42 INCH DIAMETER HEATSHIELD -45 INCH NOSE STATION	78 in^2 FIN TIPS 33 in^2 JET VANES 4.73 ft^2 FIN	78 in^2 FIN TIPS 38.9 in^2 JET VANES 4.73 ft^2 FIN

SCOUT S-178C
TABLE CXCIV- MOMENT DISTURBANCES
FIRST STAGE

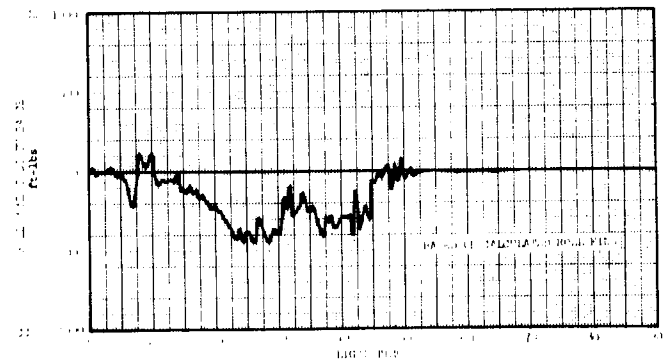
YAW



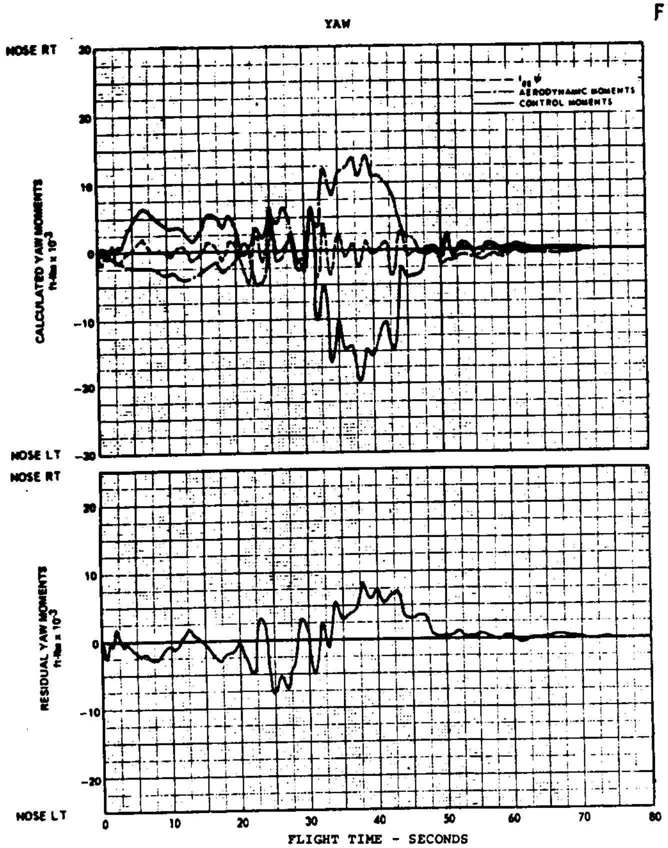
PITCH

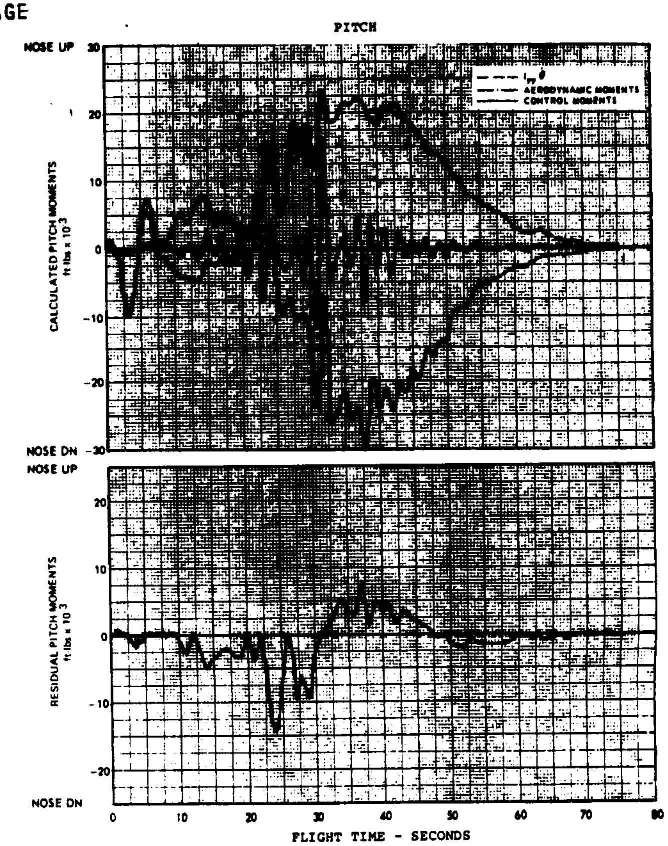


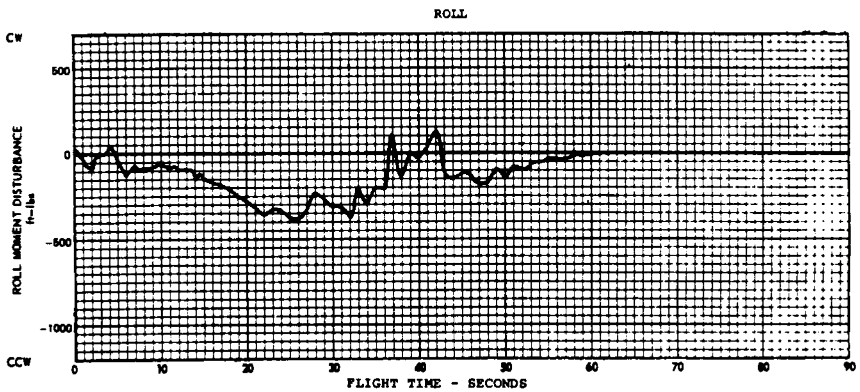
ROLL



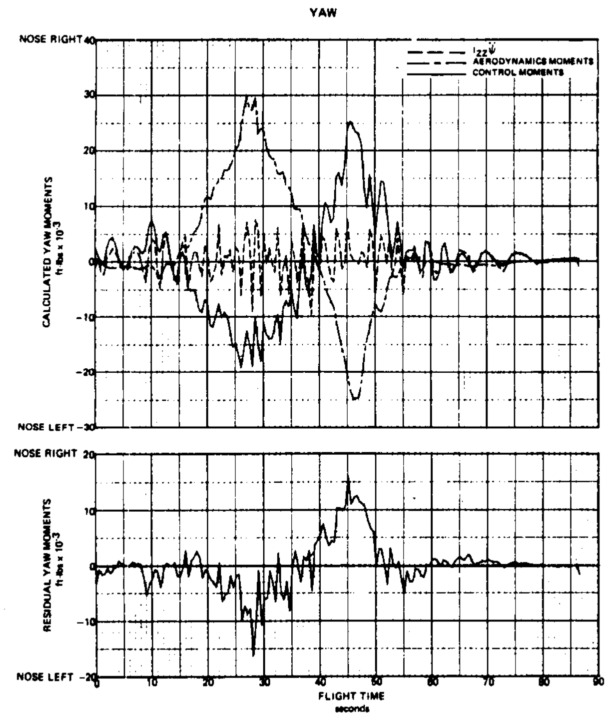
SCOUT S-180C
TABLE CXCV - MOMENT DISTURBANCES
FIRST STAGE

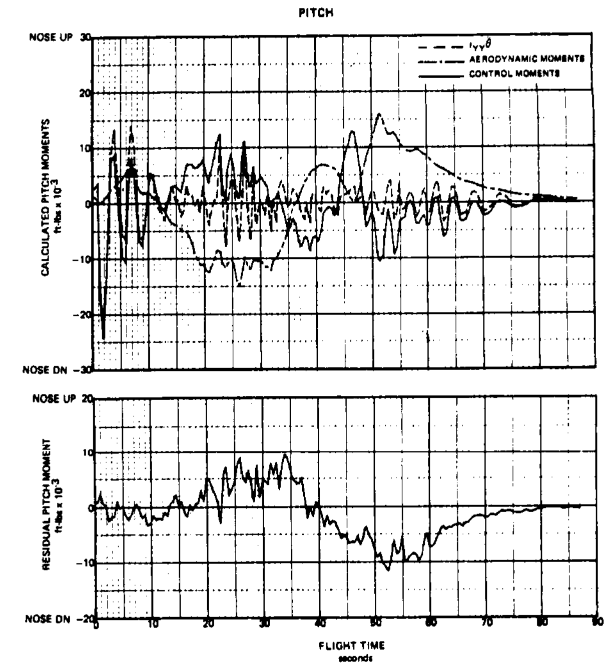


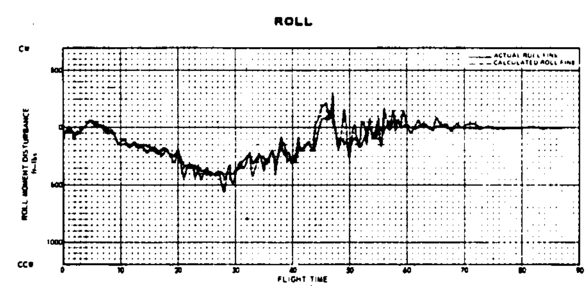




SCOUT S-181C
TABLE CXCVI - MOMENT DISTURBANCES
FIRST STAGE

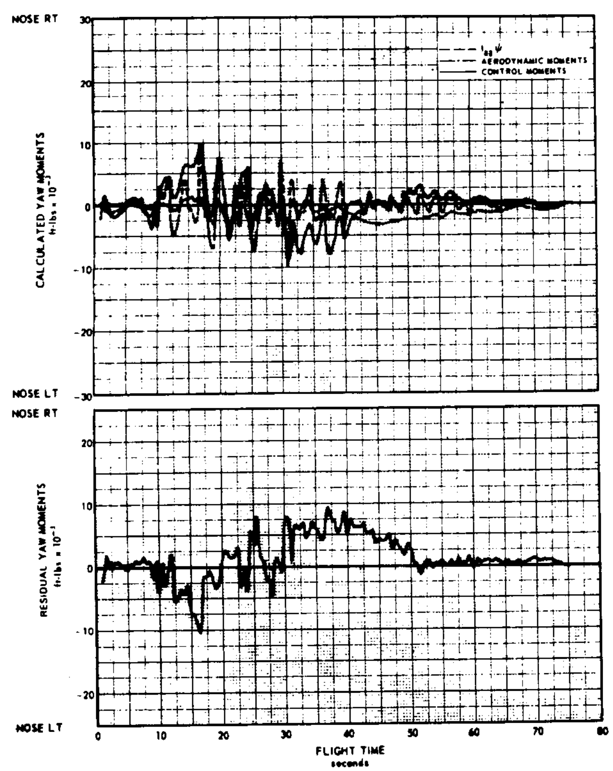




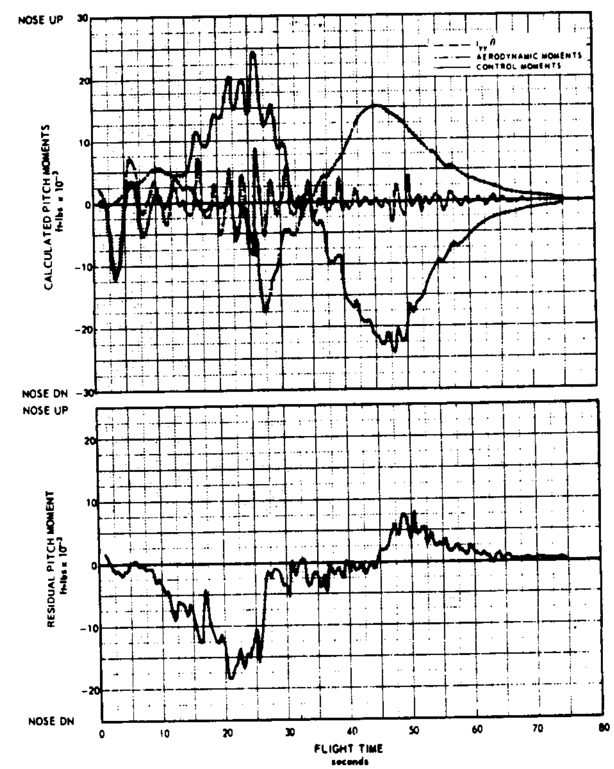


SCOUT S-182C
TABLE CXCVII - MOMENT DISTURBANCES
FIRST STAGE

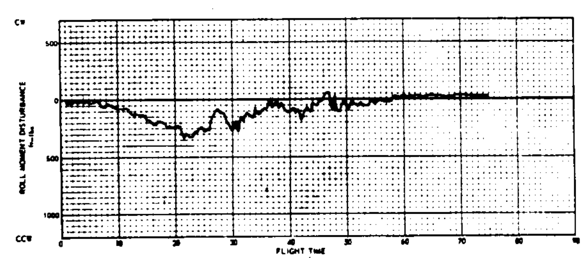
YAW



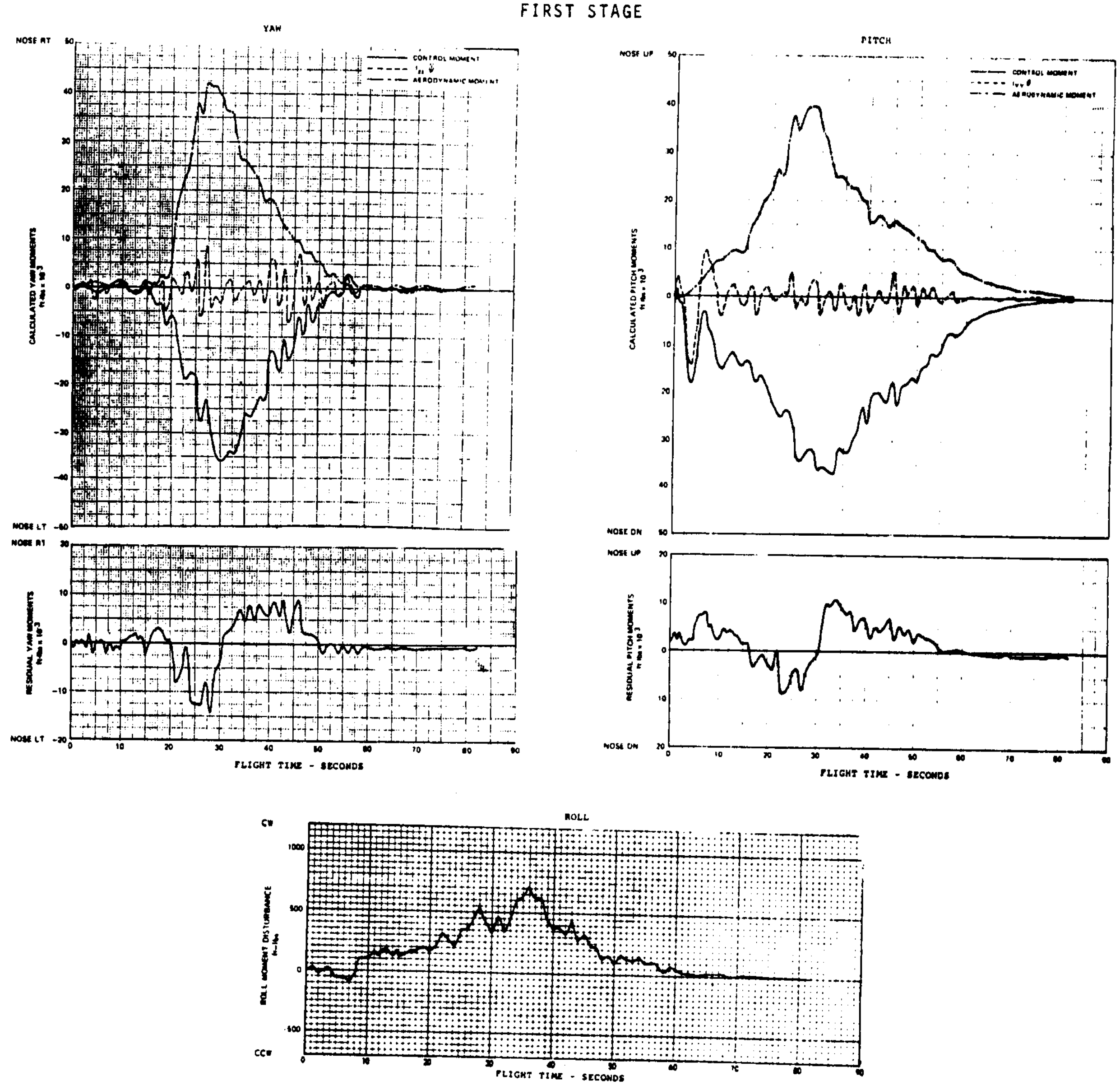
PITCH



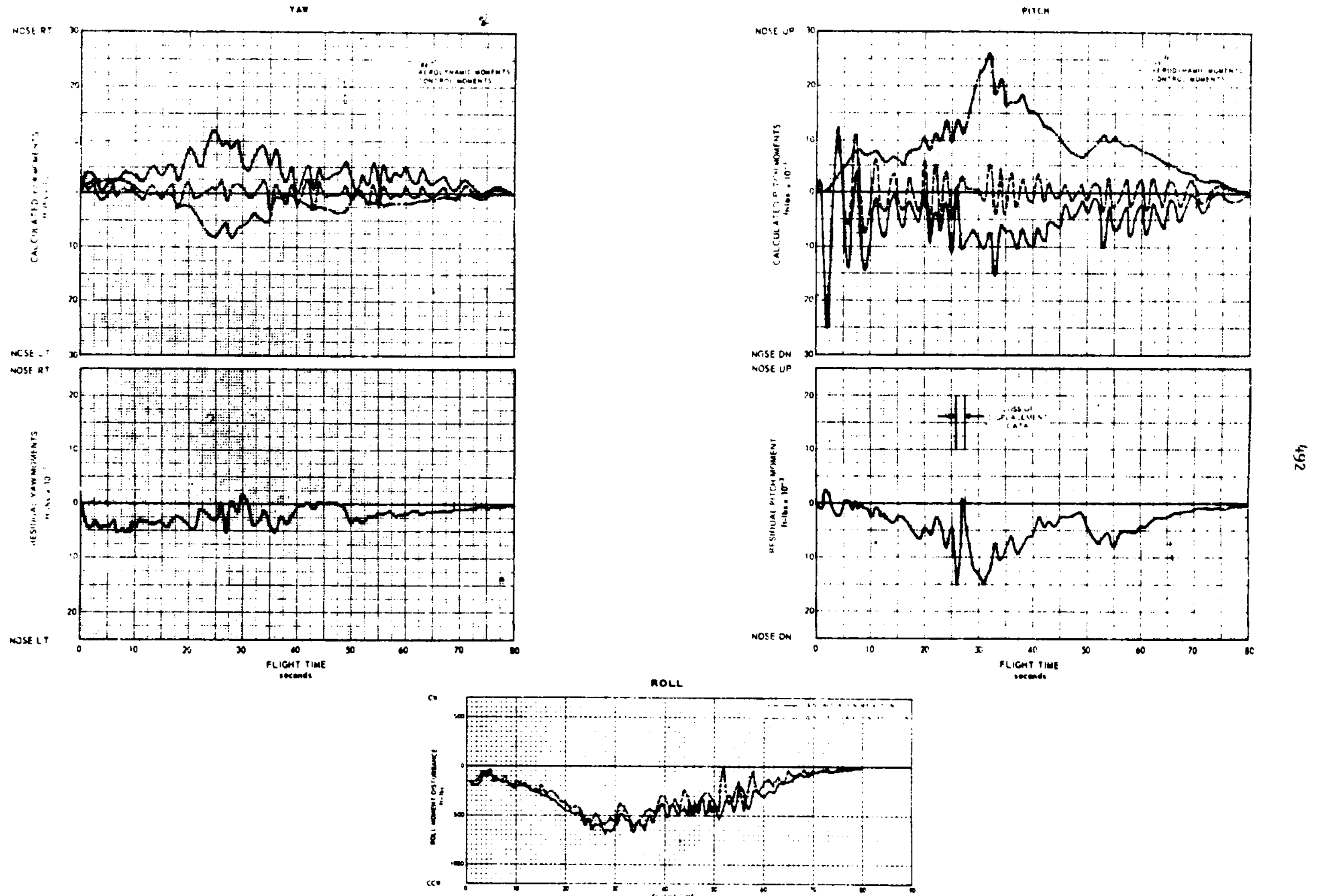
ROLL



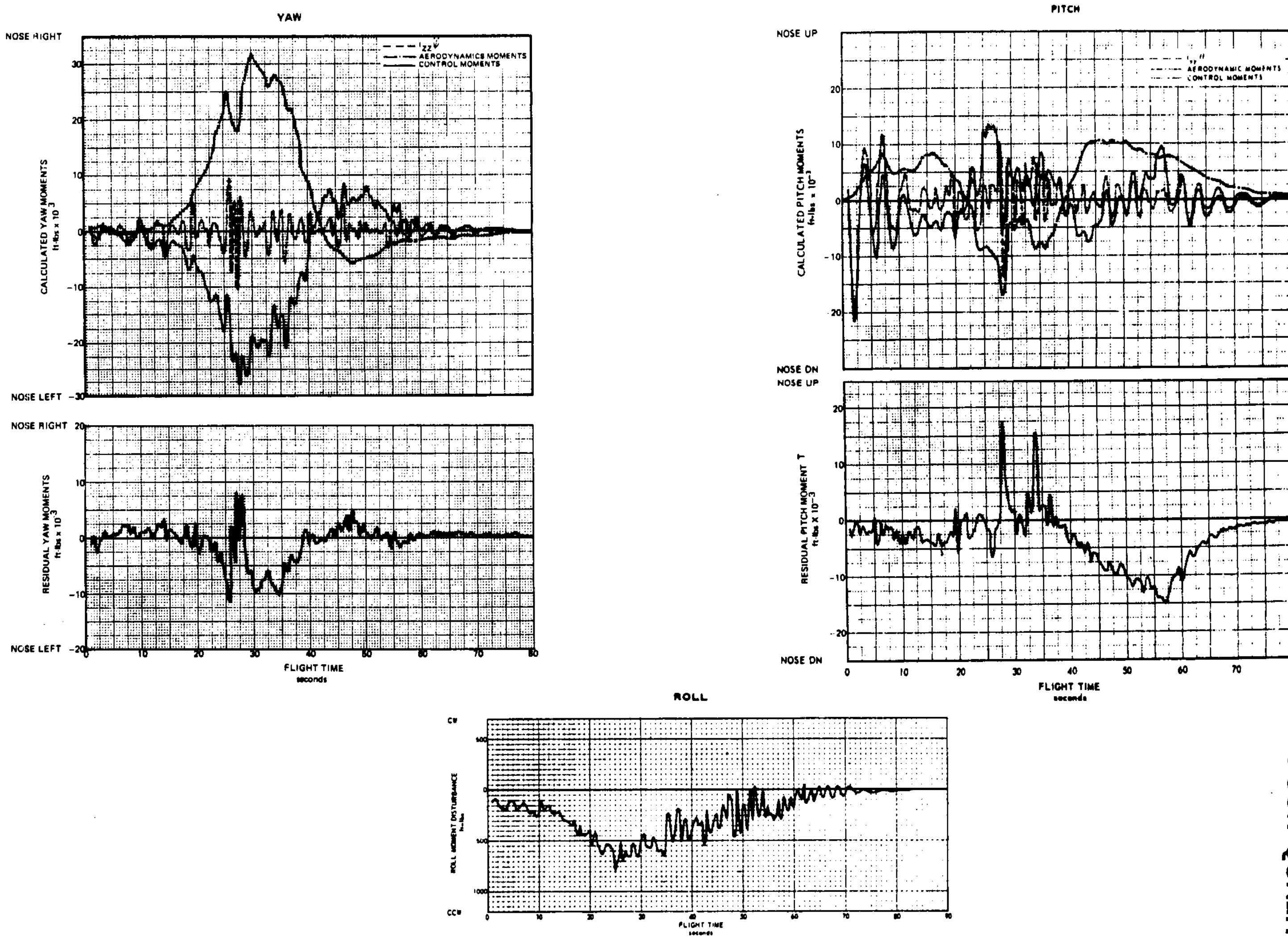
SCOUT S-183C
TABLE CXCVIII - MOMENT DISTURBANCES
FIRST STAGE



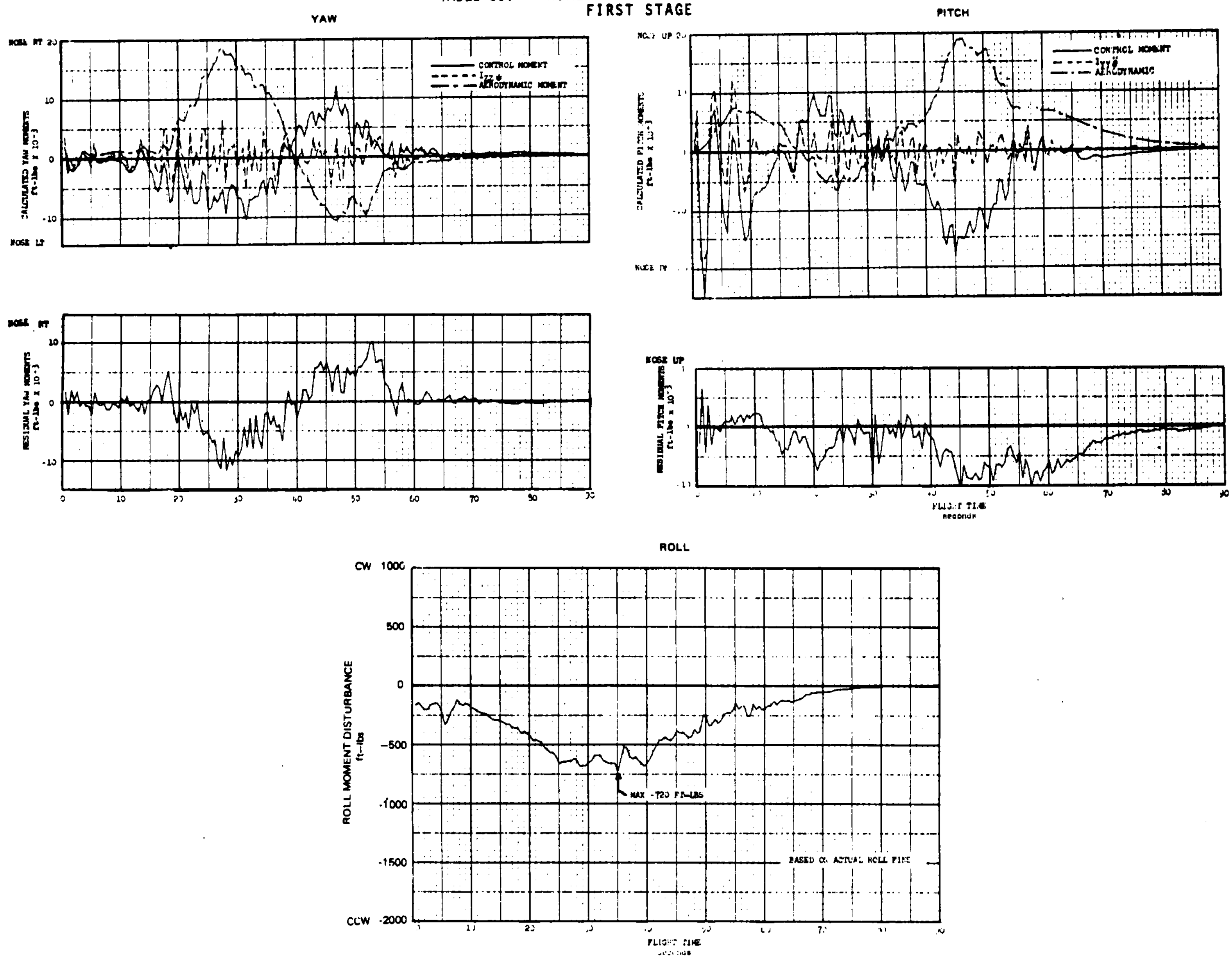
SCOUT S-184C
TABLE CXCIX -MOMENT DISTURBANCES
FIRST STAGE



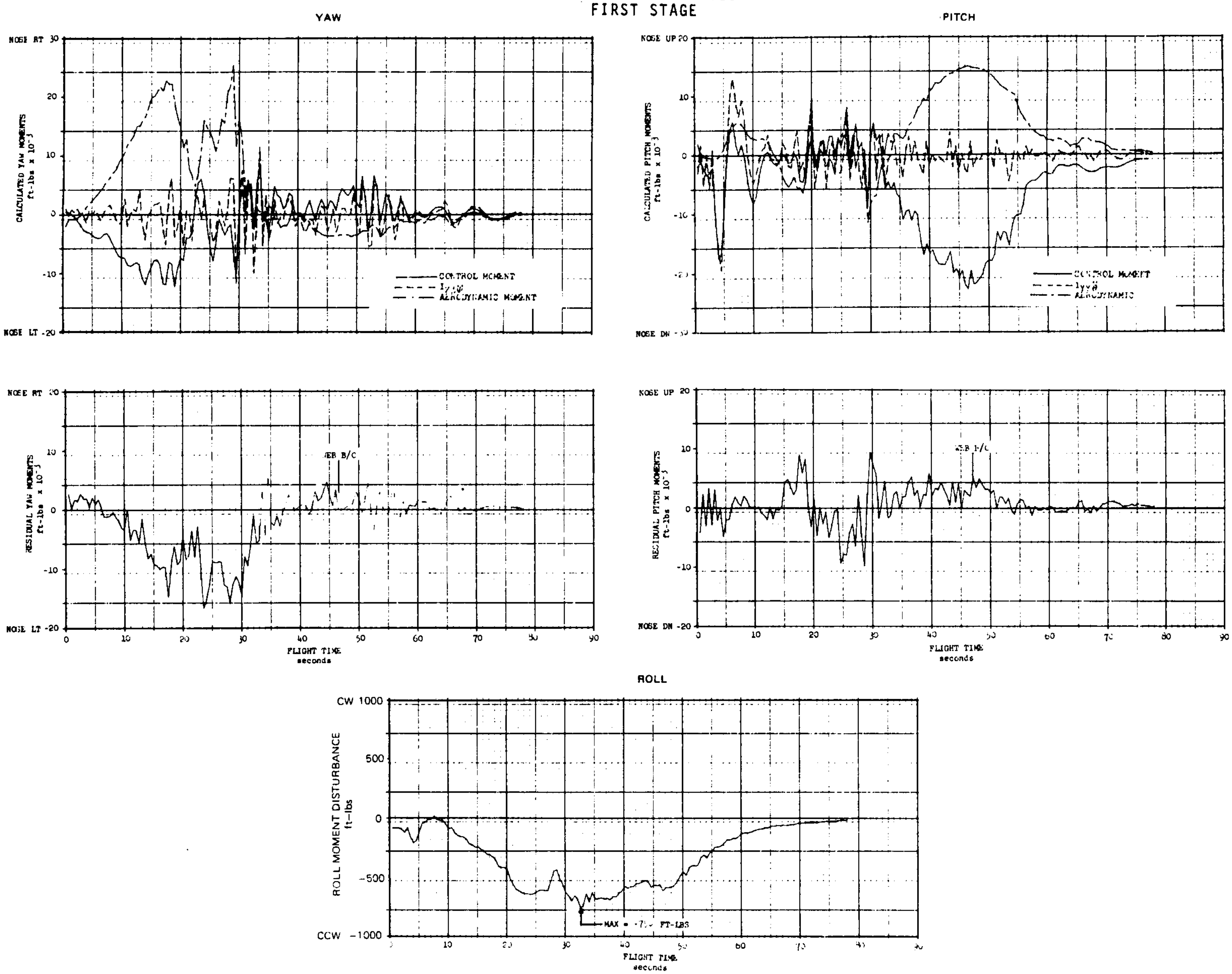
SCOUT S-185C
TABLE CC - MOMENT DISTURBANCES
FIRST STAGE



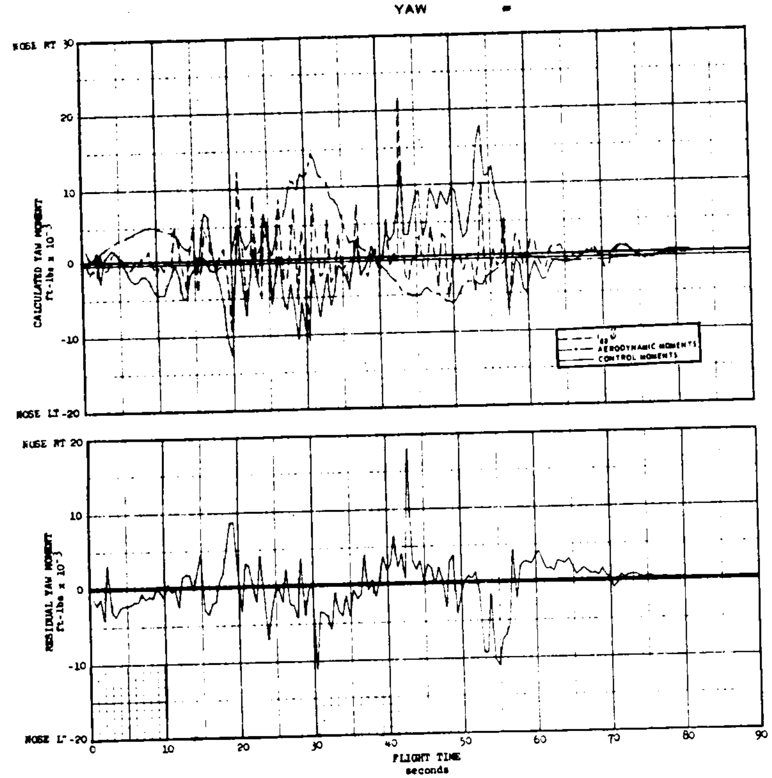
SCOUT S-186C
TABLE CCI - MOMENT DISTURBANCES
FIRST STAGE

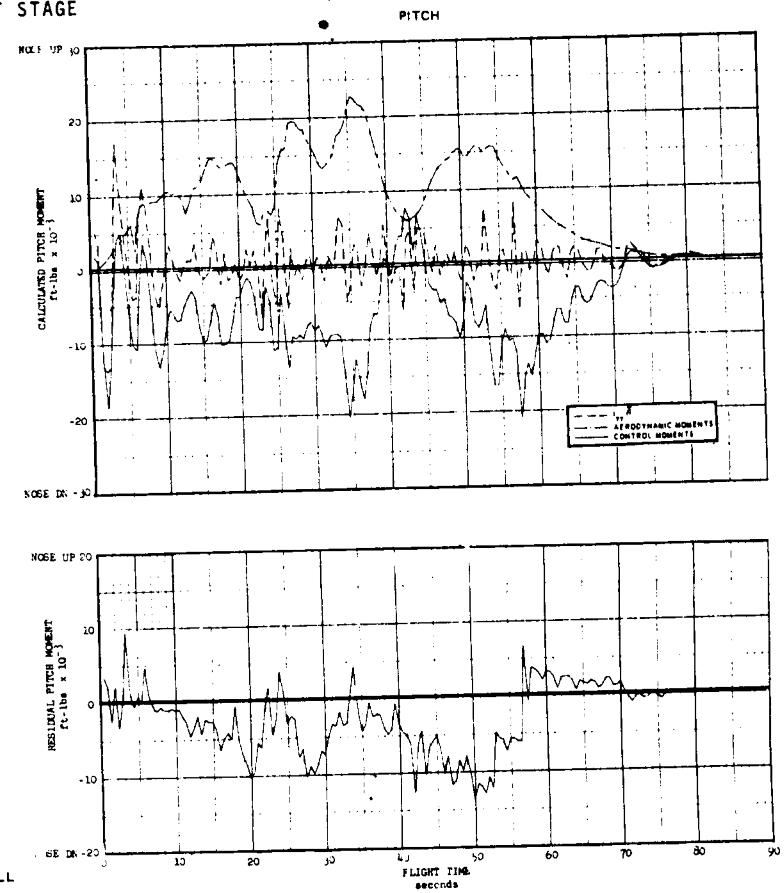


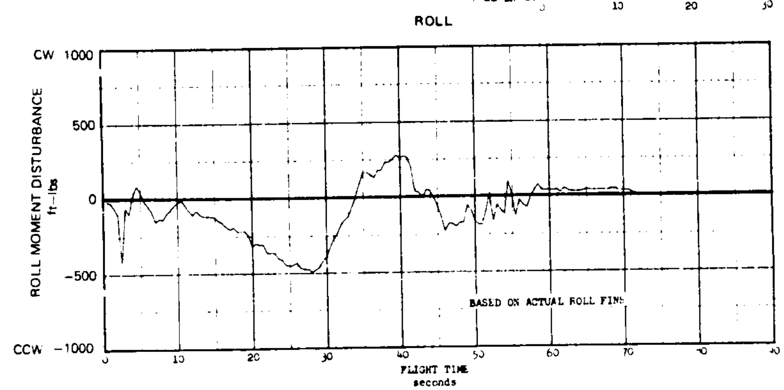
SCOUT S-187C
TABLE CCII - MOMENT DISTURBANCES
FIRST STAGE



SCOUT S-184C
TABLE CCIII - MOMENT DISTURBANCES
FIRST STAGE

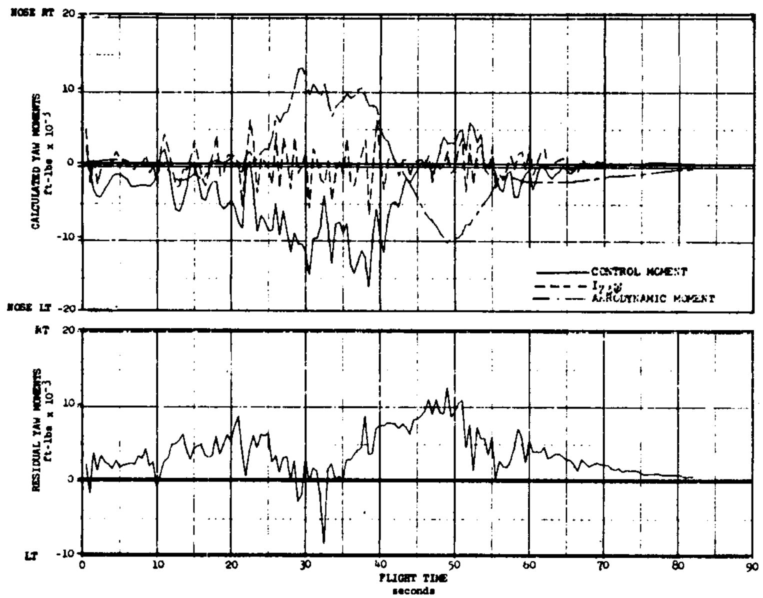




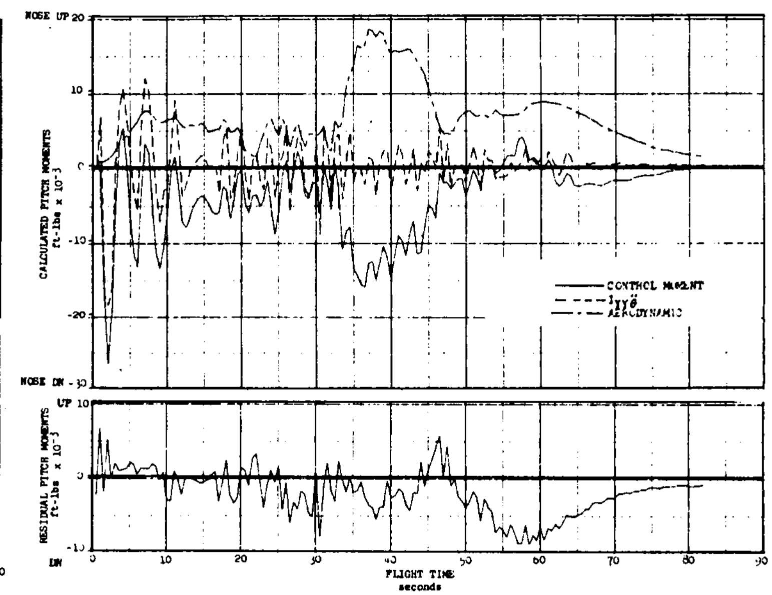


SCOUT S-189C
TABLE CCIV - MOMENT DISTURBANCES
FIRST STAGE

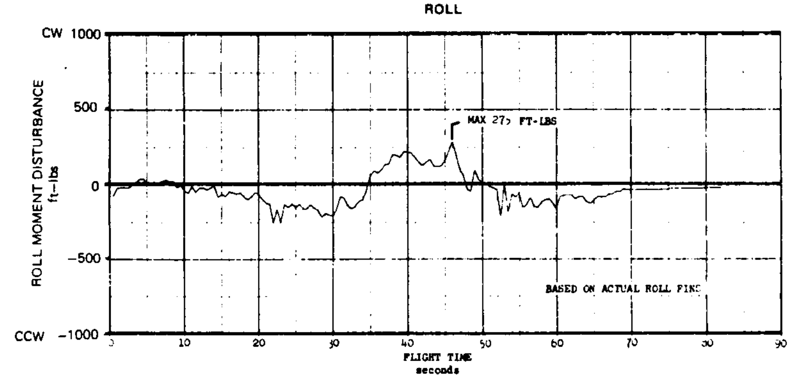
YAW



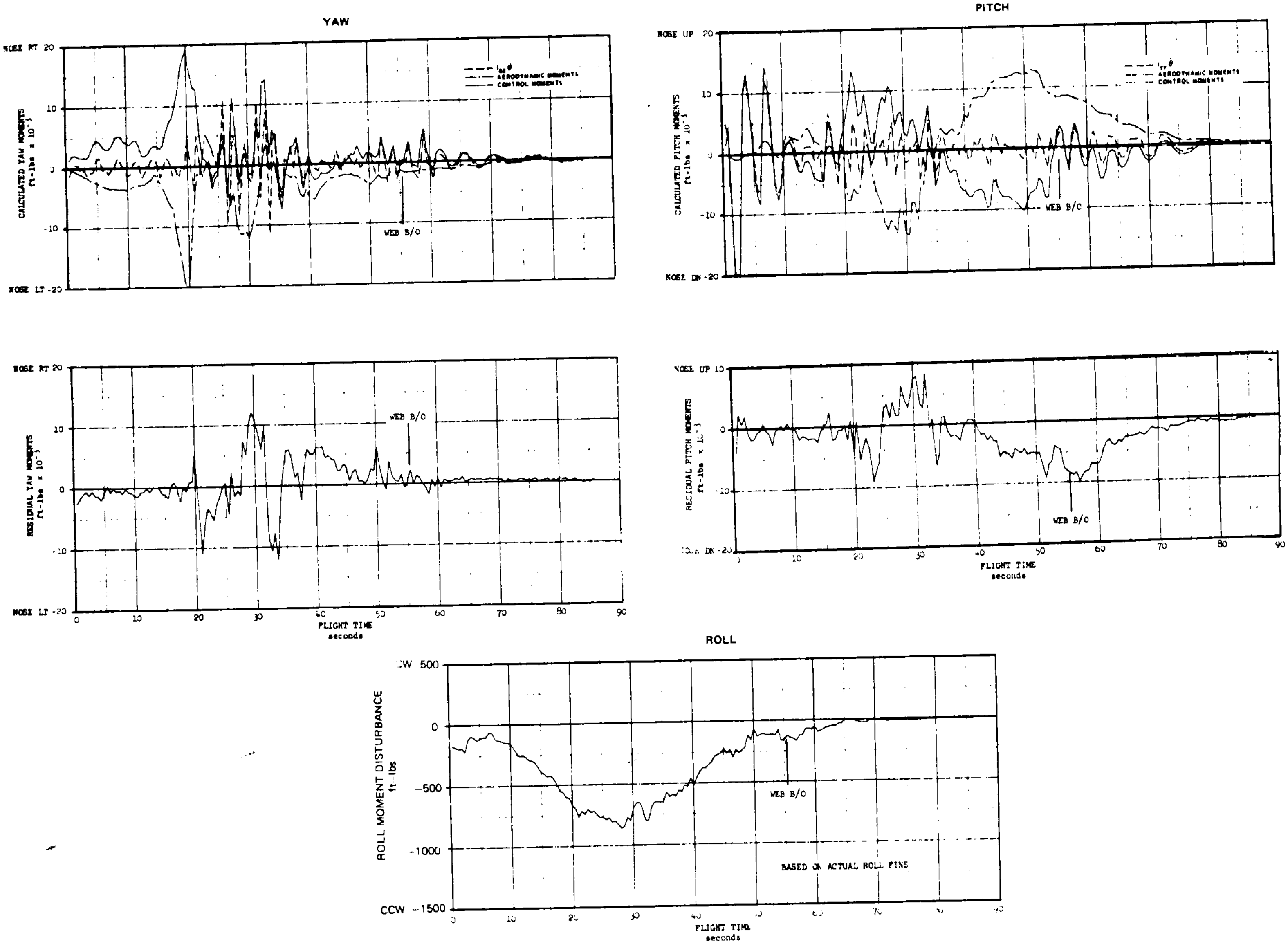
PITCH



ROLL



SCOUT S-190C
TABLE CCV - MOMENT DISTURBANCES
FIRST STAGE



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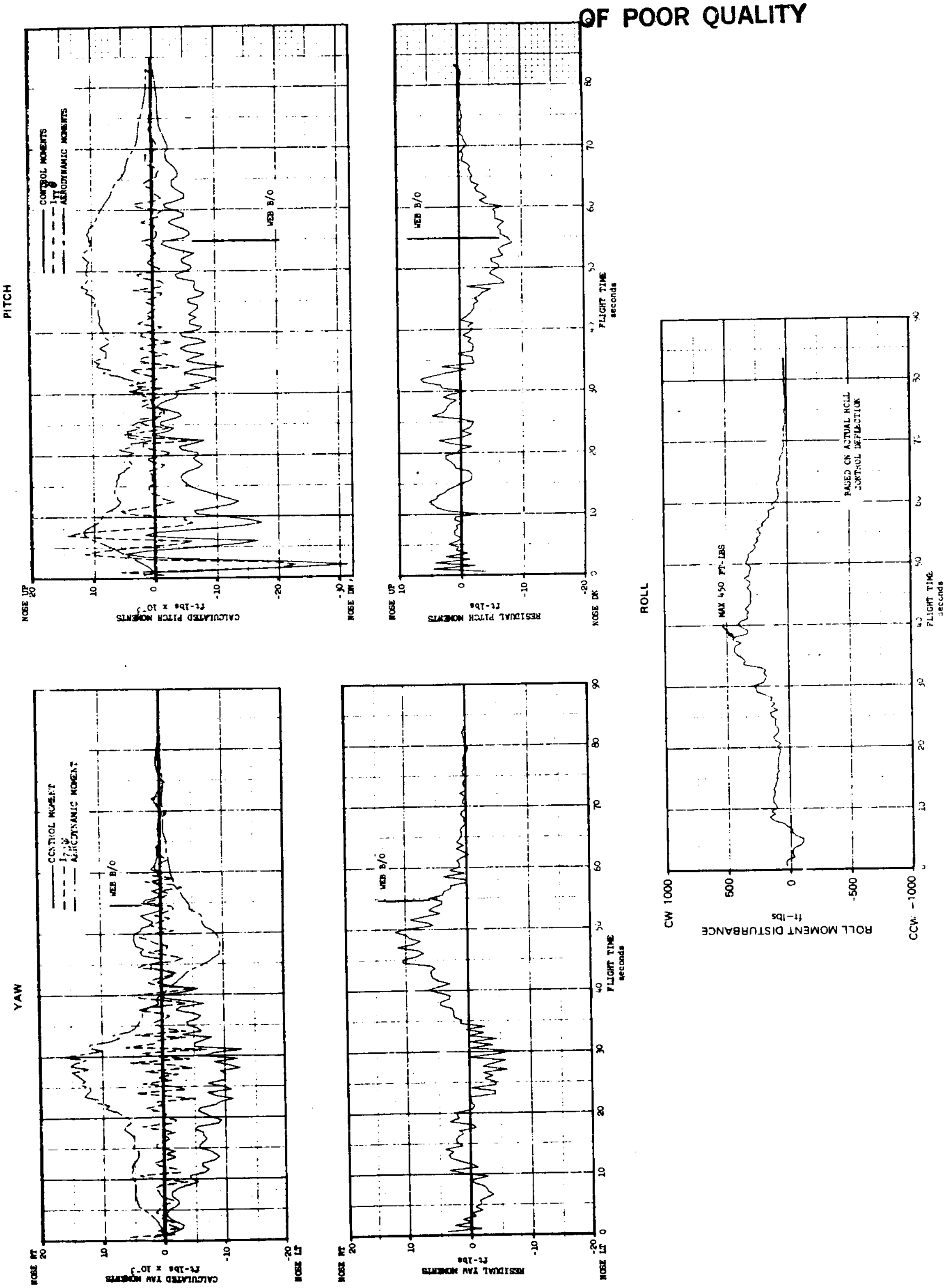
SCOUT S-191C
TABLE CCVI - MOMENT DISTURBANCES
FIRST STAGE



SCOUT
TABLE CCVII - SECOND-STAGE INITIAL CONDITIONS AND CAPTURE

				PITCH (UP+)					YAW (RIGHT+)					ROLL (RIGHT +)				
VEHICLE	FIRST STAGE MOTOR	HEAT-SHIELD	IGN. DYN. PRESS.	θ_o DEG.	$\dot{\theta}_o$ DEG/SEC.	$\Delta\dot{\theta}$ TIP-OFF DEG/SEC.	MAX. θ CAPTURE DEG.	MAX. $\dot{\theta}$ DEG/SEC.	ψ_o DEG.	$\dot{\psi}_o$ DEG/SEC.	$\Delta\dot{\psi}$ TIP-OFF DEG/SEC.	MAX. ψ CAPTURE DEG.	MAX. $\dot{\psi}$ DEG/SEC.	ϕ_o DEG.	$\dot{\phi}_o$ DEG/SEC.	$\Delta\dot{\phi}$ TIP-OFF DEG/SEC.	MAX. ϕ CAPTURE DEG.	MAX. $\dot{\phi}$ DEG/SEC.
S-178C	A2	34/-25	85	+1.36	-0.18	+0.15	+1.35	-2.1	+0.75	+0.05	-0.15	NONE	NONE	-0.10	+0.17	+0.1	NONE	NONE
S-180C	A2	34/-25	40	+1.10	-0.50	*	*	*	-0.20	0.0	*	*	*	-0.30	-0.10	*	*	*
S-181C	A3	42/-45	41	+1.00	-0.20	*	+1.00	-1.60	-0.04	+0.10	+0.10	NONE	NONE	-0.85	-0.25	+0.20	NONE	NONE
S-182C	A2	34/-40	74	+1.72	-0.20	+0.10	+1.76	-2.75	-0.45	-0.40	-0.10	NONE	NONE	+1.50	+0.20	0.0	-1.55	-1.70
S-183C	A2	34/-25	42	+2.00	-0.40	0.0	+2.00	-3.50	-0.65	-0.05	-0.20	-0.70	+1.15	+0.75	+0.30	0.0	NONE	NONE
S-184C	A3	34/-40	100	-0.25	-0.15	+0.30	NONE	NONE	+0.20	-0.10	+0.10	NONE	NONE	0.00	+0.20	0.0	NONE	NONE
S-185C	A3	34/-40	41	+0.94	-0.25	+0.40	+0.95	-1.00	-0.15	0.0	+0.20	NONE	NONE	-0.10	0.0	0.0	NONE	NONE
S-186C	A3	42/-45	40	+0.40	-0.35	NONE	NONE	NONE	-0.38	+0.05	-0.1	NONE	NONE	-0.20	+0.15	0.0	NONE	NONE
S-187C	A2	42/-45	70	+ 1.26	-0.3	0.0	+1.26	-1.7	-0.5	-0.18	0.0	0.0	0.0	-0.7	+0.05	0.0	NONE	NONE
S-188C	A3	42/-45	44	0.0	-0.27	0.0	0.0	0.0	-0.3	+0.21	0.0	0.0	0.0	+0.25	+0.10	-0.14	NONE	NONE
S-189C	A3	34/-40	100	+0.13	-0.4	0.0	0.0	0.0	-0.26	0.0	0.0	0.0	0.0	-0.39	-0.12	0.0	NONE	NONE
S-190C	A3	34/-25	40	+0.85	-0.15	+0.07	+0.85	-0.88	-0.16	-0.28	0.0	0.0	0.0	-0.01	-0.25	+0.1	NONE	NONE
S-191C	A3	34/-40	91	+0.44	-0.55	+0.46	0.0	0.0	+0.15	+0.07	+0.42	0.0	0.0	+0.52	-0.14	-0.3	NONE	NONE

*DATA OBSCURED BY NOISE

ORIGINAL PAGE IS OF POOR QUALITY

SCOUT
TABLE CCVIII - THIRD-STAGE INITIAL CONDITIONS AND CAPTURE
ANTARES IIA

VEHICLE	PITCH (UP+)					YAW (RIGHT+)					ROLL (RIGHT +)				
	θ_o DEG.	$\dot{\theta}_o$ DEG./SEC	$\Delta\dot{\theta}$ TIP-OFF DEG./SEC	MAX. θ CAPTURE DEG.	MAX. $\dot{\theta}$ DEG./SEC	ψ_o DEG.	$\dot{\psi}_o$ DEG./SEC	$\Delta\dot{\psi}$ TIP-OFF DEG./SEC	MAX. ψ CAPTURE DEG.	MAX. $\dot{\psi}$ DEG./SEC	ϕ_o DEG.	$\dot{\phi}_o$ DEG./SEC	$\Delta\dot{\phi}$ TIP-OFF DEG./SEC	MAX. ϕ CAPTURE DEG.	MAX. $\dot{\phi}$ DEG./SEC
S-178C	+0.25	+1.20	NONE	+0.5	+1.25	+0.07	+1.38	NONE	+0.5	+1.35	-1.07	+0.1	+0.15	NONE	NONE
S-179C															
S-180C	-0.50	-0.50	0.0	-0.60	-0.60	-0.40	+1.20	+2.60	+1.55	+3.80	+0.80	+1.40	*	+0.95	+1.40
S-181C	-0.35	-0.95	+0.70	NONE	NONE	-0.35	-1.50	-0.20	NONE	NONE	-0.17	-2.25	+0.50	-0.50	-2.25
S-182C	-0.50	+0.80	+1.00	NONE	NONE	0.0	+0.90	+1.40	+0.75	+2.50	-0.80	-0.30	+0.20	NONE	NONE
S-183C	-0.10	+1.25	0.0	NONE	NONE	-0.20	-0.20	+5.10	+1.80	+4.90	-0.50	+0.15	-0.50	NONE	NONE
S-184C	+0.10	+1.35	-2.20	NONE	NONE	+0.60	-1.10	-1.00	*	-2.30	+0.40	+0.80	-0.10	NONE	NONE
S-185C	+0.50	-2.00	+2.20	NONE	NONE	+0.05	+0.90	-0.50	NONE	NONE	-0.95	+0.75	0.0	NONE	NONE
S-186C	0.0	-1.25	-0.67	-0.56	-0.67	-0.15	-0.25	+0.3	0.0	0.0	+0.6	-1.0	0.0	NONE	NONE
S-187C	+0.15	+1.0	-0.2	+0.15	-1.0	+0.1	-0.05	-2.72	-0.8	-2.77	-0.15	-1.15	0.0	NONE	NONE
S-188C	+0.07	-0.08	-1.92	-0.6	-2.0	-0.07	-1.8	-1.2	-1.1	-3.0	-1.26	-0.27	+0.9	-1.34	+0.8
S-189C	+0.1	+0.6	+2.55	+1.9	+3.9	+0.35	-1.2	-0.57	+0.35	-1.85	+1.14	-0.4	0.0	NONE	NONE
S-190C	-0.05	+0.5	0.0	0.0	0.0	-0.11	+1.2	+0.6	+0.69	+1.8	-0.18	+0.5	0.0	NONE	NONE
S-191C****	-0.35	-1.65	0.0	-1.65	-0.65	+0.10	+1.25	-1.5	0.0	0.0	-0.71	+0.36	0.0	NONE	NONE

* DATA OBSCURED BY NOISE
** TELEMETERED MATRIX LOST
*** MOTOR FIRING AT IGNITION
**** ANTARES IIB

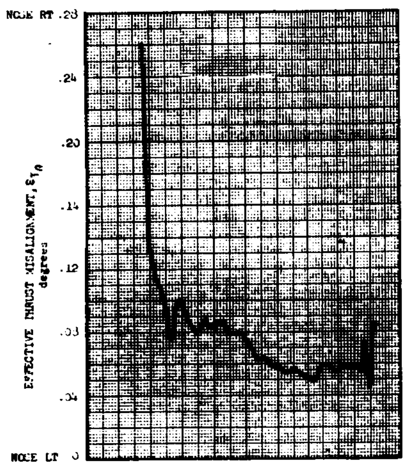
ORIGINAL PAGE IS OF POOR QUALITY

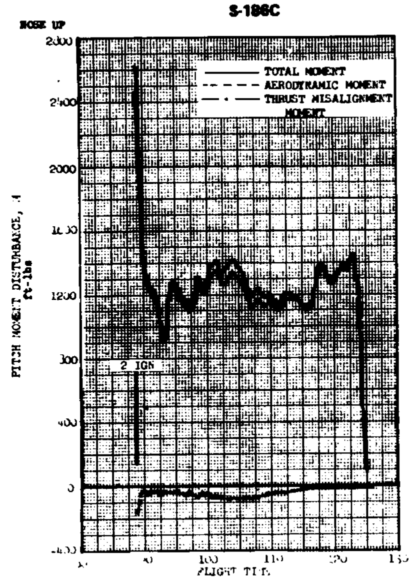
TABLE CCIX - PITCH AND YAW MOMENTS AND THRUST MISALIGNMENT
SCOUT SECOND AND THIRD STAGES

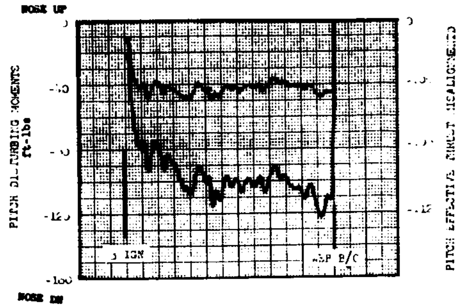
SECOND STAGE

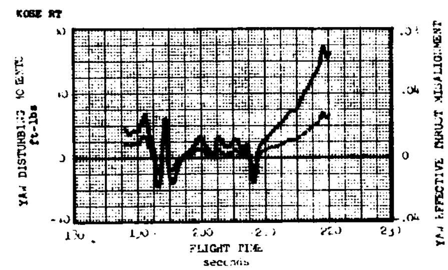
THIRD STAGE

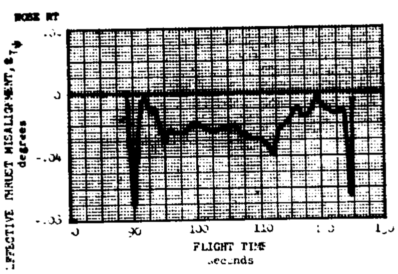
S-186C

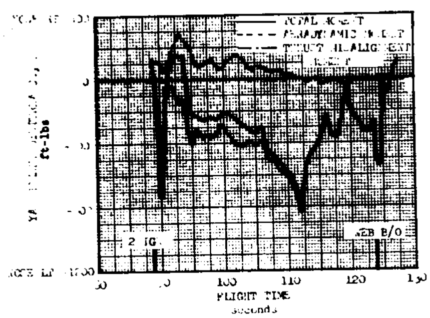




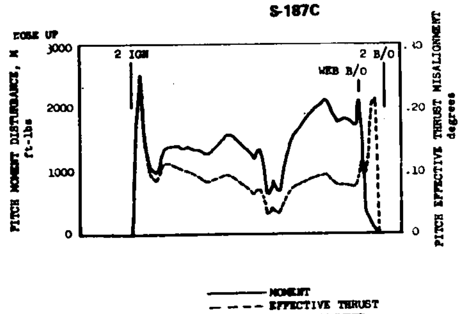


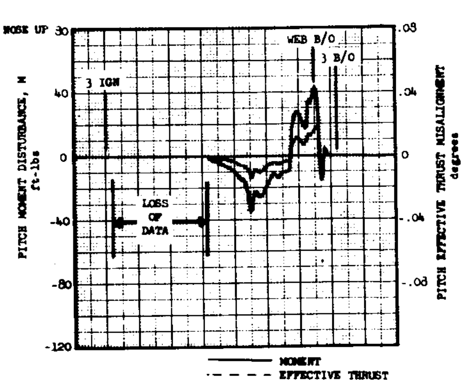


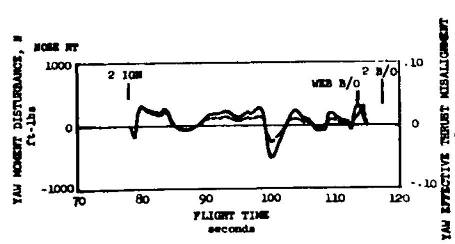


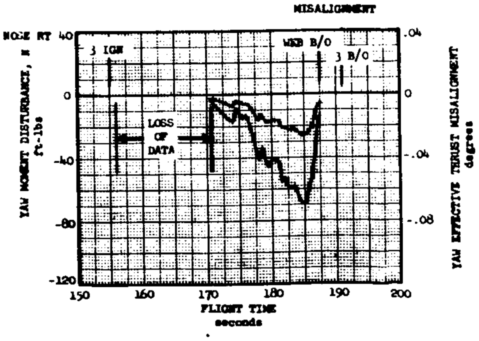


S-187C









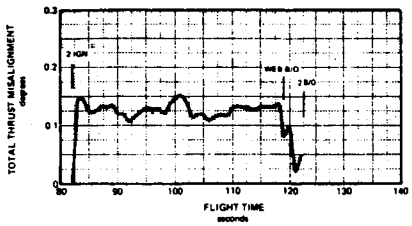
SCOUT

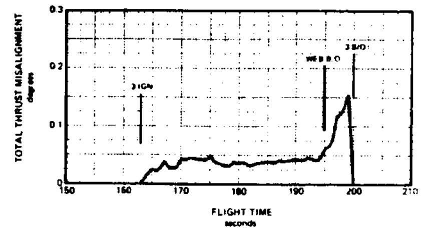
TABLE CCX - TOTAL THRUST MISALIGNMENT VS TIME

SECOND STAGE

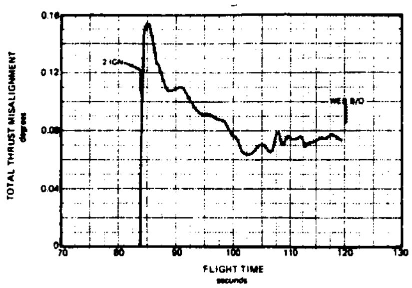
THIRD STAGE

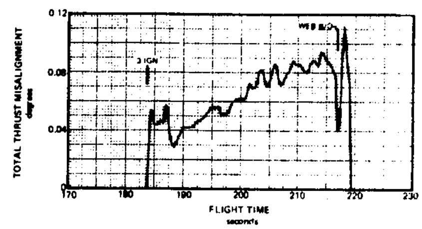
S-184C



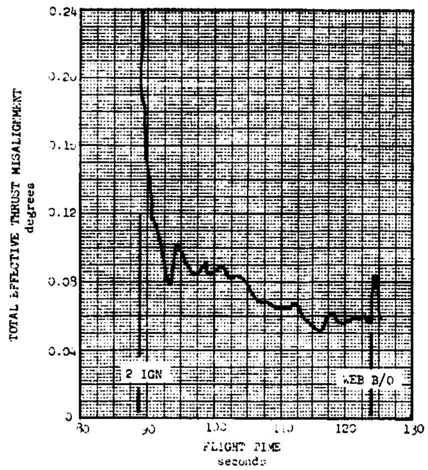


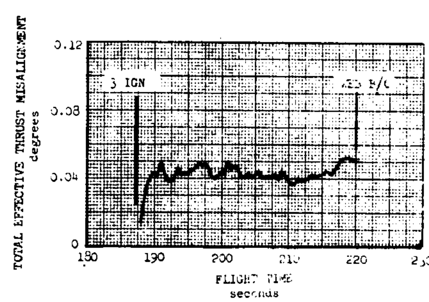
S-185C



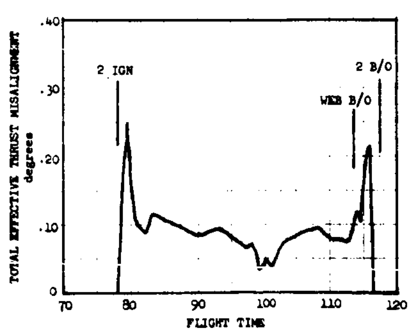


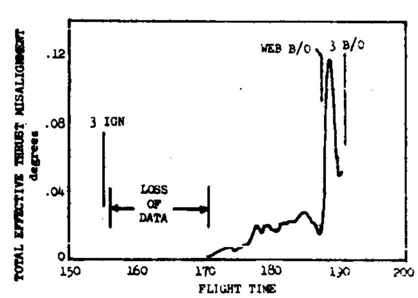
S-186C





S-187C





Rev. 8

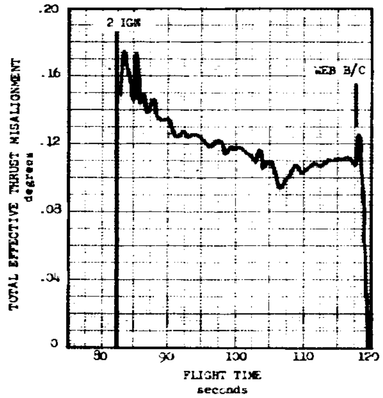
SCOUT

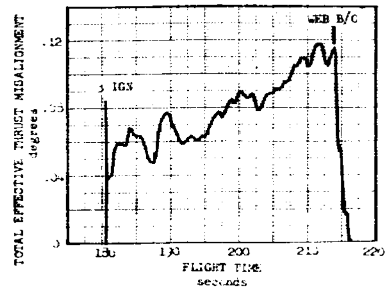
TABLE CCXI - TOTAL THRUST MISALIGNMENT VS TIME

SECOND STAGE

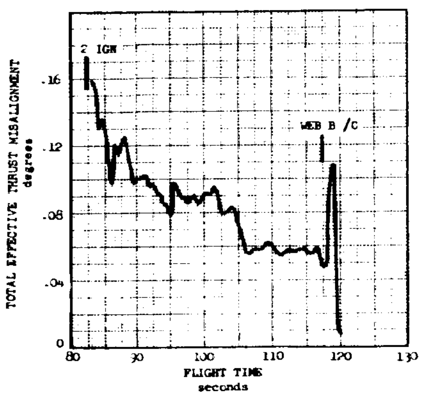
THIRD STAGE

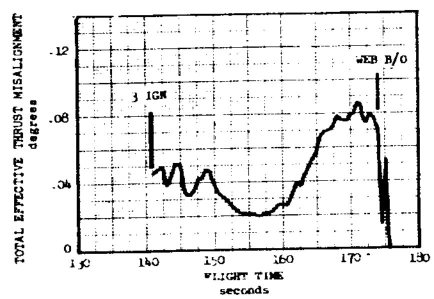
S-189C



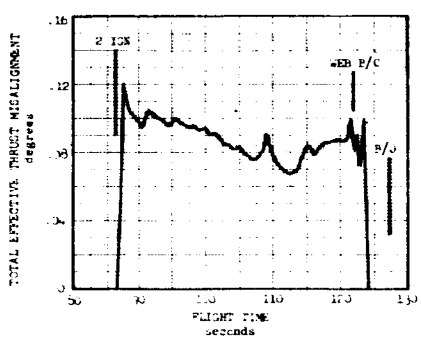


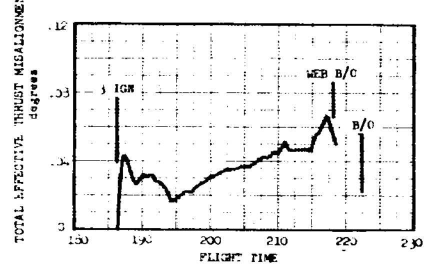
S-189C



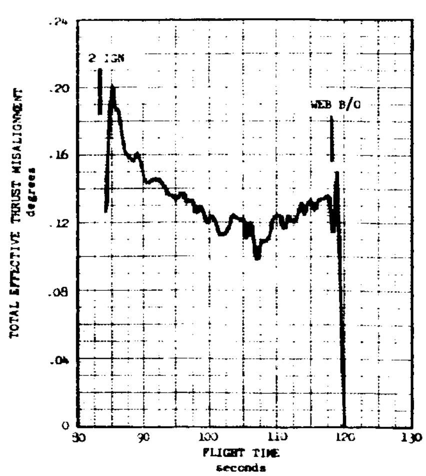


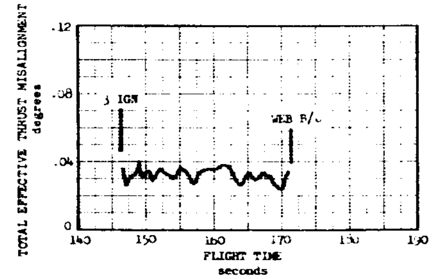
S-190C





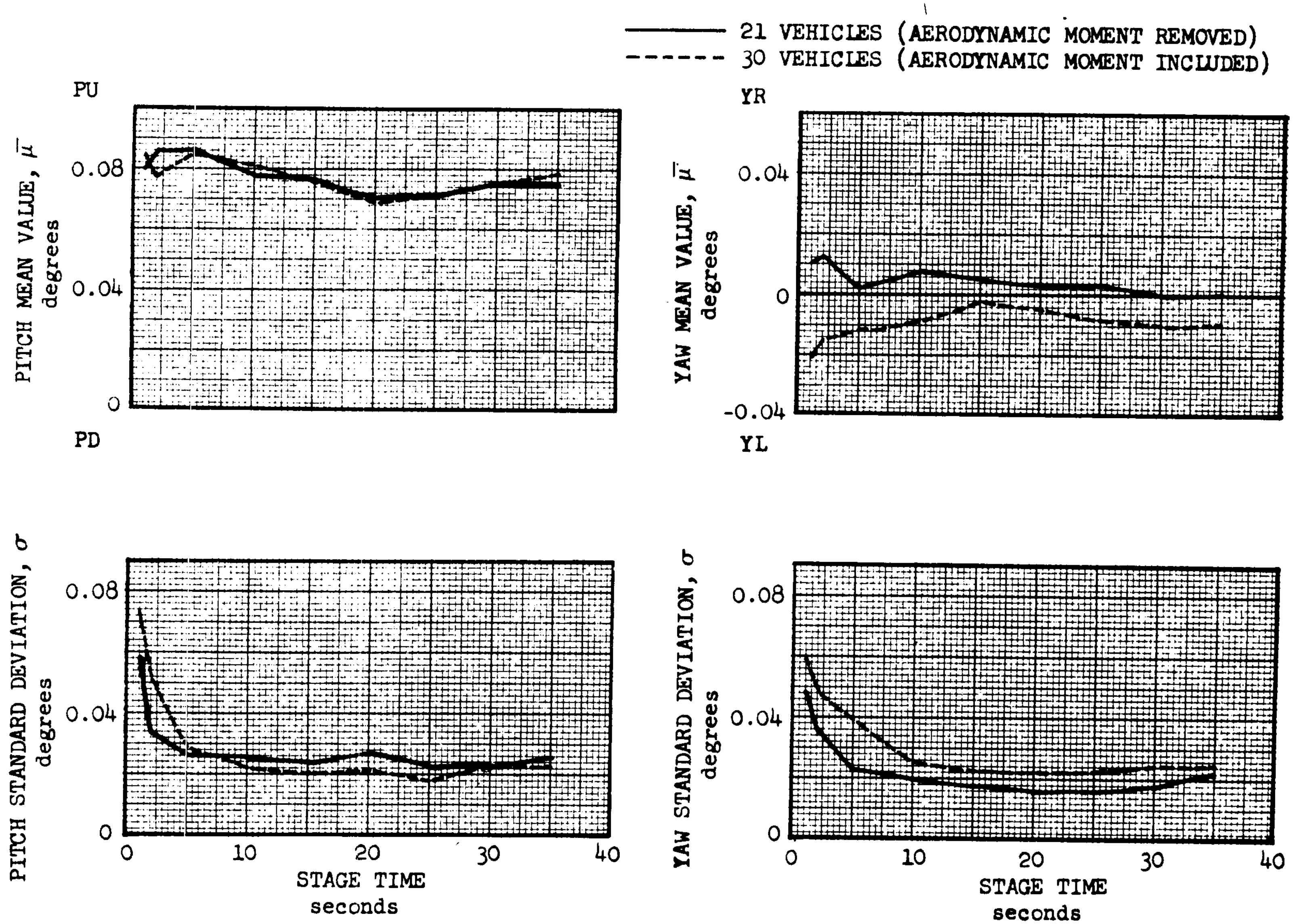
S-191C





SECOND STAGE (CASTOR II)

TABLE CCXII -THRUST MISALIGNMENT Vs TIME



THIRD-STAGE (ANTARES IIA)

TABLE CCXIII - THRUST MISALIGNMENT Vs TIME

(BASED ON 33 VEHICLES)

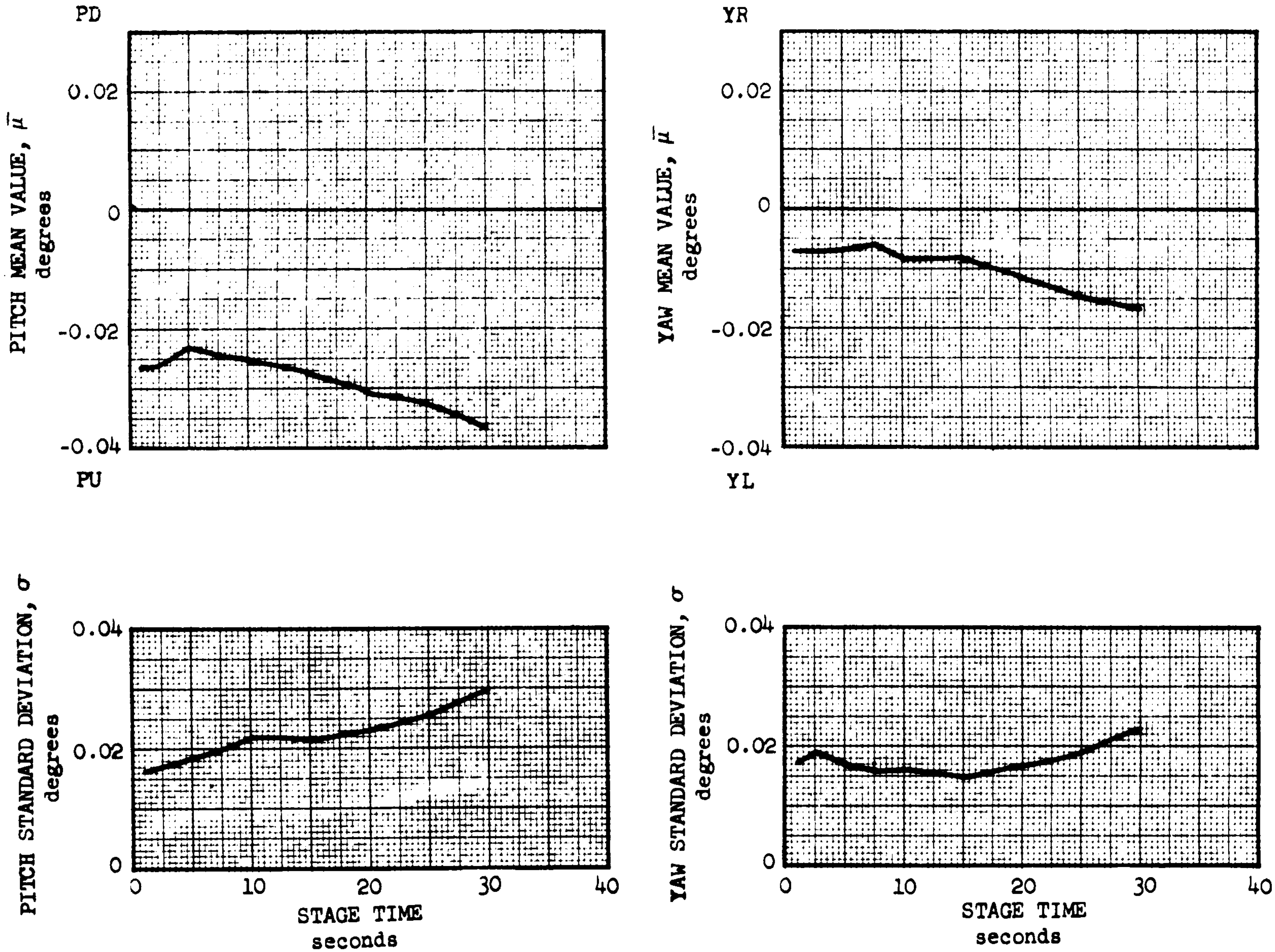


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TABLE CCXIV -

SCOUT
SECOND-STAGE FUEL CONSUMPTION REACTION CONTROL SYSTEM

VEHICLE	FUEL AT LIFT-OFF LBS	MISSION	CASTOR MOTOR	BOOST FUEL LBS	BOOST FUEL I_{SP} SEC	COAST TIME SEC.	FILTER NETWORK	COAST FUEL LBS.	COAST FUEL FLOW RATE LBS/SEC	COAST FUEL I_{SP} SEC	TOTAL FUEL LBS
S-173C	187	ORBITAL	IIA	29.0	130.6	23.19	IN	36.5	1.574	108.4	65.3
S-174C	188.5	ORBITAL	IIA	25.5	106.5	16.14	IN	24.5	1.516	123.7	50.0
S-175C	187	ORBITAL	IIA	35.2	139.5	14.56	IN	20.8	1.428	135.0	55.0
S-176C	187	ORBITAL	IIA	44.6	116.8	5.11	IN	11.4	2.230	120.0	56.0
S-177C	181.5	ORBITAL	IIA	33.5	121.9	5.72	IN	6.2	1.084	148.6	39.7
S-178C	183.0	ORBITAL	IIA	42.5	116.92	6.69	IN	6.3	0.942	104.1	48.8
S-180C	185.5	ORBITAL	IIA	26.4	116.3	8.59	IN	11.1	1.292	110.9	37.5
S-181C	184.0	ORBITAL	IIA	41.0	126.2	59.8	OUT	36.6	0.612	117.1	77.6
S-182C	180.0	ORBITAL	IIA	38.6	127.5	4.9	IN	5.2	1.061	*	43.8
S-183C	180	ORBITAL	IIA	39.9	128.2	21.21	IN	39.3	1.853	127.0	79.2
S-184C	181.0	ORBITAL	IIA	51.0	115.0	40.7	OUT	20.1	0.494	121.0	71.1
S-185C	182.5	ORBITAL	IIA	33.2	128.3	60.0	OUT	30.1	0.502	123.5	63.3
S-186C	181.0	ORBITAL	IIA	29.1	124.0	60.02	OUT	28.7	0.478	104.1	57.8
S-187C	190.0	ORBITAL	IIA	33.7	122.2	37.93	OUT	23.1	0.609	119.8	57.0
S-188C	183.0	ORBITAL	IIA	43.6	128.2	60.27	OUT	23.5	0.390	126.8	67.0
S-189C	183.0	ORBITAL	IIA	33.1	131.7	19.89	IN	22.7	1.141	110.6	55.8
S-190C	180.5	ORBITAL	IIA	36.0	125.0	60.0	OUT	26.5	0.442	106.7	62.5
S-191C	181.0	ORBITAL	IIA	43.9	126.8	24.45	IN	34.8	1.423	126.6	79.0

* NOT CALCULATED

TABLE CCXV -

SCOUT

THIRD-STAGE FUEL CONSUMPTION REACTION CONTROL SYSTEM

VEHICLE	FUEL AT LIFT-OFF LBS.	MISSION	BOOST FUEL LBS	BOOST FUEL I_{SP} SEC	COAST TIME SEC	COAST FUEL LBS	RETRO TIME SEC	RETRO FUEL LBS	RETRO I_{SP} SEC	RETRO FUEL FLOW RATE LBS/SEC
S-173C	19.5	ORBITAL	4.70	-	192.03	1.30	8.80	12.5	-	1.420
S-174C	19.1	ORBITAL	3.20	136.4	264.22	1.20	8.32	13.7	157.8	1.647
S-175C	19.5	ORBITAL	3.40	-	*373.31	0.40	11.00	14.7	152.0	1.336
S-176C	19.0	ORBITAL	5.30	150.0	573.78	1.30	9.40	11.5	163.4	1.223
S-177C	18.9	ORBITAL	2.40	123.2	405.94	1.80	8.35	13.7	-	1.641
S-178C	19.2	ORBITAL	1.7	129.69	593.93	2.70	11.5	13.8	169.7	1.200
S-180C	19.5	ORBITAL	2.90	129.4	500.91	2.60	10.95	12.9	-	1.178
S-181C	19.4	ORBITAL	4.9	164.7	139.908	0.60	9.37	12.9	150.2	1.377
S-182C	18.8	ORBITAL	2.16	121.7	484.295	2.64	10.8	12.9	172.1	1.194
S-183C	19.0	ORBITAL	4.10	131.5	360.11	1.70	9.63	13.2	-	1.371
S-184C	19.0	ORBITAL	4.2	141.8	362.076	1.50	9.38	12.3	157.3	1.311
S-185C	19.4	ORBITAL	4.81	157.9	138.172	0.70	10.0	12.9	157.6	1.290
S-186C	19.2	ORBITAL	[illegible].6	152.9	141.83	0.40	11.0	15.2	155.1	1.291
S-187C	19.5	ORBITAL	1.5	-	344.2	1.7	12.2	15.3	156.5	1.254
S-188C	19.4	ORBITAL	6.5	171.6	451.67	1.2	8.24	10.5	151.9	1.274
S-189C	18.8	ORBITAL	5.2	141.3	365.64	1.9	7.4	10.7	139.9	1.459
S-190C	17.8	ORBITAL	3.7	157.3	104.1	0.8	8.9	12.3	144.3	1.382
S-191C**	19.1	ORBITAL	3.9	125.9	335.8	1.8	8.4	12.4	164.5	1.477

** ANTARES IIB MOTOR; 60 POUND THRUST CONTROL MOTORS (PITCH-YAW).

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TABLE CCXVI -

SCOUT
- FIRST-STAGE MOTOR PERFORMANCE SUMMARY

VEHICLE	MOTOR			TOTAL IMPULSE				WEB BURN TIME			PREDICTED I_{SP} SEC	PREDICTED INERTS CONSUMED LBS.
	NAME	MODEL	S/N	PREDICTED I_t LB-SEC	RADAR INDICATION LB-SEC	PERCENT OF RADAR FROM PREDICTED	IN-FLIGHT I_t LB-SEC	PREDICTED WEB TIME SEC.	IN-FLIGHT WEB TIME SEC.	PERCENT FROM PREDICTED		
S-173C	ALGOL	IIB	74	5 465 142	5 452 944	-0.22	5 548 360	47.14	46.52	-1.32	257.87	216.0
S-174C	ALGOL	IIB	68	5 478 605	5 460 245	-0.34	5 546 670	46.909	47.43	+1.11	259.01	216.0
S-175C	ALGOL	IIB	66	5 451 604	5 450 773	-0.02	5 440 870	46.664	46.85	+0.40	257.87	216.0
S-176C	ALGOL	IIB	75	5 486 047	5 465 870	-0.37	5 408 980	47.628	47.54	-0.18	259.14	216.0
S-177C	ALGOL	IIB	76	5 467 025	5 462 000	-0.09	5 450 120	47.10	46.84	-0.55	257.87	216.0
S-178C	ALGOL	IIC	86	5 425 530	5 424 702	-0.02	5 456 764	47.01	46.19	-1.74	257.12	264.0
S-180C	ALGOL	IIC	78	5 457 608	5 449 158	-0.15	5 411 750	47.54	46.24	-2.73	257.37	216.0
S-181C	ALGOL	IIIA	5502-4	7 202 383	7 234 540	+0.45	7 176 441	55.50	55.61	+0.19	258.20	218.0
S-182C	ALGOL	IIC	84	5 427 525	5 434 495	+0.13	5 473 756	46.57	46.32	-0.54	257.05	216.0
S-183C	ALGOL	IIC	89	5 444 738	5 440 196	-0.08	5 439 168	47.08	47.03	-0.11	257.37	216.0
S-184C	ALGOL	IIIA	5502-2	7 222 474	7 269 680	+0.65	7 462 108	56.58	56.07	-0.90	258.20	218.0
S-185C	ALGOL	IIIA	5502-3	7 245 033	7 302 221	+0.79	7 175 893	55.50	56.50	+1.80	258.20	218.0
S-186C	ALGOL	IIIA	5502-9	7 285 444	7 300 510	+0.21	7 268 378	56.50	56.77	+0.48	259.55	218.0
S-187C	ALGOL	IIC	79	5 434 337	5 446 816	+0.23	5 460 466	46.59	46.73	+0.30	257.12	216.0
S-188C	ALGOL	IIIA	5502-7	7 279 549	7 284 878	+0.07	7 289 422	55.80	56.30	+0.89	259.55	218.0
S-189C	ALGOL	IIIA	5502-10	7 269 848	7 265 010	-0.07	7 338 260	56.50	56.54	+0.07	259.55	218.0
S-190C	ALGOL	IIIA	5502-6	7 268 578	7 273 639	+0.07	7 364 690	55.20	55.33	+0.235	259.55	218.0
S-191C	ALGOL	IIIA	5502-8	7 288 522	7 304 641	+0.22	7 243 845	55.25	54.89	+0.65	259.55	218.0

TABLE CCXVII -

SCOUT
- SECOND-STAGE MOTOR PERFORMANCE SUMMARY

VEHICLE	MOTOR			TOTAL IMPULSE				WEB BURN TIME			PREDICTED I_{sp} SEC	PREDICTED INERTS CONSUMED LBS.
	NAME	MODEL	S/N	PREDICTED I_t LB-SEC	RADAR INDICATION LB-SEC	PERCENT OF RADAR FROM PREDICTED	IN-FLIGHT I_t LB-SEC	PREDICTED WEB TIME SEC.	IN-FLIGHT WEB TIME SEC.	PERCENT FROM PREDICTED		
S-173C	CASTOR	IIA	182	2 315 850	2 323 682	+0.34	2 308 130	36.85	36.27	-1.57	281.81	55.20
S-174C	CASTOR	IIA	175	2 311 524	2 308 815	-0.12	2 302 880	38.381	38.02	-0.94	281.81	55.20
S-175C	CASTOR	IIA	180	2 313 897	2 320 490	+0.28	2 298 510	36.283	35.89	-1.08	281.81	55.20
S-176C	CASTOR	IIA	184	2 312 330	2 310 140	-0.09	2 250 430	36.773	36.35	-1.15	281.81	55.20
S-177C	CASTOR	IIA	181	2 311 090	2 303 720	-0.32	2 265 240	36.20	35.37	-2.29	281.81	55.20
S-178C	CASTOR	IIA	194	2 305 686	2 299 581	-0.26	2 289 053	35.585	35.20	-1.08	280.99	55.20
S-180C	CASTOR	IIA	186	2 314 379	2 305 208	-0.40	2 314 270	36.51	36.27	-0.66	281.81	55.20
S-181C	CASTOR	IIA	191	2 308 688	2 305 282	-0.15	2 273 742	35.56	34.99	-1.60	281.5	55.20
S-182C	CASTOR	IIA	197	2 314 586	2 300 148	-0.62	2 318 579	35.14	35.18	+0.11	281.5	55.20
S-183C	CASTOR	IIA	192	2 311 871	2 306 050	-0.25	2 310 605	35.57	35.71	+0.39	281.81	55.20
S-184C	CASTOR	IIA	187	2 312 942	2 312 309	-0.03	2 308 869	36.48	36.19	-0.79	281.50	55.20
S-185C	CASTOR	IIA	188	2 310 031	2 289 569	-0.88	2 309 189	36.51	36.37	-0.38	281.50	55.20
S-186C	CASTOR	IIA	200	2 309 463	2 310 353	+0.04	2 328 629	34.97	34.95	-0.06	280.99	55.20
S-187C	CASTOR	IIA	189	2 305 225	2 301 731	-0.15	2 271 006	35.58	35.32	-0.73	280.99	55.20
S-188C	CASTOR	IIA	198	2 311 177	2 313 323	+0.09	2 301 150	35.132	35.42	+0.82	280.99	55.20
S-189C	CASTOR	IIA	201	2 306 338	2 299 785	-0.28	2 207 650	35.00	35.15	+0.43	280.99	55.20
S-190C	CASTOR	IIA	190	2 308 232	2 311 467	+0.14	2 311 230	36.478	35.63	-2.32	280.99	55.20
S-191C	CASTOR	IIA	199	2 305 883	2 299 637	-0.27	2 206 907	35.007	34.85	-0.45	280.99	55.20

TABLE CCXVIII -

SCOUT
- THIRD-STAGE MOTOR PERFORMANCE SUMMARY

VEHICLE	MOTOR			TOTAL IMPULSE				WEB BURN TIME			PREDICTED I_{sp} SEC	PREDICTED INERTS CONSUMED LBS.
	NAME	MODEL	S/N	PREDICTED I_t LB-SEC	RADAR INDICATION LB-SEC	PERCENT OF RADAR FROM PREDICTED	IN-FLIGHT I_t LB-SEC	PREDICTED WEB TIME SEC.	IN-FLIGHT WEB TIME SEC.	PERCENT FROM PREDICTED		
S-173C	X259	B3	HIB-224	725 877	N/A	N/A	N/A	N/A	N/A	N/A	281.86	25.0
S-174C	X259	B3	HIB-218	726 722	725 894	-0.11	715 340	30.00	29.74	-0.87	281.861	25.0
S-175C	X259	B3	HIB 226	725 172	723 421	-0.24	720 210	30.00	30.08	+0.27	281.861	25.0
S-176C	X259	B3	HIB-219	726 243	724 200	-0.28	707 300	30.00	30.58	+1.93	281.861	25.0
S-177C	X259	B3	HIB-223	727 032	724 300	-0.375	733 470	30.43	29.92	-1.68	281.86	25.0
S-178C	X259	B3	HIB-310	718 220	717 882	-0.05	711 079	32.79	32.63	-0.49	280.50	25.0
S-180C	X259	B3	HIB-314	720 662	718 065	-0.36	716 870	30.49	30.37	-0.39	281.86	25.0
S-181C	X259	B3	HIB-313	719 638	716 184	-0.48	718 690	32.47	32.69	+0.67	281.30	25.0
S-182C	X259	B3	HIB-311	719 434	716 938	-0.35	733 780	32.83	32.66	-0.52	281.35	25.0
S-183C	X259	B3	HIB-302	726 221	723 569	-0.365	728 642	30.43	30.23	-0.66	281.86	25.0
S-184C	X259	B3	HIB-303	727 821	725 761	-0.28	728 711	32.83	31.77	-3.23	281.35	25.0
S-185C	X259	B3	HIB-313	719 968	717 280	-0.37	713 967	32.47	33.05	+1.78	281.30	25.0
S-186C	X259	B3	HIB-315	718 557	720 798	+0.31	731 750	32.79	32.80	+0.03	280.50	25.0
S-187C	X259	B3	HIB-307	723 690	723 881	+0.03	734 984	32.25	32.50	+0.775	280.50	25.0
S-188C	X259	B3	HIB-308	718 192	719 961	+0.25	714 869	32.79	33.36	+1.74	280.50	25.0
S-189C	X259	B3	HIB-316	717 912	718 240	+0.045	710 870	32.79	33.31	+1.585	280.50	25.0
S-190C	X259	B3	HIB-306	718 916	720 038	+0.16	739 230	32.79	31.83	-2.93	280.50	25.0
S-191C	X259	B4	HIB-401	733 440	736 040	+0.35	723 000	25.21	25.22	+0.04	285.76	18.59

TABLE CCXIX -

SCOUT
- FOURTH-STAGE MOTOR PERFORMANCE SUMMARY

VEHICLE	MOTOR			TOTAL IMPULSE				WEB BURN TIME			PREDICTED I_{sp} SEC	PREDICTED INERTS CONSUMED LBS.
	NAME	MODEL	S/N	PREDICTED I_t LB-SEC	RADAR INDICATION LB-SEC	PERCENT OF RADAR FROM PREDICTED	IN-FLIGHT I_t LB-SEC	PREDICTED WEB TIME SEC.	IN-FLIGHT WEB TIME SEC.	PERCENT FROM PREDICTED		
S-173C	FW-4S		2223-14	172 116	N/A	N/A	N/A	33.18	N/A	N/A	283.95	5.00
S-174C	FW-4S		2223-3	171 850	171 222	-0.365	N/A	31.89	N/A	N/A	284.425	5.00
S-175C	FW-4S		2223-10	172 116	172 081	-0.02	N/A	33.13	N/A	N/A	283.95	5.00
S-176C	X258	E5	ABL-149	140 533	140 215	-0.23	N/A	21.00	N/A	N/A	277.30	5.11
S-177C	FW-4S		2223-7	172 031	171 718	-0.18	165 990	31.37	30.61	-2.42	283.95	5.00
S-178C	X258	E5	ABL-150	140 269	139 742	-0.375	N/A	21.00	N/A	N/A	277.30	5.10
S-180C	FW-4S		2223-15	172 045	171 639	-0.235	168 610	31.60	31.21	-1.23	283.95	5.00
S-181C	FW-4S		2376-2	171 412	171 970	+0.325	172 780	27.52	27.88	+1.29	283.42	4.00
S-182C	FW-4S		2376-1	171 345	171 209	-0.08	N/A	27.14	N/A	N/A	283.45	4.00
S-183C	FW-4S		2223-12	171 645	172 210	+0.33	N/A	33.25	N/A	N/A	283.95	4.00
S-184C	FW-4S		2376-8	171 445	172 519	+0.63	169 330	27.57	28.11	+1.92	283.45	4.00
S-185C	FW-4S		2223-13	172 078	172 667	+0.34	172 330	30.29	30.60	+1.02	283.42	4.00
S-186C	FW-4S		2376-6	171 996	172 954	+0.56	171 820	27.40	28.09	+2.52	284.15	4.00
S-187C	ALTAIR IIIA	TCC/E	TCC/E-13	171 956	175 063	+1.81	175 780	28.20	29.32	+3.97	286.45	3.10
S-188C	FW-4S		2376-7	171 680	172 176	+0.29	169 240	27.05	28.02	+3.585	283.91	4.00
S-189C	ALTAIR IIIA	TCC/E	TCC/E-14	172 271	174 972	+1.57	173 900	28.20	29.28	+3.83	236.45	3.10
S-190C	FW-4S		2376-4	172 050	172 676	+0.36	202 700	27.30	27.69	+1.43	283.91	4.00
S-191C	FW-4S		2376-3	171 825	171 645	-0.10	172 440	27.20	27.35	+0.55	284.15	4.00

TABLE CCXX–

SCOUT

SUMMARY OF DYNAMIC RESPONSE DATA

VEHICLE	FIRST STAGE					SECOND STAGE					THIRD STAGE				
	PERCENT FUEL BURNED	OBSERVED BENDING FREQUENCY H_z	PEAK TRANSIENT ACCELERATION "g"			PERCENT FUEL BURNED	OBSERVED BENDING FREQUENCY H_z	PEAK TRANSIENT ACCELERATION "g"			PERCENT FUEL BURNED	OBSERVED BENDING FREQUENCY H_z	PEAK TRANSIENT ACCELERATION "g"		
			LONG.	NORM.	TRANS.			LONG.	NORM.	TRANS.			LONG.	NORM.	TRANS.
S-173C	0	2.92(P)	+5.45	+1.48	+0.33	0	13.41(P)	+6.22	+0.79	+0.71	0	* (P)	*	*	*
		* (Y)	-1.28	-1.64	-0.27		13.40(Y)	-1.11	-0.79	-0.29		* (Y)	*	*	*
S-174C	0	2.92(P)	+4.26	+0.30	+0.10	0	14.4(P)	+5.64	+0.48	+0.48	0	11.4(P)	+0.81**	+0.24	+0.29
		3.03(Y)	-0.72	-0.19	-0.06		14.0(Y)	-0.46	-0.40	-0.17		12.3(Y)	*	*	-0.12
S-175C	0	2.92(P)	+5.91	+0.92	+0.27	0	* (P)	+6.64	+0.31	+0.65	0	15.06(P)**	*	*	*
		3.04(Y)	-2.35	-0.98	-0.19		13.92(Y)	-1.57	-1.06	-0.69		15.00(Y)**	*	*	*
S-176C	0	3.14(P)	+4.15	+0.50	+0.33	0	16.4(P)	+5.66	+0.31	+0.33	0	16.1(P)	+2.23	+0.81	+0.76
		* (Y)	-3.12	-0.56	-0.24		16.5(Y)	-1.25	-0.38	-0.32		15.8(Y)	-1.56	-0.94	-0.70
S-177C	0	3.01(P)	+0.63	+0.38	+0.13	0	5.27(P)	+5.32	+0.56	+0.36	0	12.43(P)	*	*	*
		2.74(Y)	-0.63	-0.21	-0.15		12.80(Y)	-0.63	-0.44	-0.24		13.40(Y)	*	*	*
S-178C	0	3.20(P)	+1.65	+0.51	+0.34	0	16.7(P)	+7.28	+0.67	+0.79	0	15.2(P)	+9.80	+0.63	+1.47
		* (Y)	-0.52	-0.37	-0.20		16.9(Y)	-0.98	-0.71	-0.60		15.5(Y)	*	-0.37	-1.47
S-180C	0	3.13(P)	+1.26	+0.57	+0.19	0	* (P)	+5.08	*	*	0	15.72(P)	*	+1.65	+1.43
		* (Y)	-0.99	-0.57	-0.15		* (Y)	-0.91	*	*		15.60(Y)	*	-2.13	-1.66
S-181C	0	* (P)	+2.56	+0.79	±0.29		* (P)	+6.84	+0.41	+0.41	0	13.7 (P)	+8.98	+0.97	*
		* (Y)	+0.37	-0.60			16.9(Y)	-0.99	-0.97	-0.77		13.6 (Y)	+3.71	-0.48	*
S-182C	0	2.71(P)	+1.67	+1.09	+0.31	0	* (P)	+8.23	+0.37	+1.01	0	13.3 (P)	+7.96	+0.59	+0.32
		* (Y)	-0.38	-0.72	-0.33		* (Y)	-1.67	-0.49	-1.51		13.3 (Y)	-3.55	-0.57	-0.54
S-183C	0	3.19(P)	+1.36	+0.80	+0.23	0	16.9(P)	*	*	*	0	* (P)	*	*	*
		* (Y)	-0.54	-0.51	-0.21		38.2(Y)	*	*	*		* (Y)	*	*	*
S-184C	0	* (P)	+2.51	+0.63	+0.29	0	14.9 (P)	+7.05	+0.61	+0.44	0	11.8 (P)	+10.36	+1.17	+1.91
		* (Y)	+0.46	-1.10	-0.38		14.4 (Y)	-0.97	-0.59	-0.65		12.0 (Y)	+ 4.30	-1.09	-1.63
S-185C	0	2.35(P) * (Y)	+0.98 -0.67	+0.48 -0.50	±0.23	0	11.48(P) * (Y)	+5.70 -0.77	+0.68 -0.62	+0.49 -0.86	0	12.0 (P) 12.22 (Y)	+5.81 -0.51	* *	* *
S-186C	0	2.92(P)	+3.50	+0.73	+0.31	0	15.38(P)	+6.93	+0.71	+0.51	0	13.5(P)	+8.55	*	*
		2.84(Y)	+0.37	-0.75	-0.21		14.83(Y)	-0.52	-0.71	-0.41		12.9(Y)	-0.83	*	*
S-187C	0	2.80(P)	+1.04	+0.62	+0.19	0	17.1 (P)	+3.91	+0.49	+0.38	0	13.6(P)	+4.17	+1.05	+0.99
		* (Y)	-0.94	-0.58	-0.17		17.3 (Y)	-0.83	-0.49	-0.36		13.3(Y)	-1.56	-0.82	-0.53
S-188C	0	2.92(P)	+3.74	+0.75	+0.31	0	15.6 (P)	+4.44	*	*	0	14.7(P)	*	*	*
		2.87(Y)	-0.48	-0.79	-0.22		16.1 (Y)	-0.83	*	*		14.6(Y)	*	*	*
S-189C	0	2.92(P)	+3.56	+0.80	+0.48	0	17.3 (P)	+7.28	*	+0.68	0	12.3(P)	+7.18	*	+0.93
		2.88(Y)	-0.33	-0.80	-0.31		18.6 (Y)	-0.13	-1.55	-0.58		12.1(Y)	-0.25	*	-0.99
S-190C	0	2.94(P)	+3.71	+0.84	+0.20	0	* (P)	+6.72	+0.59	+0.43	0	12.2(P)	+10.53	*	+0.74
		* (Y)	-0.43	-0.75	-0.18		* (Y)	-0.52	-0.71	-0.78		12.0(Y)	-0.68	*	-0.72
S-191C	0	2.91(P)	+3.62	+0.19	+0.24	0	14.8 (P)	+6.83	+0.53	+0.49	0	12.3(P)	+6.57	*	+1.18
		2.97(Y)	+0.28	-0.44	-0.31		13.6 (Y)	-1.12	-0.85	-0.86		11.5(Y)	*	-1.91	-1.18

* UNREADABLE

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Final Report

16. Abstract

The historical data for all aspects of the Phase VI Scout Program is presented in detail; the 100 percent launch success, the improvement progra, the reimbursable programs (both international and Department of Defense), the advanced planning, the diverse capabilities, and the financial status during the 1971 - 1978 time period.

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