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SCOUT LAUNCH VEHICLE PROGRAM

FINAL REPORT - PHASE VI

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APPENDIX A

APPENDIX A

SCOUT PROBE AND REENTRY MISSIONS

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(a) PROBE LAUNCHES

In addition to the orbital capability of the Scout launch vehicle, as noted on all fifteen Phase VI Scouts, Scout also has Space Probe and Reentry capability. The Scout launch vehicle launched seven space probe missions, as follows:

PHASE	LAUNCH NO.	CONFIGURATION	VEHICLE NO.	DATE LAUNCHED
I	1	X-1	ST-1	7-1-60
I	2	X-1	ST-2	10-4-60
I	7	X-1	ST-7	10-19-61
I	9	X-2	ST-9	3-29-62
III	28	X-4	S-124	7-20-64
V	76	B	S-166	9-20-71
VII	95	D	S-193	6-18-76

A Scout Probe Mission is achieved by imparting the maximum energy of the booster system to the payload, allowing the payload to ascend to a maximum height. Figure A-1 illustrates a typical probe ascent trajectory. The only major difference between probe and orbit missions is the timing of fourth-stage firing. In a probe mission, the fourth stage is fired nominally 20 seconds following third-stage burnout. Fourth-stage spinup and separation are accomplished during this coast phase. The payload may or may not be separated from the empty fourth stage following burnout. Capabilities of Scout as a probe booster are defined in figures A-2, A-3, and A-4. All stages of the vehicle are fired in sequence and the payload coasts to apogee. As the payload weight decreases, the apogee increases until the payload will eventually escape the earth's gravitational field and become sun orbital. The apogee altitudes (figure A-2) and time at zero "g" (figure A-3) for the standard Scout vehicle are indicated in this appendix along with the five-stage solar mission performance (figure A-4). The probes included radiation experiments, ionosphere experiments, ion engine experiment, and a German experiment. All seven were successful.

(b) REENTRY LAUNCHES

The Scout vehicle lends itself well to the reentry-type mission. When employed to fly a reentry mission trajectory, a significan departure from orbit and probe mission staging sequence is required. The first two stages are handled in the same manner as orbit and brobe missions. However, the third and fourth stages are generally used to drive the payload back into the atmosphere. This necessitates a much longer second-stage coast than the normal five seconds used for orbit and probe missions. This long coast phase allows the vehicle to coast to the vicinity of the apogee altitude resulting from the energy supplied to the system by stages one and two. The exact ignition time and position of the third stage are determined by the reentry test conditions required by the payload agency. Following third-stage burnout a minimum coast phase of 20 seconds is required to perform the spinup and separation of the fourth stage and payload.

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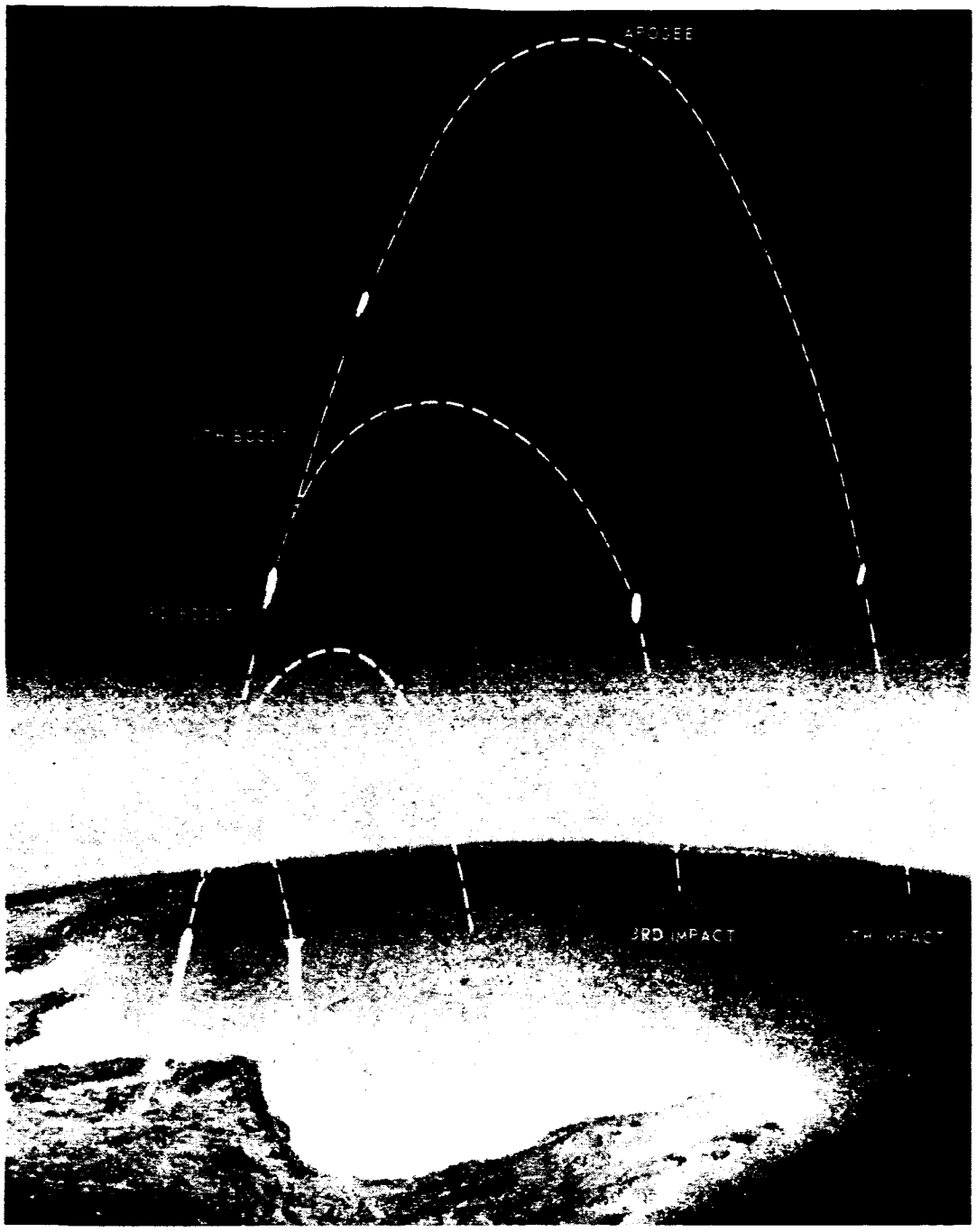

Figure A-1.- Typical Probe Ascent Trajectory.

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FOUR STAGE SCOUT

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

WFC LAUNCH
LAUNCH AZIMUTH = 90°

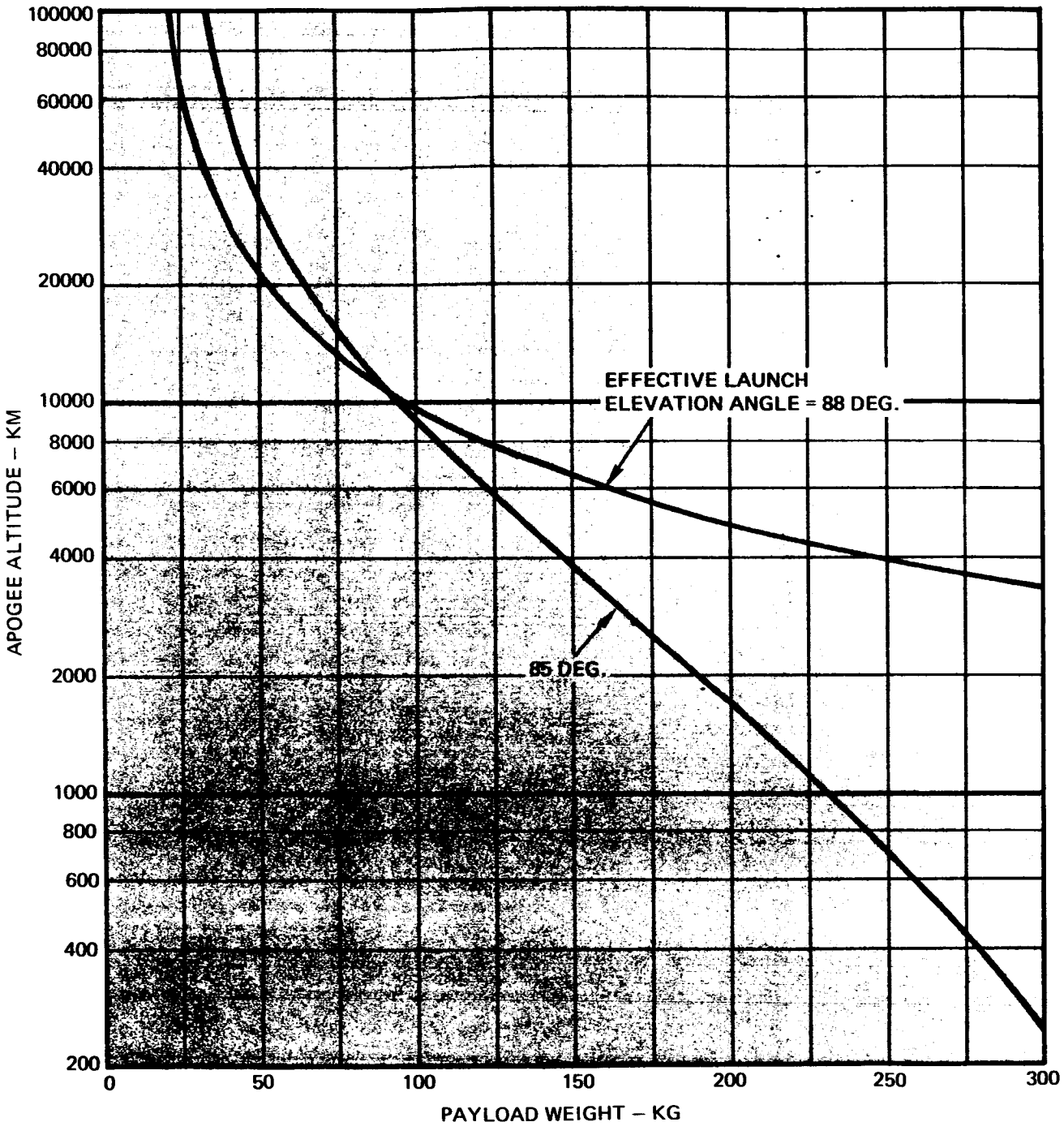

Figure A-2.- Probe performance - Apogee Altitude.

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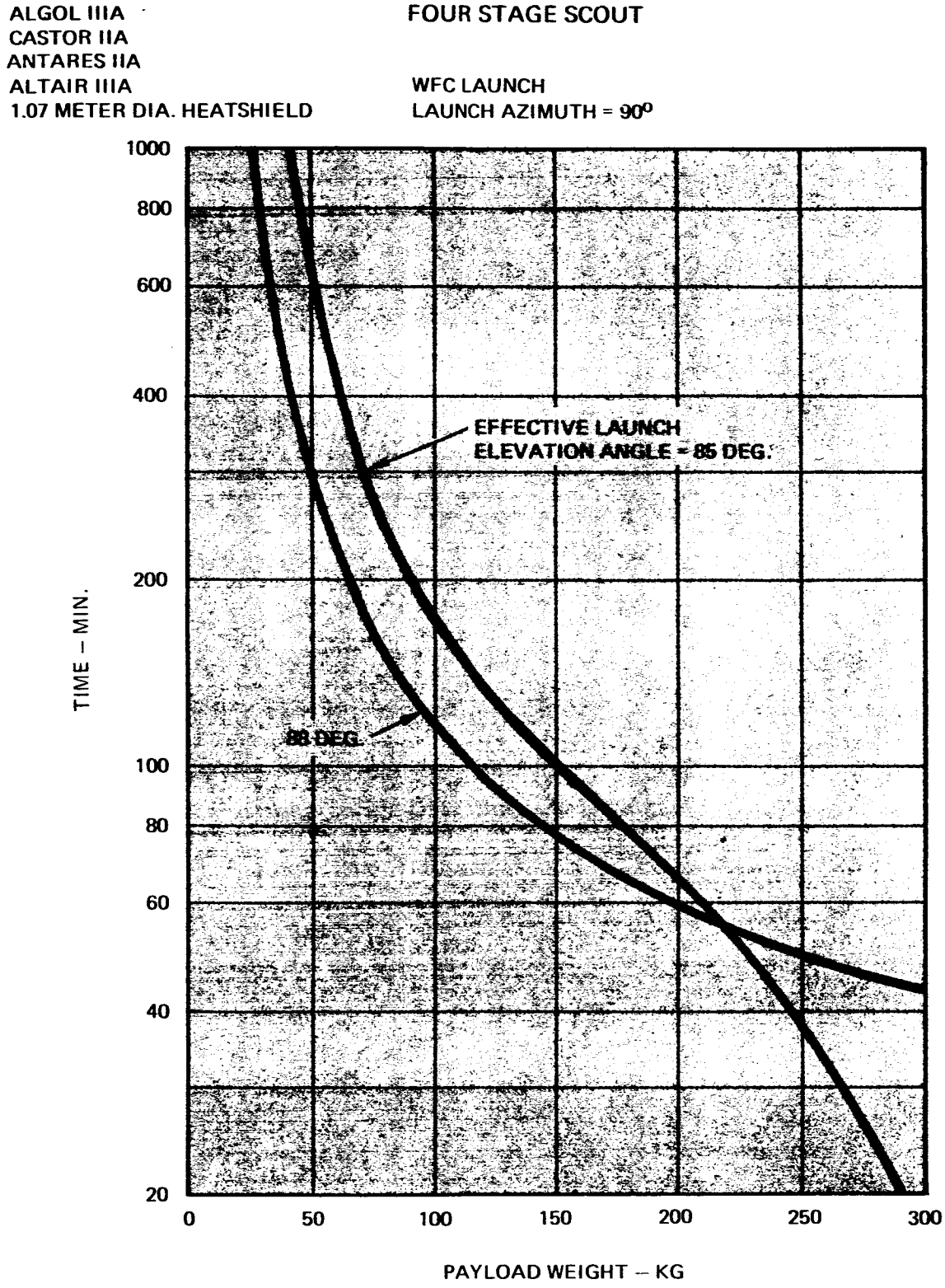

Figure A-3 .- Probe Performance - Time at Zero "G"

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FIVE STAGE SCOUT

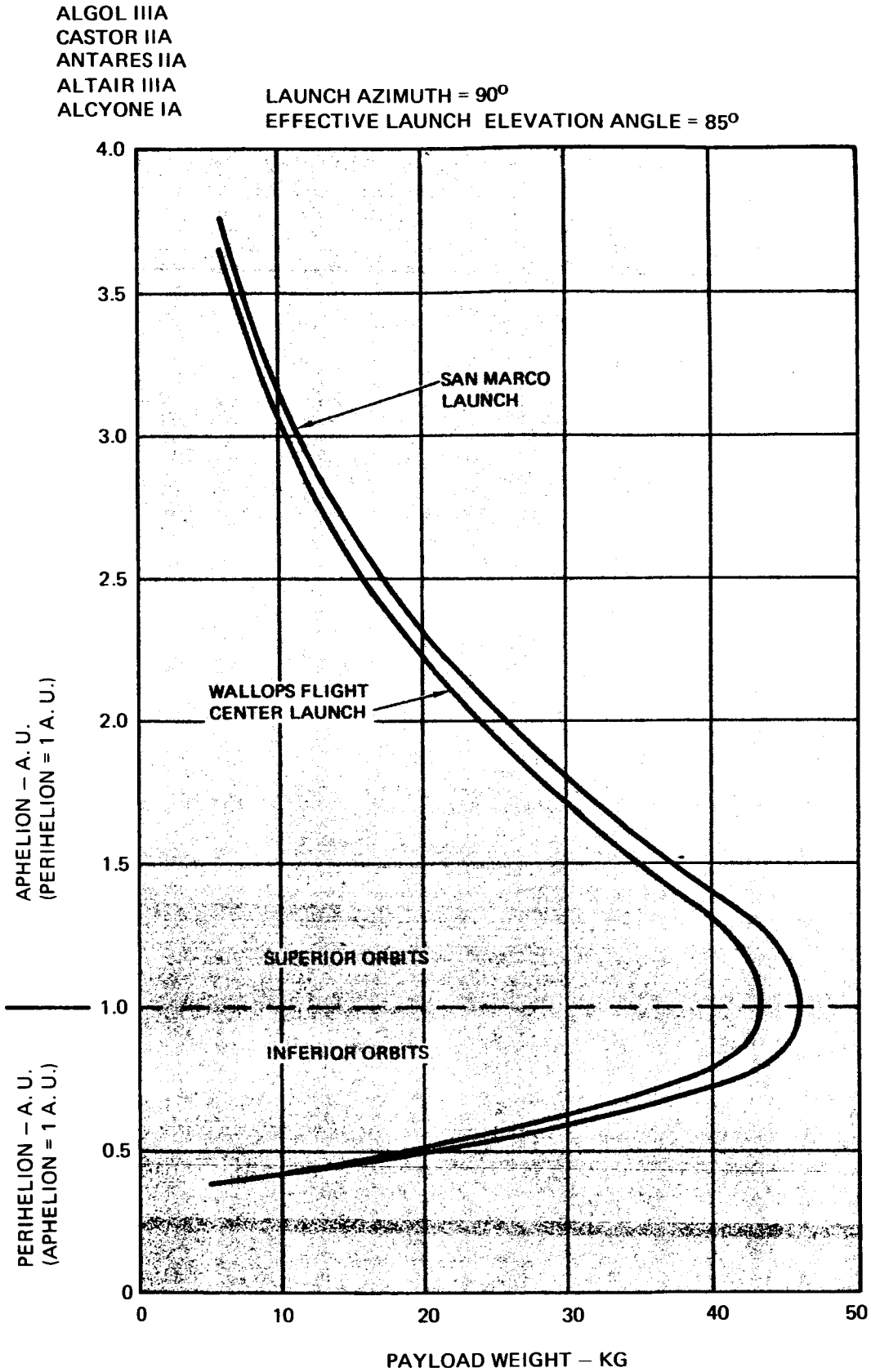

Figure A-4.- Solar Probe Performance.

The Scout launch vehicle has performed twelve Scout reentry launches as follows:

PHASE	LAUNCH NO.	CONFIGURATION	VEHICLE NO.	DATE LAUNCHED
I	1	X-1A	ST-8	3-1-62
II	13	X-3A	S-114	8-31-62
II	19	X-3	S-116	5-22-63
II	22	X-3!	S-110	7-20-63
III	29	X-4A	S-129	8-18-64
III	31	X-3C	S-130	10-9-64
IV	42	X-4A	S-141	2-9-66
IV	57	B	S-159	10-19-67
V	61	X-5C	S-164	4-27-68
V	64	B	S-168	8-22-68
V	69	B	S-171	11-7-69
IV	73	B	S-144	6-20-71

Two of the reentry missions were unsuccessful. Both were during the prototype missions; launch number 13 and 22. The missions included reentry heating, reentry mission for the support of Apollo, materials test, nose cone test, communications measurements, and PAET experiment. Launch vehicles ST-8, S-114, S-110, S-129, and S-141 had an additional propulsion unit as part of the payload. A typical reentry mission profile is illustrated in figure A-5. Figure A-6 presents the reentry performance at fourth-stage burnout.

The typical sequence of reentry events is listed below:

TIME	EVENT
-0.13	Stage-I Ignition
0.00	Lift-off
0.10	Start Timer
82.82	Stage-I Burnout
90.00	Stage-2 Ignition, activate "B" controls, separate first stage, remove first-stage controls
128.23	Stage-2 burnout
345.80	Separate payload heat shield, activate "C" burn controls, third-stage squib ignition
347.50	Stage-3 ignition, separate second stage, remove second stage controls
384.15	Stage-3 burnout
389.15	Activate "C" coast controls
430.56	Spin motor ignition, fourth-stage squib ignition
432.06	Explosive bolt ignition, separate third stage
432.56	Retro force command
405.15	Stage-four ignition
436.91	Stage-four burnout

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RE-ENTRY MISSION

Re-entry performance of the Scout following a gravity turn is provided in the following pages. The booster fires the first two stages, coasts beyond peak altitude and then fires the upper stages to drive the payload back into the atmosphere as depicted in the typical Wallops to Bermuda sequence shown below. Re-entry capabilities shown should be considered typical of Scout capabilities since significant changes in re-entry conditions can be obtained through selection of pitch rates, staging times and final stage attitude at ignition. For additional range, such as a re-entry mission launched from VAFB with impact in the vicinity of Hawaii, the staging can be modified to three stages fired up with the final stage fired down.

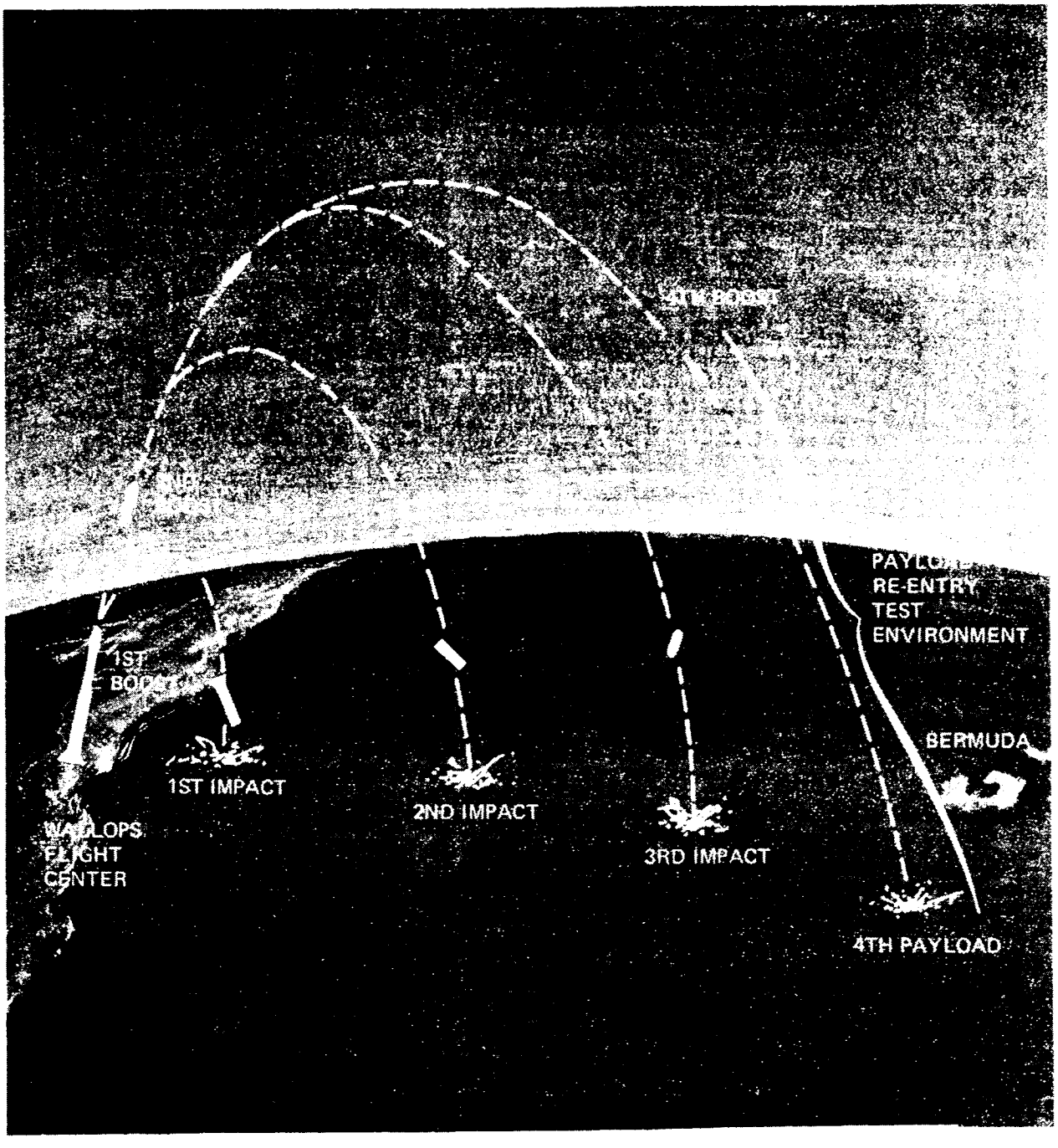

Figure A-5 .- Typical reentry profile with stage impacts.

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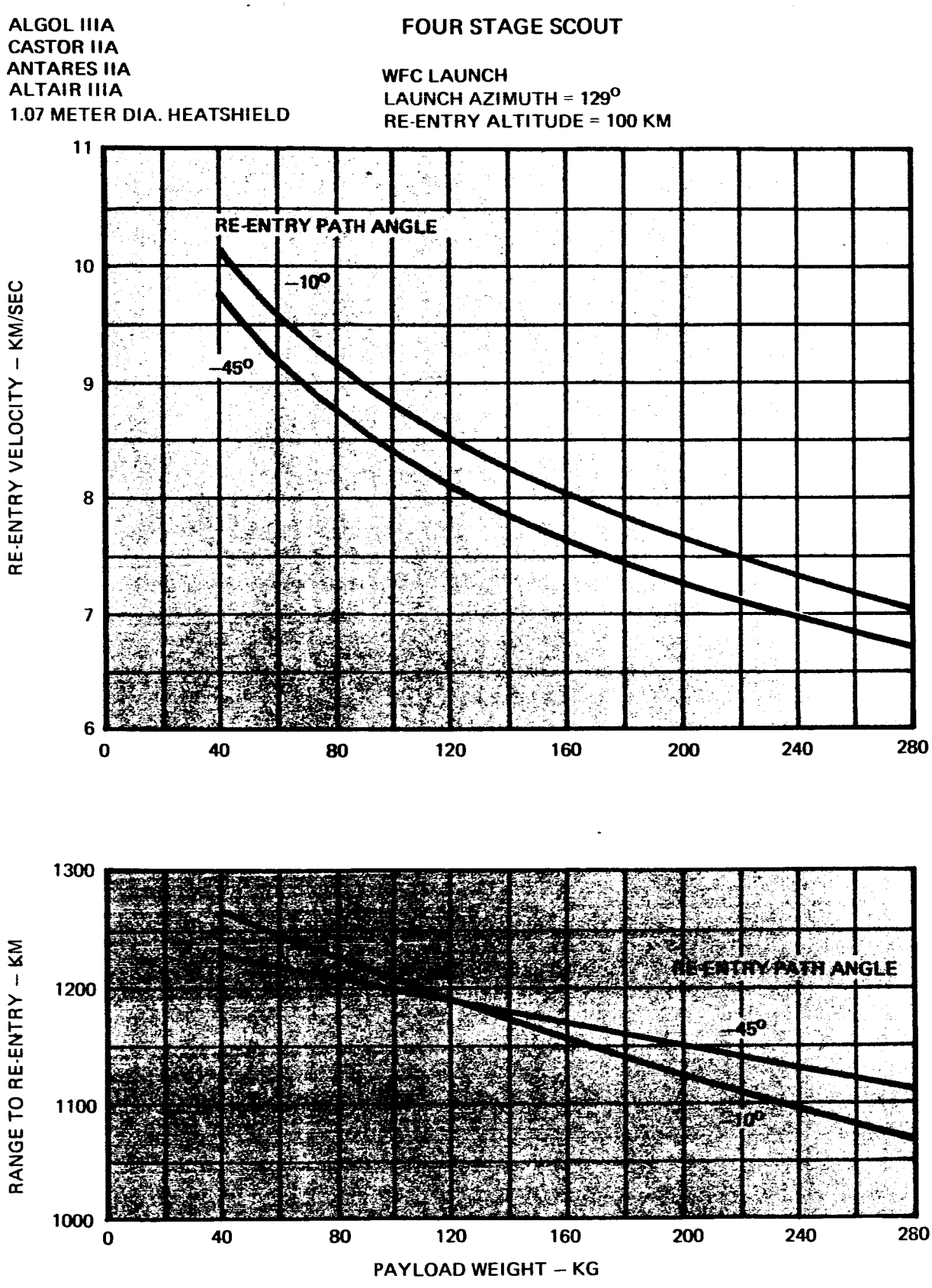

Figure A-6.- Reentry performance at fourth-stage burnout.

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APPENDIX B

SCOUT SINGLE FAILURE POINT INVESTIGATION

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APPENDIX B

SCOUT SINGLE FAILURE POINT INVESTIGATION[a]

SUMMARY

The purpose of the Single Failure Point (SFP) Investigation was to analyze flight-critical systems of the Scout vehicle. The outcome of this analysis was to define single failure point sources whose failure could result in the loss of a Scout mission, and determine the adequacy of prelaunch testing and Ground Support Equipment (GSE) associated with the identified single failure point.

In order to minimize duplication of effort and to conduct the activities in an expeditious manner, the program was conducted in the following three phases:

Phase I - Single Failure Point Identification
Phase II - Identification and Review of Test Procedures
Phase III - Ground Support Equipment Review

During the course of this investigation, 343 single failure point sources were identified for the various flight critical Scout systems reviewed. While this number may seem large, it does not appear to be out of proportion with a vehicle whose systems are as complex as those found on Scout. For the most part, these sources are present because of the shortcomings inherent in non-redundant designs. There were no single failure point sources identified in the vehicle systems which exhibited deficiencies that would necessitate mandatory design corrective action.

Mechanical systems, such as structures, do not lend themselves readily to this type of analysis. The mechanical portions of the vehicle and the launcher were analyzed in a similar manner to that for other vehicle systems and the information generated has been included in LTV report 23.548.

The initial effort for Single Failure Point Identification consisted of compiling a list of prelaunch and flight critical functions necessary for mission success. These lists, shown in tables B-I and B-II, were then used as the basis for identifying SFP sources employing fault tree analysis techniques.

Table B-I lists those required functions which are verified during the last portion of the countdown commencing approximately thirty minutes prior to launch. It should be noted that some critical functions have been omitted from the list, e.g., fueling of the second and third stage reaction control subsystems which is completed earlier in the vehicle processing. However, successful execution of the items in this table does corroborate the fact that performance of these crucial tasks has been accomplished (e.g., items 0.14 through 0.17 for the fueling example above).

Table B-II lists those functions which must take place during each stage of flight in order to complete a typical Scout mission successfully. Following

[a]Reference Bibliography - LTV Report 23.546

TABLE B-I

CRITICAL FUNCTIONS LIST - PRELAUNCH

	Launcher Arms Cleared From Vehicle
0.1	Support Arms Clear of Vehicle
0.2	RCS Fueling Arms Clear of Vehicle
	Vehicle Alignment
0.3	Azimuth Angle Set
0.4	Elevation Angle Set
	Ignition Destruct Batteries Flight Readied
0.5	System Nos. 1 and 2 Batteries Activated
	Ignition/Destruct System Armed
0.7	Destruct System Armed
0.8	Ignition System Armed
	Displacement Gyros Referenced
0.9	Pitch Gyro Caged
0.10	Yaw and Roll Gyros Caged
	Timer Reset to Zero
0.11	Channels One Through Twenty-Eight Reset
	Systems in Reset Status
0.12	Power Control Relay Box Reset
0.13	Timer Reset
	Reaction Control Systems Launch Readied
0.14	Third Stage RCS Pressurized
0.15	Third Stage Catalyst Beds Preheated
0.16	Second Stage RCS Pressurized
0.17	Second Stage Catalyst Beds Preheated
	Systems on Internal Power
0.18	Command Destruct
0.19	Telemetry
0.20	Radar Beacon
0.21	Guidance 37 VDC
0.22	Guidance 28 VDC
0.30	Guidance 3 VDC
	Displace Gyros Uncaged
0.23	Pitch
0.24	Yaw/Roll
	First Stage Control System Launch Readied
0.25	Hydraulic Pump On
0.26	Fin Tips Zeroed
	Reset Removed
0.27	Timer Reset Removed
0.28	Power Control Relay Box Reset Removed

TABLE B-11

CRITICAL FUNCTIONS LIST - FLIGHT

First Stage

	First Stage Ignition
1.1	Algol Motor Thrust Buildup
	Lift-Off
1.2	Start Timer
1.3	Arm Ignition System
1.4	Establish Vehicle Control
1.5	Clear Launcher
	Program Desired First Stage Trajectory
1.6	Maintain Structural Integrity
1.7	Program Pitch Axis
	First Stage Burnout
1.8	Disable First Stage Autodestruct

Second Stage

	Second Stage Ignition
2.1	Castor Motor Thrust Buildup
2.2	Separate First Stage
2.4	Activate Second Stage Controls
2.5	Establish Vehicle Control
	Program Desired Second Stage Trajectory
2.6	Maintain Structural Integrity
2.7	Program Pitch Axis
	Second Stage Burnout
2.8	Disable Second Stage Autodestruct

Third Stage

	Initiate Third Stage Ignition
3.1	Jetison Payload Heat Shield
3.2	Activate Third Stage Controls
3.3	Fire Ignition Delay Initiators
	Third Stage Ignition
3.4	Antares Motor Thrust Buildup
3.5	Separate Second Stage
3.6	Establish Vehicle Control
	Program Desired Third Stage Trajectory
3.7	Program Pitch Axis
3.8	Maintain Structural Integrity

TABLE B-11 Continued

CRITICAL FUNCTIONS LIST - FLIGHT Continued

Third Stage Continued

	Third Stage Burnout
3.9	Activate Coast Reaction Control System
3.10	Establish Control of Vehicle
	Program Desired Third Stage Pitch Attitude
3.11	Program Pitch Axis

Fourth Stage

	Initiate Fourth Stage Ignition
4.1	Fire Altair Motor Squibs
4.2	Fourth Stage Spin-Up
	Separate Third Stage
4.3	Fire Separation System
4.4	Retro Third Stage
4.5	Clear Third Stage
	Fourth Stage Ignition
4.7	Altair Motor Thrust Buildup
4.10	Maintain Structural Integrity
	Fourth Stage Burnout

Optional Events

	Coast Second Stage
2.9	Remove Filter
	Program Desired Third Stage Yaw Attitude
3.12	Select Yaw Axis Programming
3.13	Program Yaw Axis
	Separate Payload
4.6	Start Payload Timer
4.8	Fire Separation Bolts
4.9	Clear Fourth Stage

---

the grouping of items by stage of flight, those optional events are listed which may be incorporated into the flight profile or vehicle systems in order to satisfy particular mission requirements established by the payload to be launched.

The concept of Fault Tree Analysis was originated in 1961 as a technique with which to perform a safety evaluation of the Minuteman Launch Control System. Since that time significant refinements of the analytical and mathematical

techniques have taken place through the natural evolution of its application to many different kinds of systems.

In addition to safety evaluations, the fault tree technique can be used to perform a reliability analysis of a particularly important undesired event, failure mode and effects analyses, system sensitivity studies and to identify single points of failure.

The construction of a fault tree begins by defining the undesired event(s) (loss of a flight critical function in this case) to be analyzed. Each undesired event then becomes the output event of a fault tree and is placed at the top of the tree. The fault tree is then constructed by properly relating all possible sequences of events, that upon occurrence, result in the undesired event. These occurrences are related through the use of standardized logic symbols as explained below.

Two basic logic gates are used in construction of a fault tree: the AND and the OR gate as illustrated in figure B-1. The AND gate describes the logic function whereby the coexistence of all input events are required to produce the output event. The OR gate defines the situation whereby the output event will exist if one or more of the input events are present. There are no restrictions as to the number of inputs to either type of gate.

FIGURE B-1 - BASIC LOGIC GATES

Certain special logic gates are presented in figure B-2. These symbols allow the analyst to stipulate particular conditions that must exist before an output can be realized. The PRIORITY AND gate performs the same logic function as the AND gate with the added stipulation that sequence as well as coexistence is required. The EXCLUSIVE OR gate functions as an OR gate with the restriction that no output is provided for the coexistence of two or more inputs. The INHIBIT gates describe a casual relationship between one fault and another. The input event directly produces the output event if the indicated condition is satisfied. The conditional input defines a state of the system that permits the fault sequence to occur, and may be either normal to the system or result from failures. The inhibit condition is represented by an oval if it describes a specific failure mode and by a rectangle if it describes a condition that may exist for the life of the system.

These symbols are used to represent the logic for the fault tree. There are also four standard symbols used to represent events in the fault tree; these are illustrated in figure B-3. The rectangle identifies an event that results from the combination of fault events through the input logic gate. The circle describes a basic fault event that requires no further development.

The diamond represents a fault event that is considered basic; however, the possible causes of the event are not developed either because the event is of insufficient consequence or because the necessary information is unavailable. The house is used to indicate an event that is normally expected to occur.

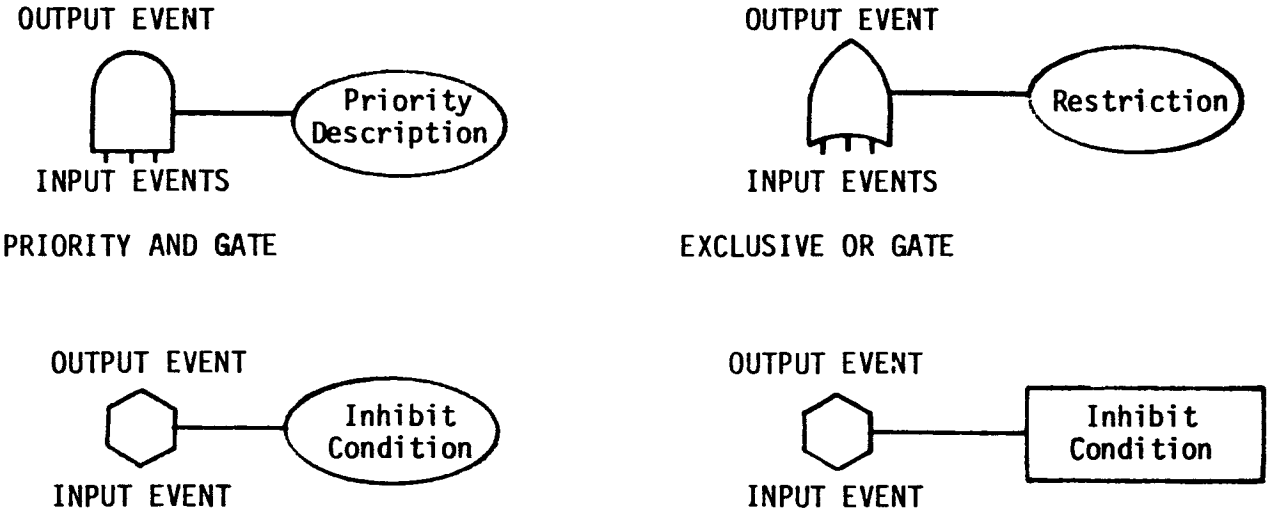

Figure B-2 -SPECIAL LOGIC GATES

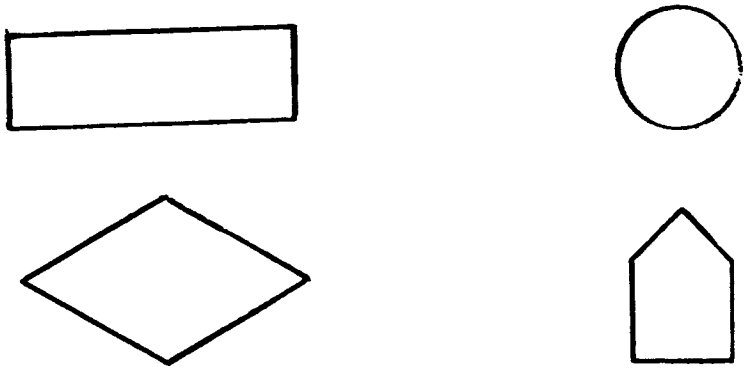

FIGURE B-3 -EVENT REPRESENTATIONS

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In addition to these symbols, the triangle, as shown in Figure B-4, is used as a transfer symbol of a fault tree path to another portion of the fault tree. A line from the apex of the triangle indicates a "transfer to" and a line from the side denotes a "transfer from". This is a useful tool to eliminate duplication of effort when the same event occurs in more than one branch of the tree.

FIGURE B-4-TRANSFER SYMBOL

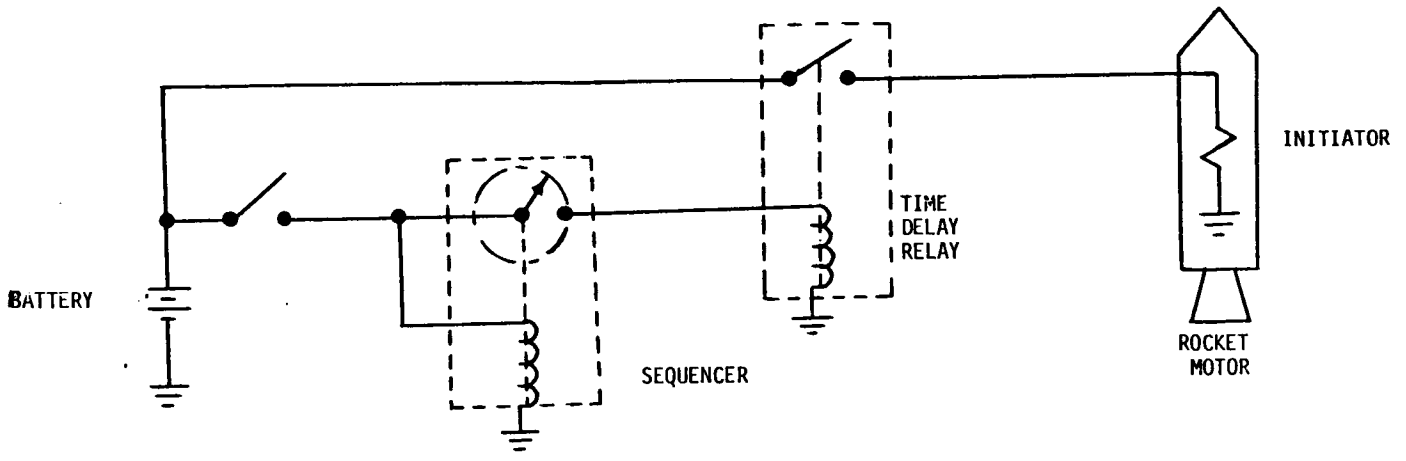

FIGURE B-5 - HYPOTHETICAL SYSTEM

The hypothetical system, shown in Figure B-5, is presented as a simple example for performing a fault tree analysis. A system description follows: When the Start Switch is closed, battery power is supplied to the Sequencer and to the Time Delay Relay contacts. When the Sequencer reaches position 1, battery power is supplied to the Time Delay Relay coil. After the programmed delay, the Time Delay Relay contacts close, supplying battery power to the Rocket Motor Initiator, which in turn ignites the Rocket Motor.

Three undesired events which can be defined for this system are (1) premature Rocket Motor ignition, (2) no Rocket Motor ignition, and (3) late Rocket Motor ignition. For purposes of this example, only the first undesired event (premature Rocket Motor ignition) will be analyzed; however, the same techniques can be employed for the other two instances as well.

For the sample system, the fault tree is constructed as shown in Figure B-6. Premature firing of the rocket motor can result from (1) auto-ignition, (2) mechanical shock or (3) time delay relay output. The causes of the first two incidents are not pursued further. The time delay relay output will be provided if the circuit is completed and battery power is available. The time delay relay circuit can be completed if the contacts fail closed or if the time delay relay coil is energized. A delay gate contact failure can result from a basic failure of the contacts or as the result of the application of some external environment (e.g., vibration, mechanical shock). The coexistence of both the sequencer stepping switch in position 1 and the power available to the stepping switch contacts are essential to provide power to the time delay relay coil.

Power is provided to the stepping switch contacts if the start switch is closed as a result of a basic switch failure or due to the application of some external environment. The sequencer will move to position 1 as the result of a basic failure of the stepping switch or due to some external environment or if power is supplied to the sequencer coil through a failure of the start switch (as described above). This completes the construction of the fault tree.

Tracing each fault path (or branch) of the fault tree discloses that either of two single occurrences can produce the undesired events (i.e., failure of the time delay relay contacts or failure of the start switch). These items (outlined in heavy black lines for emphasis on Figure B-6) are thus identified as the single failure point sources for this hypothetical system.

It should be emphasized that failures due to personnel error were not considered during this investigation. It is recognized that personnel errors can and will occur but an investigation into this source of problem areas was beyond the scope of this study. The analyses conducted in this investigation were performed to a level within each system consistent with the functions which are measured at the interface connectors of the components. This ground rule was established to be compatible with the scope of this program and is consistent with the Scout assembled vehicle system testing philosophy.

TEST PROCEDURE ADEQUACY

IGNITION SYSTEM

1. Subsequent to their last adequate test, eight ignition relays in the Power Control Relay Box are cycled to the prelaunch condition without proper verification of relay contact position.

2. Subsequent to their last adequate test, both fourth stage timer start switches are cycled to the prelaunch condition without proper verification of switch contact position.

3. Subsequent to its last adequate test, the system number 1 payload timer is energized without verifying position.

4. Redundancy in the Power Control Relay Box cannot be verified during assembly or vehicle testing.

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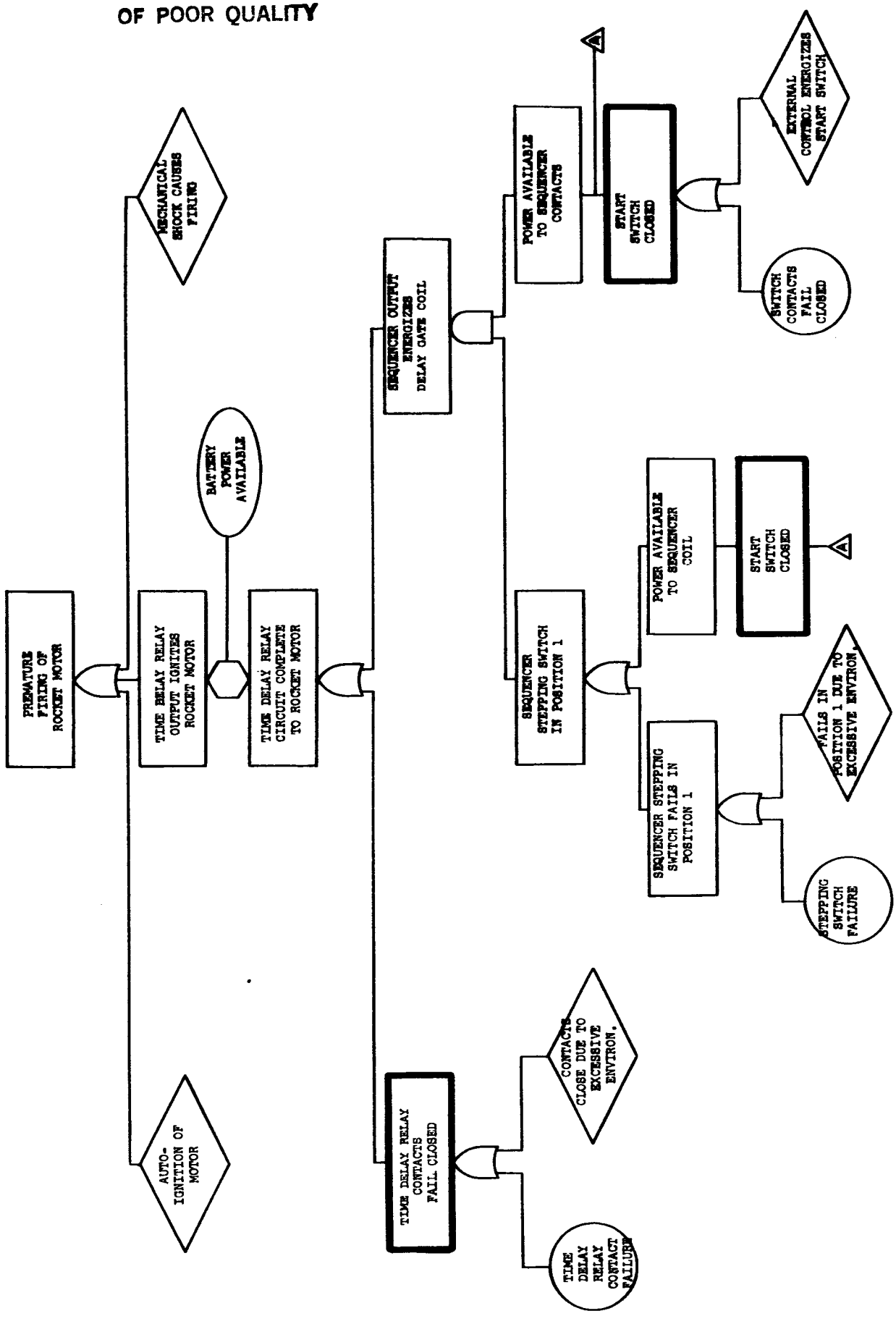

FIGURE B-6 - FAULT TREE

CONTROL SYSTEM

1. None of the reaction control motors, except for the four 500-pound assemblies, receive an adequate test for small leaks through the motor chamber.

2. None of the 18 motor chamber pressure switches are tested for leakage after receipt at LTV.

3. The high pressure relief valve used in the hydraulic system receives its last adequate test during receiving acceptance testing at LTV/Dallas.

GUIDANCE SYSTEM

1. Rate Gyro Unit tests on the launcher, subsequent to the last adequate tests, do not adequately verify output signal tolerances.

PROPULSION SYSTEM

1. Verification that the correct initiator is installed in the fourth stage motor is not required in the test procedures.

DESTRUCT SYSTEM

Testing of the destruct system was found to adequately evaluate the critical failure modes of that system.

MECHANICAL SYSTEM

The review showed that the critical failure modes in the mechanical system were covered by an acceptable test or inspection.

GROUND SUPPORT EQUIPMENT ADEQUACY

A total of 10 potential problem areas were disclosed by the review to determine the adequacy of the Ground Support Equipment (GSE) used in the last adequate test of each single failure point source.

IGNITION SYSTEM

1. The failure of a single GSE relay would permit a failure of one of eight vehicle single failure point source to go undetected prior to launch.

2. More comprehensive use of the telemetry system for verification of control system parameters would provide a backup to other GSE information used for verification of system operation.

GUIDANCE SYSTEM

1. An out-of-tolerance condition in the GSE tool used to position and verify the vehicle alignment scribe marks could result in out-of-tolerance verticality of the vehicle at launch.

2. The documentation of procedures for verification of the GSE azimuth and pitch encoders should be improved.

GUIDANCE SYSTEM Continued

3. Verification of the functional status of the GSE extension cables used in testing of the Inertial Reference Package during SP 5-7-3 is not required prior to their use.

4. More comprehensive use of the telemetry system for verification of guidance system parameters would provide a backup to other GSE information used for verification of system operation.

PROPULSION SYSTEM

1. Verification of the functional status of the GSE low pressure hose assembly, used to leak check motors, is not required prior to use.

MECHANICAL SYSTEM

The ground support equipment used to evaluate the critical failure modes of this system was found to be adequate in all cases.

APPENDIX C

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SCOUT VEHICLE FAMILY TREE

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VOUGHT MISSILES
AND SPACE COMPANY
P O BOX 6267 · DALLAS TEXAS 75222

TITLE

SCOUT VEHICLE FAMILY TREE

SUBMITTED UNDER

NASA Statement of Work No. L34-100A

REPORT NO.	DATED
23.506	1 November 1971
PROJECT	CONTRACT NO.
Scout	NAS1-10000

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APPROVED

REV.	DATE	REV. BY	PAGES AFFECTED	REMARKS

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Q - Scout Guidance and Control Wiring Block Diagram	565
R - Payload Interface Drawings	566
S - Modification Accumulation Drawings	567

1.0 INTRODUCTION

SCOUT VEHICLE FAMILY TREE

S-178 THROUGH S-192

The Scout vehicle booster has been divided into major subsystems and those in turn divided into drawing lists defining major assemblies and installations.

The major installation drawing for a system in any specific vehicle section is given at the top of the list. Next, major assemblies and sub-assemblies are listed by drawing number. Dash numbers have not been shown except in a few instances where it is necessary to avoid confusion. Where applicable, procurement and acceptance test specification number and FAT test request numbers are included.

In some cases, the next assembly number for a specific component is shown immediately above the block containing information on the component.

Generally, flow lines have not been used. However, for the hydraulic subsystem and the reaction control subsystem, flow lines are used to indicate a one line schematic of the system. In several other sheets, "next-assembly" flow lines have been used for clarity.

No attempt has been made to show all breakdown details for any system. However, all major parts and sub-assemblies of each subsystem are listed for reference. Pursuit of further detailed drawing information is thus simplified since these details are available either on the listed drawing or in the L/M of the listed drawing.

Heatshield structure installation drawings will be shown on the related payload interface drawings as payload assignments and heatshield configurations are defined. Payload-GSE interface drawings will also be referenced on the related payload interface drawing.

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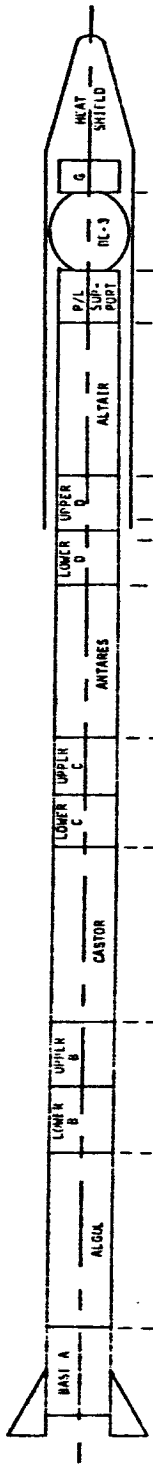
SCOUT PROPULSION SUBSYSTEM BLOCK DIAGRAM

A



MOTOR	DRAWING NO.	IGNITER	INITIATOR	
BE-3-RS		83214E0003	SOI-266-8	

MOTOR	DRAWING NO.	IGNITER	INITIATOR	
X-258	60212A23032	253E-2-05 -0032	ABL 5060A1	
F4-4S	5A0032-14-4	5M0001 or 806853	ABL 5060A1	

SPIN MOTOR	DRAWING NO.	PROCUREMENT SPECIFICATION	ACCEPTANCE SPECIFICATION	
.6KS40	23-003342	304-615	305-699	
.6KS40	23-003781 (Mod)	-	305-699	
.6KS40	23-002983	304-665	305-896	
1KS40	23-003342	304-612	305-698	
1KS40	23-003781 (Mod)	-	305-698	
1KS40	23-002983	304-664	305-895	
1KS75	23-003342	304-499	305-721	
1KS75	23-003781 (Mod)	-	305-721	
1KS75	23-002983	304-663	305-894	

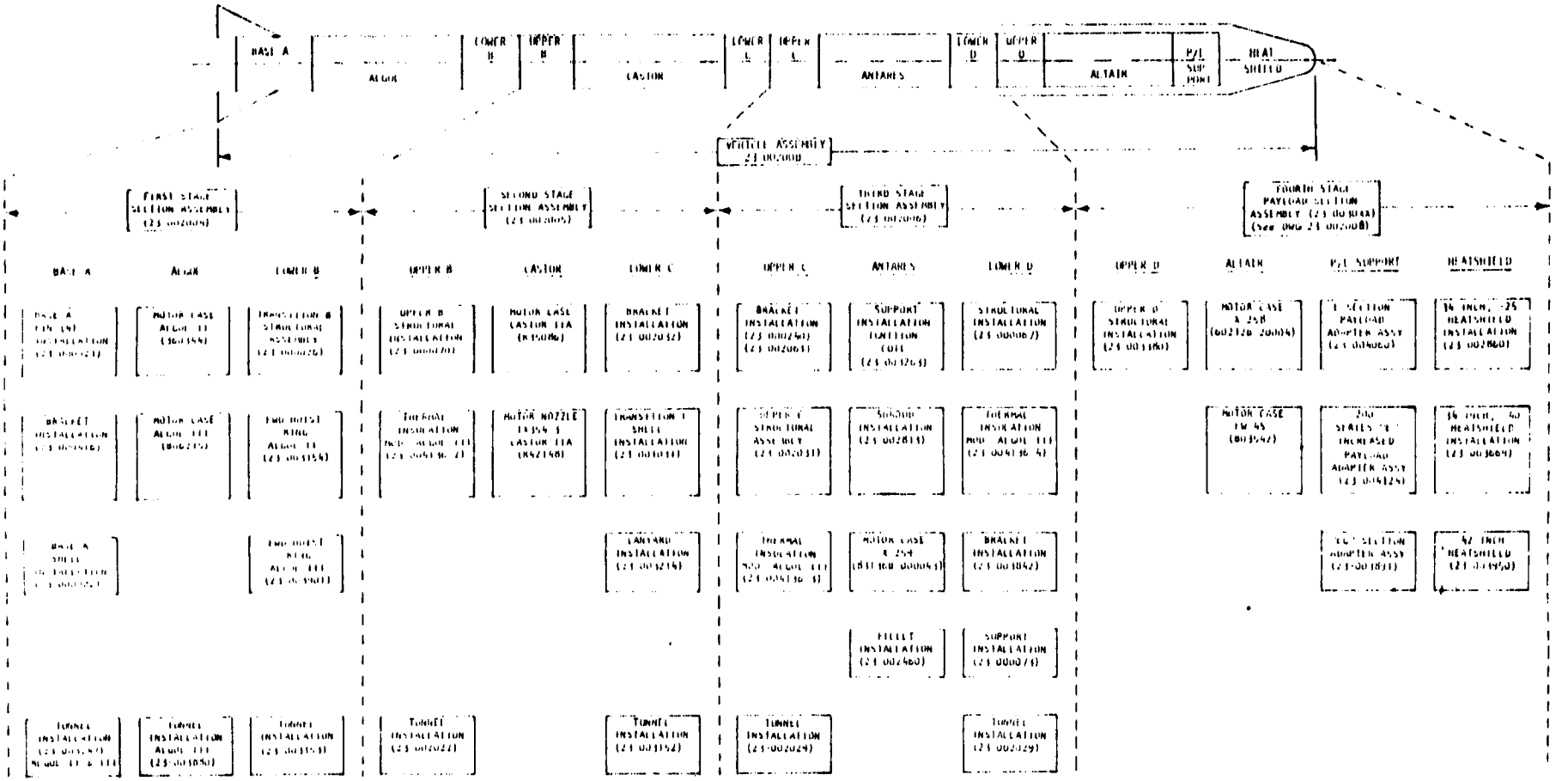
MOTOR	DRAWING NO.	IGNITER	INITIATOR	
X-25983	83176A00001	83136E00014 -003	ABL 5860E0	

MOTOR	DRAWING NO.	IGNITER	INITIATOR	
CASTOR 11A TX354-3	R42223	R45969	23-003793	

MOTOR	DRAWING NO.	IGNITER	INITIATOR	
ALGOL 11B	383633-63	363931	HOLEX 3184	
ALGOL 11C	23-004000 (383633-79)	1128253	23-003793	
ALGOL 111	23-003810 (606212)	806219	23-003793	

SCOUT STRUCTURAL SUBSYSTEM BLOCK DIAGRAM

B



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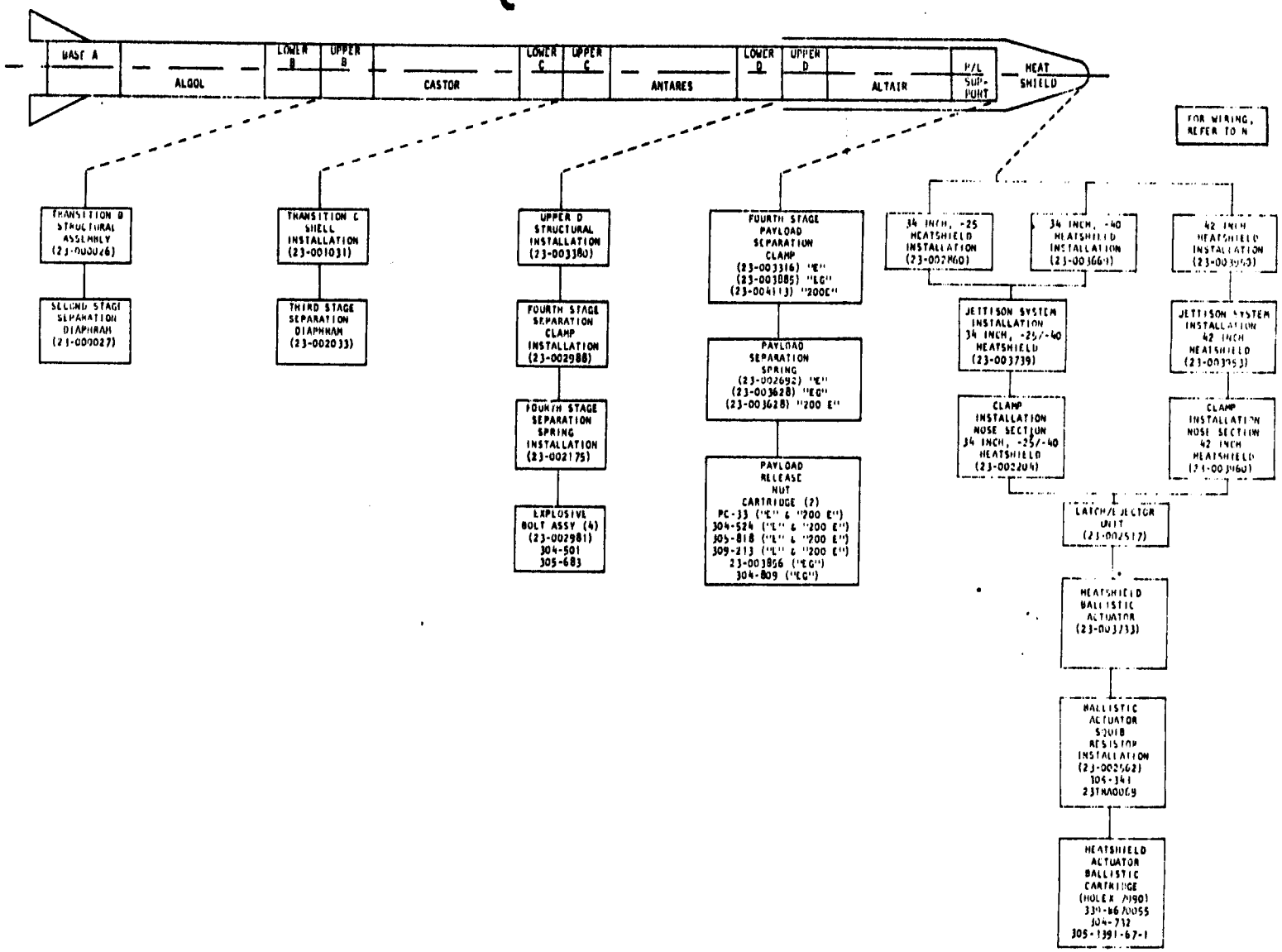
SCOUT SEPARATION SUBSYSTEM BLOCK DIAGRAM

C



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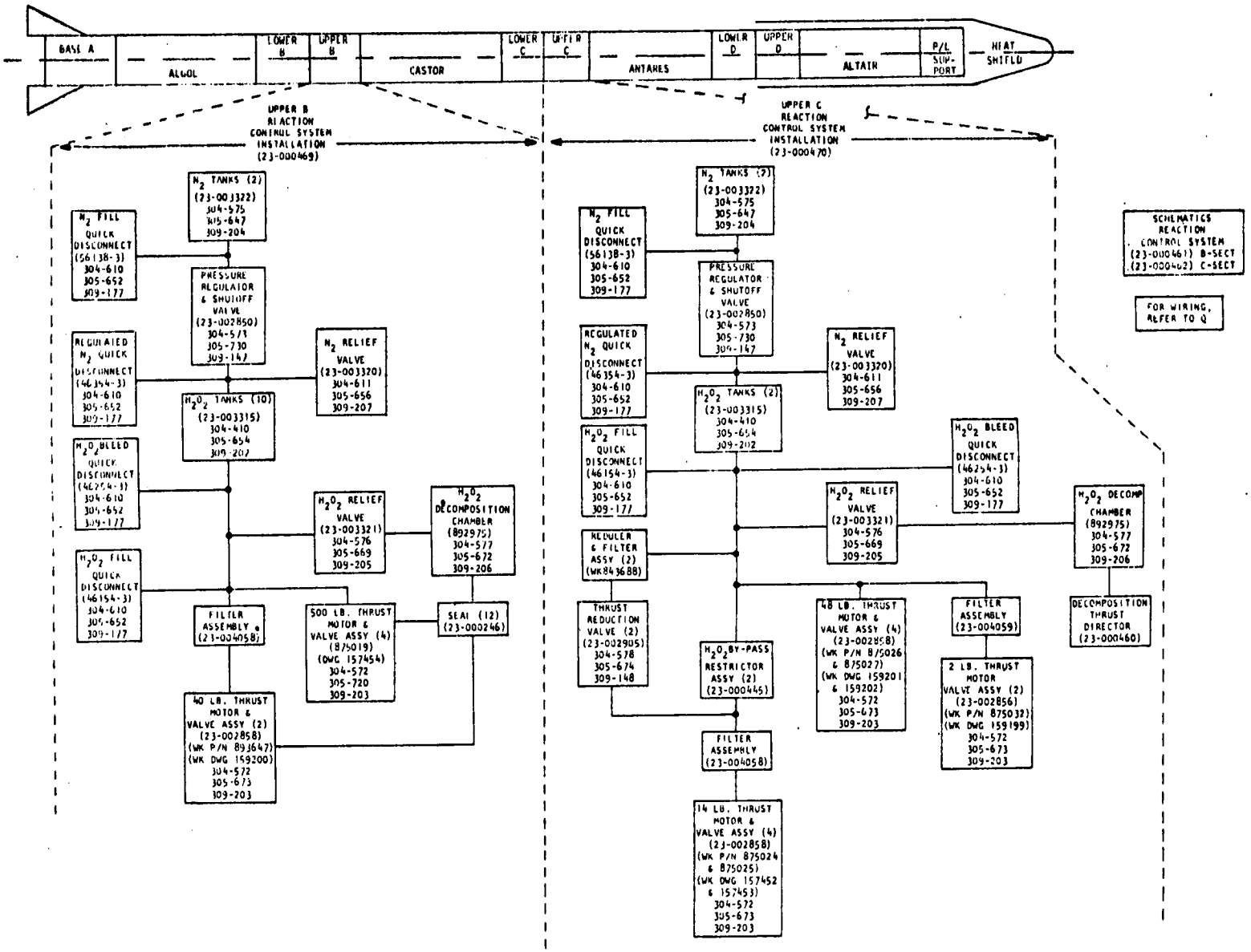
SCOUT REACTION CONTROLS SUBSYSTEM BLOCK DIAGRAM

D



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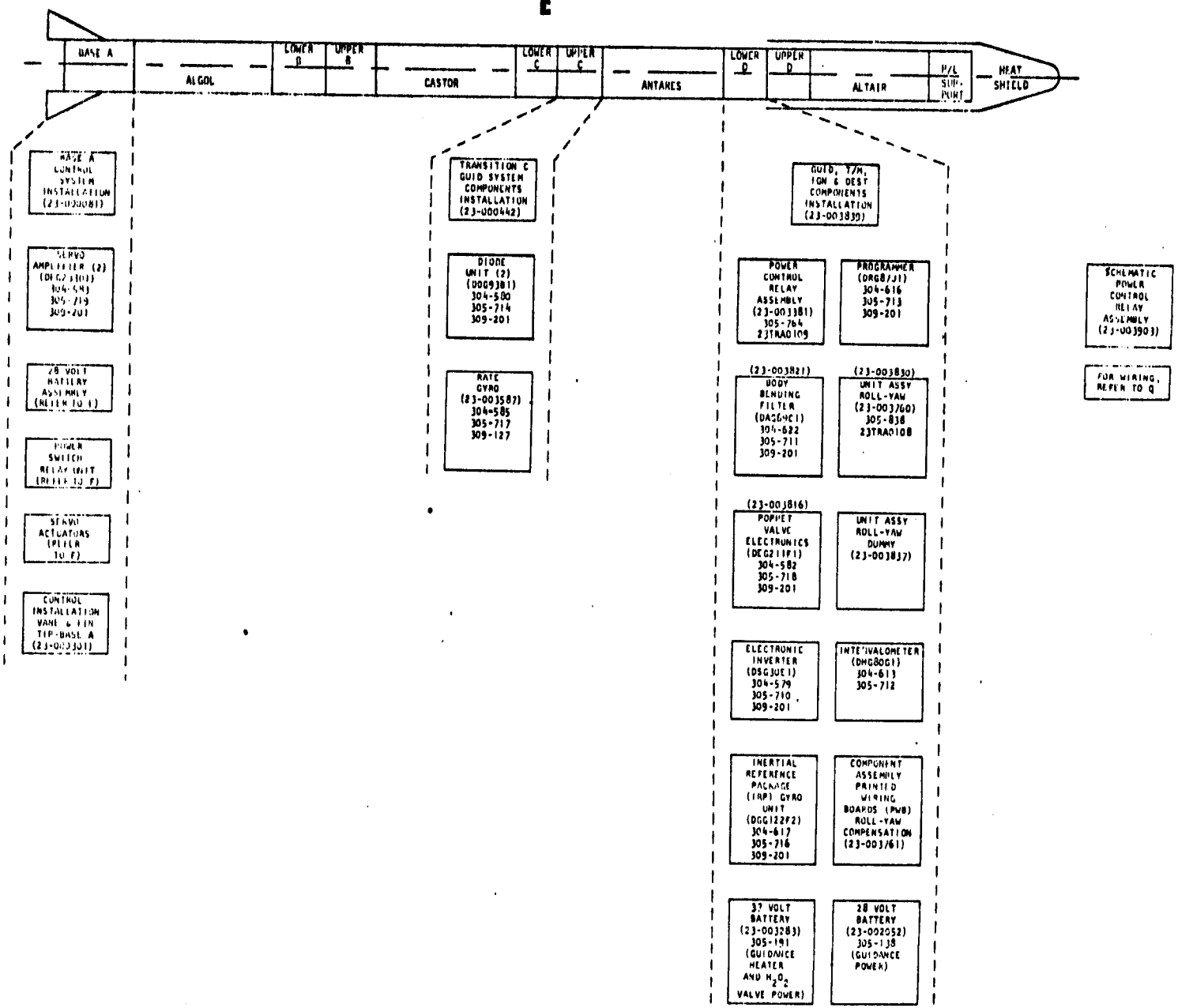
SCOUT GUIDANCE AND CONTROL SUBSYSTEM BLOCK DIAGRAM

E



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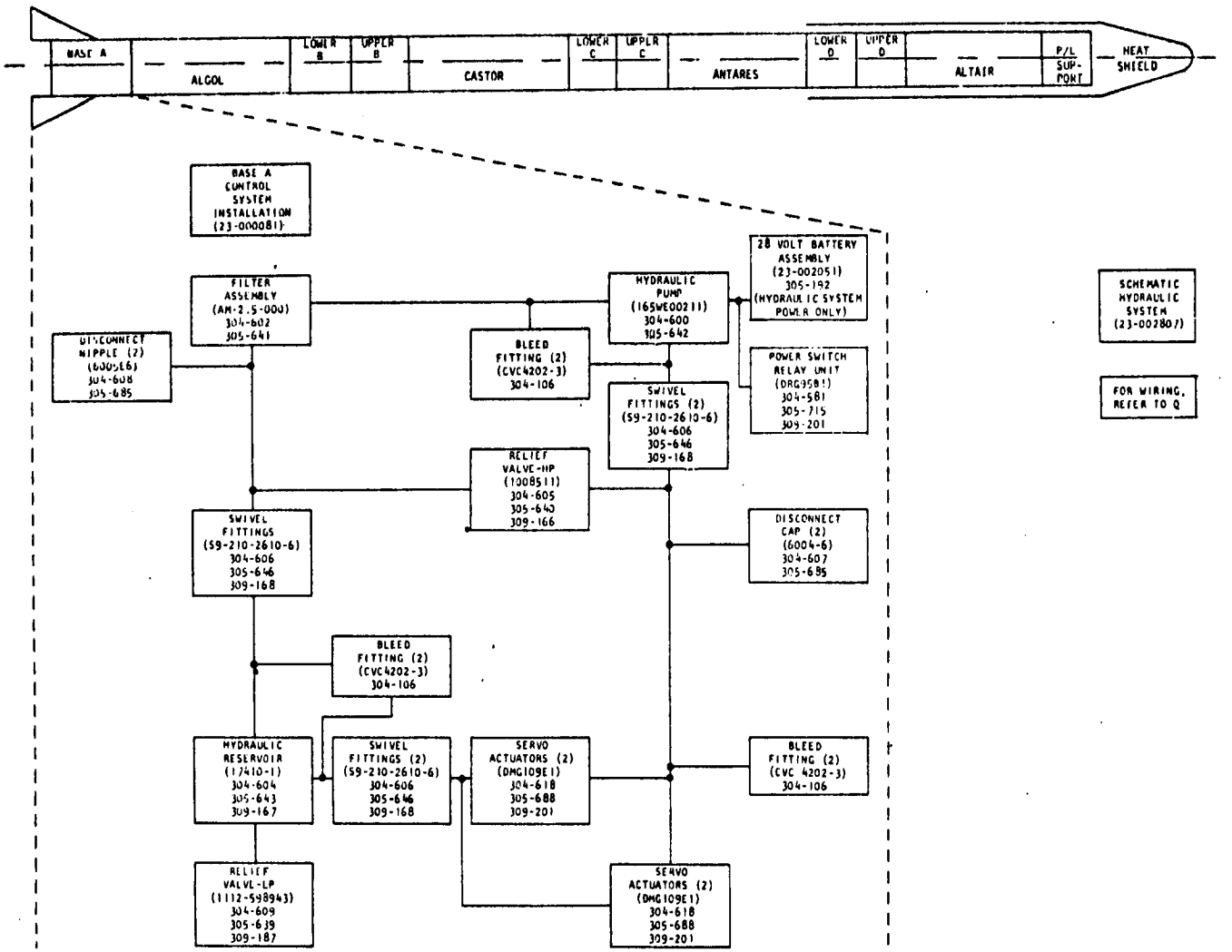
SCOUT HYDRAULIC CONTROL SUBSYSTEM BLOCK DIAGRAM

F



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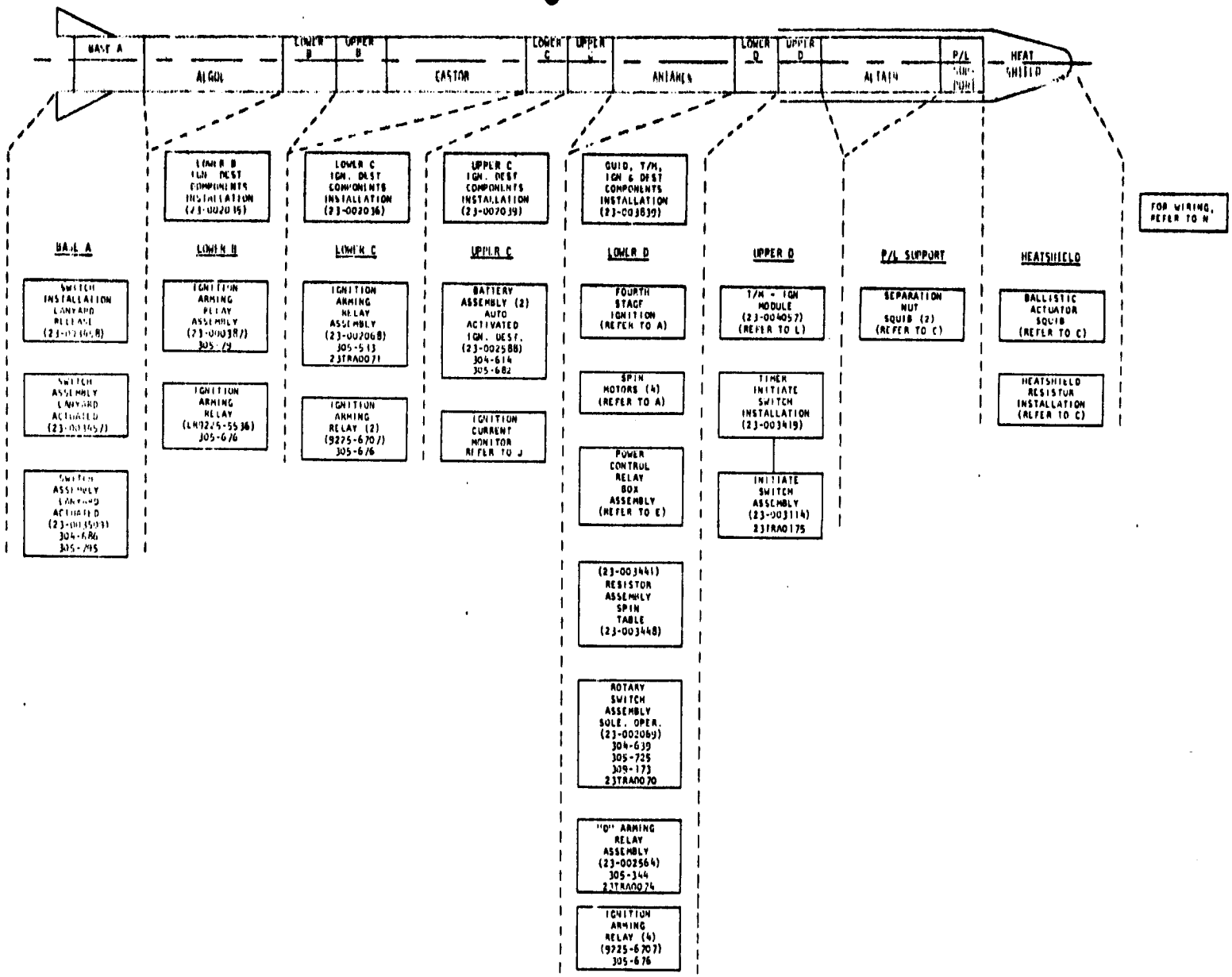
SCOUT IGNITION SUBSYSTEM BLOCK DIAGRAM

G



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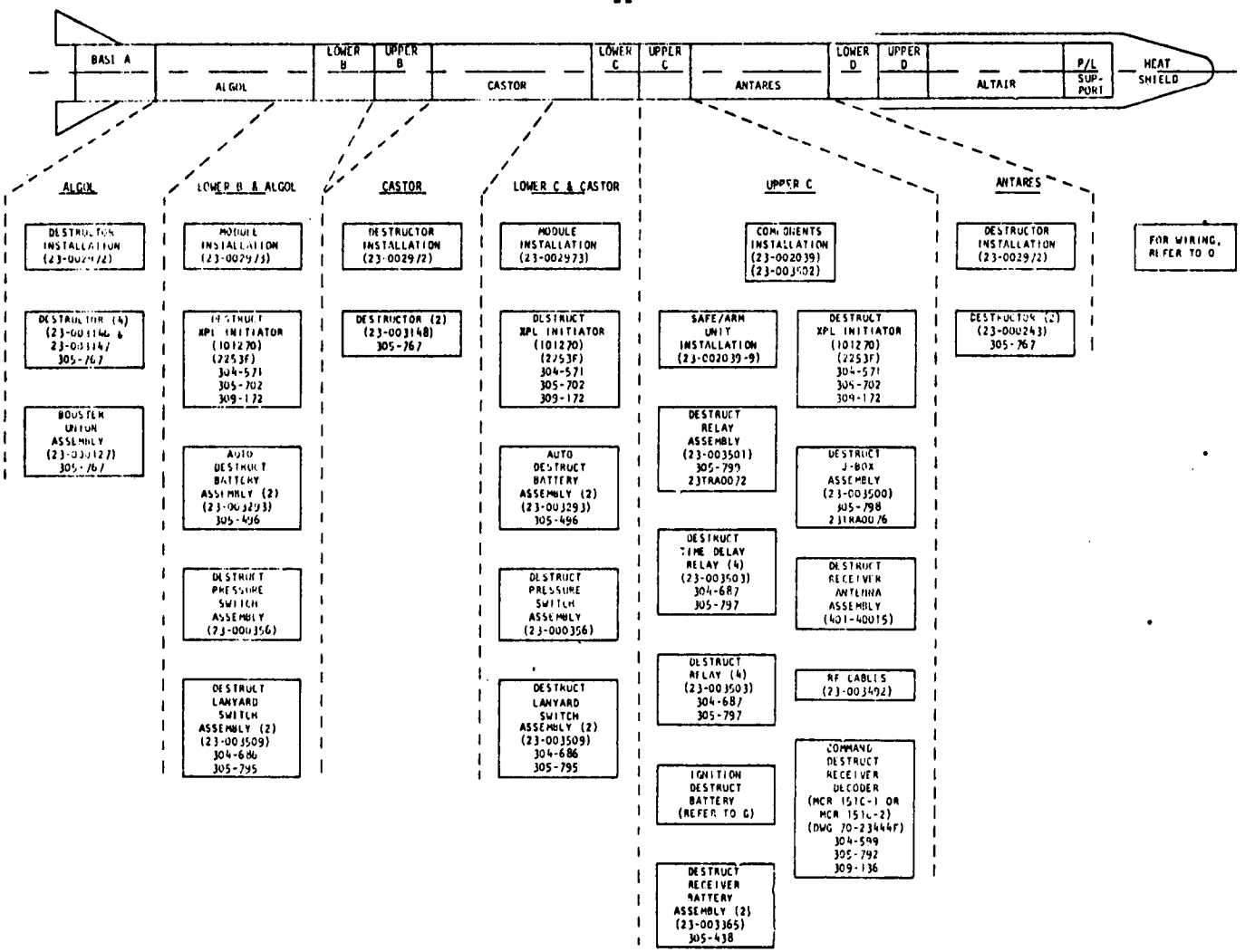
SCOUT DESTRUCT SUBSYSTEM BLOCK DIAGRAM

H



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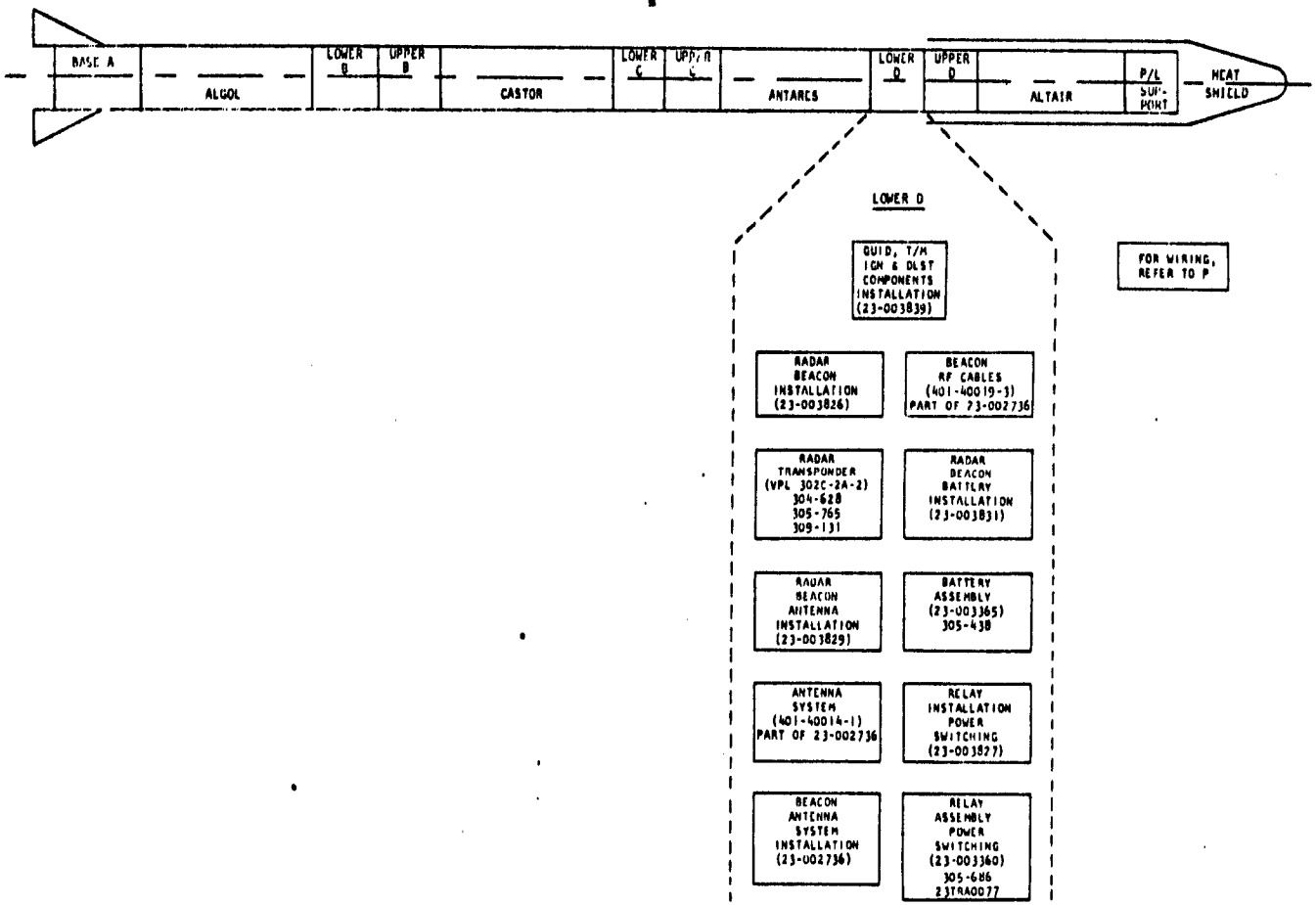
SCOUT RADAR BEACON SUBSYSTEM BLOCK DIAGRAM



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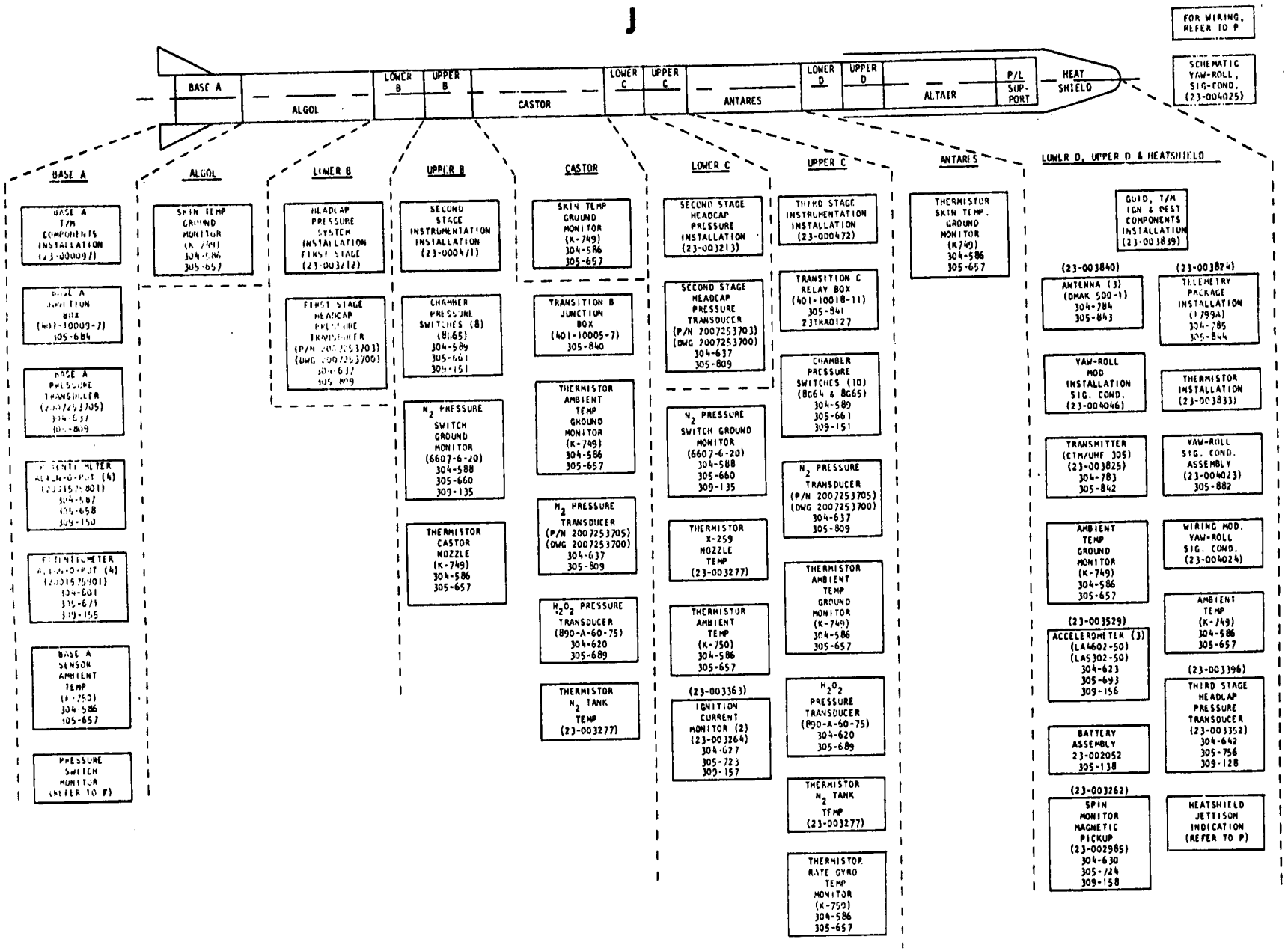
SCOUT INSTRUMENTATION AND TELEMETRY SUBSYSTEM BLOCK DIAGRAM

J



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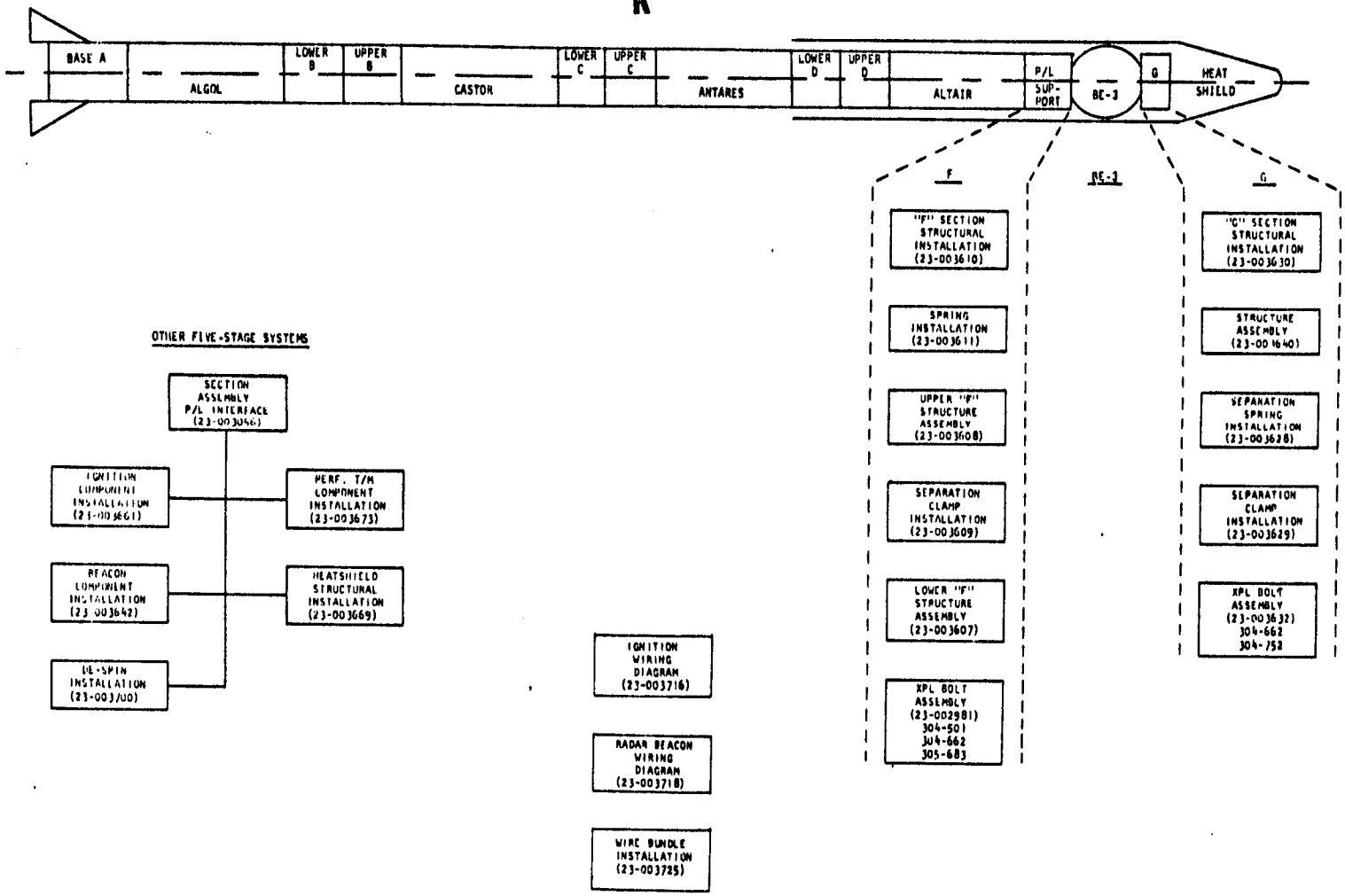
SCOUT FIFTH STAGE SUBSYSTEM BLOCK DIAGRAM

K



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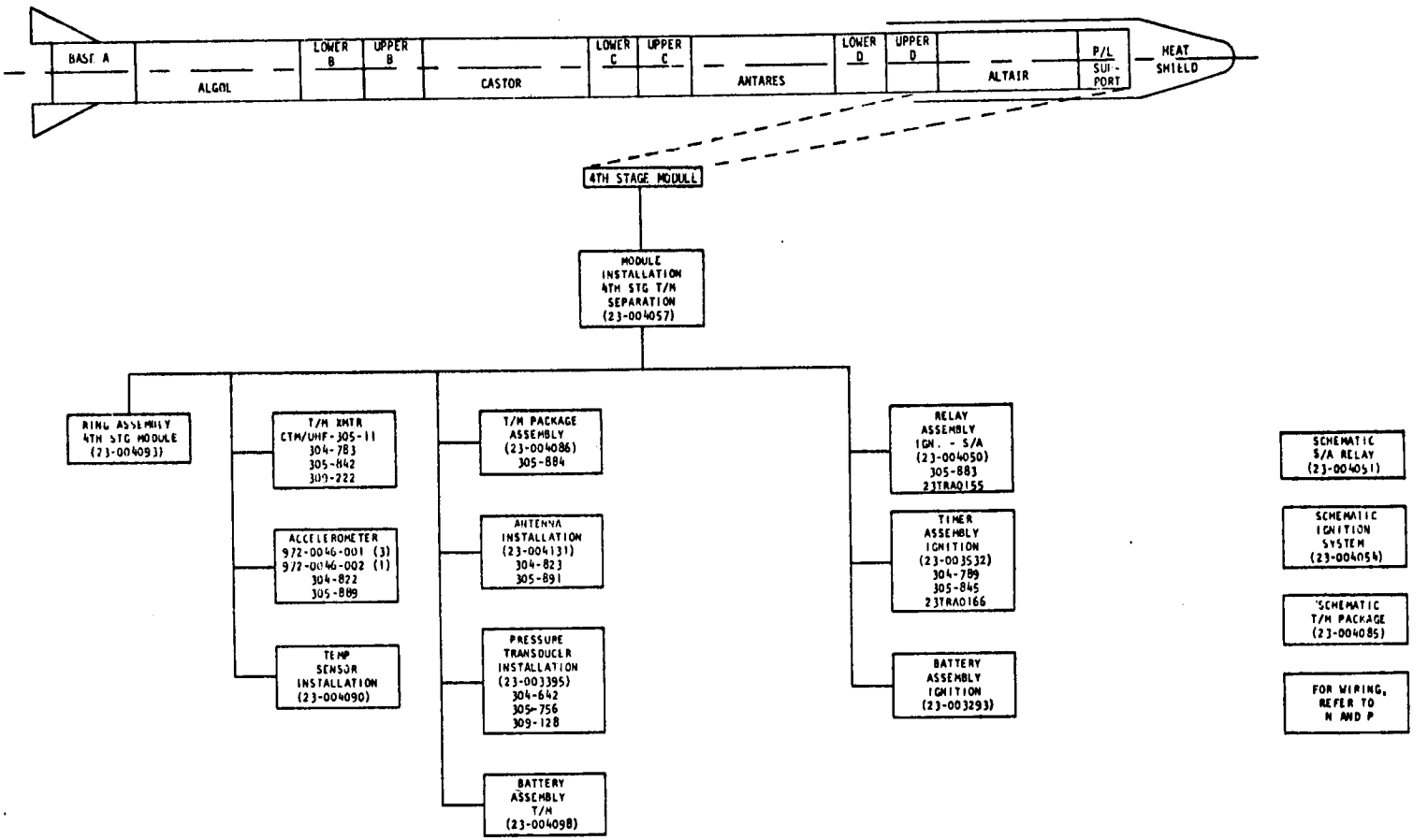
SCOUT 4TH STAGE T/M - SEPARATION SUBSYSTEM BLOCK DIAGRAM

L



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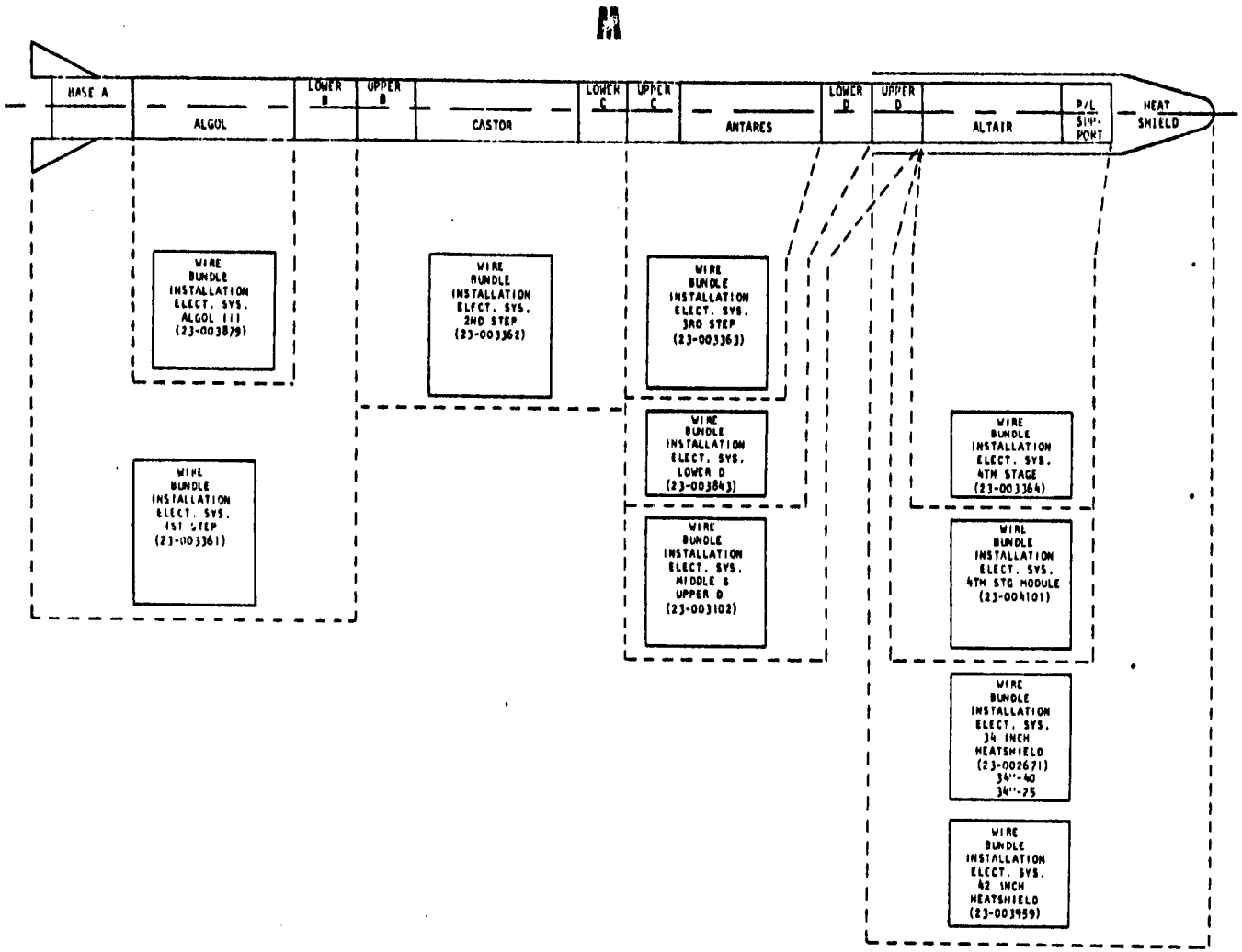
SCOUT WIRE BUNDLE INSTALLATION BLOCK DIAGRAM



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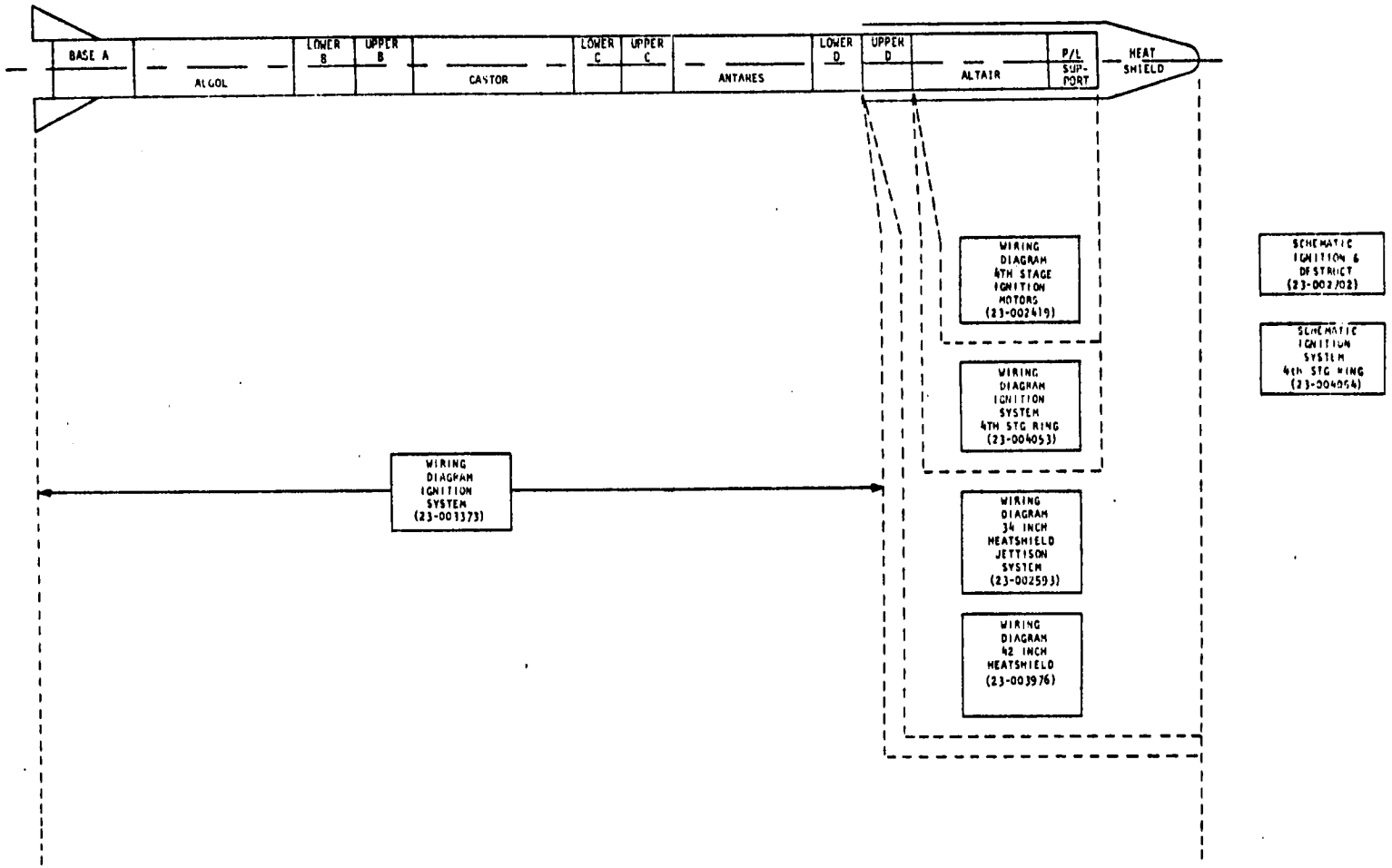
SCOUT IGNITION ELECTRICAL WIRING BLOCK DIAGRAM

N



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SCOUT DESTRUCT ELECTRICAL WIRING BLOCK DIAGRAM

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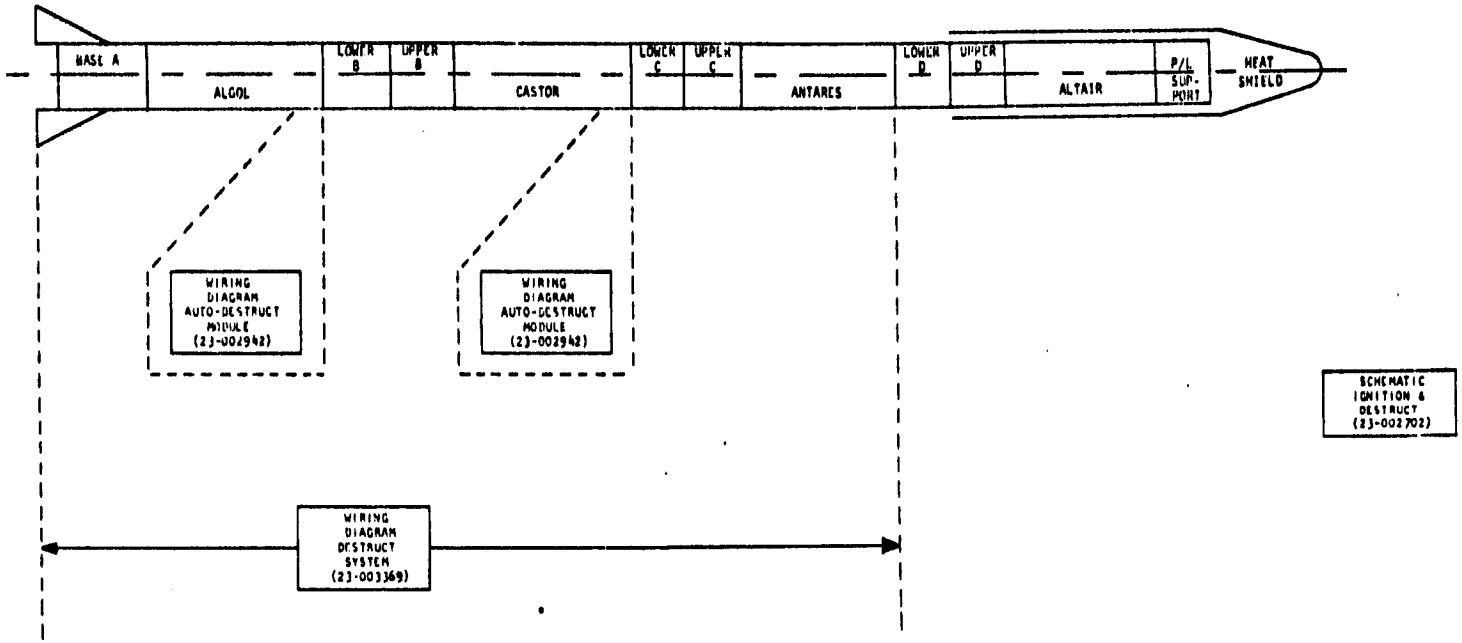

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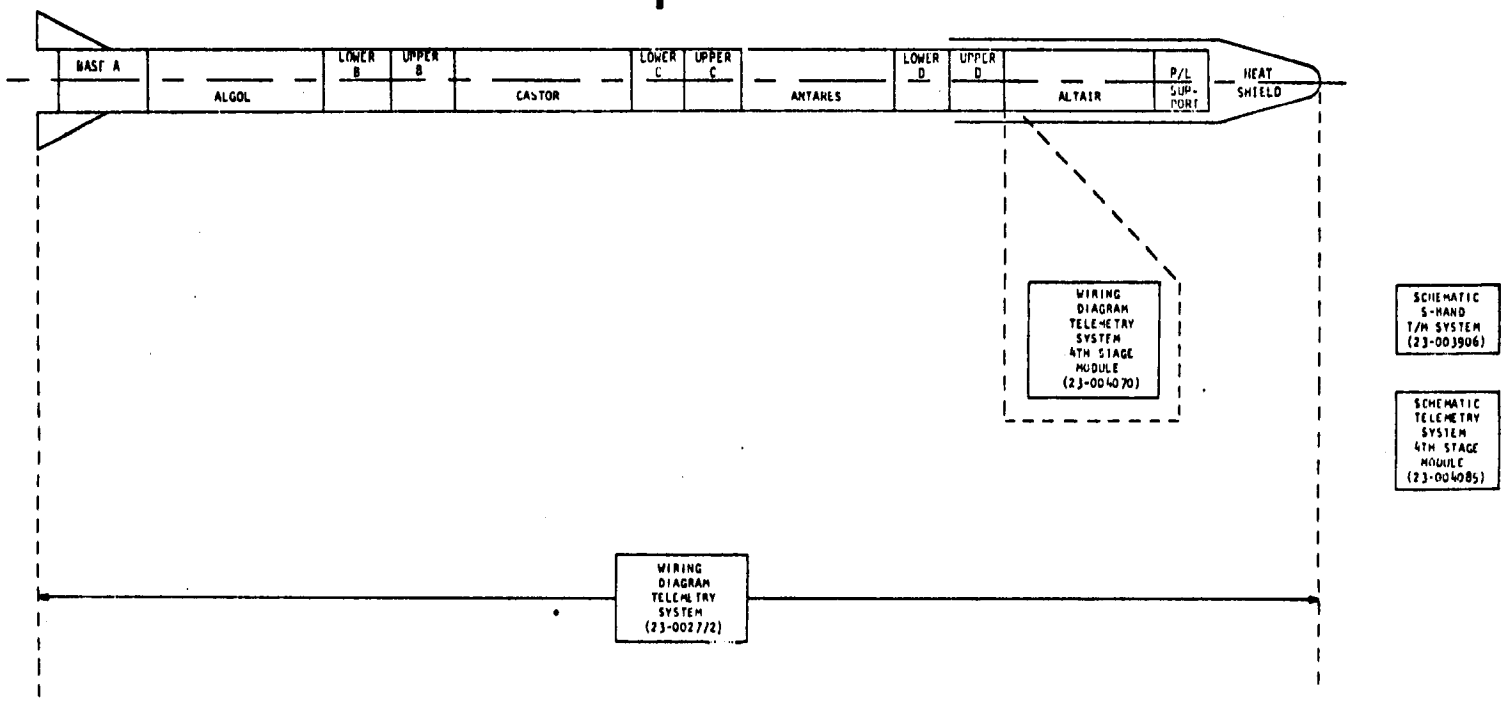
SCOUT INSTRUMENTATION AND TELEMETRY ELECTRICAL WIRING BLOCK DIAGRAM

P



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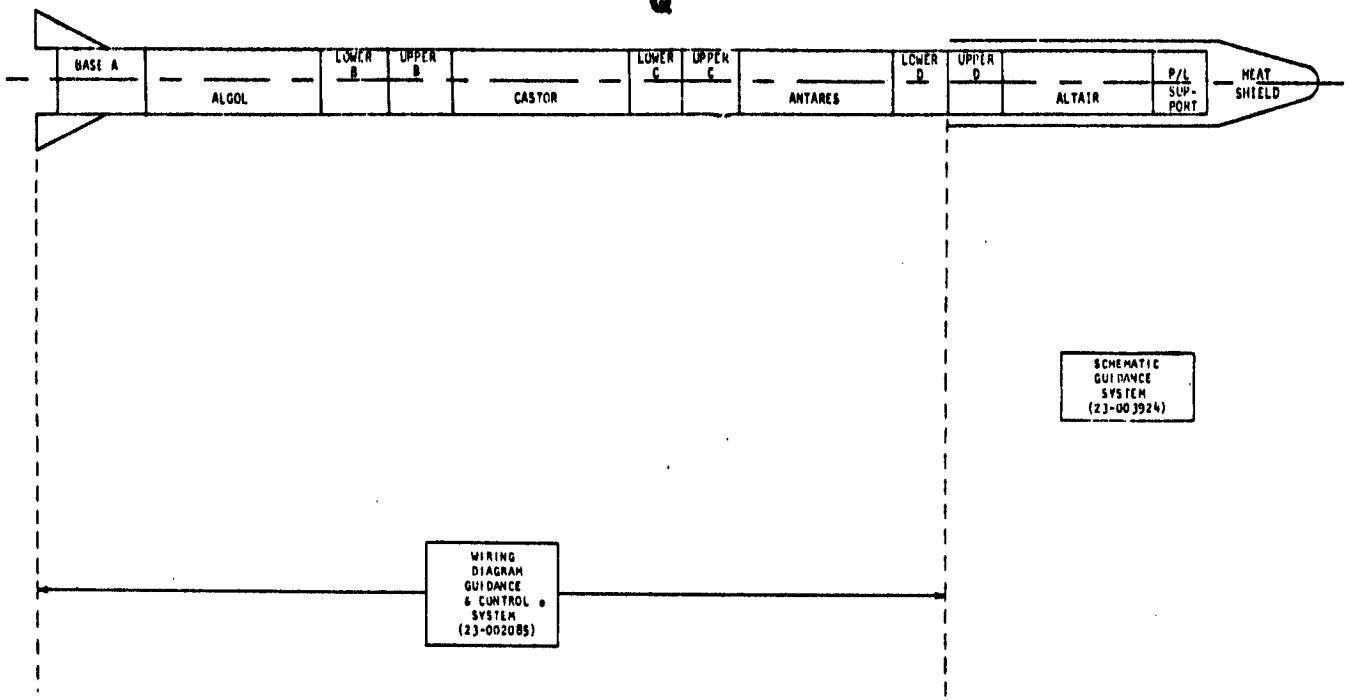
SCOUT GUIDANCE AND CONTROL ELECTRICAL WIRING BLOCK DIAGRAM

Q



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PAYLOAD INTERFACE DRAWINGS

R

SCOUT VEHICLE	DRAWING NO.
178	23-003036-11
179	23-003036-12
180	23-003060-1
181	23-003060-2
182	23-003062-1
183	23-003061-1
184	23-003064-1
185	23-003065-1
186	23-003066-1
187	23-003067-1
188	23-003068-1
189	23-003069-1
190	23-003070-1
191	23-003071-1
192	23-003072-1
193	23-003073-1
194	23-003074-1
195	23-003075-1
196	23-003076-1
197	23-003077-1
198	23-003078-1
199	23-003079-1
200	23-003080-1
201	23-003081-1
202	23-003082-1
203	23-003083-1
204	23-003084-1
205	23-003085-1
206	23-003086-1
207	23-003087-1

MODIFICATION ACCUMULATION DRAWINGS

S

SCOUT VEHICLE	DRAWING NO.
178	23-002010-1
179	23-002010-2
180	23-002010-3
181	23-002010-4
182	23-002010-5
183	23-002010-6
184	23-002010-7
185	23-002010-8
186	23-002010-9
187	23-002010-10
188	23-002010-11
189	23-002010-12
190	23-002010-13
191	23-002010-14
192	23-002010-15
193	23-002010-16
194	23-002010-17
195	23-002010-18
196	23-002010-19
197	23-002010-20
198	23-002010-21
199	23-002010-22
200	23-002010-23
201	23-002010-24
202	23-002010-25
203	23-002010-26
204	23-002010-27
205	23-002010-28
206	23-002010-29
207	23-002010-30

APPENDIX D

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APPENDIX D

SCOUT PROGRAM REVIEW OF APRIL 5, 1973

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APPENDIX D

One of the best management tools is to have all parties concerned get together and discuss all issues. The Scout Program accomplished this with periodic program reviews. At these reviews the prime contractor presented the current status of the contractor's responsibilities including administrative, technical, and advanced planning reports.

The sample Scout Program Review presented in this appendix dated April 5, 1973, took place about the midpoint of Phase VI.

SCOUT PROGRAM REVIEW

5 APRIL 1973

VOUGHT SYSTEMS DIVISION

SEQUENCE OF PRESENTATION

- ORGANIZATION CHANGES
- REVIEW OF KEY POSITIONS
- NAS1-10000 SYSTEM MANAGEMENT PROGRAM
- NAS1-11400 MOTOR PRODUCTION – PHASE VII
- NAS1-11000 VEHICLE PRODUCTION – PHASE VII
- NAS1-10500 TASK ORDER CONTRACT
- NAS1-9258 ALGOL III MOTOR PROGRAM
- NAS1-12500 (PROPOSED) FOLLOW-ON MANAGEMENT PROGRAM
- LTV BUSINESS REPORT

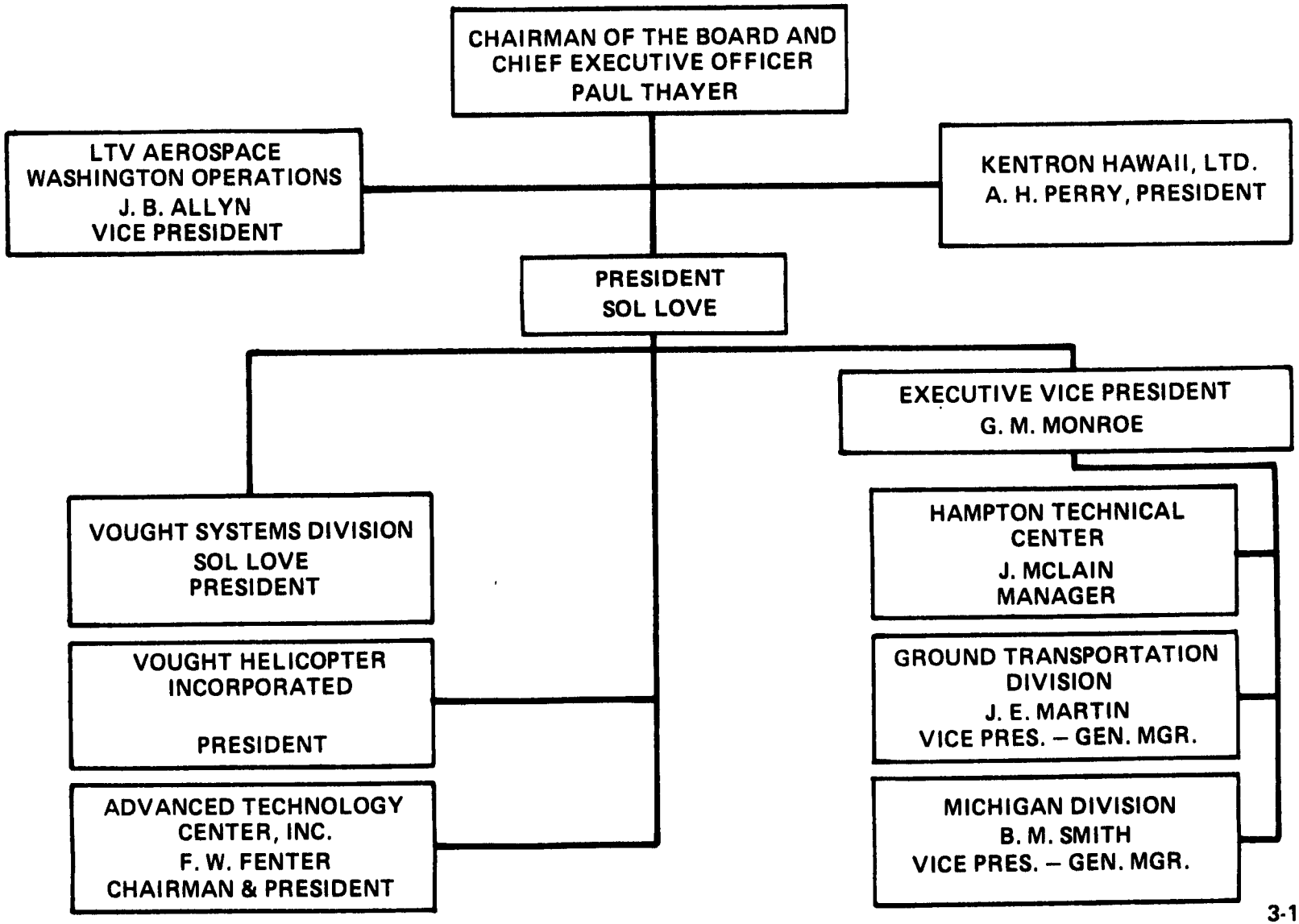
3-1-73

VOUGHT SYSTEMS DIVISION

LTV ORGANIZATION CHANGES

VOUGHT SYSTEMS DIVISION

LTV AEROSPACE CORPORATION ORGANIZATION CHART



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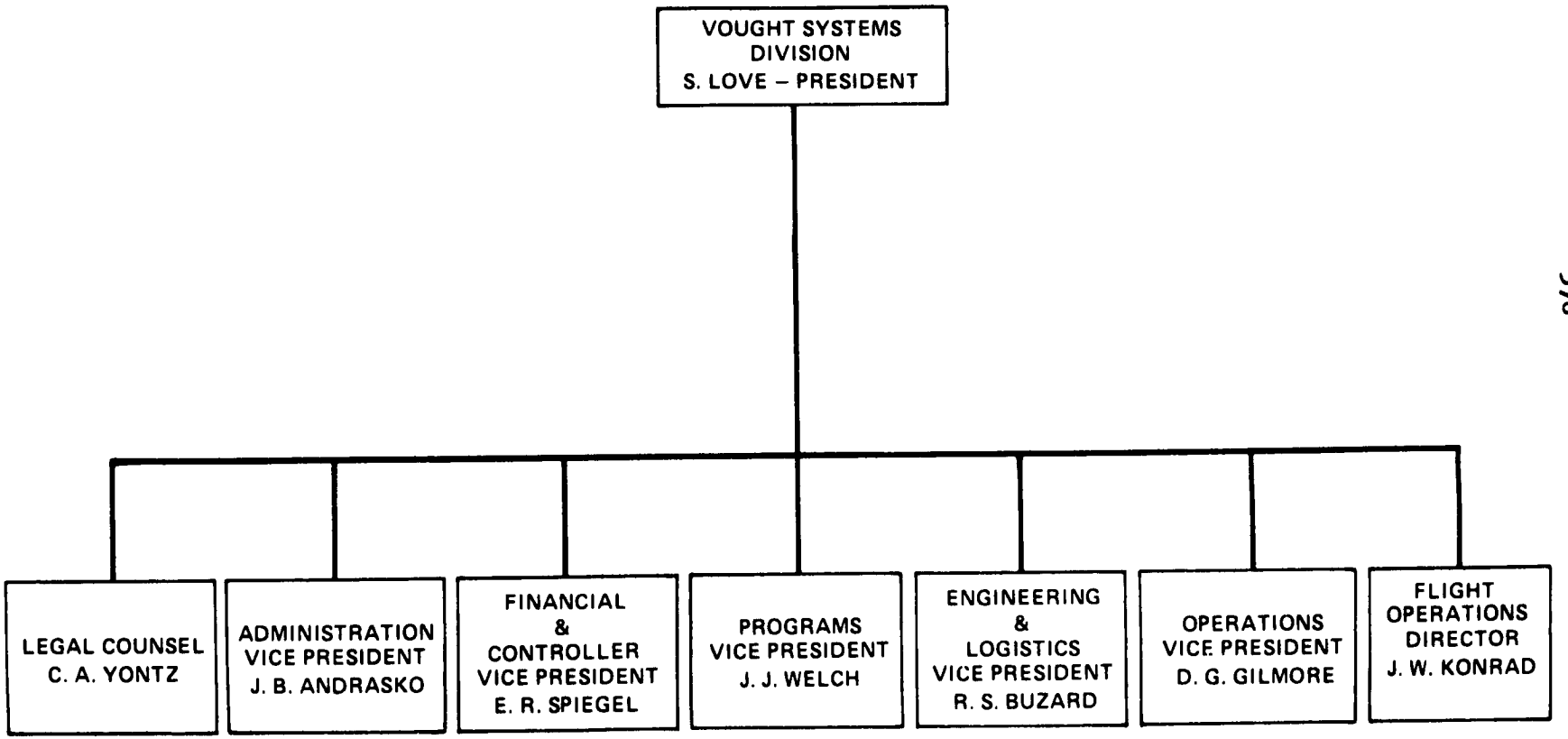
575

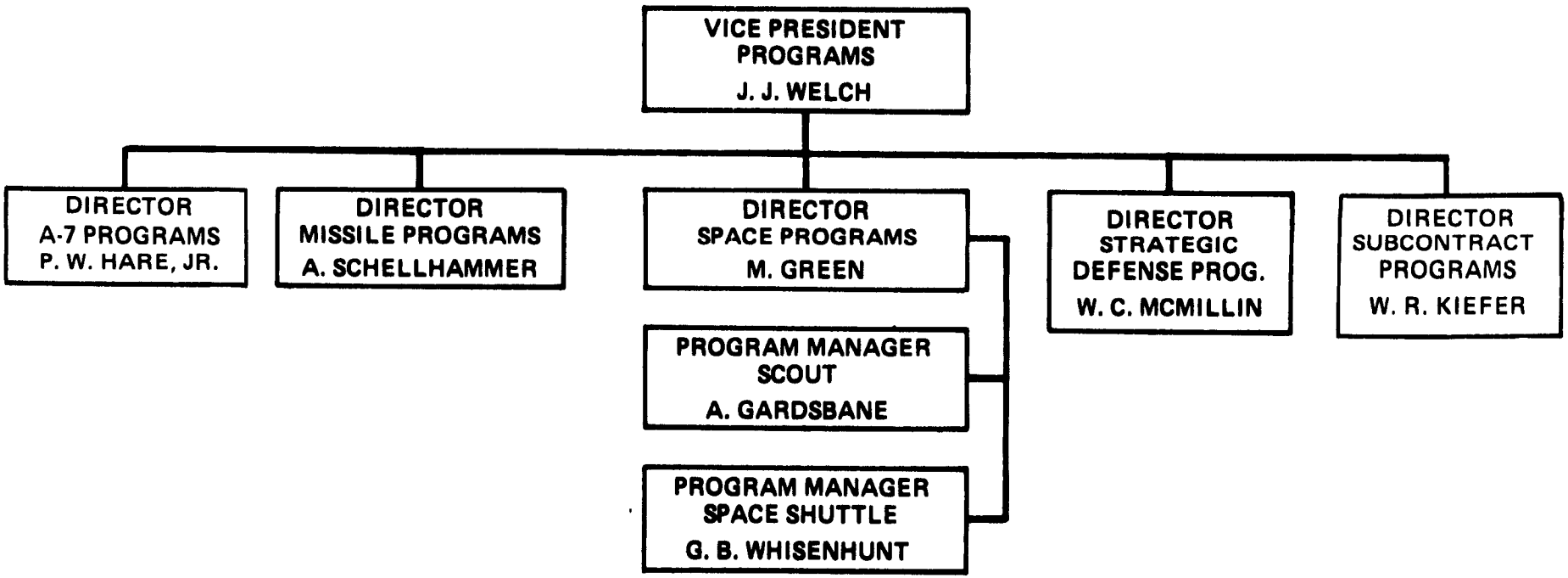
VOUGHT SYSTEMS DIVISION ORGANIZATION



VOUGHT SYSTEMS DIVISION

3-1-73

VOUGHT SYSTEMS DIVISION ORGANIZATION



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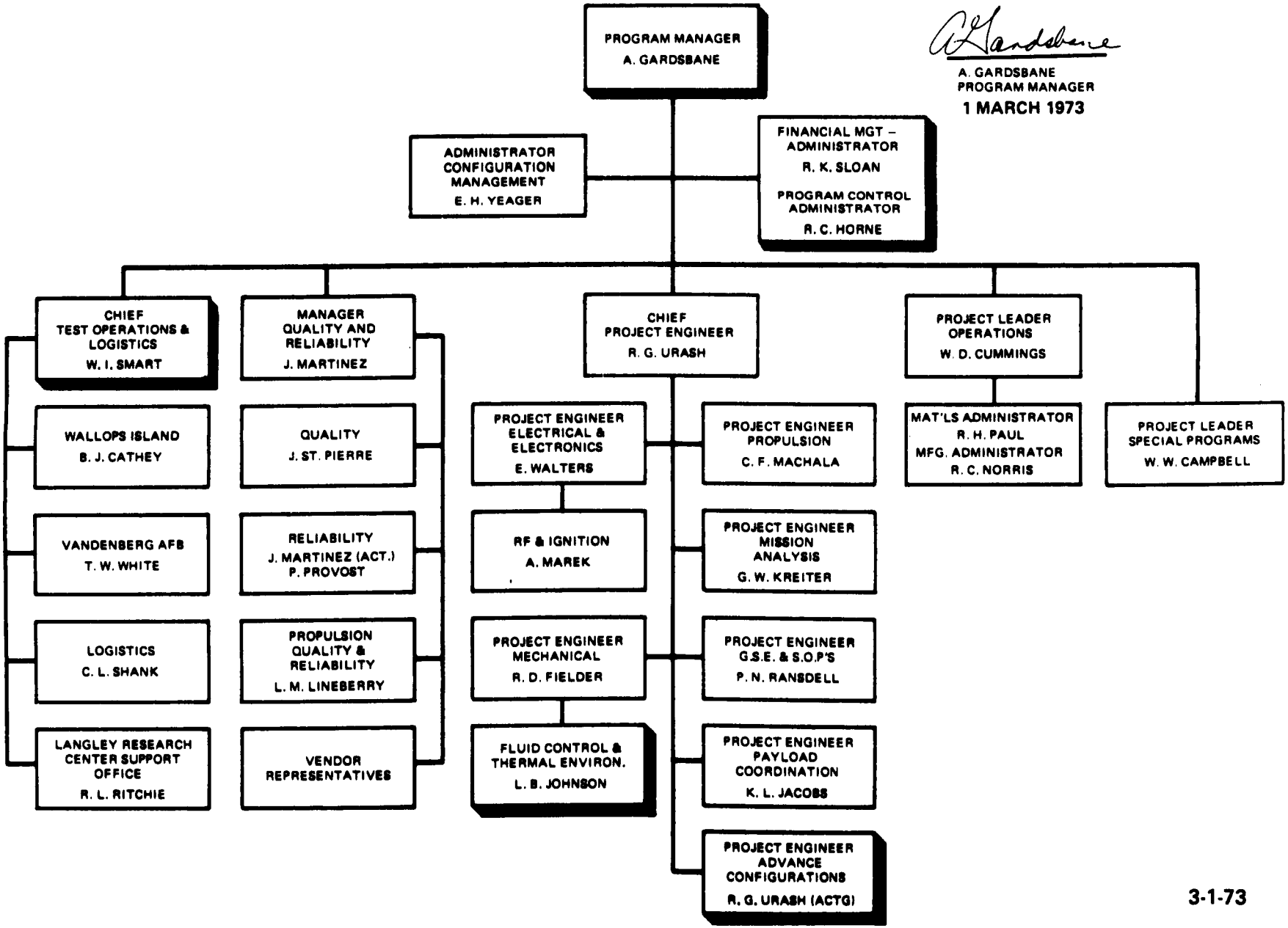
VOUGHT SYSTEMS DIVISION

SCOUT

PROGRAM MANAGEMENT ORGANIZATION



A. GARDSBANE
PROGRAM MANAGER
1 MARCH 1973

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REVIEW OF KEY POSITIONS

KEY PERSONNEL

PROGRAM MANAGER	ADMINISTRATOR – CONFIGURATION MANAGEMENT
CHIEF PROJECT ENGINEER	ADMINISTRATOR – PROGRAM CONTROL
CHIEF, TEST OPERATIONS AND LOGISTICS	ADMINISTRATOR – FINANCIAL MANAGEMENT
MANAGER QUALITY AND RELIABILITY	PROJECT LEADER – OPERATIONS
PROJECT ENGINEER – ELECTRICAL/ELECTRONIC	PROJECT LEADER – SPECIAL PROGRAMS
PROJECT ENGINEER – RF AND IGNITION	FIELD MANAGER – WALLOPS ISLAND
PROJECT ENGINEER – MECHANICAL	FIELD MANAGER – VANDENBERG AFB
PROJECT ENGINEER – FLUIDS AND THERMAL ENVIRON.	TEST CONDUCTOR – WALLOPS ISLAND
PROJECT ENGINEER – MISSION ANALYSIS	TEST CONDUCTOR – VANDENBERG AFB
PROJECT ENGINEER – G. S. E. AND S. O. P.'S	SUPERVISOR – FIELD ENGINEERING – WALLOPS ISLAND
PROJECT ENGINEER – PAYLOAD COORDINATION	SUPERVISOR – FIELD ENGINEERING – VANDENBERG AFB
PROJECT ENGINEER – PROPULSION	

579

CHANGES:

(1) AS A RESULT OF A REALIGNMENT OF PROGRAM RESPONSIBILITIES THE FUNCTION OF ASSIST. TO THE PROGRAM MANAGER HAS BEEN ELIMINATED

(2) WITH THE MERGER OF THE VMSC-T AND THE VAC SYSTEMS THE FUNCTION OF ADMINISTRATOR, FINANCIAL MANAGEMENT, HAS BEEN CREATED

NAS1-10000

VOUGHT SYSTEMS DIVISION

580

LAUNCH SUMMARY

(NAS1-10000)

VEH. NO.	PAYLOAD	LAUNCH SITE	DATE
S-174	OFO/RMS	W. I.	NOV '70
S-175	SAS-A	SAN MARCO	DEC '70
S-173	S/M-C	SAN MARCO	APR '71
S-144	PAET	W. I.	JUN '71
S-177	SOLRAD-C	W. I.	JUL '71
S-180	CAS-A	W. I.	AUG '71
S-166	GRP-A	W. I.	SEP '71
S-163	SSS-A	SAN MARCO	NOV '71
S-183	UK-4	VAFB	DEC '71
S-184	MTS	W. I.	AUG '72
S-182	INS-1	VAFB	SEP '72
S-170	SAS-B	SAN MARCO	NOV '72
S-185	ESRO-IV	VAFB	NOV '72
S-181	AEROS	VAFB	DEC '72

14 LAUNCHES – ALL SUCCESSFUL

OVERALL SUCCESS RATIO = 95% (SINCE RECERT)

28 CONSECUTIVE SUCCESSES TO DATE

LAUNCH PLANNING SCHEDULE

	1973			1974			1975		
	WEST	EAST	SAN MARCO	WEST	EAST	SAN MARCO	WEST	EAST	SAN MARCO
JAN FEB MAR				X-4		UK-5	○	GP-A	
APR MAY JUN	○			NPE ○					SAS-C
JULY AUG SEPT				AEROS-B ANS-A			DAD-A		
OCT NOV DEC	○			●			○	UK-6	

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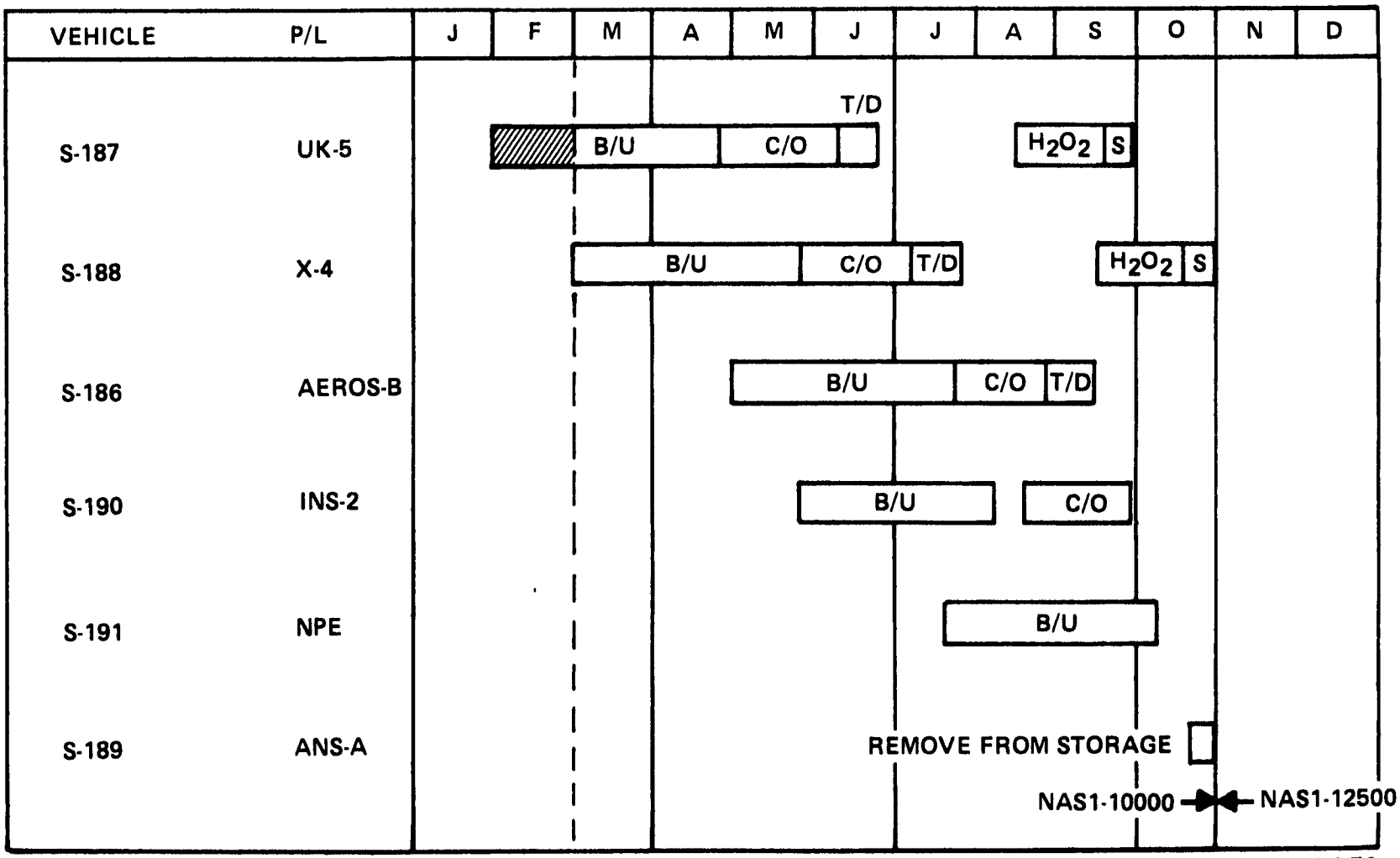
NOTE: ○ NOT FIRM

VOUGHT SYSTEMS DIVISION

VEHICLE PROCESSING SCHEDULE

NAS1-10000



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VOUGHT SYSTEMS DIVISION

SCOUT SYSTEM MANAGEMENT PLANNING SUMMARY

(1 JAN 1973)

		1973				1974				1975				1976			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
ESTIMATED LAUNCH			1		1	2	2	2	1	2	1	1	2	1	2	1	2
(* INDICATES ONE NOT FIRM)			*		*		*			*			*	*	* *	*	* *
DELIVERY TO STORAGE																	
VEHICLES					2	3	3	3	3	1							
CASTOR II		8	2	(4 IN STOPWORK)													
ANTARES IIB		3	6	(9 IN STOPWORK)													
ALTAIR IIIB				4	6	(7 IN STOPWORK)											
ALGOL III			2	2	3	3	1										
INVENTORY																	
VEHICLES	(9)	9	8	8	9	10	11	12	14	13	12	11	9	8	6	5	3
ALGOL IIC	(12)	12	11	11	10	9	8	8	7	6	6	6	5	**			
ALGOL III	(0)	0	2	4	7	9	9	7	7	6	5	4	3	2	0		
CASTOR II	(11)	19	20	20	19	17	15	13	12	10	9	8	6	5	3	2	0
ANTARES II	(7)	7	6	6	5	3	1	0									
ANTARES IIB (H/P)	(0)	3	9	9	9	9	9	8	7	5	4	3	1	0			
ALTAIR II (X-258)	(4)	4	3	3	2	**											
ALTAIR III (FW-4S)	(4)	4	4	4	4	2	0										
ALTAIR IIIB	(0)			4	10	10	10	8	7	5	4	3	1	0			

**REMAINING MOTORS PAST SHELFLIFE

VOUGHT SYSTEMS DIVISION

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CONTRACT NAS1-10000
(DELIVERABLE ITEM ESTIMATE)

ITEM	REQ'D	ASSIGNED	ETC	DELTA
PRELIMINARY TRAJ. (4 STG)	13	8	1	−4
PRELIMINARY TRAJ. (5 STG)	2	0	1	−1
FEASIBILITY TRAJ.	10	10	2	+2
ENVIRONMENTAL STUDY (THERMAL)	5	1	0	−4
ENVIRONMENTAL STUDY (VIBRATION)	5	6	1	+2
VEHICLE INTERFACE (STANDARD)	11	9	3	+1
VEHICLE INTERFACE (TRANSIT)	4	1	0	−3
G.S.E. INTERFACE (STANDARD)	11	10	2	+1
G.S.E. INTERFACE (TRANSIT)	4	0	0	−4
HEATSHIELD DESIGNS (STANDARD)	10	7	4	+1
HEATSHIELD DESIGNS (TRANSIT)	3	1	0	−2
PRE-FLIGHT PLANNING (STANDARD)	11	12	2	+3
PRE-FLIGHT PLANNING (TRANSIT)	4	3	0	−1
CALIBRATION SUMMARIES	11	7	3	−1
ORB. PERF. CAPABILITY REPORT	6	3	1	−2
POST FLIGHT ANALYSIS (STANDARD)	11	13	0	+2
POST FLIGHT ANALYSIS (TRANSIT)	4	1	0	−3
POST FLIGHT ANALYSIS (5 STG)	1	0	0	−1
HISTORICAL SUMMARY REV.	3	1	1	−1
HEATSHIELD FIT CHECKS	15	11	3	−1
ALGOL III MOD KIT INSTAL.	4	4	2	+2

– ALL OTHER DELIVERABLE ITEMS ESTIMATED TO BE IN ACCORDANCE WITH CONTRACT REQUIREMENTS

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SAN MARCO

- VEHICLE S-170 WITH THE SAS-B PAYLOAD WAS SUCCESSFULLY LAUNCHED INTO EQUATORIAL ORBIT ON 16 NOV 1972
- CURRENT EFFORT:
  - RANGE T/M GROUND STATION CONVERSION TO S-BAND IS BEING PRODUCED BY SCIENTIFIC ATLANTIC, ATLANTA, GA.
  - AUTHORIZATION THRU CRA TRUST FUND INITIATED FOR G.S.E. MODS FOR S-178 AND SUBS CONFIGURATION. ADDITIONAL FUNDING REQ'D TO COMPLETE
  - FABRICATION SCHEDULED TO COMPLETE MID OCT '73; RANGE INSTALLATION COMPLETE END OF DEC '73
- FUTURE EFFORT:
  - UK-5 TO LAUNCH THE FIRST QUARTER OF 1974
  - SAS-C TO LAUNCH THE SECOND QUARTER OF 1975
  - ADDITIONAL LAUNCHES WILL REQUIRE 193 & SUBS. MODIFICATIONS

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VOUGHT SYSTEMS DIVISION

TASK R SUMMARY

TOTAL OF 66 TASKS AUTHORIZED

45 TASKS COMPLETE

SIGNIFICANT TASKS CURRENTLY IN WORK

		VALUE	EST. COMP. DT.	STATUS
• R-43	S-181, S-185 SPECIAL INSTRUMENTATION (POST FLIGHT WORK REMAINS)	$59K	5/15/73	ON SCHED.
• R-44	G.S.E. FABRICATION	$52K	5/31/73	ON SCHED.
• R-46	ALGOL III BURST TEST (FINAL REPORT IN WORK)	$70K	3/15/73	REPORT SUBM. – AWAITING NASA COMMENTS
• R-57	C/D, S/A G.S.E. DESIGN AND SOP'S	$32K	6/29/73	ON SCHED.
• R-64	INCORPORATION OF HIGH PRESSURE X-259	$40K	8/10/73	ON SCHED.

TOTAL EST. VALUE OF THE 21 TASKS IN WORK – $.485 M

TOTAL EST. VALUE OF ALL 66 TASKS ASSIGNED – $1.714 M

TASK S SUMMARY

- TOTAL OF 30 TASKS ASSIGNED – 22 COMPLETED
- OPEN TASKS:

	VALUE	EST. COMP. DT.	STATUS
– X-258 SHELFLIFE PROGRAM	$43K	4/30/73	ON SCHED.
– (5) X-259 SPECIAL INSTRUMENTATION KITS	$59K	8/15/73	ON SCHED.
– MODIFICATIONS FOR NEW SAFE/ARM UNITS	$52K	10/31/73	ON SCHED.
– BASE "A" LAUNCH PINS	$9K	5/18/73	ON SCHED.
– ALGOL III DRILL FIXTURE REPAIR	$7K	4/20/73	ON SCHED.
– ASSEMBLY OF 4TH STAGE IGNITION AND T/M SYSTEMS	$5K	6/30/73	ON SCHED.
– LONG LEAD TIME ITEMS FOR LARGE "E" SECTION	$6K	8/7/73	ON SCHED.
– FAB. AND INSTALL. OF MISC. G.S.E. CHANGES	$48K	10/31/73	ON SCHED.

- TOTAL ESTIMATED VALUE OF ALL TASKS – $594K

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VOUGHT SYSTEMS DIVISION

3-1-73

SINGLE FAILURE POINT INVESTIGATION
(TASK W-001)

		COMPLETED
PHASE I:	SFP IDENTIFICATION	22 NOVEMBER 72
	• 339 SFP SOURCES IDENTIFIED	
	• CRITICAL FAILURE MODES DEFINED FOR EACH	
	• NO SFP SOURCES IDENTIFIED REQUIRE MANDATORY DESIGN CORRECTIVE ACTION	
PHASE II:	TEST PROCEDURE REVIEW	5 JANUARY 73
	• TESTING OF CRITICAL FAILURE MODES INDICATE EIGHT AREAS SHOULD BE INVESTIGATED FOR IMPROVEMENT	
PHASE III:	GSE REVIEW	2 MARCH 73
	• GSE USED IN TEST OF SFP SOURCES DISCLOSED TEN AREAS THAT REQUIRE FURTHER INVESTIGATION	
PROGRAM REPORT	PRELIMINARY	30 MARCH 73

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SCOUT MOTOR STATUS

VOUGHT SYSTEMS DIVISION

SCOUT MOTOR HISTORY

1 MARCH, 1973

MOTOR	SHELF LIFE	FLIGHT SUCCESS RATIO	INVENTORY
ALGOL II	5 YRS.	63/64 (S-110)	12
ALGOL III	3 YRS.	4/4	0
CASTOR	5 YRS.*	300/300	17
ANTARES II	5 YRS.	186/187 (S-152)	7
ALTAIR II (X-258)	6 YRS.	25/25	4
ALTAIR III (FW-4S)	5 YRS.	60/61 (S-151)	4

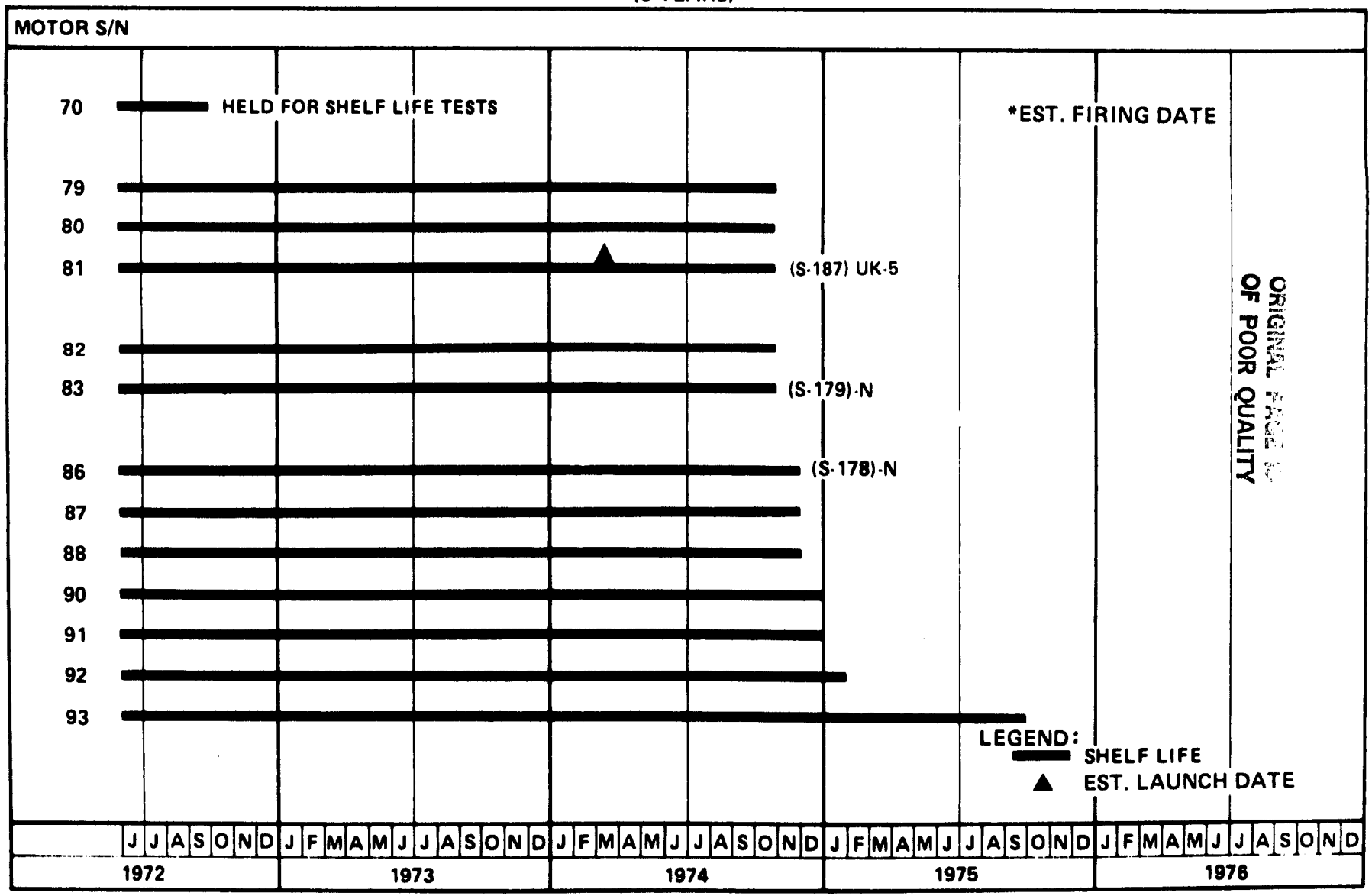
*WITH SUCCESSFUL X-RAY

3-1-73

VOUGHT SYSTEMS DIVISION

ALGOL IIC MOTOR SHELF LIFE

(5 YEARS)



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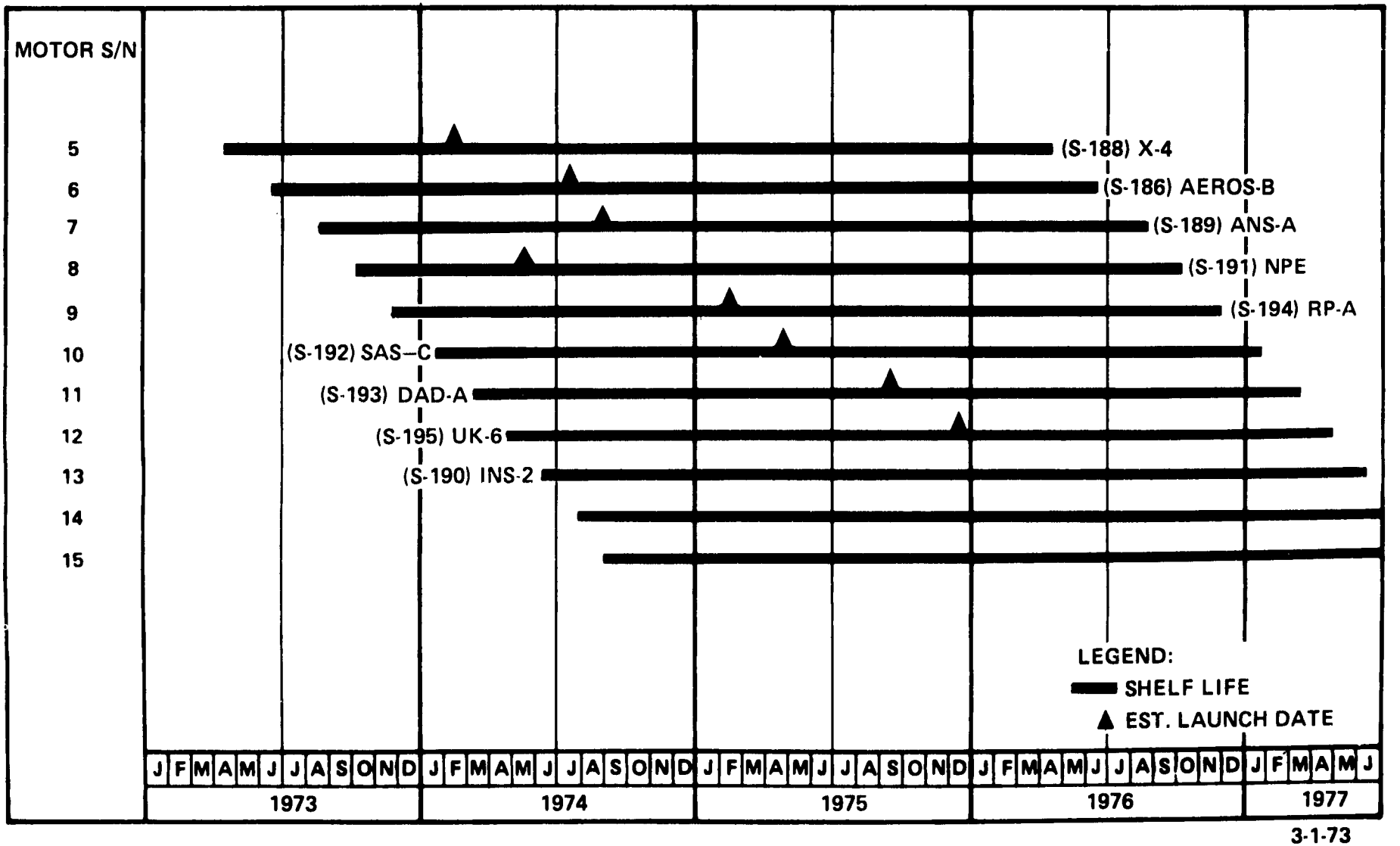
ALGOL III MOTOR SHELF LIFE

3 YEARS



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VOUGHT SYSTEMS DIVISION

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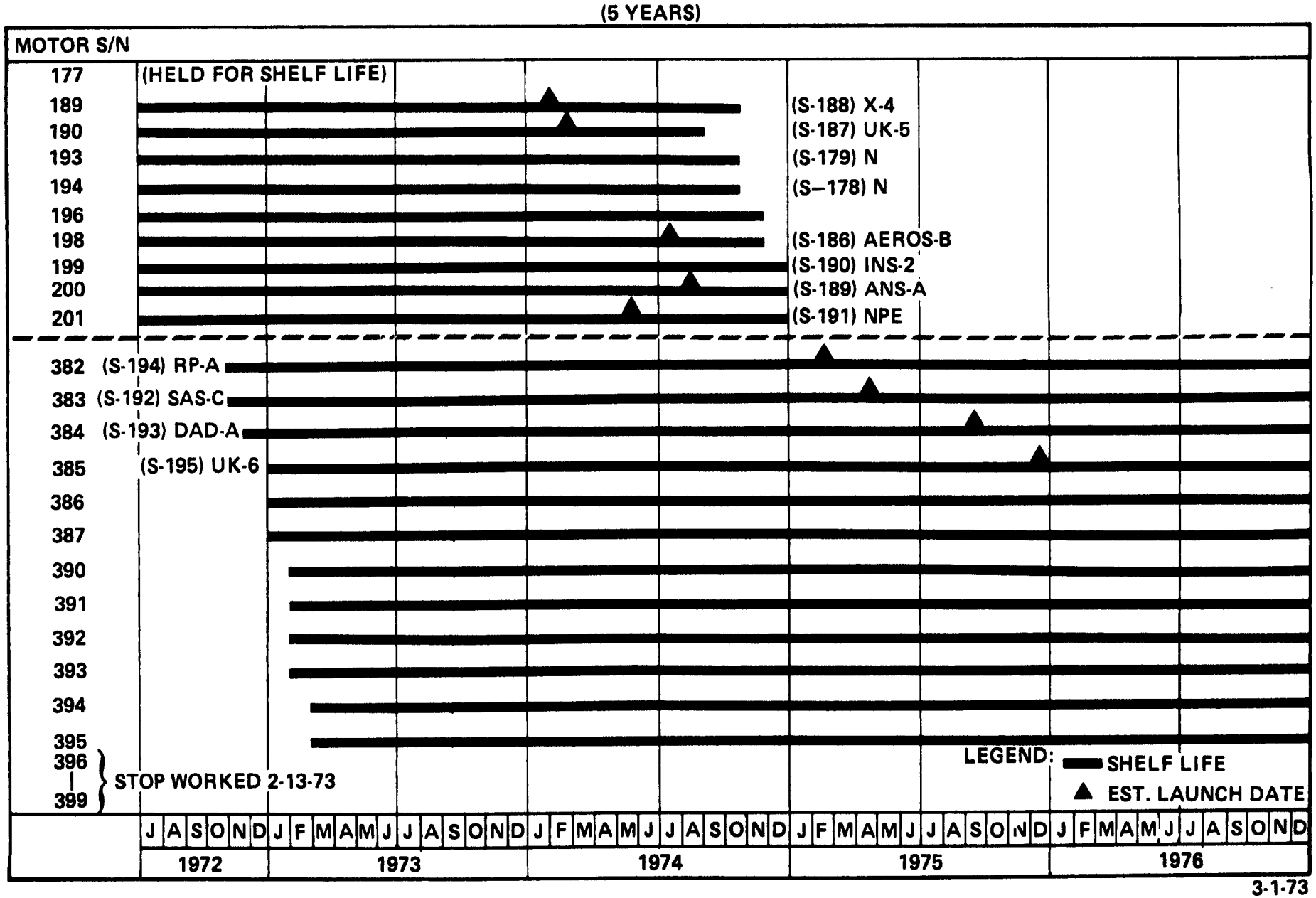
CASTOR MOTOR SHELF LIFE



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X-259 MOTOR STATUS

STANDARD MOTOR:

- ONE 125 MO. OLD MOTOR FIRED IN NOV '72 AT OPERATING PRESSURE FOR THE EFFECT OF THE LIGHT WEIGHT IGNITER ON THE X-259-B3. AN IGNITION DELAY OF APPROX. 8 SECONDS WAS NOTED. RESULTS VERIFY THAT THE LT.WT. IGNITER CANNOT BE USED WITH THE STANDARD MOTOR.

HIGH PRESSURE MOTOR:

- ONE MOTOR WITH LIGHT WEIGHT IGNITER AND REWORKED NOZZLE TESTED AT HI/ABL (NOV '72)
- ONE MOTOR WITH LIGHT WEIGHT IGNITER AND GRAPHITE PHENOLIC THROAT INSERT NOZZLE FROM TASK ORDER NO. 2 TESTED AT HI/ABL (DEC '72)
- ONE MOTOR WITH PRODUCTION LIGHT WEIGHT IGNITER AND PRODUCTION HIGH PRESSURE NOZZLE TO BE FIRED AT AEDC (JULY '73)
- NINE PRODUCTION MOTORS TO BE CAST – NINE HAVE BEEN PLACED IN STOPWORK

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X-259 MOTOR STATUS (CONT'D)

HIGH PRESSURE X–259 CHANGES:

- DESIGN CHANGE FOR SBASI AND INSTRUMENTATION AUTHORIZED BY R-54
- FABRICATION OF SBASI AND INSTRUMENTATION KITS (5) AUTHORIZED BY S-024
- DESIGN AND FABRICATION OF G.S.E. MODIFICATIONS AUTHORIZED BY R-67
- ASSOCIATED S.O.P. CHANGES AUTHORIZED BY R-67
- ANALYSES ASSOCIATED WITH VEHICLE PERFORMANCE, TRAJECTORY, STABILITY AND CONTROL, LOADS AND DYNAMICS AND REPORT UP-DATING AUTHORIZED BY R-64
- SUPPORT TO AEDC TEST AND REVISION TO USER'S MANUAL TO BE DONE

3-1-73

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X-259 PERFORMANCE COMPARISON

MOTOR DESCRIPTION	IGNITER WT.	INITIATOR	ISP	TOTAL IMPULSE
STANDARD X-259-B3	20 LBS	SD-60-EO	281.8	723,400
HIGH PRESSURE X-259-B4	8.8 LBS	SBASI	285.5*	733,160*

*ESTIMATED VALUES

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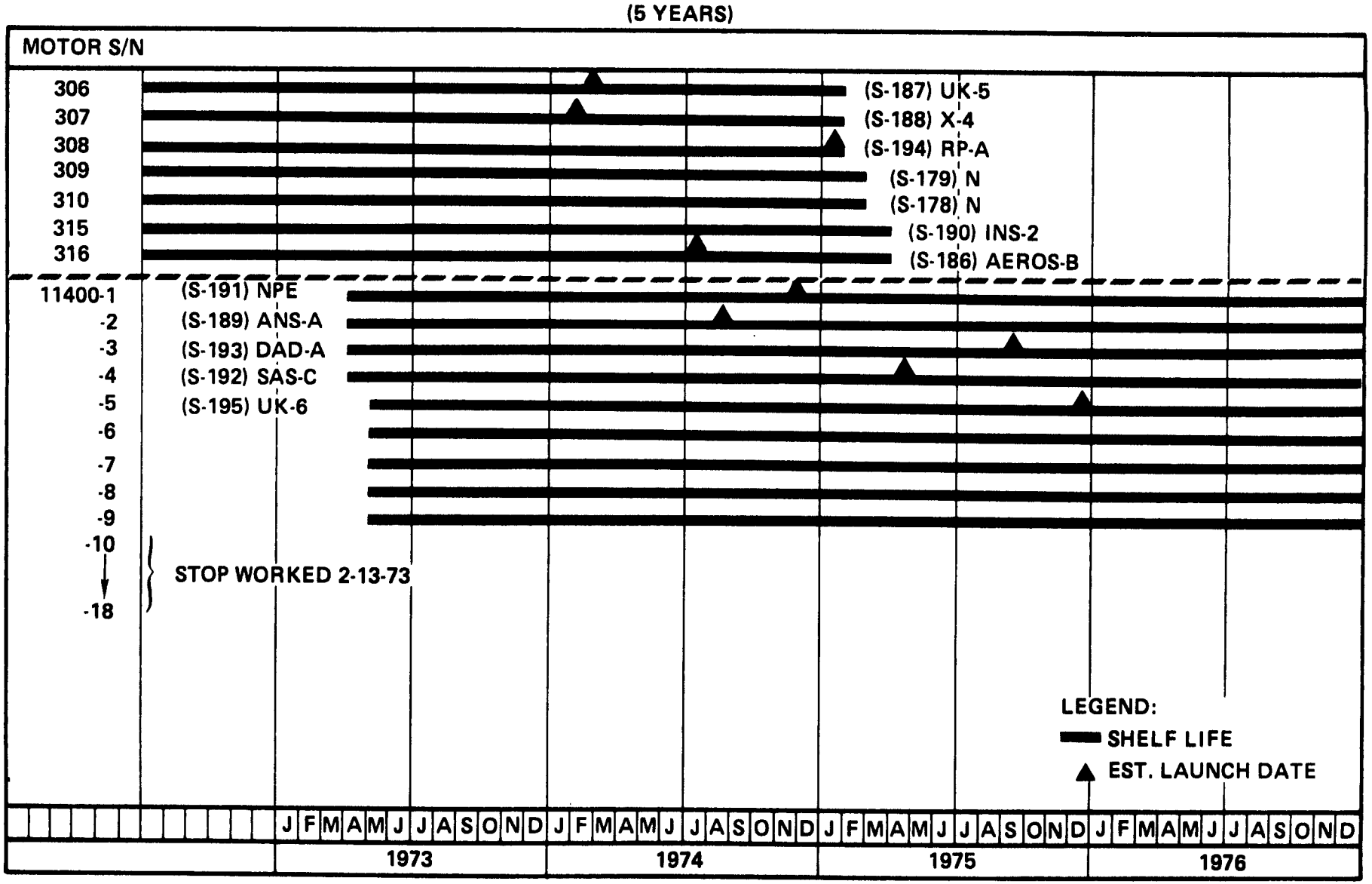
X-259 MOTOR SHELF LIFE



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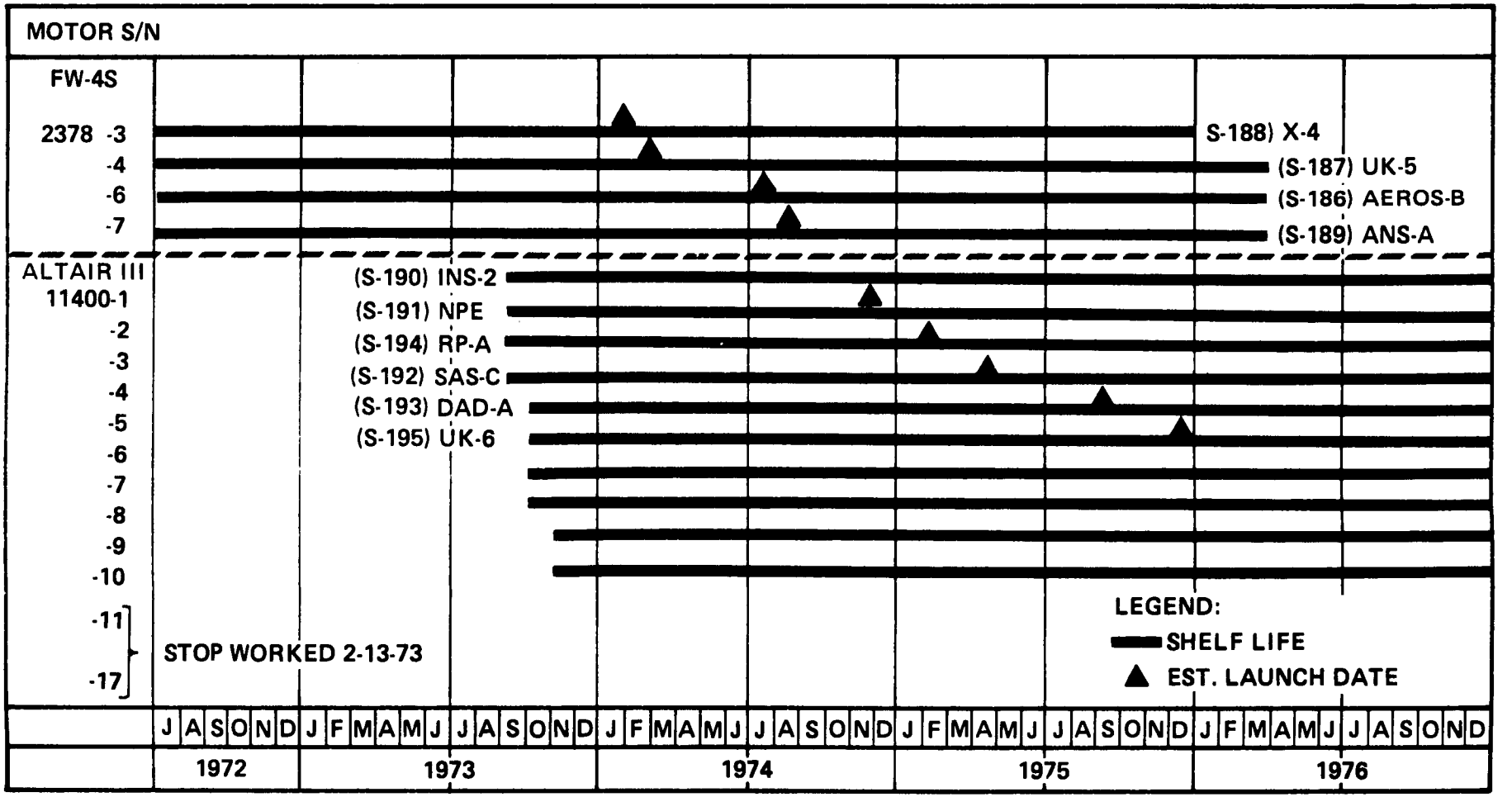
ALTAIR III MOTOR SHELF LIFE
(5 YEARS)



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VOUGHT SYSTEMS DIVISION

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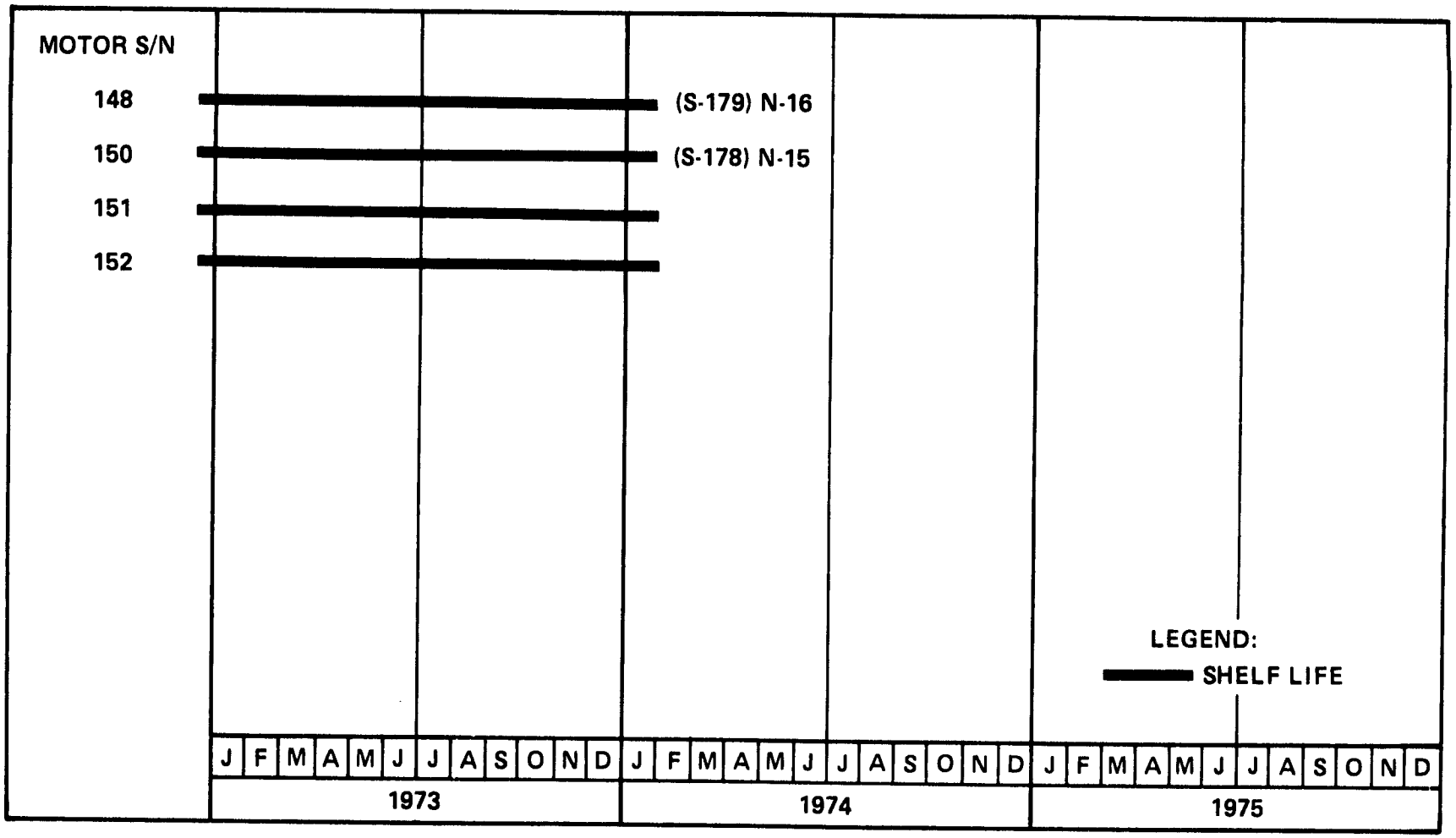
X-258 MOTOR SHELF LIFE

(6 YEARS)



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VOUGHT SYSTEMS DIVISION

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BE-3 MOTOR SHELFLIFE

(3 YEARS)

		1974				1975				1976			
MOTOR S/N	CAST DATE	1ST	2ND	3RD	4TH	1ST	2ND	3RD	4TH	1ST	2ND	3RD	4TH
AN09/003	3/68		▲	—	—	—	—	—	—	—	* (S-191) NPE		
AN09/005	4/68	—	—	—	—	—	—	—	—	—	*		
AN09/006	4/68	—	—	—	—	—	—	—	—	—	*		
AN09/008	5/68	—	—	—	—	—	—	—	—	—	—	*	
AN09/010	5/68	—	—	—	—	—	—	—	—	—	—	*	

3-1-73

- ALL MOTORS CURRENTLY OUT OF SHELFLIFE
- PROPOSAL SUBMITTED TO EXTEND PERIOD TO 8 YEARS
- SUCCESSFUL PROGRAM WILL RESULT IN EXTENSIONS AS SHOWN

LEGEND:

* SHELFLIFE

▲ EST. LAUNCH DATE

VOUGHT SYSTEMS DIVISION

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DONELY COMMITTEE REVIEW

(SUMMARY OF RECOMMENDATIONS)

- ACTION CONSIDERED ESSENTIAL TO REALIZE 50 CONSECUTIVE SUCCESSFUL LAUNCHES
  - REVIEW TRENDS IN HISTORICAL DATA THAT MIGHT FOCUS ON A SYSTEM WEAKNESS
  - PROVIDE POSITIVE STEPS TO INSURE ENVIRONMENTAL PROTECTION DURING ALL CONDITIONS OF STORAGE AND TRANSPORT AND ASSURE ADEQUATE DOCUMENTATION FOR READY REVIEW AND TRACEABILITY
  - CONTINUE CLOSE SURVEILLANCE OF ALL COMPONENTS, SYSTEMS AND SUPPORT EQUIPMENT IN ORDER TO TAKE REMEDIAL ACTION AS NECESSARY TO MAINTAIN A CONTINUANCE OF SCOUT'S EXCELLENT RELIABILITY
  - MAINTAIN PROFICIENCY OF ALL SCOUT PERSONNEL, ESPECIALLY THE LAUNCH TEAM, BY CLASSROOM AND ON-THE-JOB TRAINING

DONELY COMMITTEE REVIEW (CONT'D)

- COMMITTEE REVIEW RESULTED IN 25 RECOMMENDATIONS TO BE CONSIDERED FOR POSSIBLE REMEDIAL ACTION
- 20 ITEMS WERE ASSIGNED TO CONTRACTOR AND 5 TO LRC/SPO
- REVIEW COMPLETED ON ALL RECOMMENDATIONS
- OF THE CONTRACTOR'S 20 ITEMS:
  - 4 ARE CLOSED: NO ACTION REQ'D.
  - 10 ARE CLOSED: ACTION COMPLETE
  - 3 ARE OPEN: ACTION IN WORK
  - 3 ARE OPEN: ACTION PENDING

604

DONELY COMMITTEE REVIEW

(ACTION ITEMS – IN WORK)

ITEM	ACTION	STATUS
• MAINTAIN QUALIFIED PERSONNEL IN PLANT-IN FIELD – AT SPO	• LIST SKILLS – IDENTIFY KEY POSITIONS – PROPOSE TRAINING PROGRAM	• ONLY OPEN ITEM – DEVELOP TRAINING PROGRAM FOLLOWING NASA CONCURRENCE
• RELIABILITY OF "E" SECTION ELECTRICAL SYSTEM	• FAILURE MODE ANALYSIS OF TIMER	• ITEM IN WORK (5-1-73)
	• THERMAL ANALYSIS OF TIMER INITIATE SWITCH	• CLOSED – ANALYSIS INDICATED SWITCH OK
	• EVALUATE USE OF TIMER INITIATE SWITCH TO SWITCH POWER	• ANALYSIS SUBMITTED TO NASA
	• VERIFICATION OF TIMER PERFORMANCE DURING COUNTDOWN	• ANALYSIS SUBMITTED TO NASA
• ASSURE AVAILABILITY OF FLIGHT WORTHY BE-3-A9 MOTOR	• PREPARE DETAIL PLAN	• ACTION PENDING NASA CONTRACTUAL AUTH. TO PROCEED WITH SHELFLIFE PROGRAM

605

DONELY COMMITTEE REVIEW

(ACTION ITEM – PENDING)

ITEM	ACTION	STATUS
• MAINTAIN PROFICIENCY OF GROUND CREW	• PROVIDE PROFICIENCY TRAINING PLAN	• PLAN SUBMITTED 9-11-72 – AWAITING NASA ACTION
• REVIEW OF TIR'S TO ESTABLISH TRENDS	• COMPILE AND CORRELATE SCOUT VEHICLE TIR'S AND FLIGHT ANOMALIES. TIR'S SHALL BE FROM VEHICLE S-139 AND FLIGHT ANOMALIES FROM VEHICLE ST-1 IF POSSIBLE	• ANOMALIES SUBMITTED 10-12-72 – TIR REVIEW SUBMITTED 3-30-73. ACTION WILL FOLLOW STUDY OF RESULTS
• INITIATE PROGRAM FOR UPDATE & MAINTENANCE OF ALL GROUND FACILITIES	• REVIEW AND IMPROVE PREVENTIVE MAINT. PROCEDURE • IMPROVE REPORTING • EVALUATE AGE AND LIFE EXPECTANCY OF S^3T & SLC COMPONENTS • EVALUATE ALL GSE SEMI-ANNUALLY	• PROGRAM PLAN AND SCHEDULE FOR NASA APPROVAL IN WORK EST. COMPL. 4-15-73

VOUGHT SYSTEMS DIVISION

3-1-73

PHASE VII
PRODUCTION PROGRAM

VOUGHT SYSTEMS DIVISION

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PHASE VII PROCUREMENT

CONTRACT DELIVERY SCHEDULES

ITEM		1973 1ST	1973 2ND	1973 3RD	1973 4TH	1974 1ST	1974 2ND	1974 3RD	1974 4TH	1975 1ST
						NAS1-11000				
VEHICLES (S-193 – S-207)	15				1 1	1 1 1	1 1 1	1 1 1	1 1 1	1
CASTOR II	16 (4 IN S/W)	2 2	2 2 2	2 ~~2~~ ~~2~~						
ANTARES II (X-259)	18 (9 IN S/W)	3	2 4 ~~4~~	~~5~~		NAS1-11400				
ALTAIR III	17 (7 IN S/W)			4 4	2 ~~2~~ ~~5~~					

3-1-73

VOUGHT SYSTEMS DIVISION

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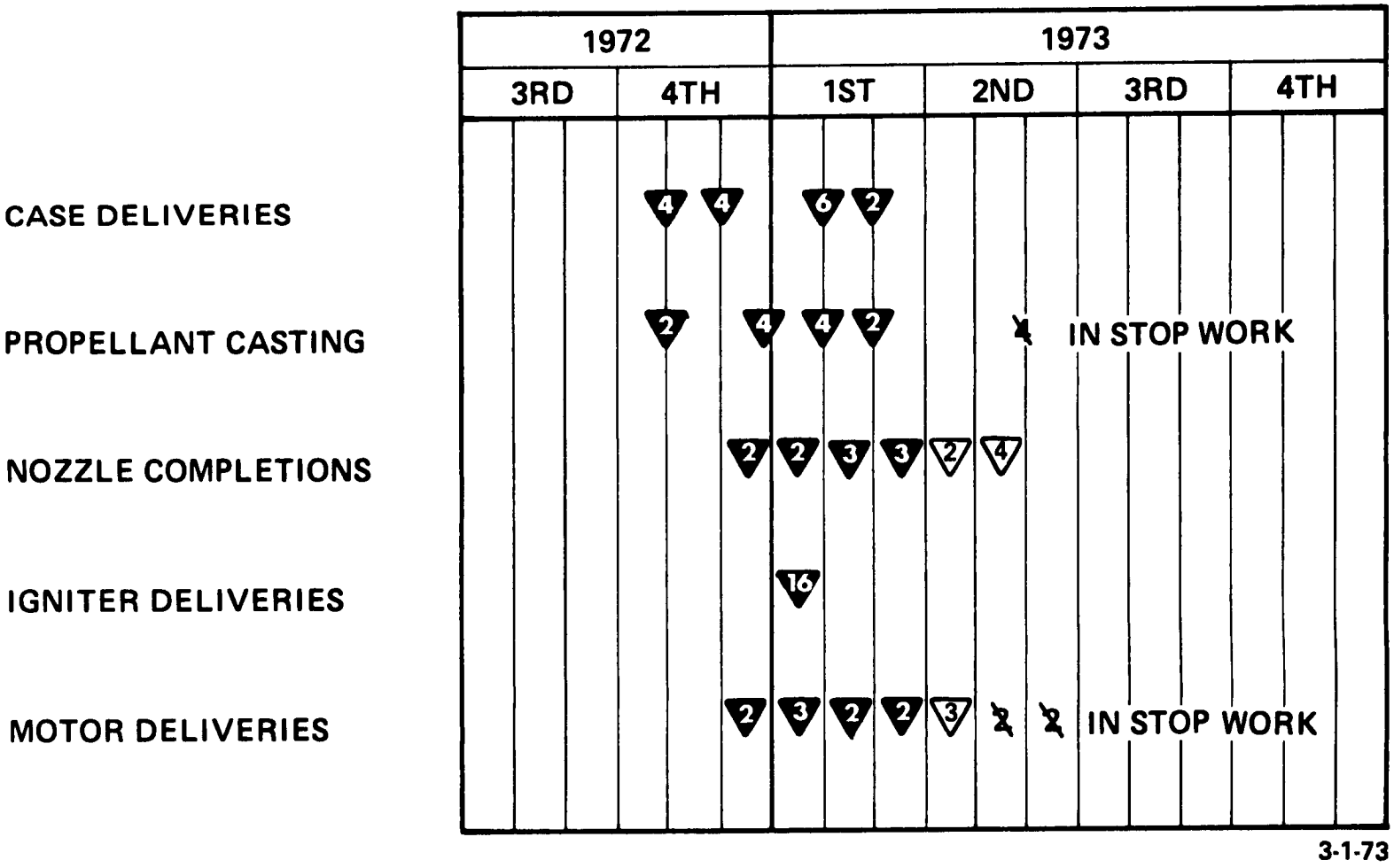
NAS1-11400

VOUGHT SYSTEMS DIVISION

MILESTONES - CASTOR II PROGRAM



VOUGHT SYSTEMS DIVISION

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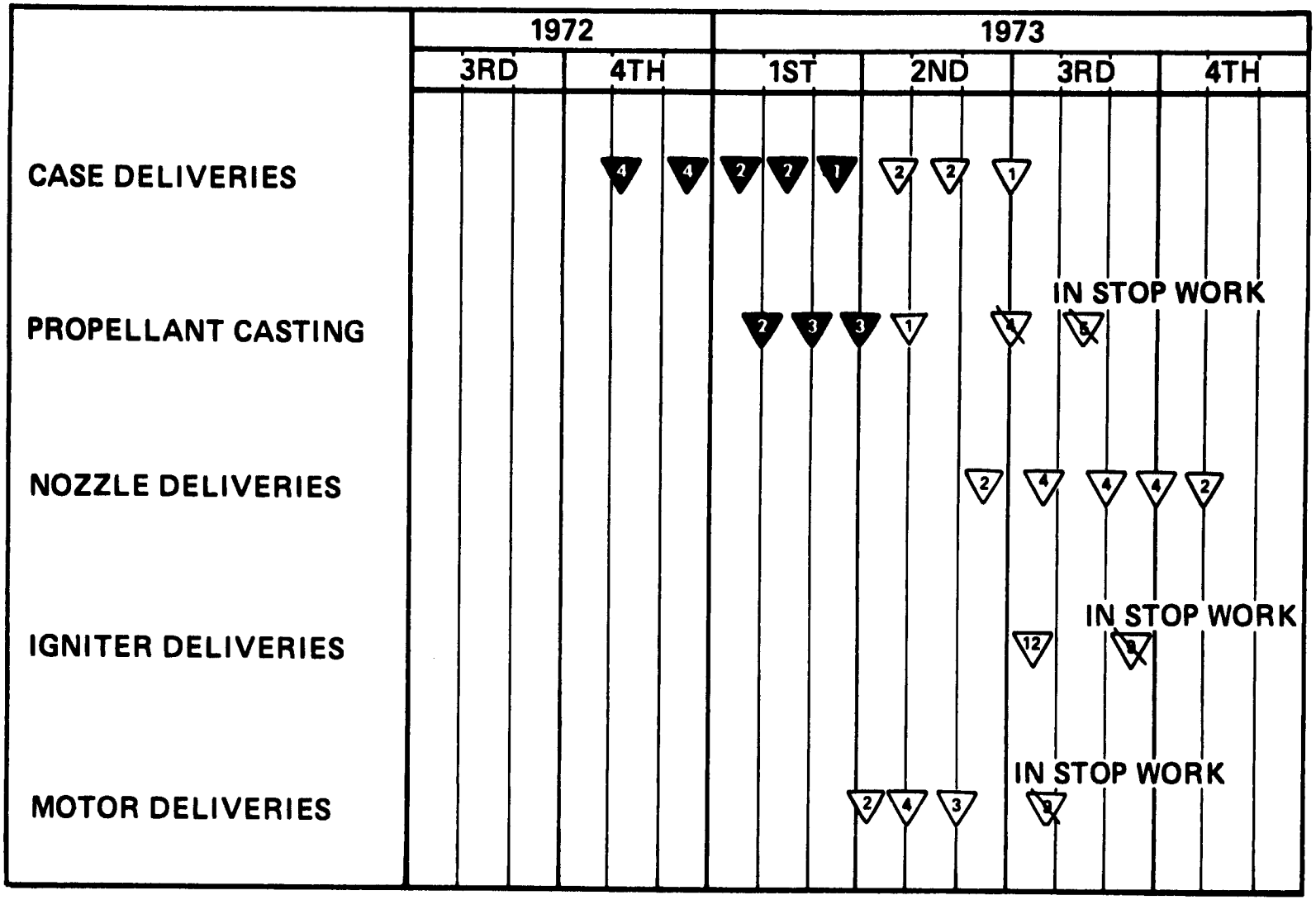
MILESTONES - X-259 MOTOR PROGRAM



VOUGHT SYSTEMS DIVISION

3-1-73

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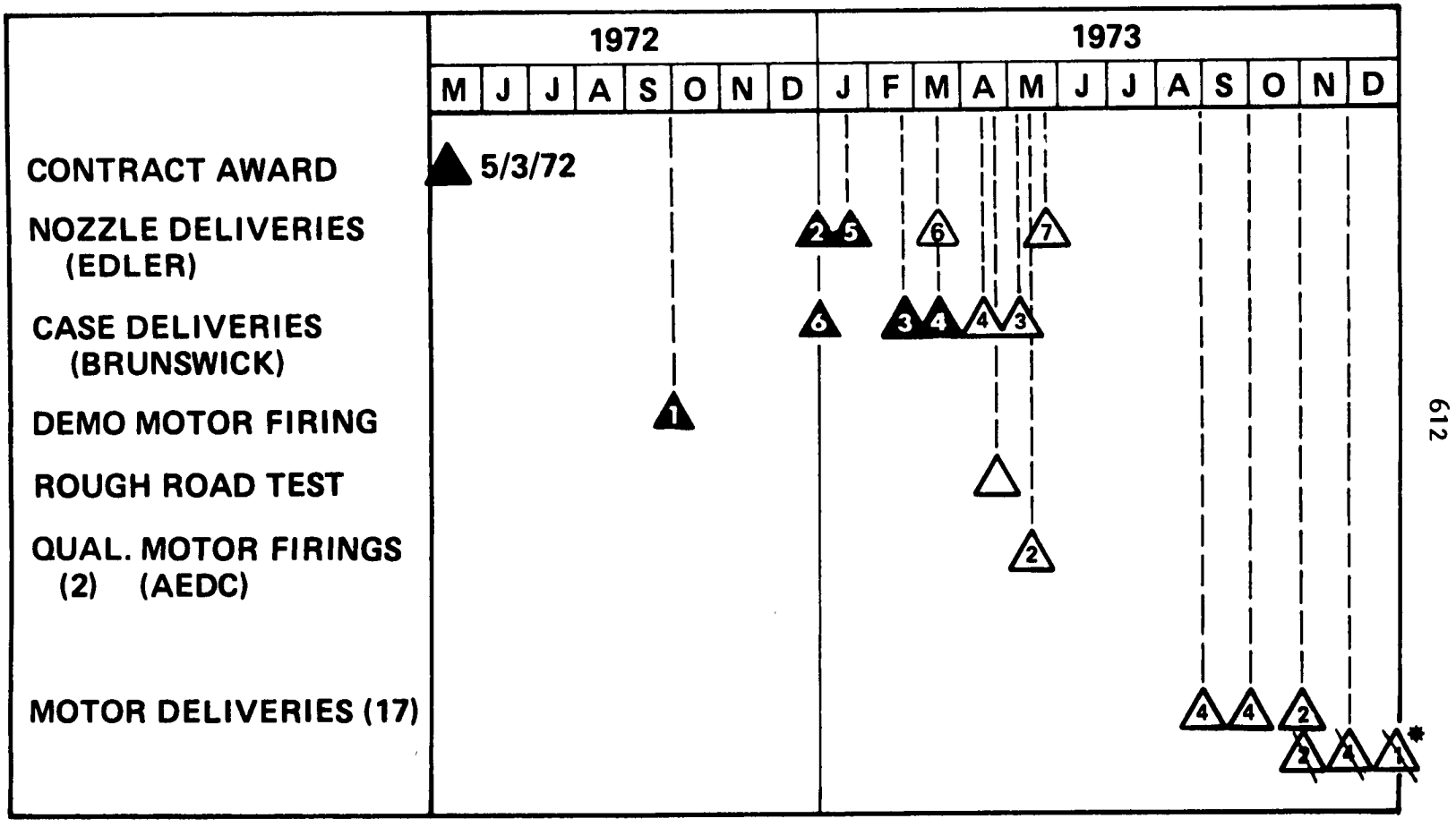
MILESTONES - ALTAIR III MOTOR PROGRAM



*LAST (7) MOTOR AND IGNITERS IN STOPWORK

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VOUGHT SYSTEMS DIVISION

3-1-73

NAS1-11000

VOUGHT SYSTEMS DIVISION

NAS1-11000 PROCUREMENT

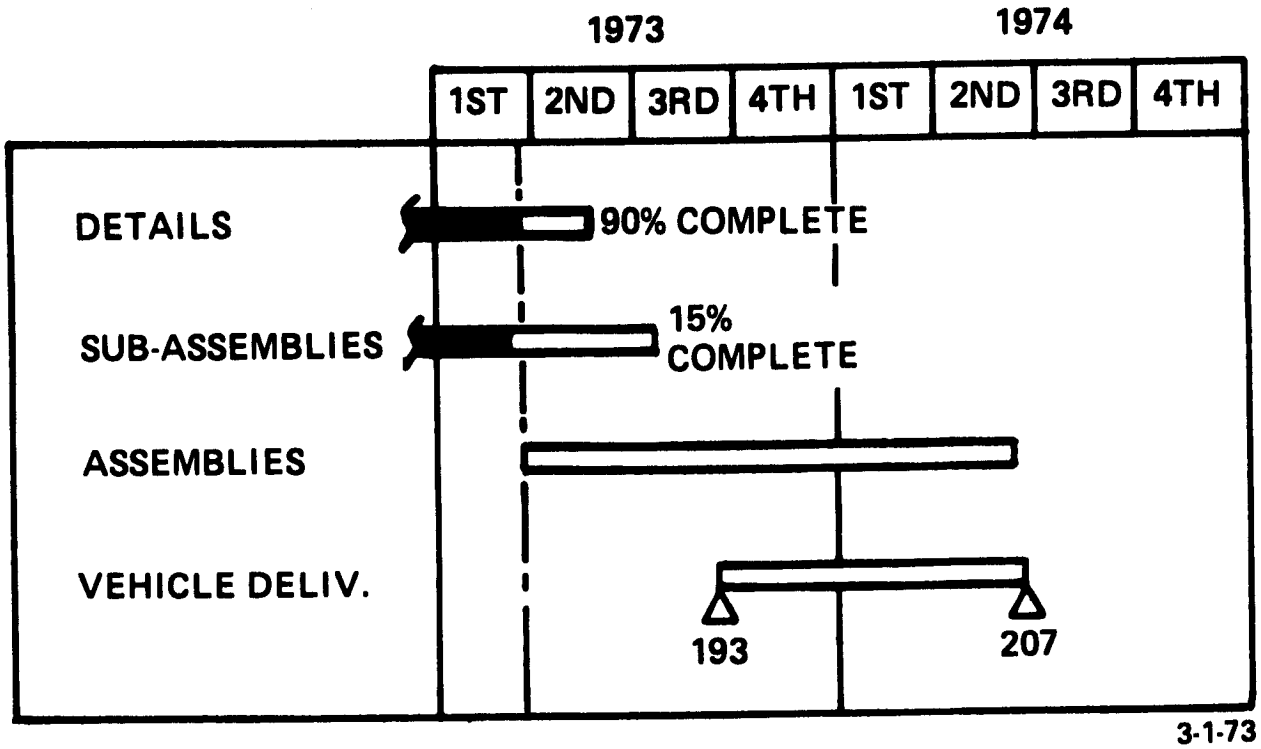
VEHICLE COMPONENT CHANGES

- COMMAND DESTRUCT RECEIVERS – 34 UNITS PROCURED DUE TO VAFB RANGE SAFETY REQUIREMENT FOR "NARROW BAND" RECEIVER 1 JAN 1973
- SAFE AND ARM UNITS – 70 UNITS TO BE PROCURED DUE TO INABILITY OF OLD UNIT TO MEET RANGE SAFETY REQUIREMENTS
- POWER CONTROL RELAY BOX (PCRB) – 20 UNITS PROCURED TO A NEW DESIGN SINCE THE MULTI-LAYER PRINTED CIRCUIT BOARD VENDOR COULD NO LONGER SUPPLY SCOUT REQUIREMENTS
- INCORPORATION OF H/P X-259 VEHICLE REQUIREMENTS

3-1-73

VOUGHT SYSTEMS DIVISION

PHASE VII VEHICLE SCHEDULE



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VOUGHT SYSTEMS DIVISION

NAS1-10500

T.O. #1 – 4TH STAGE TIMERS – CPFF (FP PRODUCTION)

T.O. #2 – NOZZLE MATERIAL DEVELOPMENT – CPFF

T.O. #3 – ATTITUDE CORRECTION SYSTEM – CPFF
(VAN ALLEN MISSION)

VOUGHT SYSTEMS DIVISION

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4TH STAGE TIMERS

(T. O. NO. 1)

- PHASE I DESIGN, DEVELOPMENT AND QUALIFICATION SUCCESSFULLY COMPLETED IN JANUARY 1973
- PHASE II 30 UNIT PRODUCTION OPTION AUTHORIZED IN FEB 1973
- FIRST DELIVERIES ESTIMATED IN JUNE 1973

3-1-73

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VOUGHT SYSTEMS DIVISION

NOZZLE MATERIAL PROGRAM STATUS

(T. O. NO. 2)

- STATIC FIRING TESTS SUCCESSFULLY COMPLETED
- FINAL CONFIGURATION SELECTED:

THROAT	– ABLATIVE (GRAPHITE/PHENOLIC: MXG-175 TAPE WRAPPED)
THROAT INSULATOR	– ASBESTOS/PHENOLIC (RPD-150 MOLDED)
THROAT EXTENSION	– GRAPHITE/PHENOLIC (MX2630 TAPE WRAPPED)
EXIT CONE	– SILICA/PHENOLIC (MX2600 TAPE WRAPPED)

- FINAL CONFIGURATION TO BE TEST FIRED AT AEDC UNDER CONTRACT NAS1-11400

3-1-73

PROGRAM IS COMPLETE

VOUGHT SYSTEMS DIVISION

618

ATTITUDE CORRECTION SYSTEM STATUS

(T. O. NO. 3)

- THERMAL ANALYSIS COMPLETE
- STRUCTURAL MODIFICATIONS COMPLETE
- FLIGHT UNIT ASSEMBLY IN WORK
- VENDOR TESTS COMPLETE
- ACS BENCH TEST AT VSD COMPLETE
- ACS FLIGHT ACCEPTANCE TEST INITIATED
- MISSION ACCURACY ANALYSIS IN WORK
- ENGINEERING RELEASED AND MODIFICATION OF F&G SECTIONS IN WORK (TASK R-62)

3-1-73

VOUGHT SYSTEMS DIVISION

SCOUT ATTITUDE CORRECTION SYSTEM PROGRAM SCHEDULE

T. O. NO. 3

ESTABLISH SYSTEM REQUIREMENTS
- ACS SPEC. CONT. DRAWING
- TANK SPEC. CONT. DRAWING

VENDOR GO-AHEAD

MODIFY SECTIONS

THERMAL ANALYSIS

SYSTEM EVALUATION

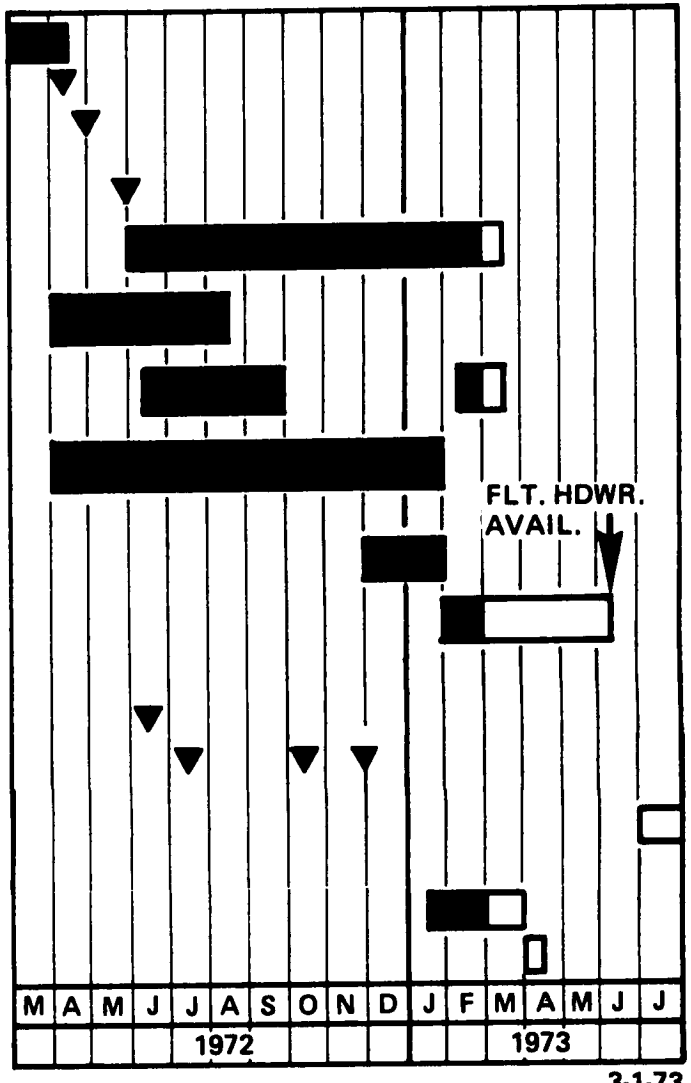
VENDOR LIAISON

TESTING
- VENDOR
- VSD

DESIGN REVIEWS
- SPO
- SPACE VECTOR

FINAL REPORT

TASK R-62
- MODIFY UPPER F&G SECTIONS
- INSTALL HARDWARE



MONTHS AFTER GO-AHEAD

3-1-73

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ATTITUDE CORRECTION SYSTEM (CONT'D)

(T. O. NO. 3)

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- THE FOLLOWING EFFORT STILL REQUIRES AUTHORIZATION
  - DEVELOPMENT OF TEST PROCEDURES FOR VEHICLE PROCESSING
  - DESIGN AND FABRICATION OF GSE MODIFICATIONS FOR IN-HOUSE AND FIELD SITES
  - PROCUREMENT OF SPARE COMPONENTS

3-1-73

NAS1-9258

VOUGHT SYSTEMS DIVISION

ALGOL III STATUS

- ADHESION OF INSULATION TO CASE (HOLZ)
  - INSULATION STRIPPED FROM CASE 0009 AND SUCCESSFULLY REINSULATED
- FIRE AT UTC COYOTE FACILITY
  - IGNITER GRAINS RECAST FEB 1973
- QUALIFICATION OF NEW CASE VENDOR (MARQUARDT)
  - SOFTWARE: ALL WELD PROCEDURES APPROVED
  - BURST TEST: SUCCESSFULLY COMPLETED 7 FEB 1973
    1319 PSI REQUIRED – 1540 PSI ACTUAL

3-1-73

VOUGHT SYSTEMS DIVISION

ALGOL III PRODUCTION SCHEDULE

MOTOR NO.	CASE NO.	1972 N	1972 D	1973 J	1973 F	1973 M	1973 A	1973 M	1973 J	1973 J	1973 A	1973 S	1973 O	1973 N	1973 D	1974 J	1974 F	1974 M	1974 A	1974 M	1974 J	1974 J	1974 A	1974 S	1974 O	1974 N	1974 D
1	0007*	DELIVERED																									
2	0008*	DELIVERED																									
3	0003*	DELIVERED																									
4	0004*	DELIVERED																									
5	1001*		●				△																				
6	0009*				●			△																			
7	1002						○		△																		
8	1004							○			△																
BURST TEST	1003				▼																						
9	1005								○			△															
10	1006										○			△													
11	1007											○			△												
12	1008													○			△										
13	1009														○			△									
14	1010															○			△								
15	1011																○			△							

LEGEND:

○ – INSULATED CASE DEL. TO UTC △ – MOTOR DEL. * – NEMEC CASES

3-1-73

VOUGHT SYSTEMS DIVISION

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NAS1-12500
(PROPOSED)

VOUGHT SYSTEMS DIVISION

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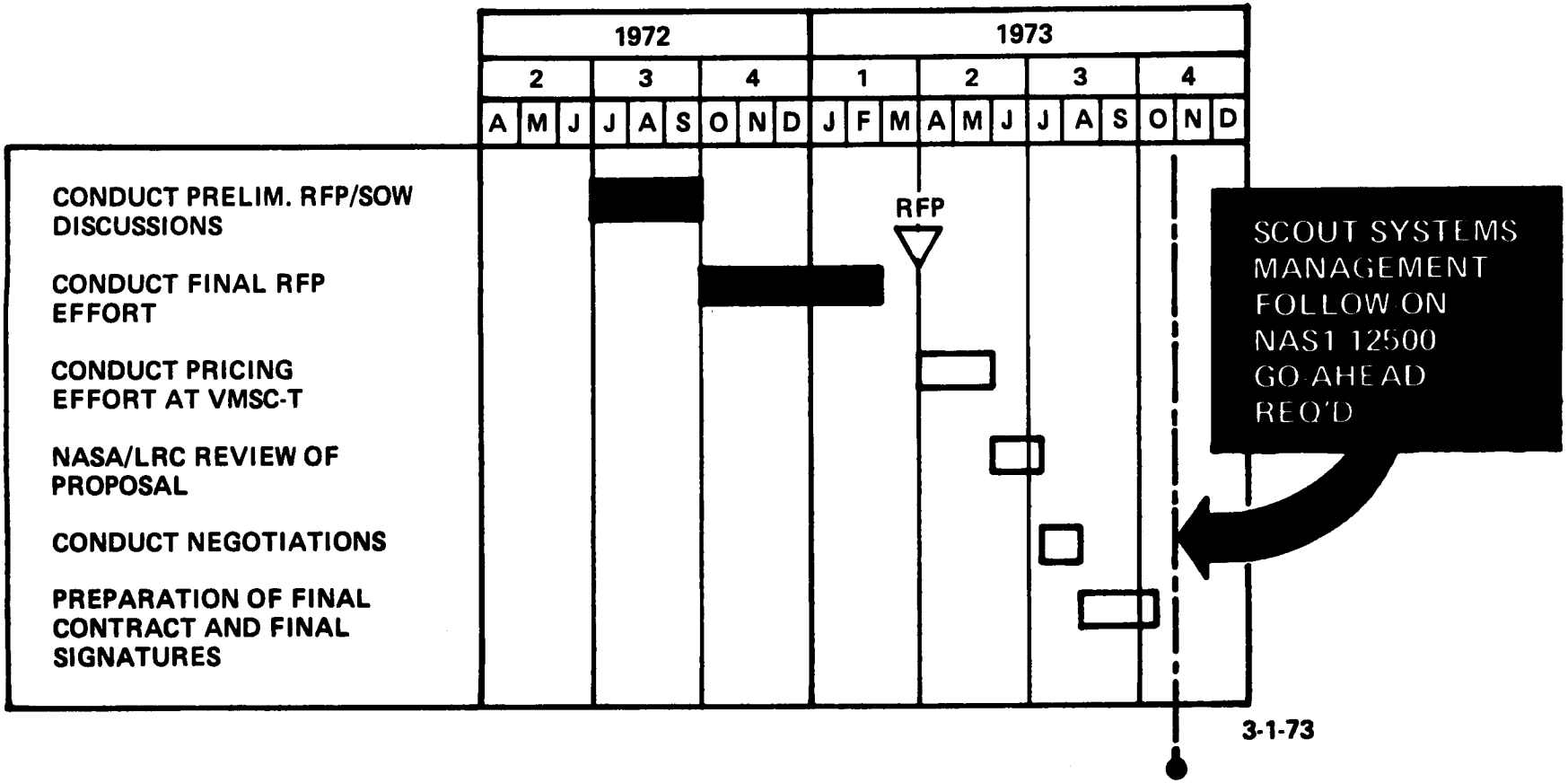
SCOUT SYSTEMS MANAGEMENT

FOLLOW-ON TO NAS1-10000



VOUGHT SYSTEMS DIVISION

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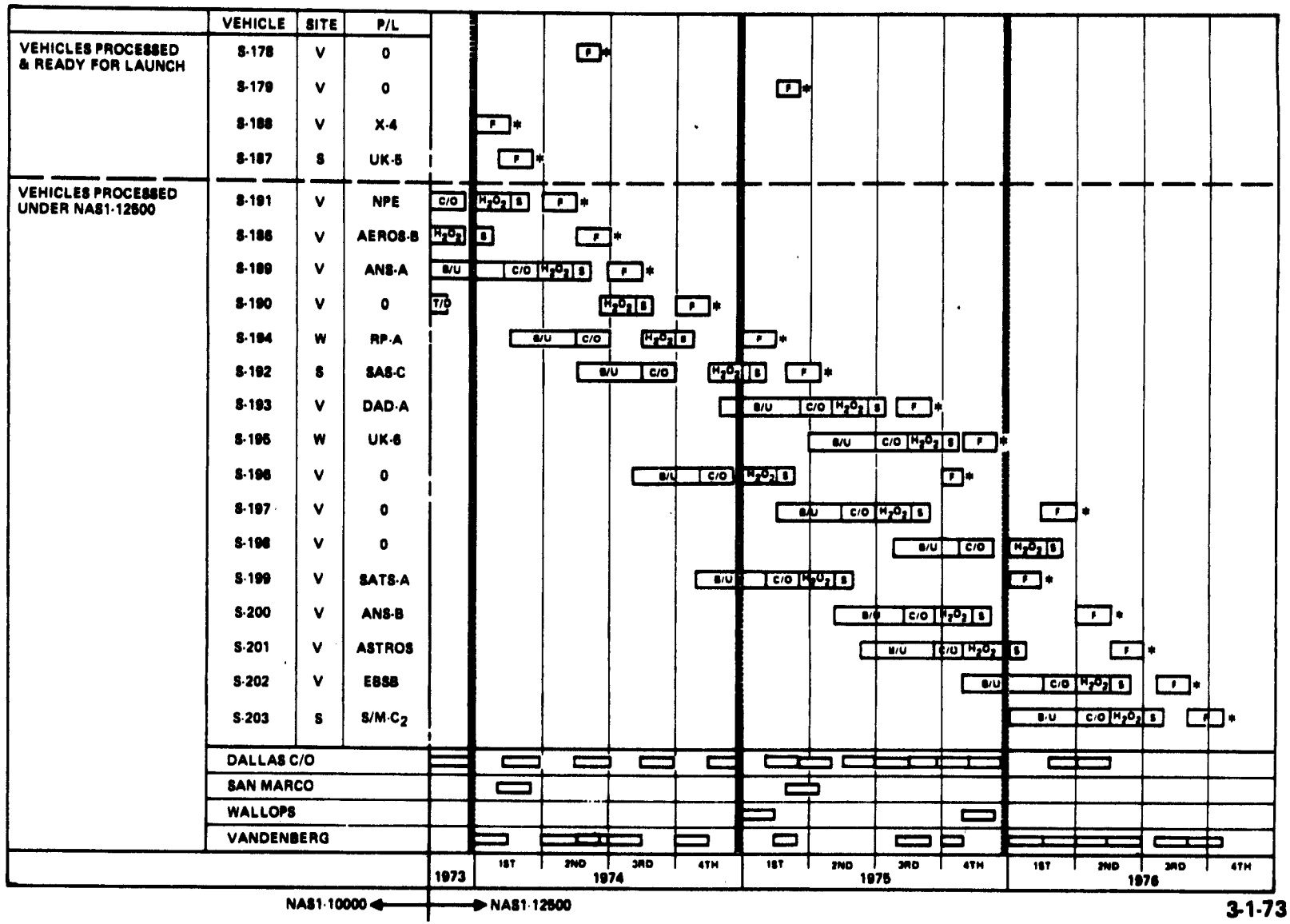
VEHICLE PROCESS AND LAUNCH SCHEDULE



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APPENDIX E

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APPENDIX E

TYPICAL SCOUT PREFLIGHT PLANNING REPORT

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VOUGHT MISSILES AND SPACE COMPANY
TEXAS DIVISION

P. O. BOX 6267 • DALLAS, TEXAS 75222

TITLE

NASA SCOUT S-185C
(ESRO IV Mission)
PRE-FLIGHT PLANNING REPORT

SUBMITTED UNDER

NASA Statement of Work No. L34-100A

REPORT NO.	DATED
3-34100/2R-56	20 October 1972
PROJECT	CONTRACT NO.
SCOUT	NAS1-10000

PREPARED
H. D. Teague

REVIEWED
G. W. Kreiter
W. A. Burrell

APPROVED
R. G. Urash
Chief Project Engineer

REV.	DATE	REV. BY	PAGES AFFECTED	REMARKS

APPENDIX E

FOREWORD

This document presents a compilation of pre-flight planning data for Scout S-185C and is submitted in accordance with NASA Statement of Work No. L34-100A, Contract NAS1-10000. Planning data presented herein are applicable only to the Scout S-185C vehicle with the ESRO IV payload to be launched over the Air Force Western Test Range from Space Launch Complex "5" (SLC-5) located at Vandenberg Air Force Base, California.

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APPENDIX E

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1.0 LAUNCH OBJECTIVES

1.1 VEHICLE OBJECTIVE

The primary objective of Scout S-185C is to provide the required boost and trajectory for the ESRO IV satellite to be launched from Vandenberg Air Force Base into an elliptical orbit about the Earth. The requested and predicted mission parameters are as follows:

PARAMETER	REQUESTED	PREDICTED
*Perigee, n.mi. (km)	151.19 (280.0)	151.19 (280.0)
*Apogee, n.mi. (km)	593.95 (1100.0)	593.79 (1099.7)
Eccentricity	--	0.05805
Inclination, deg	90.8	90.8
Period, minutes	--	98.4
Spacecraft Weight, kg	114.85	114.85

* These altitudes are based on a mean Earth radius of 3439.57 n.mi. (6370.08 km).

1.2 PAYLOAD OBJECTIVE

The ESRO IV satellite is part of a cooperative program between the European Space Research Organization (ESRO) and the United States National Aeronautics and Space Administration (NASA). The satellite, as shown in Figure E-1, comprises a set of six experiments involving four different countries. The objectives of these experiments and the countries responsible for each are as follows:

(a) Study of positive ions in the ionospheric regions (United Kingdom)
(b) Study of the composition and total mass density of natural gas in the upper thermosphere and exosphere (West Germany)
(c) Study of low energy particles precipitation in the auroral zones, pitch angle distribution and fluxes of protons and electrons in the energy range (Sweden)

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(d) Investigation of Polar Cap absorption events (The Netherlands)
(e) Measurement of flux and energy spectrum of solar flare particles, trapped particles in the lower radiation belt of the Earth, galactic and non-solar energetic particles (West Germany)
(f) Space flight qualification of an IR horizon sensing instrument for attitude measurements of spinning satellites (The Netherlands).

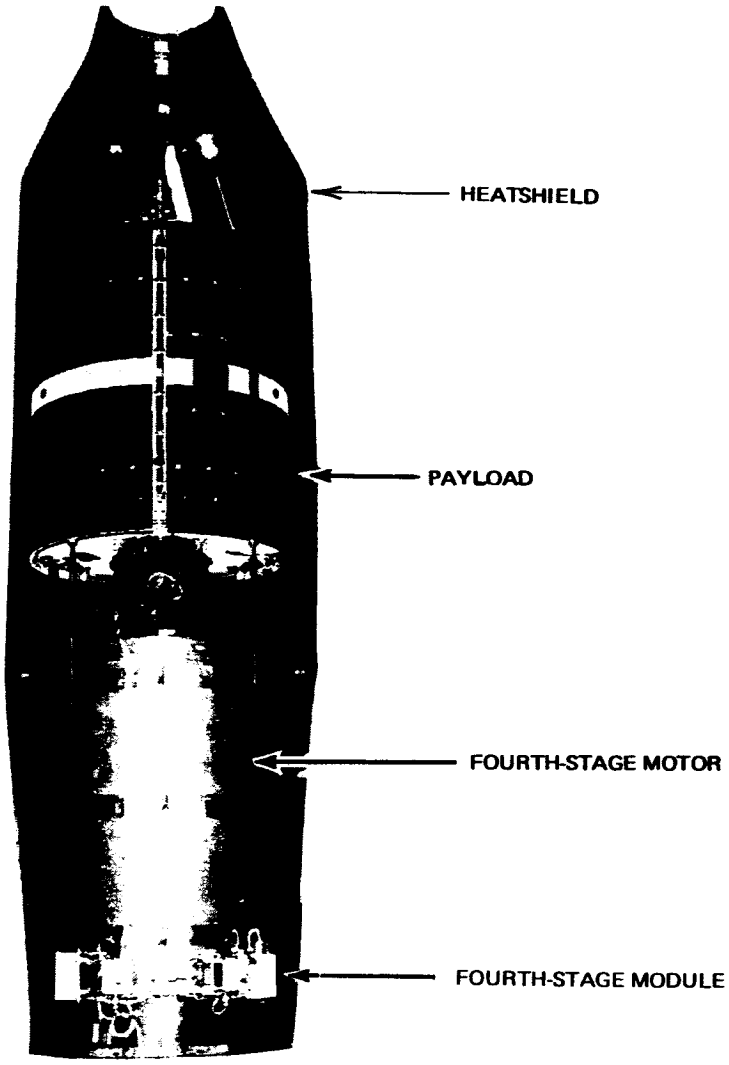

Figure E-1 - Scout S-185C, ESRO IV payload in heat shield Serial Number A-403.

D2.0 LAUNCH RESTRICTIONS

2.1 GENERAL

The launch azimuth setting will be 183.131 degrees and the launcher elevation will be 90.00 degrees. Polar plots showing 0.001, 0.01 and 0.1 probabilities of exceeding the allowable vehicle bending moment are shown as Figures E-2, E-3 and E-4, respectively. These restrictions are based on the structural capability of the vehicle at the critical station, 103.7 inches.

The maximum allowable surface wind for the vehicle on the launcher is 43.5 knots while in the launch position. Should the wind exceed the above limit, the vehicle should be recovered, lowered, and secured to the transporter. The surface wind shall not exceed 35 knots for launch of the vehicle.

Figure E-5 presents the maximum wind velocity restriction (in the critical altitude range of 9,000 to 12,000 feet). Winds in excess of those shown by Figure E-5 will cause the first-stage control vanes to reach the limits of their available control deflections.

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SCOUT S-185C

PEAK WIND VELOCITY FOR 0.001 PROBABILITY OF EXCEEDING THE FLIGHT ALLOWABLE BENDING MOMENT AT SELECTED PEAK WIND ALTITUDES

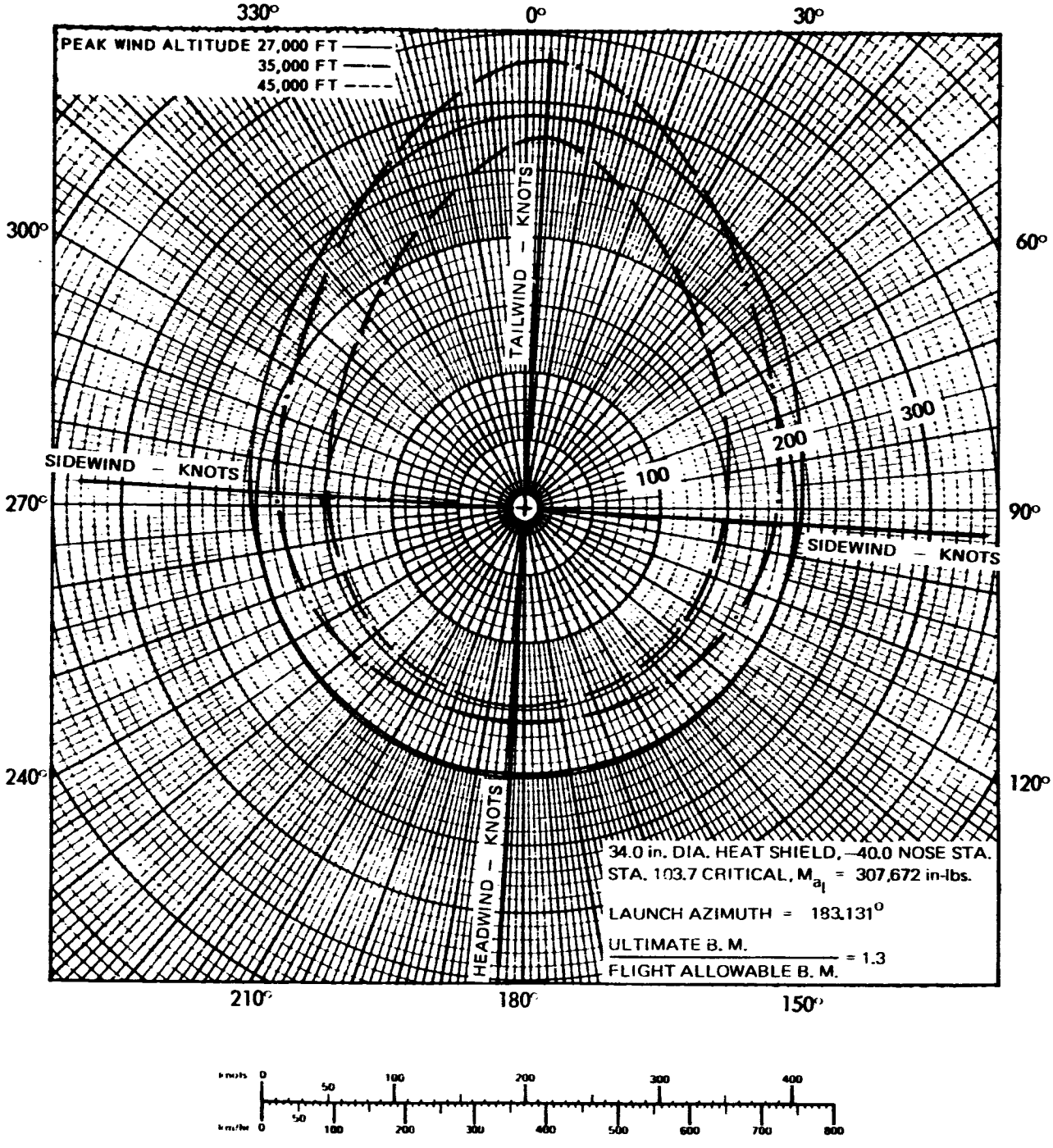

FIGURE E-2

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SCOUT S-185C

PEAK WIND VELOCITY FOR 0.01 PROBABILITY OF EXCEEDING THE FLIGHT ALLOWABLE BENDING MOMENT AT SELECTED PEAK WIND ALTITUDES

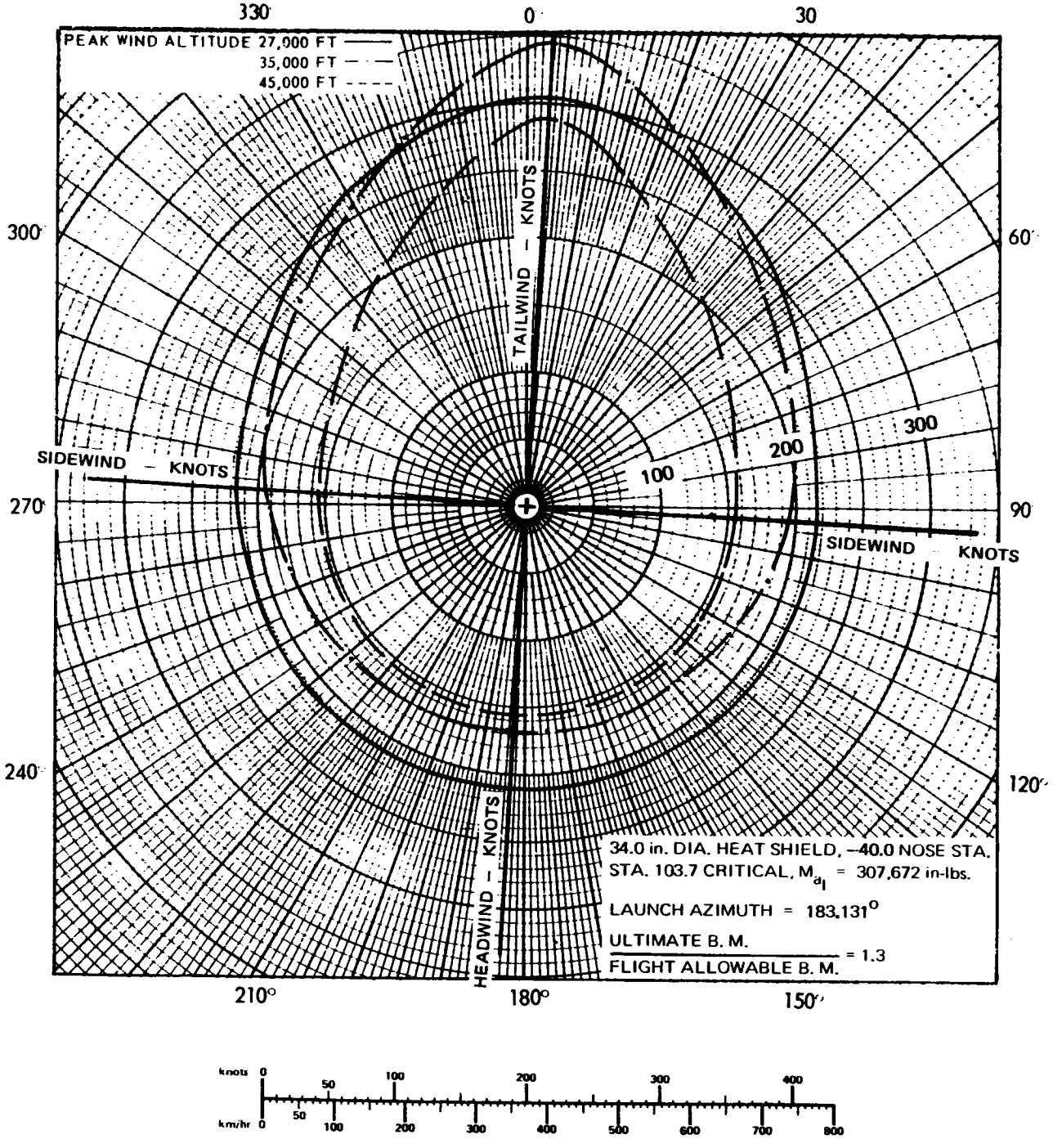

FIGURE E-3

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SCOUT S-185C

PEAK WIND VELOCITY FOR 0.1 PROBABILITY OF EXCEEDING THE FLIGHT ALLOWABLE BENDING MOMENT AT SELECTED PEAK WIND ALTITUDES

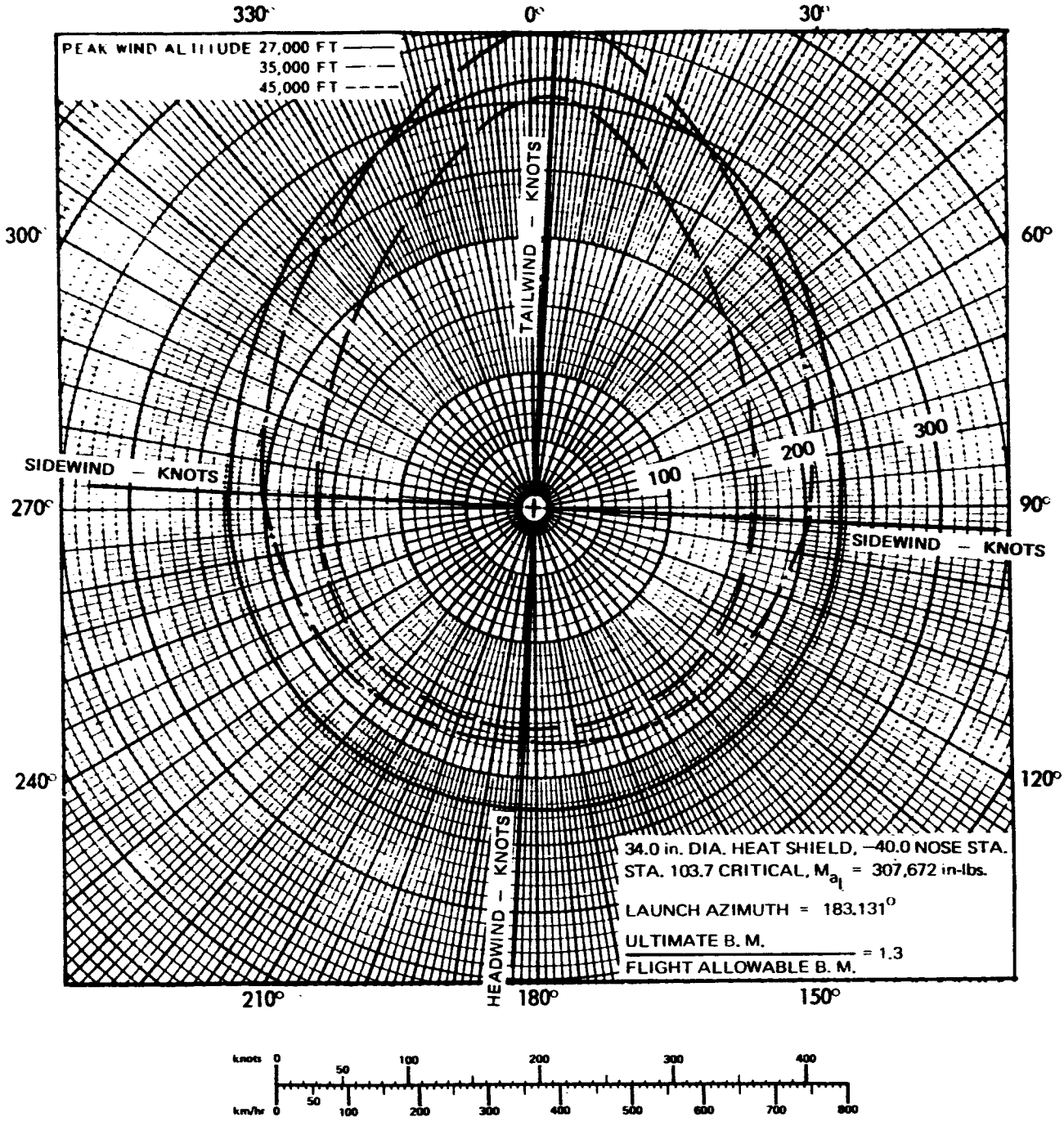

FIGURE E-4

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SCOUT S-185C

MAXIMUM ALLOWABLE WIND VELOCITY FOR THE CRITICAL ALTITUDES BASED ON CONTROL REQUIREMENTS

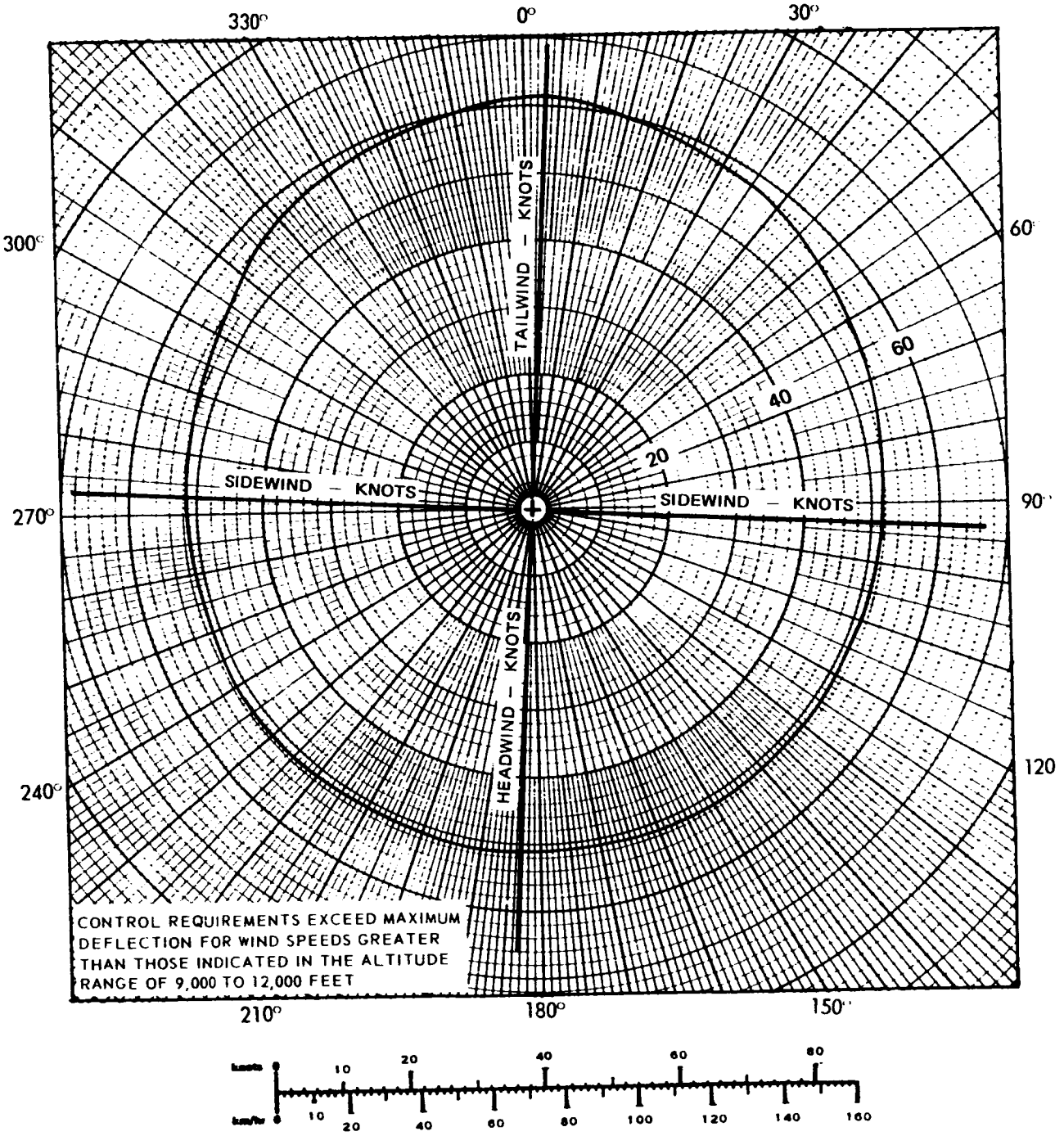

FIGURE E-5

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3.0 VEHICLE CONFIGURATION

3.1 GENERAL

Vehicle S-185C is a Scout D configuration, four-stage, solid propellant booster system. The Scout D configuration motor stack consists of ALGOL III, CASTOR IIA, ANTARES II and ALTAIR III (FW-4S) motors. This vehicle will use a 34-inch diameter heatshield with the forwardmost point at station -40.0. Two 1.0KS40 and two 1.0KS75 spin motors will be used to spin-stabilize the payload and fourth-stage motor prior to third-stage separation. The vehicle configuration and systems operation are similar to those described in reference 1.

The "D" section S-band telemetry system parameters are presented in Table E-1. Special instrumentation incorporated in the "D" section telemetry system includes the ±25 "g" ALGOL III vibrometer system on continuous IRIG Channel 21 (165 kHz) and ten temperature sensors on commutated IRIG Channel 17 (52.5 kHz).

The payload will be separated from the expended fourth-stage booster five minutes after payload separation timer start at third-stage separation; this event will be recorded on IRIG Channel 13 (14.5 kHz) of the Fourth-Stage Module telemetry system by a switch closure causing the heatshield cylindrical section temperature thermistor input voltage signal to drop to zero. The Fourth-Stage Module telemetry system (S/N 001) incorporated on vehicle S-185C is the second S-band frequency fourth-stage telemetry system and includes the FW-4S lateral ±25 "g" vibrometer (on IRIG Channel 19) and the FW-4S longitudinal ±25 "g" vibrometer (on IRIG Channel 20). A list of the Fourth-Stage Module telemetry parameters is presented in Table E-7.

Figures E-1, E-8, E-10 and E-12 illustrate the variation of vehicle weight and center-of-gravity as a function of percent of weight consumed for each stage; variations in moment of inertia versus percent of weight consumed are shown in Figures E-7, E-9, E-11 and E-13 for each stage, respectively. A plot of weight and center-of-gravity versus time is presented in Figure E-14.

TABLE E-1

SCOUT S-185C

DESCRIPTION OF INSTRUMENTATION
TRANSITION "D" SECTION
FM CHANNEL ASSIGNMENTS

TRANSMITTER FREQUENCY – 2230.5 mHz

IRIG CHANNEL	SCO FREQUENCY kHz	MEASUREMENT	SIGNAL SOURCE	RANGE
1	0.40	400 Hz Guidance Voltage	Guidance Package	0 - 15v RMS
2	0.56	(1) Fin Position No. 3	Potentiometer	± 20°
		(2) 2nd-Stage Lower Roll Motors	Switch & Relay Closures	–
		(3) 3rd-Stage Lower Roll Motors	Switch & Relay Closures	–
3	0.73	(1) Fin Position No. 2	Potentiometer	± 20°
		(2) 2nd-Stage Upper Roll Motors	Switch & Relay Closures	–
		(3) 3rd-Stage Upper Roll Motors	Switch & Relay Closures	–
4	0.96	(1) Fin Position No. 1	Potentiometer	± 20°
		(2) 2nd-Stage Yaw Motors	Switch & Relay Closures	–
		(3) 3rd-Stage Yaw Motors	Switch & Relay Closures	–

TABLE E-1

(Continued)

FM CHANNEL ASSIGNMENTS

IRIG CHANNEL	SCO FREQUENCY kHz	MEASUREMENT	SIGNAL SOURCE	RANGE
5	1.30	(1) Fin Position No. 4	Potentiometer	± 20°
		(2) 2nd-Stage Large Pitch Motors	Switch & Relay Closures	–
		(3) 3rd-Stage Large Pitch Motors	Switch & Relay Closures	–
6	1.70	Yaw Rate	Guidance Package	± 5°/sec
7	2.30	Roll Rate	Guidance Package	± 5°/sec
8	3.00	Pitch Rate	Guidance Package	± 5°/sec
9	3.90	(1) Pitch Program Rate	Guidance Package	
		(2) Spin Rate Monitor	Magnetic Pickup Assembly	
10	5.40	(1) 2nd-Stage Chamber Pressure	Abs. Pressure Transducer	0 – 800 psia
		(2) Small Pitch Motors	Switch & Relay Closures	–
11	7.35	(1) 1st-Stage Chamber Pressure	Abs. Pressure Transducer	0 – 1000 psia
		(2) 3rd-Stage Chamber Pressure	Abs. Pressure Transducer	0 – 500 psia

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TABLE E-1

(Continued)

FM CHANNEL ASSIGNMENTS

IRIG CHANNEL	SCO FREQUENCY kHz	MEASUREMENT	SIGNAL SOURCE	RANGE
12	10.50	Transverse Acceleration	Accelerometer	± 3"g"
13	14.50	Normal Acceleration	Accelerometer	± 3"g"
14	22.00	Longitudinal Acceleration	Accelerometer	-1, +15"g"
15	30.00	Ignition System No. 1 Event Monitor	Current Coil	–
16	40.00	Ignition System No. 2 Event Monitor	Current Coil	–
17	52.50	Commutated Measurements	–	–
18	70.00	Commutated Measurements	–	–
19				
20				
21	165.00	ALGOL III Vibration	Vibrometer	50 "g" Peak-Peak

TABLE E-1

(Continued)
COMMUTATOR CHANNEL SEGMENT ASSIGNMENTS
IRIG CHANNEL 17 52.50 kHz

COMMUTATOR SEGMENT	MEASUREMENT	SIGNAL SOURCE	RANGE
1	0%, Ov DC Scale Reference	Regulated Power Supply	–
2	100%, 5v DC Scale Reference	Regulated Power Supply	–
3	Events	Switch & Relay Closures	–
4	Base "A" Hydraulic Pressure	Abs. Pressure Transducer	0 – 3500 psia
5	Guidance Package Temperature	Thermistor	0 – 350 °F
6	X259 Nozzle Shield Temperature	Probe	0 – 800 °F
7	Rate Gyro Heatshield Temperature	Thermistor	0 – 350 °F
8	Second-Stage N_2 Tank Temperature	Thermistor	0 – 350 °F
9	Base "A" (Inside Nozzle Seal) Temperature	Probe	0 – 800 °F
10	Second-Stage Large Pitch-Up Motor Pressure Switch Temperature	Thermistor	0 – 350 °F
11	CASTOR Nozzle Temperature	Thermistor	0 – 350 °F
12	Third-Stage N_2 Tank Temperature	Thermistor	0 – 350 °F
13	Events	Switch & Relay Closures	–
14	Base "A" Hydraulic Pressure	Abs. Pressure Transducer	0 – 3500 psia

TABLE E-1

(Continued)
COMMUTATOR CHANNEL SEGMENT ASSIGNMENTS
IRIG CHANNEL 17 52.50 kHz

COMMUTATOR SEGMENT	MEASUREMENT	SIGNAL SOURCE	RANGE
15	Base "A" Ambient Temperature	Thermistor	0 – 350 °F
16	Upper "B" Ambient Temperature	Thermistor	0 – 350 °F
17	Second-Stage Upper Left Roll Motor Valve Coil Temperature	Thermistor	0 – 350 °F
18	"C" Section H_2O_2 Fill Temperature	Thermistor	0 – 350 °F
19	"C" Section H_2O_2 Line Temperature	Thermistor	0 – 350 °F
20	Lower "D" Ambient Temperature	Thermistor	0 – 350 °F
21	Third-Stage Lower Right Roll Motor Valve Coil Temperature	Thermistor	0 – 350 °F
22	Upper "C" Destruct Safe Arm Unit Temperature	Thermistor	0 – 350 °F
23	Events	Switch & Relay Closures	–
24	Base "A" Hydraulic Pressure	Abs. Pressure Transducer	0 – 3500 psia
25	Upper "C" Tunnel Destruct Charge Temperature	Thermistor	0 – 350 °F
26	Base "A" Aft Ring Temperature	Probe	0 – 1400 °F
27	Base "A" Barrier Temperature	Probe	0 – 1400 °F
28	50%, 2.5v DC Scale Reference	Regulated Power Supply	–
29 – 30	100%, 5v DC Scale Reference	Regulated Power Supply	–

TABLE E-1

(Continued)

COMMUTATOR CHANNEL SEGMENT ASSIGNMENTS
IRIG CHANNEL 18 70.00 kHz

COMMUTATOR SEGMENT	MEASUREMENT	SIGNAL SOURCE	RANGE
1	0%, Ov DC Scale Reference	Regulated Power Supply	–
2	100%, 5v DC Scale Reference	Regulated Power Supply	–
3	C/D Receiver No. 1 Signal Strength	C/D Receiver	0, -110 db_m
4	Roll Displacement	Guidance Package	± 5°
5	Pitch Displacement	Guidance Package	± 5°
6	Yaw Displacement	Guidance Package	± 5°
7	2nd-Stage H_2O_2 Line Pressure	Abs. Pressure Transducer	0 – 600 psia
8	2nd-Stage N_2 Line Pressure	Abs. Pressure Transducer	0 – 3500 psia
9	Roll Displacement	Guidance Package	± 5°
10	Pitch Displacement	Guidance Package	± 5°
11	Yaw Displacement	Guidance Package	± 5°
12	3rd-Stage N_2 Line Pressure	Abs. Pressure Transducer	0 – 3500 psia
13	3rd-Stage H_2O_2 Line Pressure	Abs. Pressure Transducer	0 – 600 psia
14	Roll Displacement	Guidance Package	± 5°

TABLE E-1

(Concluded)

COMMUTATOR CHANNEL SEGMENT ASSIGNMENTS
IRIG CHANNEL 18 70.00 kHz

COMMUTATOR SEGMENT	MEASUREMENT	SIGNAL SOURCE	RANGE
15	Pitch Displacement	Guidance Package	± 5°
16	Yaw Displacement	Guidance Package	± 5°
17	Spare	–	–
18	Spare	–	–
19	Roll Displacement	Guidance Package	± 5°
20	Pitch Displacement	Guidance Package	± 5°
21	Yaw Displacement	Guidance Package	± 5°
22	2nd-Stage H_2O_2 Line Pressure	Abs. Pressure Transducer	0 – 600 psia
23	C/D Receiver No. 2 Signal Strength	C/D Receiver	0, - 110 db_m
24	Roll Displacement	Guidance Package	± 5°
25	Pitch Displacement	Guidance Package	± 5°
26	Yaw Displacement	Guidance Package	± 5°
27	3rd-Stage H_2O_2 Line Pressure	Abs. Pressure Transducer	0 – 600 psia
28	50%, 2.5v DC Scale Reference	Regulated Power Supply	–
29 – 30	100%, 5v DC Scale Reference	Regulated Power Supply	–

TABLE E-2

SCOUT S-185C

DESCRIPTION OF INSTRUMENTATION
FOURTH-STAGE TELEMETRY MODULE SERIAL NO. 001

TRANSMITTER FREQUENCY: 2210.5 mHz

IRIG CHANNEL	S.C.O. FREQUENCY kHz	MEASUREMENT	SIGNAL SOURCE	RANGE
9	3.9	H/S Stagnation Point (Inside) Temperature	Thermistor	0 – 350°F
10	5.4	H/S Conical Section (Inside) Temperature	Thermistor	0 – 350°F
11	7.35	T/M Battery Temperature	Thermistor	0 – 350°F
12	10.5	T/M Transmitter Temperature	Thermistor	0 – 350°F
13	14.5	(1) H/S Cylindrical Section (Inside) Temp.	Thermistor	0 – 350°F
		(2) Payload Separation Event	Switch Closure	—
14	22.0	Fourth-Stage Chamber Pressure	Abs. Pressure Transducer	0 – 900 psia
15	30.0	Transverse Acceleration	Accelerometer	± 1/2 "g"
16	40.0	Normal Acceleration	Accelerometer	± 1/2 "g"
17	52.5	Longitudinal Acceleration	Accelerometer	± 1/2 "g"
18	70.0	Longitudinal Acceleration	Accelerometer	–1, +30 "g"
19	93.0	FW-4S Motor Lateral Vibration	Vibrometer	50 "g" Peak-to-Peak
20	124.0	FW-4S Motor Longitudinal Vibration	Vibrometer	50 "g" Peak-to-Peak

TABLE E-3

SCOUT S-185C
DETAIL PRE-FLIGHT WEIGHT DATA

FOURTH-STAGE WEIGHTS	WEIGHT pounds	C.G. SCOUT STA. inches	MOMENT inch-pounds
Interim Total	968.97		52574.
Interim Inert	357.82		12397.
Items:			
1. Payload and Separation System			
a. Payload (ESRO IV)	253.20	18.92	4791.
b. Payload Attach Ring	0.0		
c. Hardware (Payload Attach Ring)	0.0		
d. LTV/MSD-T Separation System Minus Items (b + c)	8.44	40.42	341.
e. Electrolyte	0.0		
f. Explosive Bolts (Payload Separation System)	0.07*	37.27	3.
g. Hardware (Separation System to Motor)	0.25	47.77	12.
2. Motor and Hardware			
a. ALTAIR FW-4S Motor (Inert) S/N 2223-13	55.48*	70.32	3901.
b. Ignition Harness	0.90	65.75	59.
c. Tape (Install Ignition Harness)	0.43	65.75	28.
d. Reflective Tape or Paint	0.0		
e. Ring Module (T/M & Ign)	20.41	83.10	1696.
f. Pressure Transducer	0.36	44.90	16.
g. Vibrometers and Harnesses	0.31*	51.77	16.
3. Upper "D" Section			
a. Hardware (Upper "D" to Motor)	0.18	84.27	15.
b. Upper "D" Structure + Harness	13.10	92.45	1211.
c. Dynamic Balance Weights	2.00	65.45	131.
d. Ballast Weights	2.69*	65.45	176.
Fourth-Stage Burnout	357.82	34.64	12397.
4. Consumed Weight			
a. ALTAIR Motor Internal (Consumed)	611.15*	65.74	40177.
Fourth-Stage Ignition	968.97	54.26	52574.

* Estimated or Calculated Weight

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TABLE E-3
(Continued)

THIRD-STAGE WEIGHTS	WEIGHT pounds	C.G. SCOUT STA. inches	MOMENT inch-pounds
Interim Total	3360.68		545523.
Interim Inert	771.95		129643.
5. Lower "D" Section			
1) Spin Items			
a. Spin Table Structure + Components	24.42	100.96	2465.
b. Explosive Bolts	0.53*	99.45	53.
c. Spin Motors**	3.77*	101.58	383.
d. Ring + Hardware (Spin Bearing Attachment)	0.0		
e. Inner Bearing Race	9.58	103.88	995.
2) Lower "D"			
a. Ring + Hardware (Spin Bearing to Lower "D")	6.13	103.49	634.
b. Outer Bearing Race	12.04	103.88	1251.
c. Lower "D" + Components	183.10	116.96	21415.
d. Electrolyte	2.95	109.22	322.
e. IRP Installation + Hardware	20.19	112.35	2268.
f. Tunnel Covers	0.40	128.75	52.
g. Hardware (Tunnel Covers)	0.09	128.75	12.
h. Hardware (Lower "D" to Motor)	0.35	131.10	46.
6. Motor Section			
a. ANTARES X259 (Inert) S/N HIB-312	212.37*	180.86	38409.
b. Fillet	0.35*	191.15	67.
c. Chamber Pressure Transducer	0.48*	121.75	58.
d. Nozzle Tape	0.70*	224.95	157.
e. Dome Tape	0.32*	193.95	62.
f. Motor Tunnel (Telemetry)	3.35	157.71	528.
g. Hardware (Motor Tunnel - Telemetry)	0.67	157.71	106.
h. Motor Tunnel (Guidance)	3.35	157.71	528.
i. Hardware (Motor Tunnel - Guidance)	0.67	157.71	106.
j. Tunnel Harness (Telemetry)	9.95	169.52	1687.
k. Hardware (Tunnel Harness - Telemetry)	0.40	169.52	68.
l. Tunnel Harness (Guidance)	10.46	169.52	1773.
m. Hardware (Tunnel Harness - Guidance)	0.39	169.52	66.
n. Destruct Charges + Hardware	1.12*	179.20	201.
o. Motor Nozzle Shroud + Hardware	9.53	224.05	2135.

* Estimated or Calculated Weight
** Spin Motor Configuration: (2) 1.0KS40 and (2) 1.0KS75

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TABLE E-3
(Continued)

THIRD-STAGE WEIGHTS (Concluded)	WEIGHT pounds	C.G. SCOUT STA. inches	MOMENT inch-pounds
7. Upper "C" Section			
a. Hardware (Upper "C" to Motor)	0.86	191.50	165.
b. Upper "C" + Components	224.56	211.61	47519.
c. Electrolyte	0.46	208.50	96.
d. Safe Arm + Hardware	2.10	230.00	483.
e. Static Balance Weights (0°)	0.30	203.00	61.
f. Static Balance Weights (315°)	3.73	231.40	863.
g. Nitrogen (Remaining)	1.00*	203.00	203.
h. Hydrogen Peroxide (Remaining)	14.20*	203.00	2883.
i. Tunnel Covers	6.91	215.00	1486.
j. Hardware (Tunnel Covers)	0.17	215.00	37.
Third-Stage Burnout	1740.92	104.67	182216.
8. Consumed Weight			
a. ANTARES Motor Internal (Consumed)	2584.43*	160.58	415008.
b. Hydrogen Peroxide (Consumed)	4.30*	203.00	873.
Third-Stage Ignition	4329.65	138.14	598097.
SECOND-STAGE WEIGHTS			
Interim Total	10697.91		3707839.
Interim Inert	2399.06		843503.
9. Nose Cone Heatshield			
a. Heatshield (34/40) S/N A403	296.50	35.12	10413.
b. Explosives for Actuator	0.08	-30.00	-2.

* Estimated or Calculated Weight

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TABLE E-3
(Continued)

SECOND-STAGE WEIGHTS	WEIGHT pounds	C.G. SCOUT STA. inches	MOMENT inch-pounds
10. Lower "C" Section			
a. Diaphragm (Lower "C" to Upper "C")	28.00	238.18	6669.
b. Lower "C" + Components	59.60	241.96	14421.
c. Electrolyte	0.20	269.80	54.
d. Safe Arm Unit + Hardware	2.10	279.80	588.
e. Tunnel Covers	4.23	245.05	1037.
f. Hardware (Tunnel Covers)	0.16	245.05	39.
g. Hardware (Lower "C" to Motor)	2.34	253.06	592.
h. Chamber Pressure Tube	0.23*	243.20	56.
i. Destruct Module + Battery	9.85	273.10	2690.
11. Motor Section			
a. CASTOR II A (Inert) S/N 188	1512.91*	390.84	591306.
b. Motor Tunnel (Telemetry)	10.38	347.71	3609.
c. Hardware (Motor Tunnel - Telemetry)	1.17	347.71	407.
d. Motor Tunnel (Guidance)	8.39	360.21	3022.
e. Hardware (Motor Tunnel - Guidance)	1.17	360.21	421.
f. Tunnel Harness (Telemetry)	20.65	359.21	7418.
g. Hardware (Tunnel Harness - Telemetry)	1.00	359.21	359.
h. Tunnel Harness (Guidance)	15.79	359.21	5672.
i. Hardware (Tunnel Harness - Guidance)	0.97	359.21	348.
j. Destruct Charges + Hardware	1.84	338.02	622.
12. Upper "B" Section			
a. Hardware (Upper "B" to Motor)	1.53	437.56	669.
b. Upper "B" + Components	258.50	462.41	119533.
c. Tunnel Covers	6.87	468.00	3215.
d. Hardware (Tunnel Covers)	0.10	468.00	47.
e. Nitrogen (Remaining)	7.00*	455.00	3185.
f. Hydrogen Peroxide (Remaining)	147.50*	455.00	67113.
Second-Stage Burnout	6728.71	214.25	1441599.
13. Consumed Weight			
a. CASTOR II Internal (Consumed)	8261.35*	344.65	2847274.
b. Hydrogen Peroxide (Consumed)	37.50*	455.00	17063.
Second-Stage Ignition	15027.56	286.54	4305936.

* Estimated or Calculated Weight.

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TABLE E-3
(Continued)

FIRST-STAGE WEIGHTS	WEIGHT pounds	C.G. SCOUT STA. inches	MOMENT inch-pounds
Interim Total	32489.14		21319892.
Interim Inert	4211.37		2900884.
14. CASTOR Nozzle Plug	9.00*	453.60	4082.
15. Lower "B" Section			
a. Diaphragm (Lower "B" to Upper "B")	68.50	486.66	33336.
b. Lower "B" + Components	98.00	489.16	47938.
c. Electrolyte	0.20	516.60	103.
d. Safe Arm Unit + Hardware	2.10	526.45	1106.
e. Tunnel Covers	2.05	492.00	1009.
f. Hardware (Tunnel Covers)	0.04	492.00	20.
g. Hardware (Lower "B" to Motor)	0.99	495.80	491.
h. Chamber Pressure Tube	0.25*	489.90	122.
i. Destruct Module + Battery	9.66	520.00	5023.
16. Hoist Ring Installation			
a. Hoist Ring	80.00	496.20	39696.
b. Hardware (Hoist Ring to Motor)	3.87	496.35	1921.
17. Motor Section			
a. ALGOL III (Inert) S/N 5502-3	3027.33*	666.40	2017413.
b. Destruct Charges + Hardware	3.31	656.05	2172.
c. Motor Tunnel (Telemetry)	18.60	645.74	12011.
d. Hardware (Motor Tunnel - Telemetry)	2.44	645.74	1576.
e. Motor Tunnel (Guidance)	16.55	657.95	10889.
f. Hardware (Motor Tunnel - Guidance)	2.45	657.95	1612.
g. Tunnel Harness (Telemetry)	22.30	653.05	14563.
h. Hardware (Tunnel Harness - Telemetry)	1.66	653.05	1084.
i. Tunnel Harness (Guidance)	22.05	653.05	14400.
j. Hardware (Tunnel Harness - Guidance)	1.65	653.05	1078.

* Estimated or Calculated Weight

TABLE E -3
(Continued)

FIRST-STAGE WEIGHTS (Concluded)	WEIGHT pounds	C.G. SCOUT STA. inches	MOMENT inch-pounds
18. Base "A" Section			
a. Hardware (Base "A" to Motor)	2.97	809.90	2405.
b. Base "A" + Components	809.46	842.52	681986.
c. Electrolyte	2.55	825.00	2104.
d. Tunnel Covers	3.34	810.00	2705.
e. Hardware (Tunnel Covers)	0.05	810.00	41.
First-Stage Burnout	19238.93	374.60	7206820.
19. Consumed Weight			
a. ALGOL III Internal (Consumed)	28277.77*	651.36	18419008.
First-Stage Ignition	47516.70	539.30	25625829.

* Estimated or Calculated Weight

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TABLE E-3
(Concluded)

	WEIGHT pounds
Payload	253.20
Fourth Step - Inert	104.62
Fourth-Stage Burnout	357.82
Fourth-Stage Consumed	611.15
Fourth-Stage Ignition	968.97
Third Step - Inert	771.95
Third-Stage Burnout	1,740.92
Third-Stage Consumed	2,588.73
Third-Stage Ignition	4,329.65
Second Step - Inert (includes Heatshield)	2,399.06
Second-Stage Burnout	6,728.71
Second-Stage Consumed	8,298.85
Second-Stage Ignition	15,027.56
First Step - Inert	4,211.37
First-Stage Burnout	19,238.93
First-Stage Consumed	28,277.77
First-Stage Ignition	47,516.70
To obtain static step weights, the following applies:	
Step 4 = Ign. 4 + Heatshield	1,231.55
Step 3 = Ign. 3 - Ign. 4	3,360.68
Step 2 = Ign. 2 - Ign. 3 - Heatshield + Nozzle Plug	10,444.33
Step 1 = Ign. 1 - Ign. 2 - Nozzle Plug	32,480.14
Total	47,516.70

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SCOUT S-185C
VARIATION OF WEIGHT AND C. G. DURING BURNING
FIRST STAGE

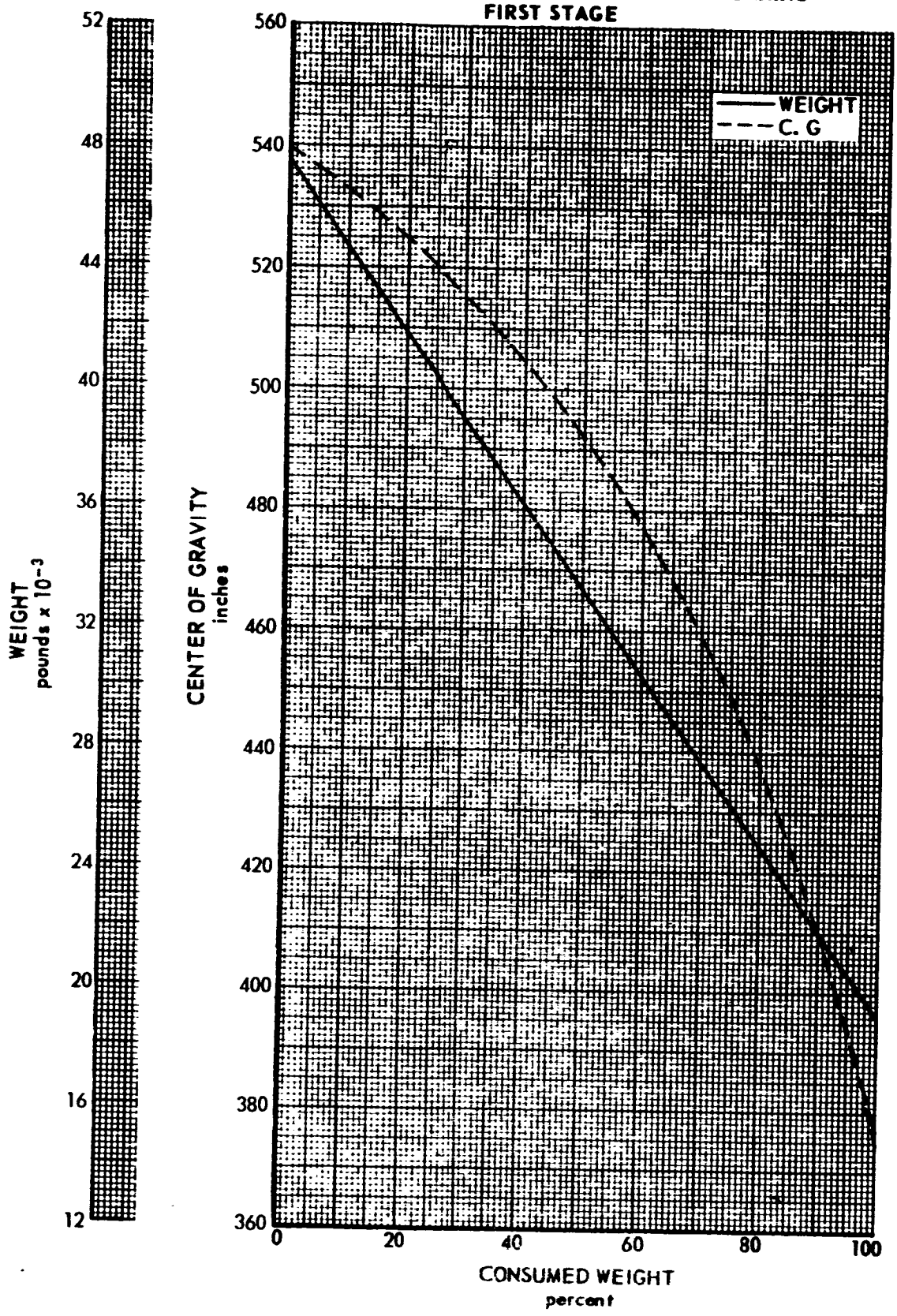

FIGURE E-6

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SCOUT S-185C

VARIATION OF MOMENTS OF INERTIA DURING BURNING

FIRST STAGE

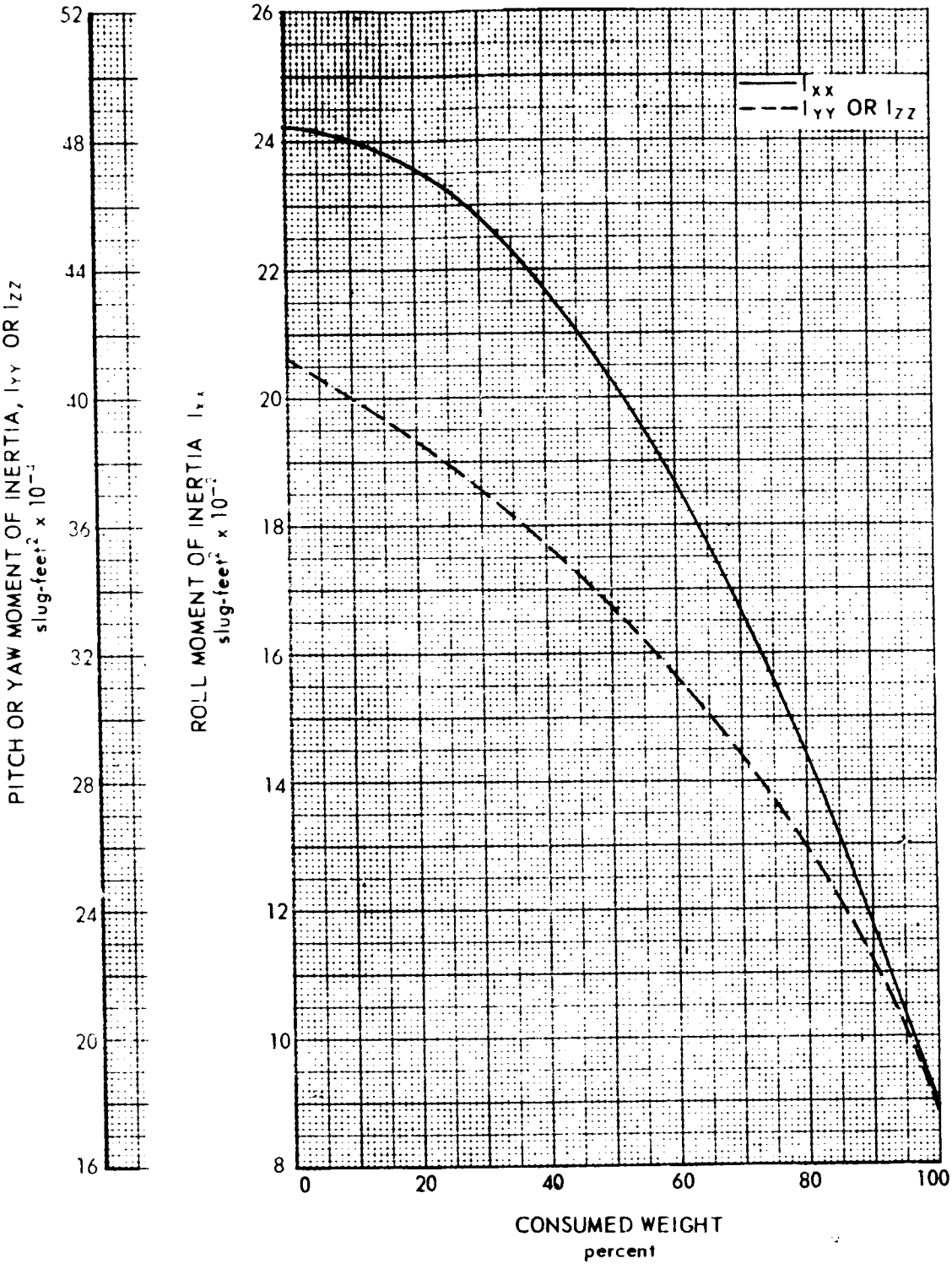

FIGURE E-7

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SCOUT S-185C
VARIATION OF WEIGHT AND C. G. DURING BURNING
SECOND STAGE

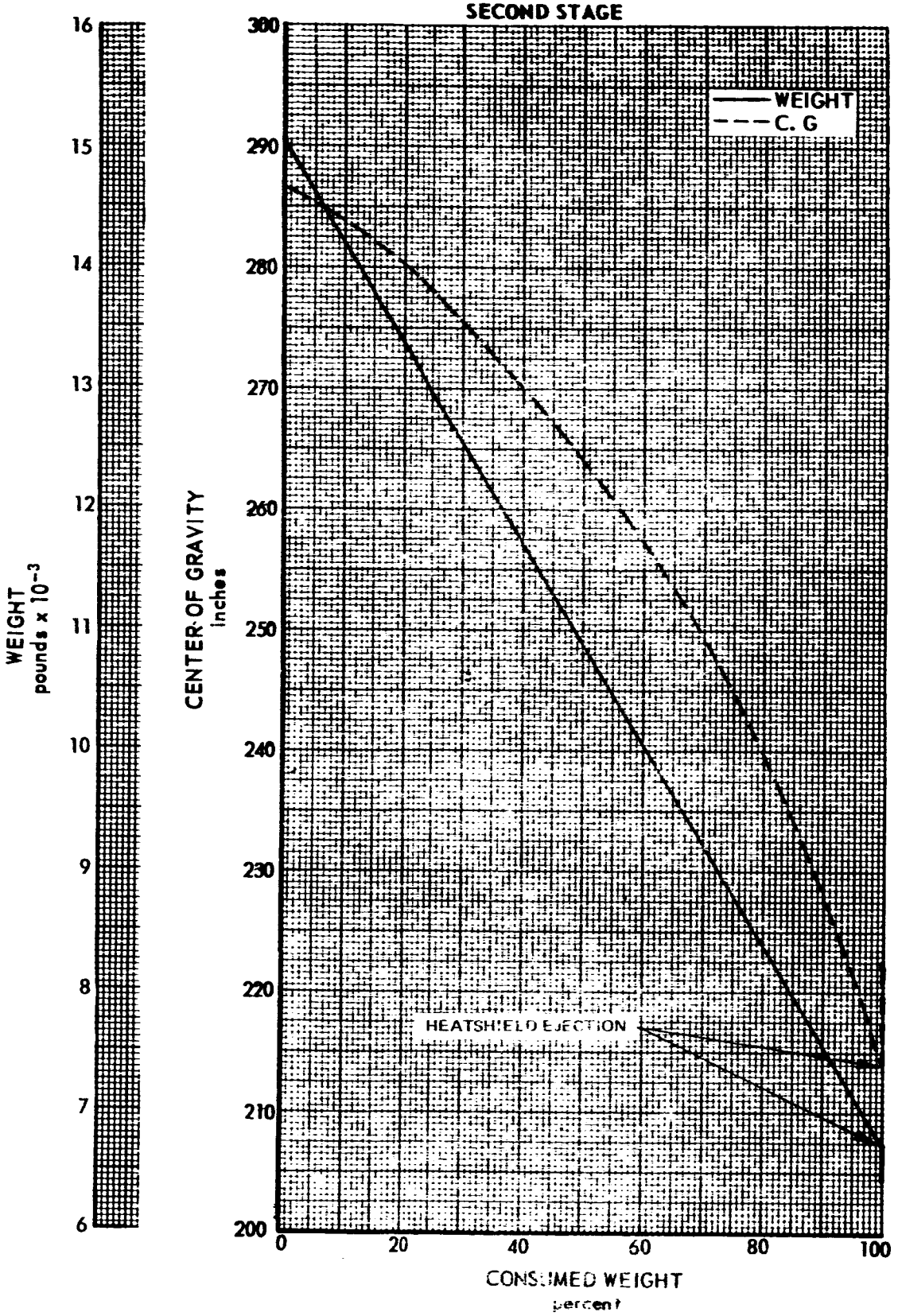

FIGURE E-8

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SCOUT S-185C
VARIATION OF MOMENTS OF INERTIA DURING BURNING
SECOND STAGE

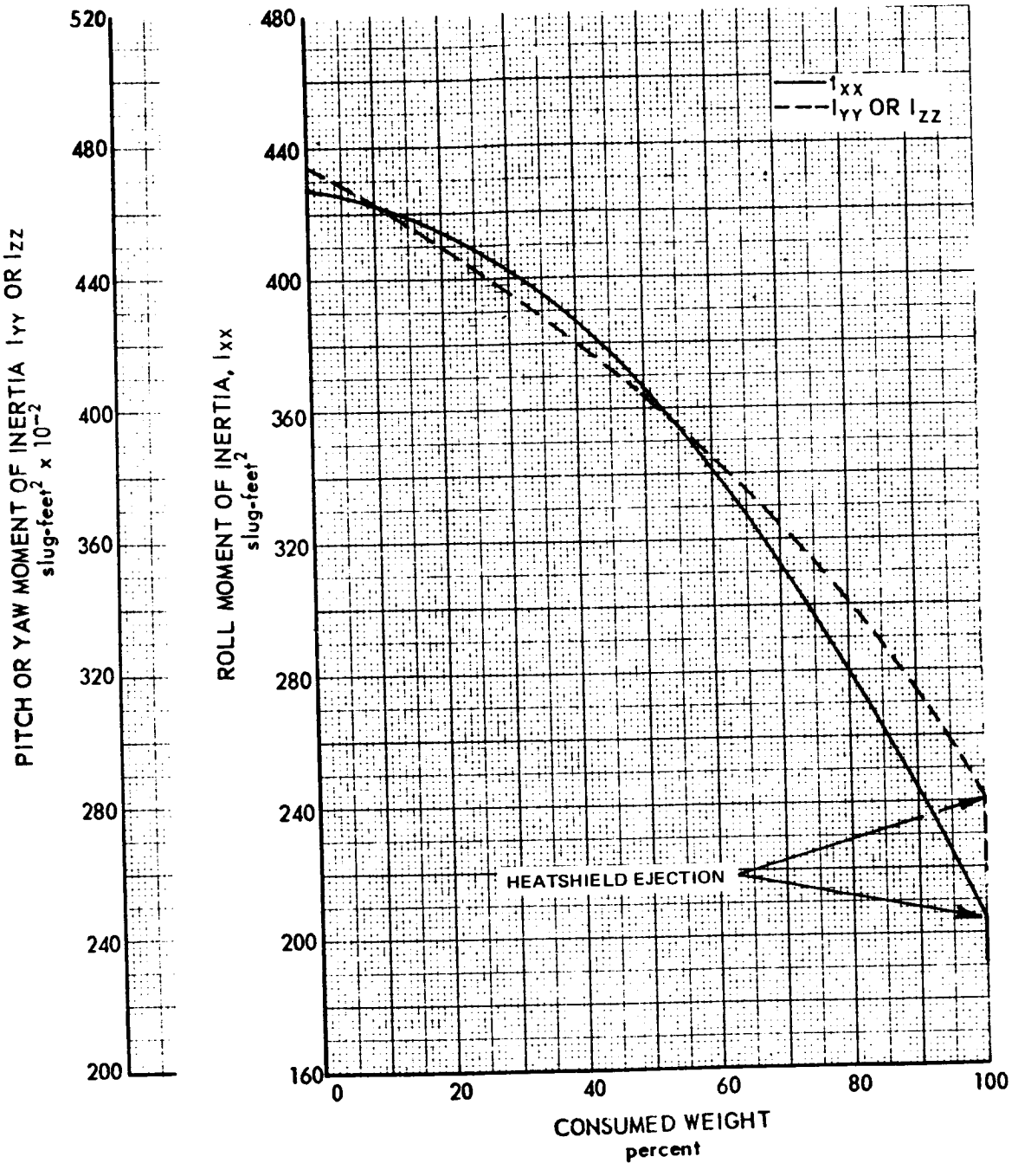

FIGURE E-9

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SCOUT S-185C

VARIATION OF WEIGHT AND C. G. DURING BURNING
THIRD STAGE

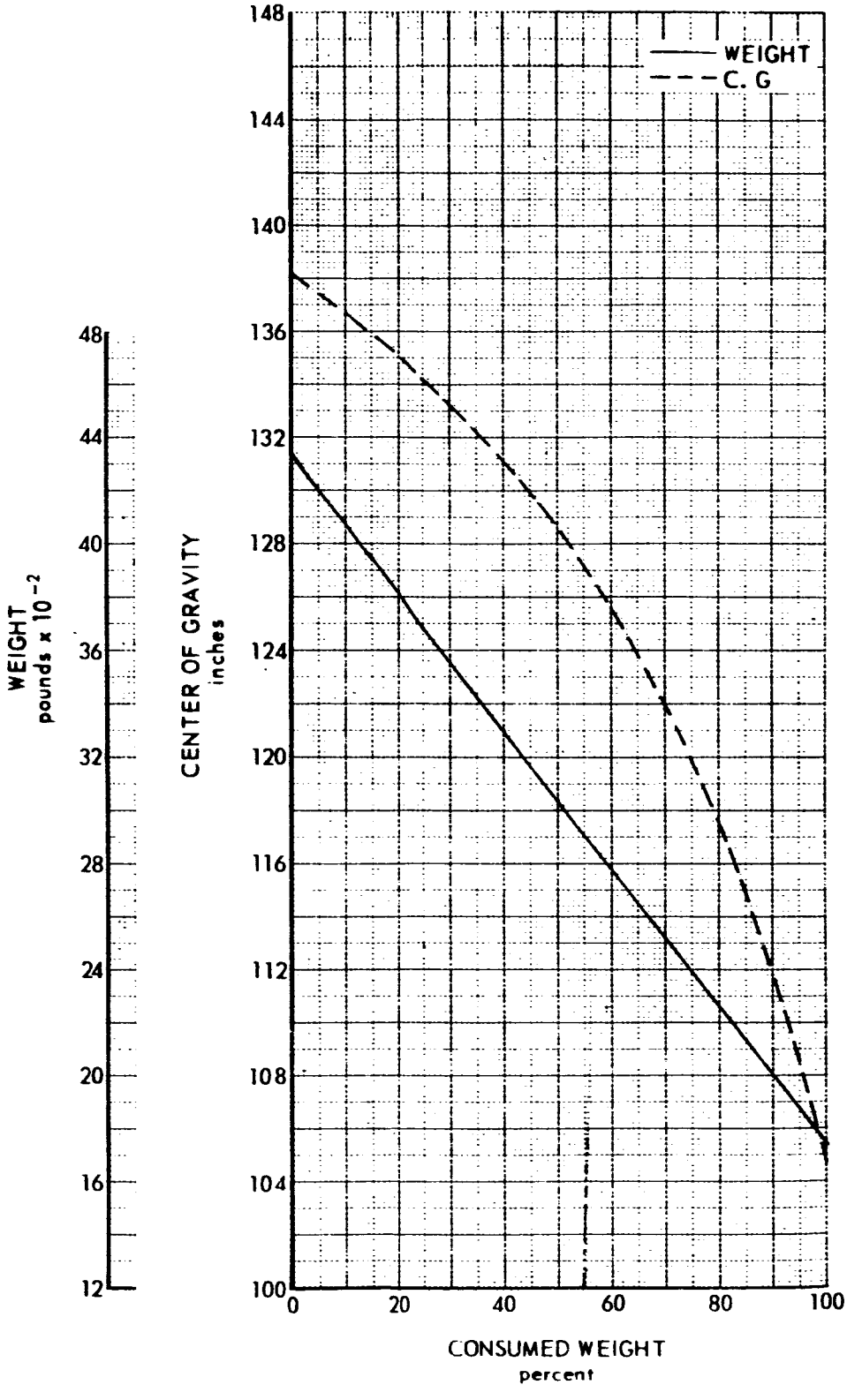

FIGURE E-10

SCOUT S-185C

VARIATION OF MOMENTS OF INERTIA DURING BURNING THIRD STAGE

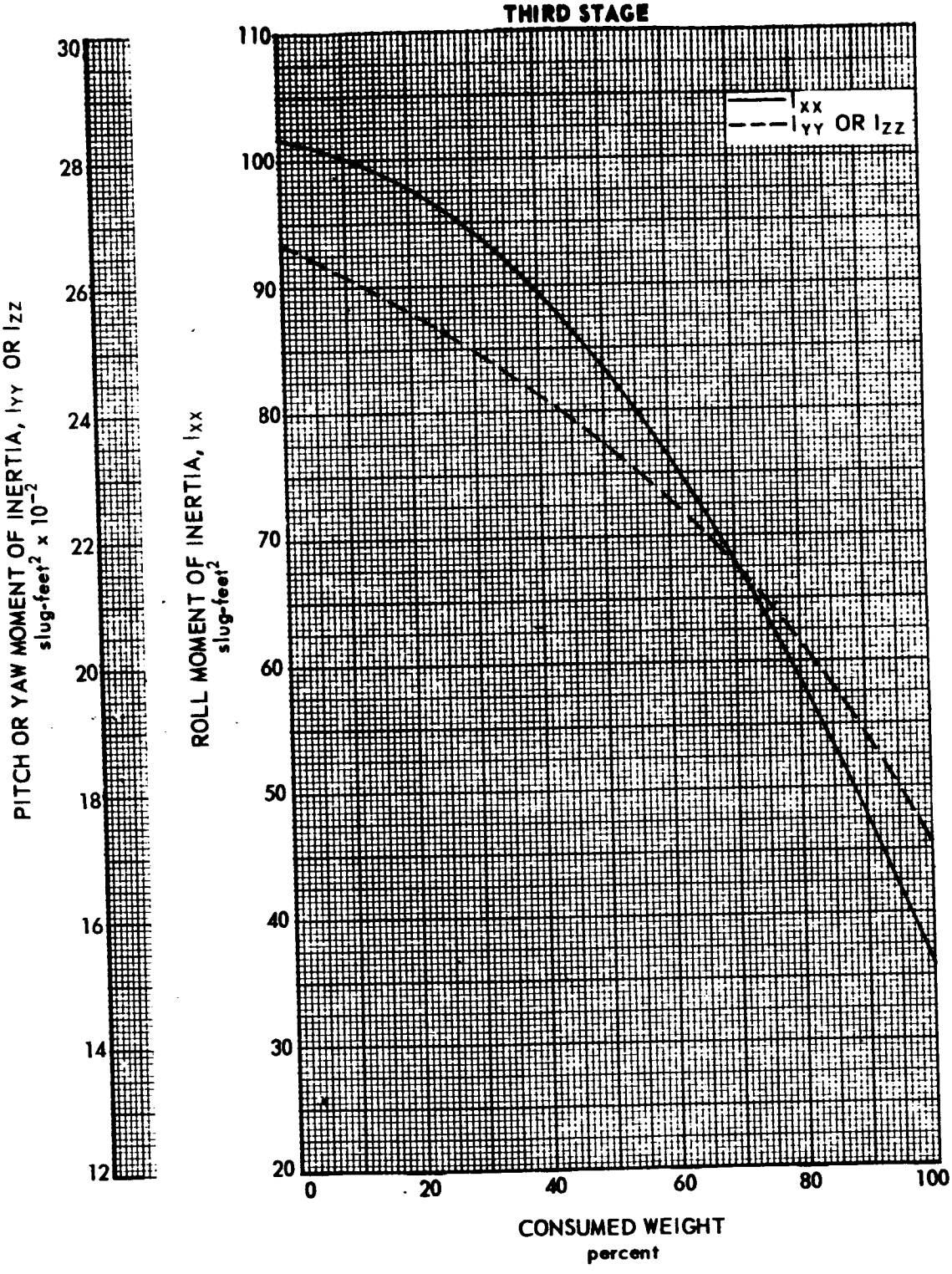

FIGURE E-11

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SCOUT S-185C
VARIATION OF WEIGHT AND C. G. DURING BURNING
FOURTH STAGE

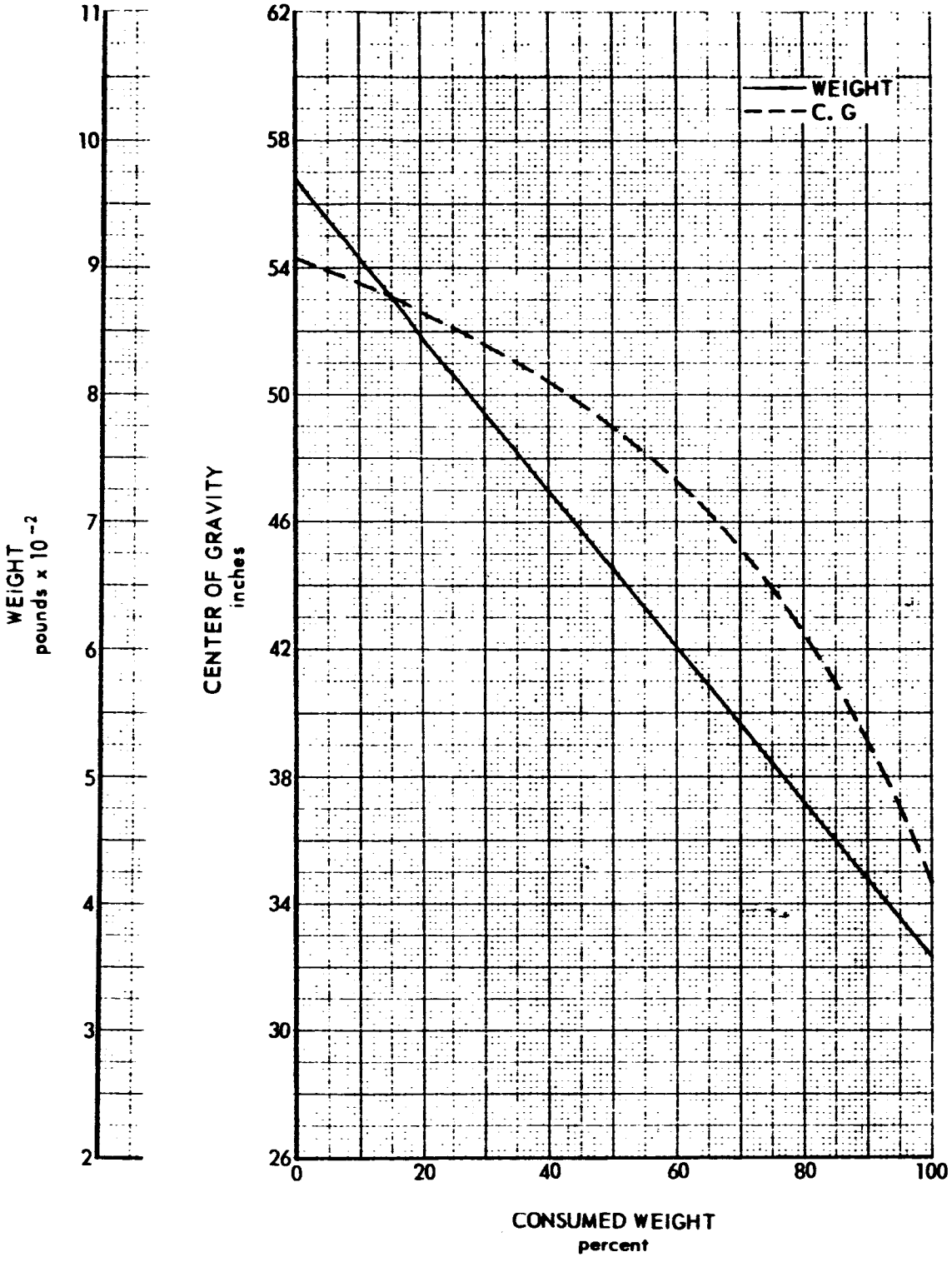

FIGURE E-12

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SCOUT S-185C

VARIATION OF MOMENTS OF INERTIA DURING BURNING
FOURTH STAGE

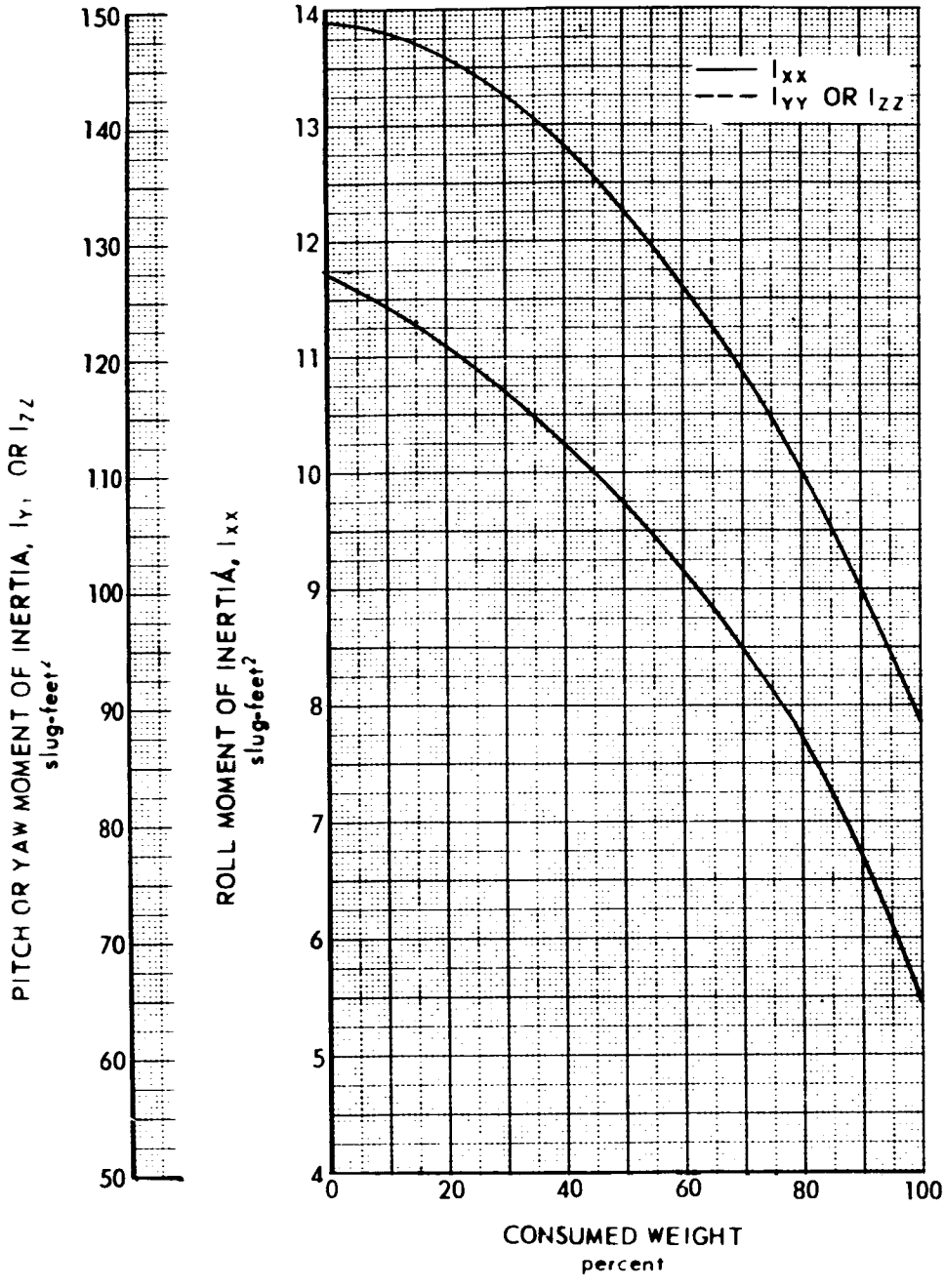

FIGURE E-13

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SCOUT S-185C
VARIATION OF WEIGHT AND C. G. WITH TIME

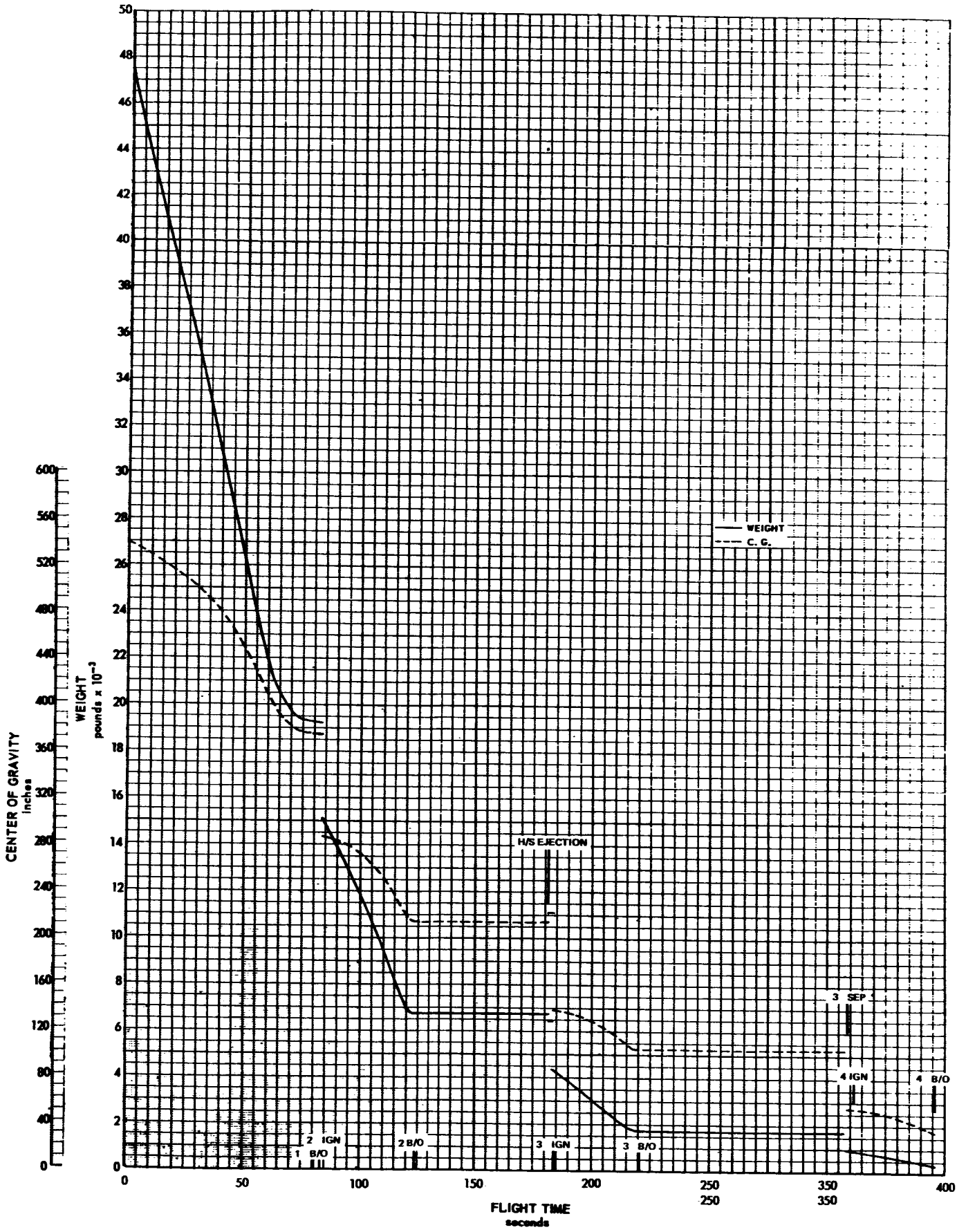

FIGURE E-14

4.0 VEHICLE PREDICTED ENVIRONMENTAL AND PERFORMANCE DATA

4.1 GENERAL

The predicted trajectory for Scout S-185C has been prepared in the format of the Contractor's IBM-360 computer routine LA0076 and previously submitted as a separate document (reference 2).

The predicted trajectory is based on weight data shown in Table E-3 and the predicted rocket motor performance data presented in Tables E-4 through E-7. The sequence of events and commanded pitch rates to be used for this mission are shown in Table E-8 and a list of trajectory parameters at major event times is presented in Table E-9. Orbital elements at injection appear in Table E-10.

Predicted performance and environmental parameters tabulated in reference 2 are presented graphically in this section. Time histories of geodetic altitude, relative velocity, relative flight path angle and relative azimuth are shown in Figures E-15 through E-18. Figure E-19 gives the dynamic pressure and axial acceleration histories. The vehicle flight profile (altitude versus range), including the spent trajectories, is presented in Figure E-20 and the ground track of the boost trajectory, showing stage impact points, appears in Figure E-21. Dispersion of stage impact points based on 0.997 probability is shown in Figure E-22. The orbital ground track is given for the first four revolutions of the Earth in Figure E-23.

Isoprobability contours of apogee/perigee deviations for probability levels of 0.997, 0.950 and 0.750 are provided in Figure E-24. The 0.997 isoprobability contour defines the limits of possible combinations of apogee/perigee deviations from the normal orbit which can occur with a probability level of 0.997 (i.e., the orbit achieved will fall within the contour 99.7 percent of the time). Two lifetime curves are shown on Figure E-24, one representing a twelve-month lifetime and the other an eighteen-month lifetime. These lifetime curves were calculated based on a ballistic coefficient of 71.4 kg/m^2 (14.7 psf) and a launch time of 1615 hours PST on 19 November 1972. Based on flight experience, the predicted probabilities of achieving lifetimes greater than 12 months and 18 months are 0.998 and 0.980, respectively.

Two special probability distributions are presented in Figure E-25. The predicted deviation of nodal longitude precession rate is presented in the upper half of Figure E-25. Similarly, the predicted deviation of the rate of change of the argument of perigee is presented in the lower half of Figure E-25. Like the predicted probabilities shown in Figure E-24, these predicted deviations are also derived from flight experience.

Based on S-185C injection conditions, the three-standard deviation in inclination is -1.83 to +1.37 degrees.

Control system fueling limitations for this vehicle are presented in Table 4-8 and control system settings are shown in Table E-23. The fourth-stage spin rate is shown in Table E-24.

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TABLE E-4
ROCKET MOTOR PERFORMANCE PREDICTION

MANUFACTURER	MOTOR TYPE
United Technology Center	ALGOL III
PLANT	**SERIAL NUMBER**
Sunnyvale, California	5502-3

PERFORMANCE PREDICTION*

DATE	REVISION DATE
12 June 1972	14 August 1972

WEIGHTS

TOTAL MOTOR WEIGHT**, LBS	TOTAL PROPELLANT WEIGHT, LBS
31,305.10	28,059.77

IMPULSE

TOTAL VACUUM IMPULSE, LB-SEC	PROPELLANT SPECIFIC IMPULSE***, SEC
7,245,032.6	258.200

NOZZLE AREAS

EXIT AREA, FT^2	THROAT AREA, IN^2
5.670	125.87

C. G. LOCATION, IN. (FROM FACE OF FORWARD ATTACH FLANGE)

LOADED MOTOR	EXPENDED MOTOR
156.82	178.9

ROLL MOMENT, SLUG-FT^2

LOADED MOTOR	EXPENDED MOTOR
1846.	314.

PITCH MOMENT, SLUG-FT^2

LOADED MOTOR	EXPENDED MOTOR
53,783	6733

MOTOR BURN TIME AND BURN RATE DATA REDUCTION PROCEDURES ARE PROVIDED BY –

DOCUMENT: VMSC-T Report 23.420 ISSUED: 20 Feb 1970 REV. N/C

THE TABULATION OF MOTOR PERFORMANCE ON THE FOLLOWING PAGE IS BASED UPON:

PREDICTED EFFECTIVE BURN TIME, SEC. 55.500
TEST MOTOR BURN RATE, IN/SEC (WEB AVERAGE) . . . N/A
PROPELLANT TEMPERATURE, °F. 77

***DOCUMENTS**

PREDICTION PROCEDURE: VMSC-T Report 23.420* ISSUED: 20 Feb 70 REV: N/C

NOMINAL DATA: VMSC-T 23-DIR-1279** ISSUED: 5 Aug 71 REV: N/C

* Reference 3

** Reference 4

**LESS NOZZLE CLOSURE, BUT INCLUDING EXTERNAL INSULATION, TUNNEL BOSSES, PAINT, TAPE, ETC.
***TOTAL VACUUM IMPULSE DIVIDED BY TOTAL PROPELLANT WEIGHT

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TABLE E-4
(Concluded)

BURN TIME seconds	VACUUM THRUST* pounds	JET VANE DRAG pounds	CONSUMABLE WEIGHT REMAINING** pounds
0.00	0.0	0.0	28277.77
0.29	151736.8	1578.1	28190.34
0.98	129627.9	1348.1	27812.06
1.48	125302.5	1303.1	27567.32
2.46	121676.9	1265.4	27092.98
4.92	112461.1	1169.6	25968.85
5.91	109529.2	1139.1	25542.53
7.38	106825.4	1111.0	24919.31
9.85	105034.4	1092.4	23902.16
12.30	104976.6	1091.8	22893.82
14.76	105842.6	1100.8	21881.68
21.65	98326.6	1022.6	19137.02
24.60	98227.3	1021.6	18004.57
29.53	101867.2	1059.4	16083.16
34.44	106294.9	1105.5	14084.34
39.36	110799.9	1152.3	11999.80
54.12	124764.0	1297.5	5213.90
55.50	125914.1	1309.5	4539.94
56.58	120573.5	1254.0	4019.19
59.04	101656.2	1057.2	2952.30
61.50	79231.9	824.0	2083.84
63.96	58772.1	611.2	1421.21
66.42	42865.9	445.8	933.23
68.89	30425.1	316.4	581.42
71.35	20790.4	216.2	335.48
73.80	12677.1	131.8	174.76
76.26	7606.2	79.1	77.40
79.70	3042.5	31.6	5.82
80.70	0.0	0.0	0.0

* Gross thrust (without deduction for jet-vane drag).

** Beginning with total consumable weight, excluding consumable external insulation weight. Consumable weight does not include propellant remaining after motor burnout.

NOTE: Average Vacuum Thrust = 109,584 pounds to web burn time.

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TABLE E-5
ROCKET MOTOR PERFORMANCE PREDICTION

MANUFACTURER	MOTOR TYPE
Thiokol Chemical Corporation	CASTOR IIA
PLANT	**SERIAL NUMBER**
Huntsville Division, Alabama	188

PERFORMANCE PREDICTION*

DATE	REVISION DATE
12 June 1972	31 July 1972

WEIGHTS

TOTAL MOTOR WEIGHT**, LBS	TOTAL PROPELLANT WEIGHT, LBS
9774.26	8206.15

IMPULSE

TOTAL VACUUM IMPULSE, LB-SEC	PROPELLANT SPECIFIC IMPULSE***, SEC
2,310,031.2	281.500

NOZZLE AREAS

EXIT AREA, FT^2	THROAT AREA, IN^2
7.950	55.63

C. G. LOCATION, IN. (FROM FACE OF FORWARD ATTACH FLANGE)

LOADED MOTOR	EXPENDED MOTOR
98.744	137.78

ROLL MOMENT, SLUG-FT^2

LOADED MOTOR	EXPENDED MOTOR
277	57

PITCH MOMENT, SLUG-FT^2

LOADED MOTOR	EXPENDED MOTOR
7838	1807

MOTOR BURN TIME AND BURN RATE DATA REDUCTION PROCEDURES ARE PROVIDED BY –

DOCUMENT: VMSC-T Report 23.420 ISSUED: 20 Feb 1970 REV. N/C

THE TABULATION OF MOTOR PERFORMANCE ON THE FOLLOWING PAGE IS BASED UPON:
PREDICTED EFFECTIVE BURN TIME, SEC. 36.510
TEST MOTOR BURN RATE, IN/SEC (WEB AVERAGE) . . . N/A
PROPELLANT TEMPERATURE, °F. 77

*DOCUMENTS

PREDICTION PROCEDURE: VMSC-T Report 23.420* ISSUED: 20 Feb 70 REV: N/C

NOMINAL DATA: VMSC-T 23-DIR-1316** ISSUED: 28 Jul 72 REV: B

* Reference 3

** Reference 5

**LESS NOZZLE CLOSURE, BUT INCLUDING EXTERNAL INSULATION, TUNNEL BOSSES, PAINT, TAPE, ETC.
***TOTAL VACUUM IMPULSE DIVIDED BY TOTAL PROPELLANT WEIGHT

TABLE F-5
(Concluded)

BURN TIME seconds	VACUUM THRUST pounds	CONSUMABLE WEIGHT REMAINING* pounds
0.0	0.0	8261.35
0.09	15164.0	8257.66
0.14	40942.7	8251.89
0.44	39931.8	8205.42
0.98	40942.7	8121.08
3.92	45997.3	7638.79
6.87	51052.1	7113.02
9.81	56106.7	6538.50
12.76	60655.9	5916.23
15.69	64699.7	5252.79
18.64	68237.9	4553.76
20.60	70007.1	4070.86
22.57	71270.5	3579.28
24.53	72028.8	3082.93
26.00	72281.5	2708.59
27.47	72028.8	2339.53
29.44	70765.3	1841.88
31.40	69248.8	1359.78
31.99	68490.6	1218.12
32.38	68237.9	1124.00
35.12	68743.2	466.35
35.91	67479.7	279.63
36.30	65205.0	188.22
36.51	62677.6	142.07
37.09	30327.9	48.55
37.44	10109.3	24.53
38.27	2021.9	5.78
38.75	1011.0	2.89
40.03	0.0	0.0

* Beginning with total consumable weight, excluding consumable external insulation weight. Consumable weight does not include propellant remaining after motor burnout.

NOTE: Average Vacuum Thrust = 62,163 pounds to web burn time.

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TABLE E-6
ROCKET MOTOR PERFORMANCE PREDICTION

MANUFACTURER	MOTOR TYPE
Hercules Incorporated	ANTARES II
PLANT	**SERIAL NUMBER**
Bacchus Works, Utah	HIB-312

PERFORMANCE PREDICTION*

DATE	REVISION DATE
12 June 1972	31 July 1972

WEIGHTS

TOTAL MOTOR WEIGHT**, LBS	TOTAL PROPELLANT WEIGHT, LBS
2796.80	2559.43

IMPULSE

TOTAL VACUUM IMPULSE, LB-SEC	PROPELLANT SPECIFIC IMPULSE ***, SEC
719,967.7	281.300

NOZZLE AREAS

EXIT AREA, FT^2	THROAT AREA, IN^2
4.350	34.93

C. G. LOCATION, IN. (FROM FACE OF FORWARD ATTACH FLANGE)

LOADED MOTOR	EXPENDED MOTOR
31.02	49.76

ROLL MOMENT, SLUG-FT^2

LOADED MOTOR	EXPENDED MOTOR
70.4	4.6

PITCH MOMENT, SLUG-FT^2

LOADED MOTOR	EXPENDED MOTOR
340	69

MOTOR BURN TIME AND BURN RATE DATA REDUCTION PROCEDURES ARE PROVIDED BY –

DOCUMENT: VMSC-T Report 23.420 ISSUED: 20 Feb 1970 REV. N/C

THE TABULATION OF MOTOR PERFORMANCE ON THE FOLLOWING PAGE IS BASED UPON:

PREDICTED EFFECTIVE BURN TIME, SEC. 32.470
TEST MOTOR BURN RATE, IN/SEC (WEB AVERAGE) . . . N/A
PROPELLANT TEMPERATURE, °F. 77

***DOCUMENTS**

PREDICTION PROCEDURE:	VMSC-T Report 23.420*	ISSUED: 20 Feb 70	REV: N/C
NOMINAL DATA:	VMSC-T 23-DIR-1316**	ISSUED: 28 Jul 72	REV: B

* Reference 3

** Reference 5

**LESS NOZZLE CLOSURE, BUT INCLUDING EXTERNAL INSULATION, TUNNEL BOSSES, PAINT, TAPE, ETC.
***TOTAL VACUUM IMPULSE DIVIDED BY TOTAL PROPELLANT WEIGHT

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TABLE E-6
(Concluded)

BURN TIME seconds	VACUUM THRUST pounds	CONSUMABLE WEIGHT REMAINING* pounds
0.00	0.0	2584.43
0.19	23783.8	2576.55
0.56	21815.0	2545.87
0.95	21307.1	2516.77
1.70	21304.0	2459.88
2.37	21195.1	2409.55
3.57	20982.2	2301.45
5.69	22013.8	2153.77
8.55	22828.3	1923.10
11.39	23354.1	1682.96
13.28	23460.8	1519.45
14.24	23408.6	1437.44
15.19	23305.7	1355.54
18.04	22846.9	1114.80
20.88	22117.9	883.33
22.79	21806.2	733.56
24.68	21494.8	586.09
26.59	21183.2	441.22
28.47	20560.1	300.63
30.10	19663.0	185.62
31.33	18786.1	101.84
32.08	17860.4	52.71
32.47	16612.6	29.49
32.81	14952.8	18.92
33.23	6438.1	11.75
33.42	2388.2	6.27
33.80	621.5	3.19
34.56	206.8	1.29
36.29	0.0	0.00

* Beginning with total consumable weight, excluding consumable external insulation weight. Consumable weight does not include propellant remaining after motor burnout.

NOTE: Average Vacuum Thrust = 21,811 pounds to web burn time.

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TABLE E-7
ROCKET MOTOR PERFORMANCE PREDICTION

MANUFACTURER	MOTOR TYPE
United Technology Center	ALTAIR III
PLANT	**SERIAL NUMBER**
Sunnyvale, California	2223-13

PERFORMANCE PREDICTION*

DATE	REVISION DATE
12 June 1972	31 July 1972

WEIGHTS

TOTAL MOTOR WEIGHT**, LBS	TOTAL PROPELLANT WEIGHT, LBS
666.63	607.15

IMPULSE

TOTAL VACUUM IMPULSE, LB-SEC	PROPELLANT SPECIFIC IMPULSE ***, SEC
172,078.5	283.420

NOZZLE AREAS

EXIT AREA, FT^2	THROAT AREA, IN^2
1.500	4.29

C. G. LOCATION, IN. (FROM FACE OF FORWARD ATTACH FLANGE)

LOADED MOTOR	EXPENDED MOTOR
18.35	22.55

ROLL MOMENT, SLUG-FT^2

LOADED MOTOR	EXPENDED MOTOR
6.75	0.9

PITCH MOMENT, SLUG-FT^2

LOADED MOTOR	EXPENDED MOTOR
21.1	4.1

MOTOR BURN TIME AND BURN RATE DATA REDUCTION PROCEDURES ARE PROVIDED BY –

DOCUMENT: VMSC-T Report 23.420 ISSUED: 20 Feb 1970 REV. N/C

THE TABULATION OF MOTOR PERFORMANCE ON THE FOLLOWING PAGE IS BASED UPON:

PREDICTED EFFECTIVE BURN TIME, SEC. 30.290
TEST MOTOR BURN RATE, IN/SEC (WEB AVERAGE) . . . N/A
PROPELLANT TEMPERATURE, °F. 77

***DOCUMENTS**

PREDICTION PROCEDURE:	VMSC-T Report 23.420*	ISSUED: 20 Feb 70	REV: N/C
NOMINAL DATA:	VMSC-T 23-DIR-1316**	ISSUED: 28 Jul 72	REV: B

* Reference 3

** Reference 5

**LESS NOZZLE CLOSURE, BUT INCLUDING EXTERNAL INSULATION, TUNNEL BOSSES, PAINT, TAPE, ETC.
***TOTAL VACUUM IMPULSE DIVIDED BY TOTAL PROPELLANT WEIGHT

TABLE E-7
(Concluded)

BURN TIME seconds	VACUUM THRUST pounds	CONSUMABLE WEIGHT REMAINING* pounds
0.00	0.0	611.15
0.18	4530.2	609.90
0.49	4271.9	604.64
0.98	4403.5	596.46
2.45	5086.8	569.15
3.73	5567.7	545.13
4.23	5466.5	535.66
4.91	5441.2	520.67
5.89	5491.7	500.67
7.85	5694.3	458.12
9.82	5891.6	418.06
11.78	6048.5	378.00
13.74	6124.5	336.45
14.72	6134.5	315.15
15.70	6124.5	294.45
17.67	6048.5	252.83
19.63	5851.1	213.45
22.58	5420.9	157.24
24.93	4975.4	113.68
25.52	4884.4	102.81
27.48	4732.5	68.17
29.45	4575.6	35.09
30.29	4327.6	21.55
31.02	4074.5	14.04
31.31	3745.4	12.64
31.90	1442.5	10.53
33.03	253.1	5.51
33.57	76.0	3.01
34.36	0.0	0.00

* Beginning with total consumable weight, excluding consumable external insulation weight. Consumable weight does not include propellant remaining after motor burnout.

NOTE: Average Vacuum Thrust = 5,456 pounds to web burn time.

TABLE E-8

SCOUT S-185C
SEQUENCE OF EVENTS

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PREDICTED TIME (sec)	EVENT	HOW ACCOMPLISHED
-00.13	Stage 1 Ignition	Blockhouse
000.00	1. Lift-off	Stage 1 Ignition
	2. $\dot{\theta}_c$ = 0.00000 deg/sec	
000.10	Start Timer	Flyaway
001.00	$\dot{\theta}_{c1}$ = -2.08684 deg/sec	Timer Function 1
006.00	$\dot{\theta}_{c2}$ = -0.74000 deg/sec	Timer Function 2
036.00	$\dot{\theta}_{c3}$ = -0.59000 deg/sec	Timer Function 3
046.00	$\dot{\theta}_{c4}$ = -0.43000 deg/sec	Timer Function 4
056.00	$\dot{\theta}_{c5}$ = -0.30700 deg/sec	Timer Function 5
080.57	Stage 1 Burnout	
083.79	1. Stage 2 Ignition (Dynamic Pressure = 39.97 psf)	Timer Function 6
	2. Activate "B" Controls	Timer Function 6
	3. Separate First Stage	Stage 2 Ignition
	4. Remove First-Stage Controls	Stage 1 Separation
	5. Switch in Body Bending Filter	Timer Function 6
100.00	$\dot{\theta}_{c6}$ = -0.17800 deg/sec	Timer Function 7
123.82	Stage 2 Burnout	
128.82	Switch out Body Bending Filter	Timer Function 8
163.00	$\dot{\theta}_{c7}$ = -2.11154 deg/sec	Timer Function 9
170.50	$\dot{\theta}_{c8}$ = -0.46500 deg/sec	Timer Function 10
181.12	1. Separate Payload Heatshield	Timer Function 11
	2. Activate "C" Burn Controls	Timer Function 11
	3. Third-Stage Squib Ignition	Timer Function 11
	4. Switch in Body Bending Filter	Timer Function 11
183.82	1. Stage 3 Ignition	Squib Delay
	2. Separate Second Stage	Stage 3 Ignition
	3. Remove Second-Stage Controls	Stage 2 Separation
220.11	Stage 3 Burnout	
225.11	1. Activate "C" Coast Controls	Timer Function 12
	2. Switch out Body Bending Filter	Timer Function 12
240.00	$\dot{\theta}_{c9}$ = +1.00000 deg/sec	Timer Function 13
255.19	$\dot{\theta}_{c10}$ = 0.00000 deg/sec	Timer Function 14
355.58	1. Spin Motor Ignition	Timer Function 15
	2. Fourth-Stage Squib Ignition	Timer Function 15
357.08	1. Explosive Bolt Ignition	Timer Function 16
	2. Separate Third Stage*	Explosive Bolt Ignition
357.58	Retro-Force Command	Timer Function 17
361.93	Stage 4 Ignition	Squib Delay
396.29	Stage 4 Burnout	
657.08	Payload/4th-Stage Separation	

*NOTE: Start Payload Separation Timer.

TABLE E-9
SCOUT S-185C ESRO IV MISSION
TRAJECTORY PARAMETERS AT EVENT TIMES

EVENT	TIME sec	WEIGHT lbs	INERTIAL VELOCITY fps	ALTITUDE n.mi.	RANGE n.mi.	GEODETIC LATITUDE deg	LONGITUDE WEST deg
Lift-Off	0.00	47478.	1257.30	0.05	0.00	34.6080	120.6245
Stage 1 B/O	80.57	19239.	4591.40	22.48	19.04	34.2900	120.6495
Stage 2 Ign.	83.79	15028.	4525.34	24.00	20.83	34.2602	120.6519
Stage 2 B/O	123.82	6729.	10914.77	50.63	59.75	33.6112	120.7049
Stage 3 Ign.	183.82	4330.	10054.95	98.55	149.21	32.1203	120.8329
Stage 3 B/O	220.11	1741.	17395.86	118.69	225.16	30.8554	120.9401
Stage 4 Ign.	361.93	969.	17074.01	148.71	610.71	24.4335	121.4737
Stage 4 B/O	396.29	358.	26127.50	148.48	726.83	22.4984	121.6286

EVENT	TIME sec	INERTIAL PATH ANGLE deg	RELATIVE PATH ANGLE deg	INERTIAL HEADING deg	RELATIVE HEADING deg.	RELATIVE VELOCITY fps	INTEGRATED AXIAL LOAD FACTOR, fps
Lift-Off	0.00	0.000	-	90.000	-	0.0	0.00
Stage 1 B/O	80.57	39.602	40.831	162.812	183.807	4476.5	6615.77
Stage 2 Ign.	83.79	38.631	39.851	162.812	183.839	4408.9	6614.17
Stage 2 B/O	123.82	31.418	31.420	175.990	183.937	10914.1	13837.03
Stage 3 Ign.	183.82	23.936	23.924	176.057	184.358	10059.4	13837.02
Stage 3 B/O	220.11	8.225	8.205	179.518	184.025	17437.4	22028.49
Stage 4 Ign.	361.93	0.598	0.597	179.545	184.403	17124.0	22028.49
Stage 4 B/O	396.29	-0.003	-0.003	180.865	184.085	26191.1	31095.87

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TABLE E-10

SCOUT S-185C ESRO IV MISSION ORBITAL ELEMENTS AT INJECTION

Parameter	Predicted Value
Orbit Inclination, deg	90.8
Argument of Perigee, deg	157.684
Orbit Eccentricity	0.05805
Time of Passage Through Perigee	Injection Time Plus 0.01 Minutes
Orbital Period, minutes	98.4
Geocentric Latitude of Perigee, deg	22.31 North
*Perigee Altitude, km	280.0 (151.19 n.mi.)
*Apogee Altitude, km	1099.7 (593.79 n.mi.)
*Altitude at Injection	280.0 (151.19 n.mi.)

*These altitudes are based on a mean earth radius of 6370.076 km (3439.566 n.mi.)

SCOUT S-185C, ESRO IV MISSION
TRAJECTORY PARAMETERS VS TIME
FIRST STAGE

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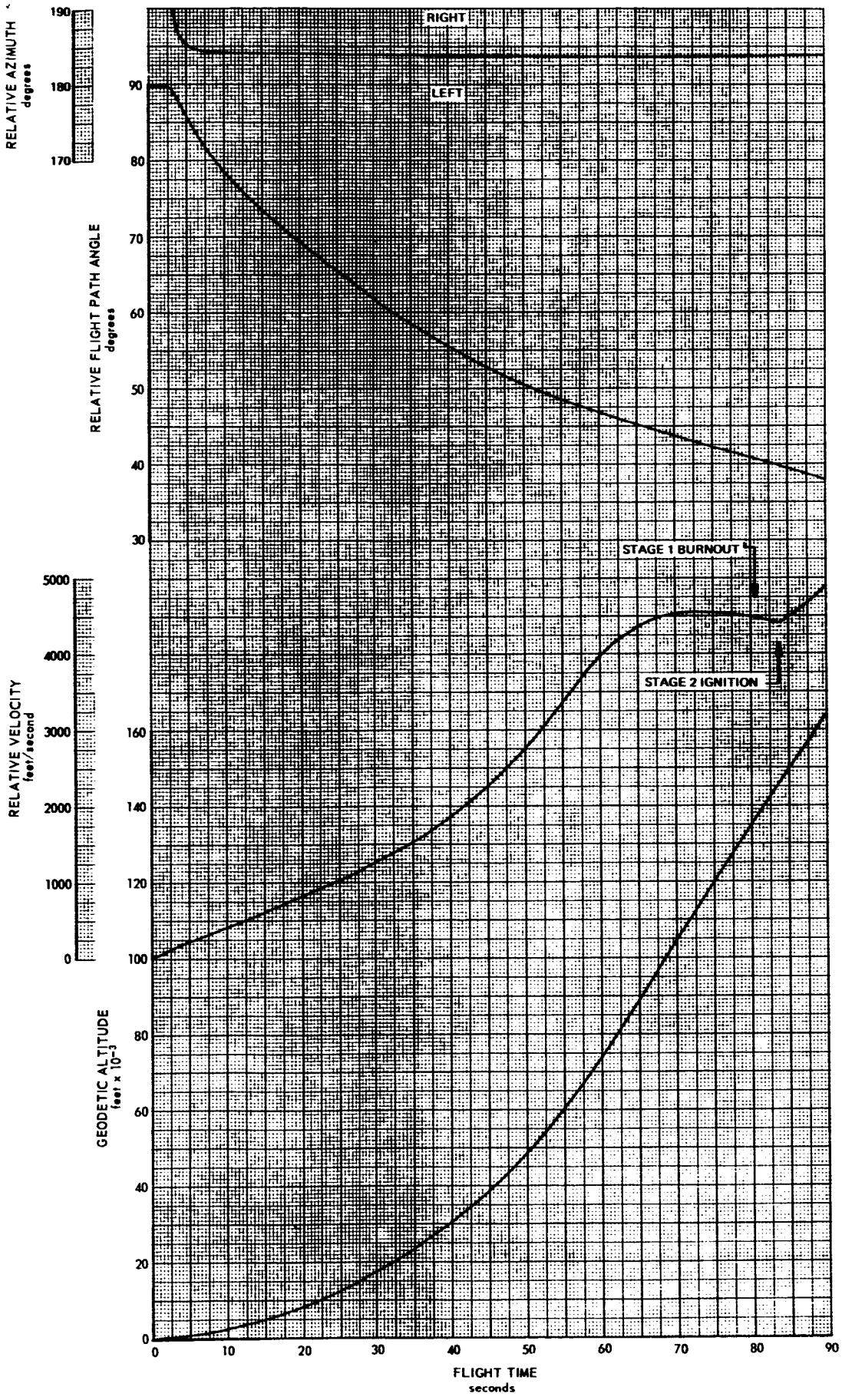

FIGURE F-15

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**SCOUT S-185C, ESRO IV MISSION
TRAJECTORY PARAMETERS VS TIME
SECOND STAGE**

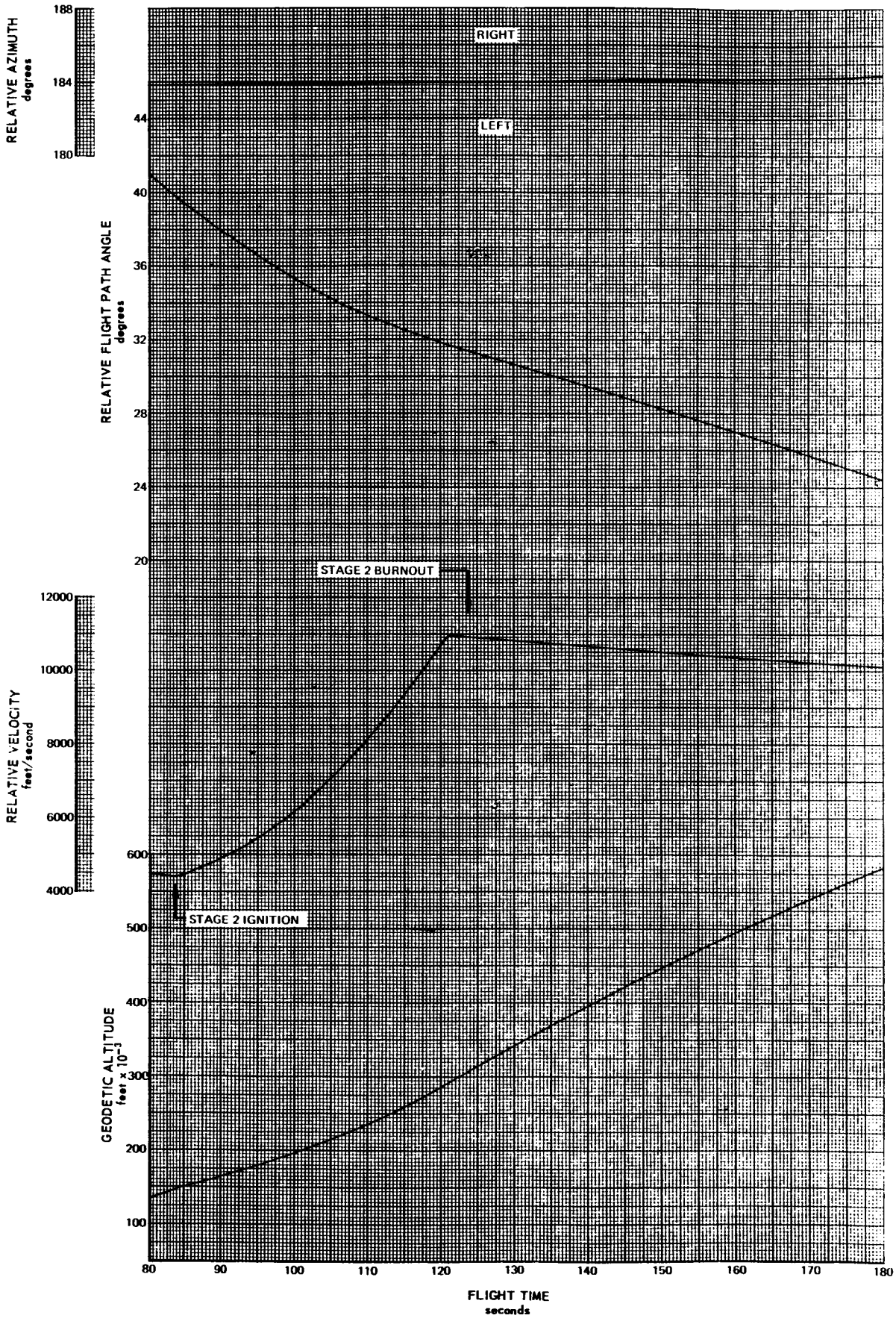

FIGURE E-16

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SCOUT S-185C, ESRO IV MISSION
TRAJECTORY PARAMETERS VS TIME
THIRD STAGE

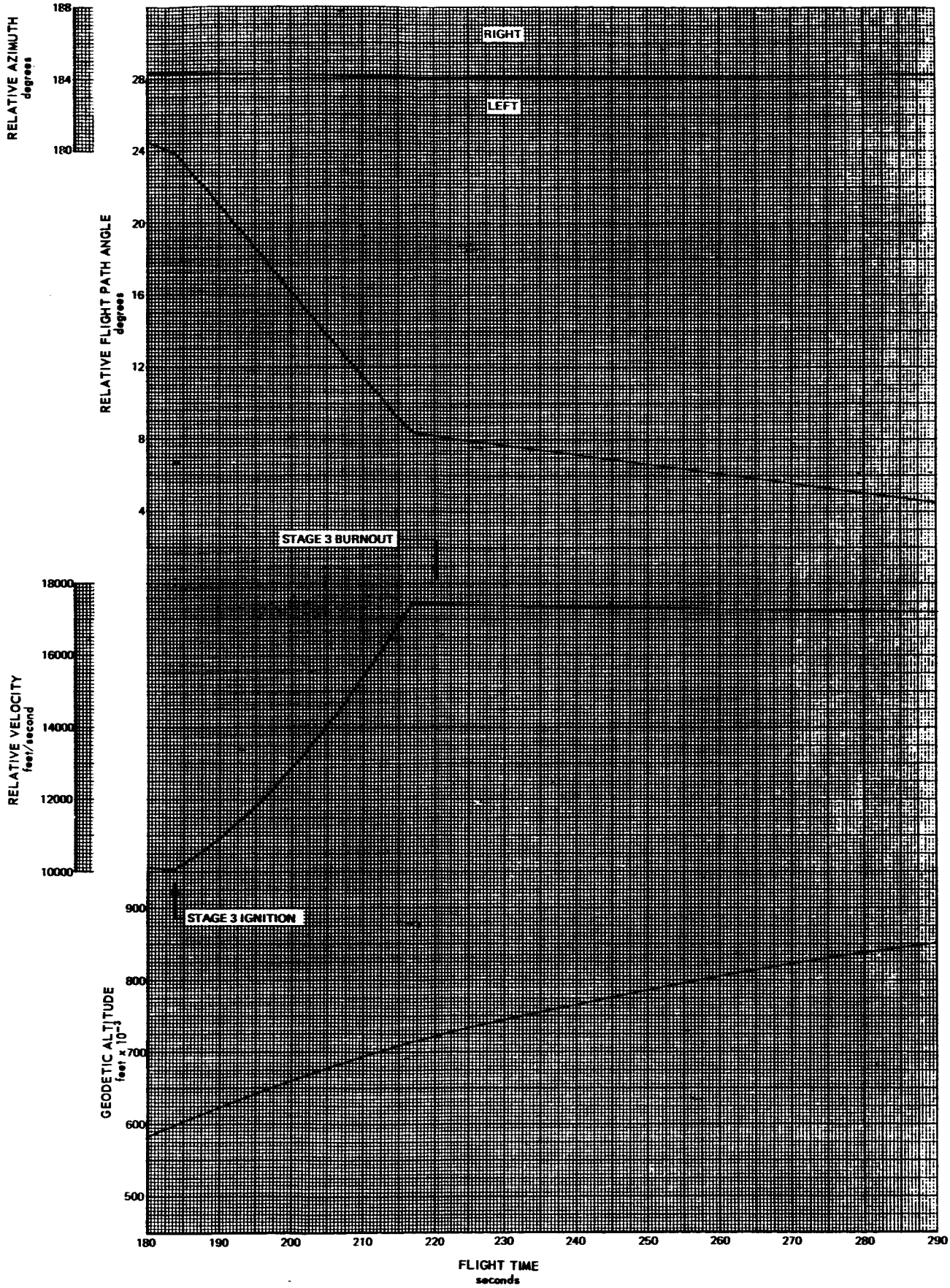

FIGURE E-17

SCOUT S-185C ESRO IV MISSION
TRAJECTORY PARAMETERS VS TIME
THIRD-STAGE COAST (CONCLUDED)
AND FOURTH-STAGE BOOST

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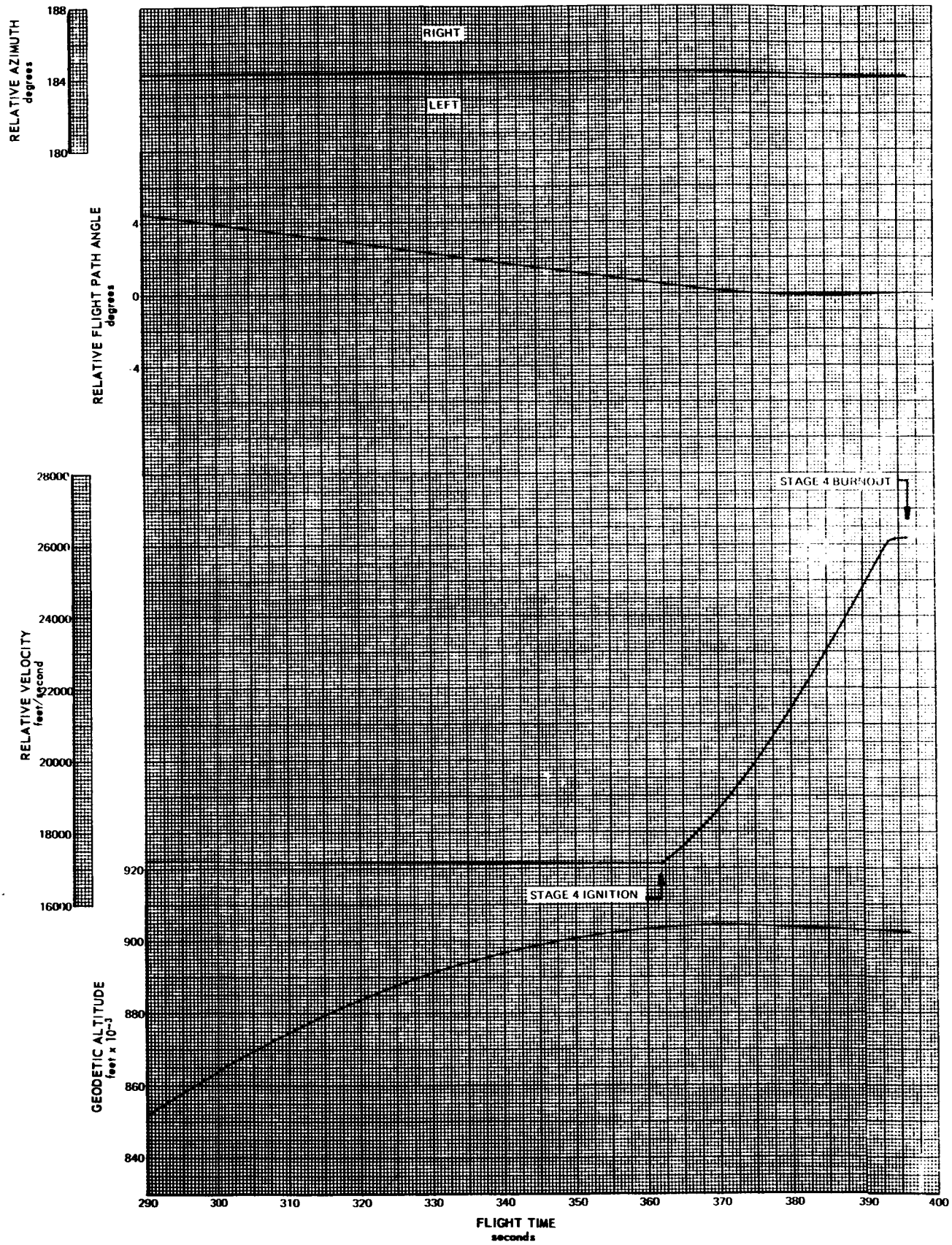

FIGURE E-18

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SCOUT S-185C, ESRO IV MISSION
AXIAL ACCELERATION AND DYNAMIC PRESSURE VS TIME

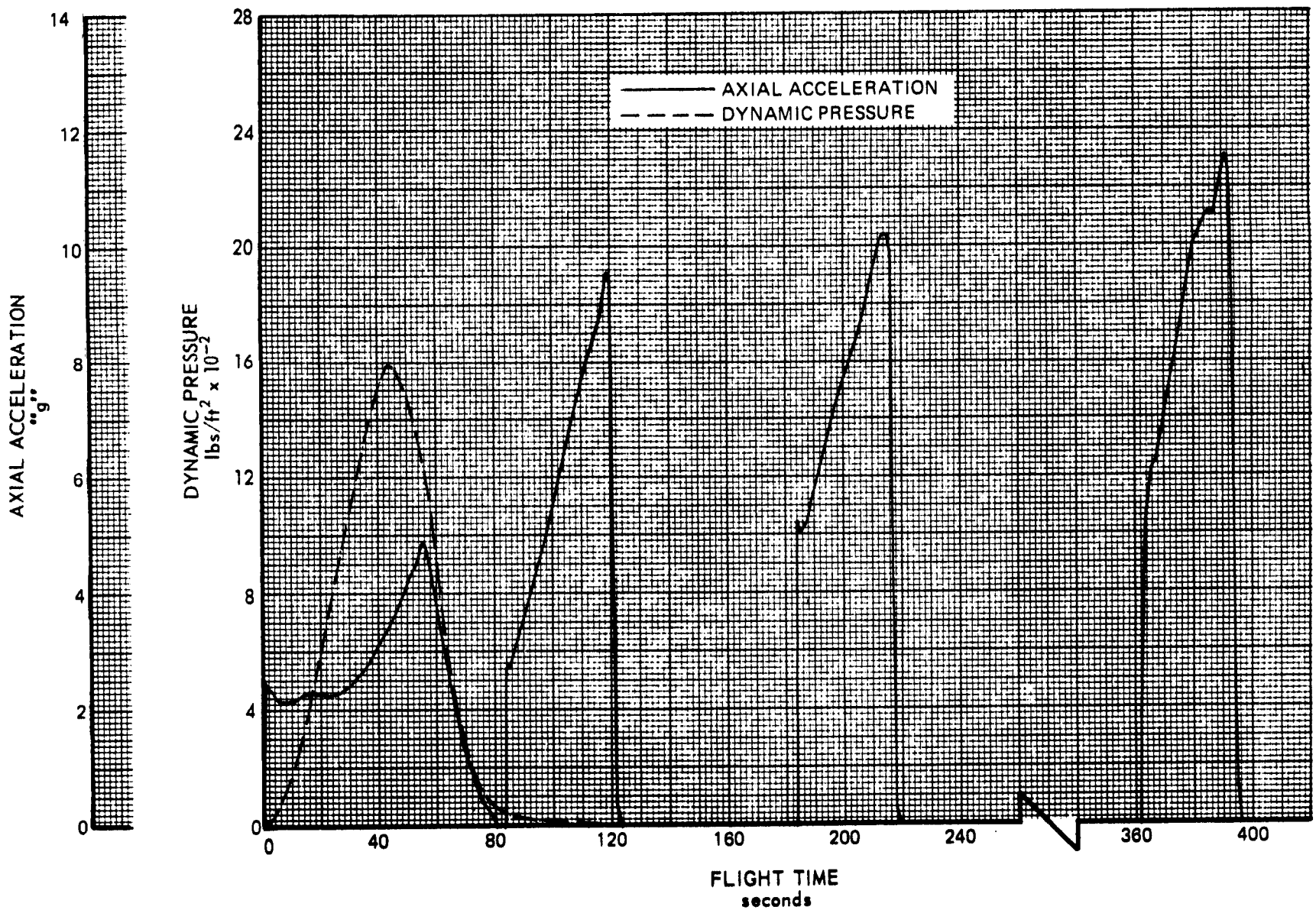

FIGURE E-19

SCOUT S-185C, ESRO IV MISSION
FLIGHT PROFILES OF THE BOOST TRAJECTORY
AND SPENT STAGE TRAJECTORIES

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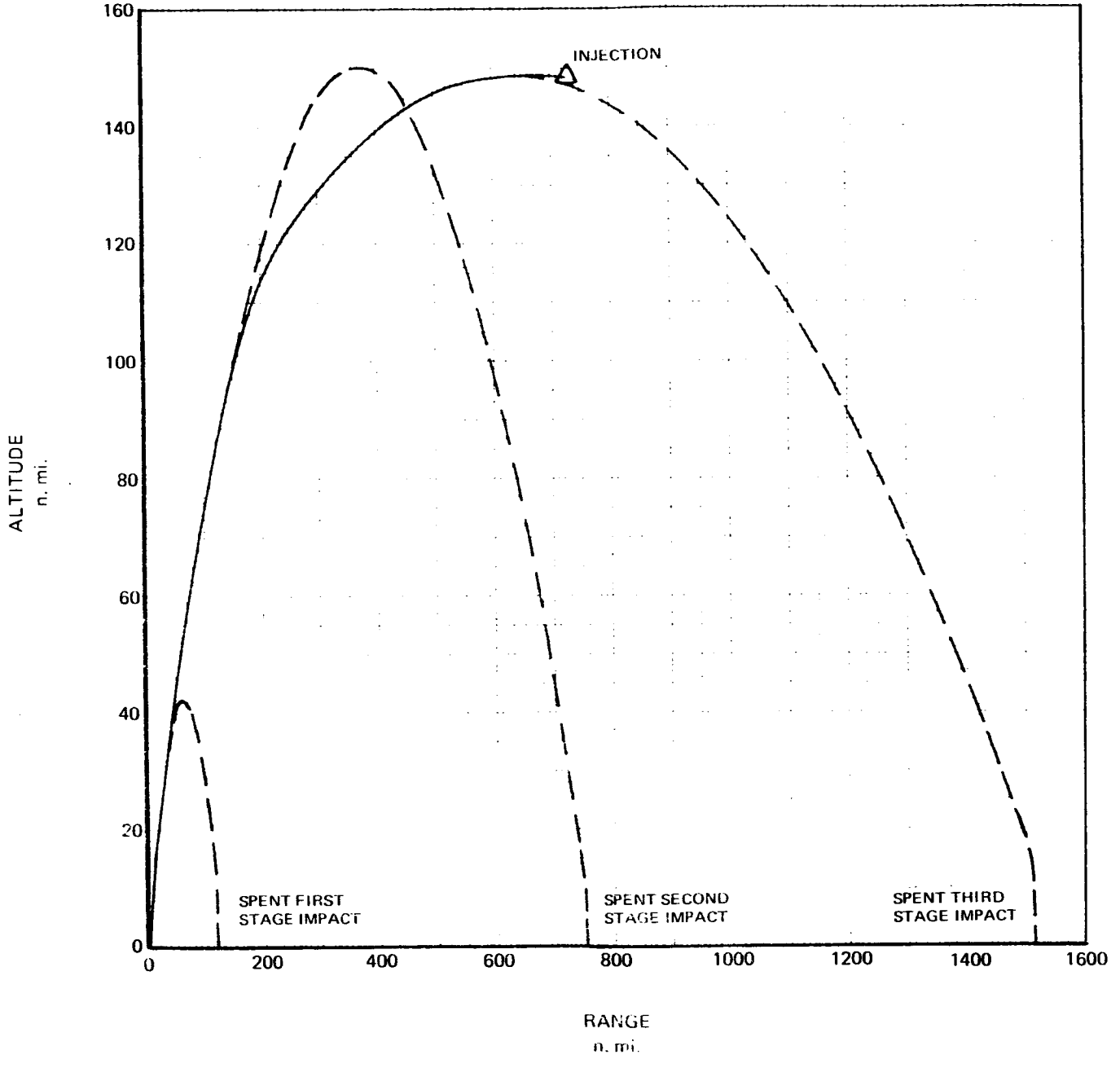

FIGURE E-20

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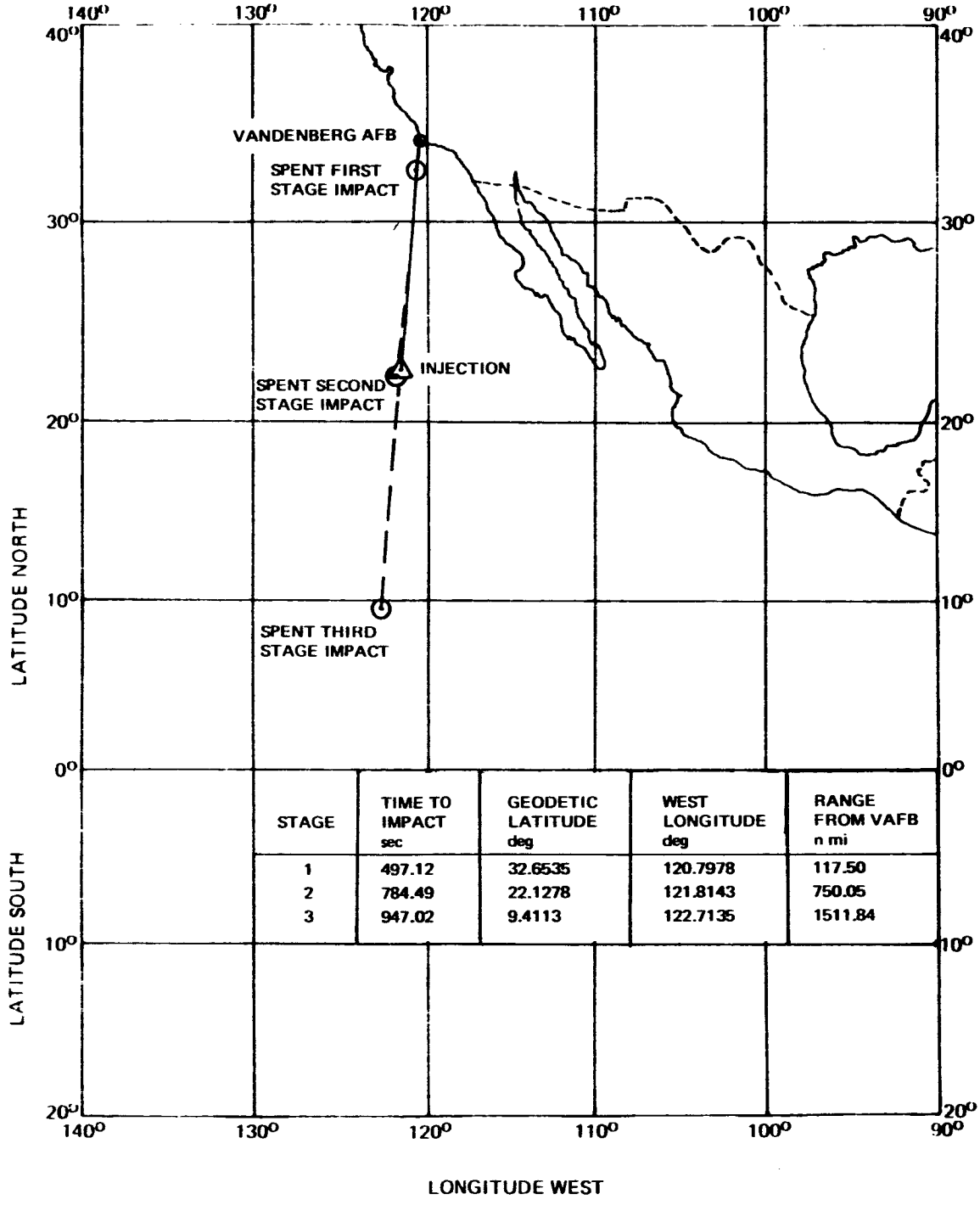
SCOUT S-185C, ESRO IV MISSION
BOOST TRAJECTORY GROUND TRACK
WITH SPENT STAGE IMPACT POINTS



STAGE	TIME TO IMPACT sec	GEODETIC LATITUDE deg	WEST LONGITUDE deg	RANGE FROM VAFB n mi
1	497.12	32.6535	120.7978	117.50
2	784.49	22.1278	121.8143	750.05
3	947.02	9.4113	122.7135	1511.84

FIGURE E-21

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SCOUT S-185C, ESRO IV MISSION
SPENT STAGE IMPACT DISPERSION AREA – 0.997 PROBABILITY

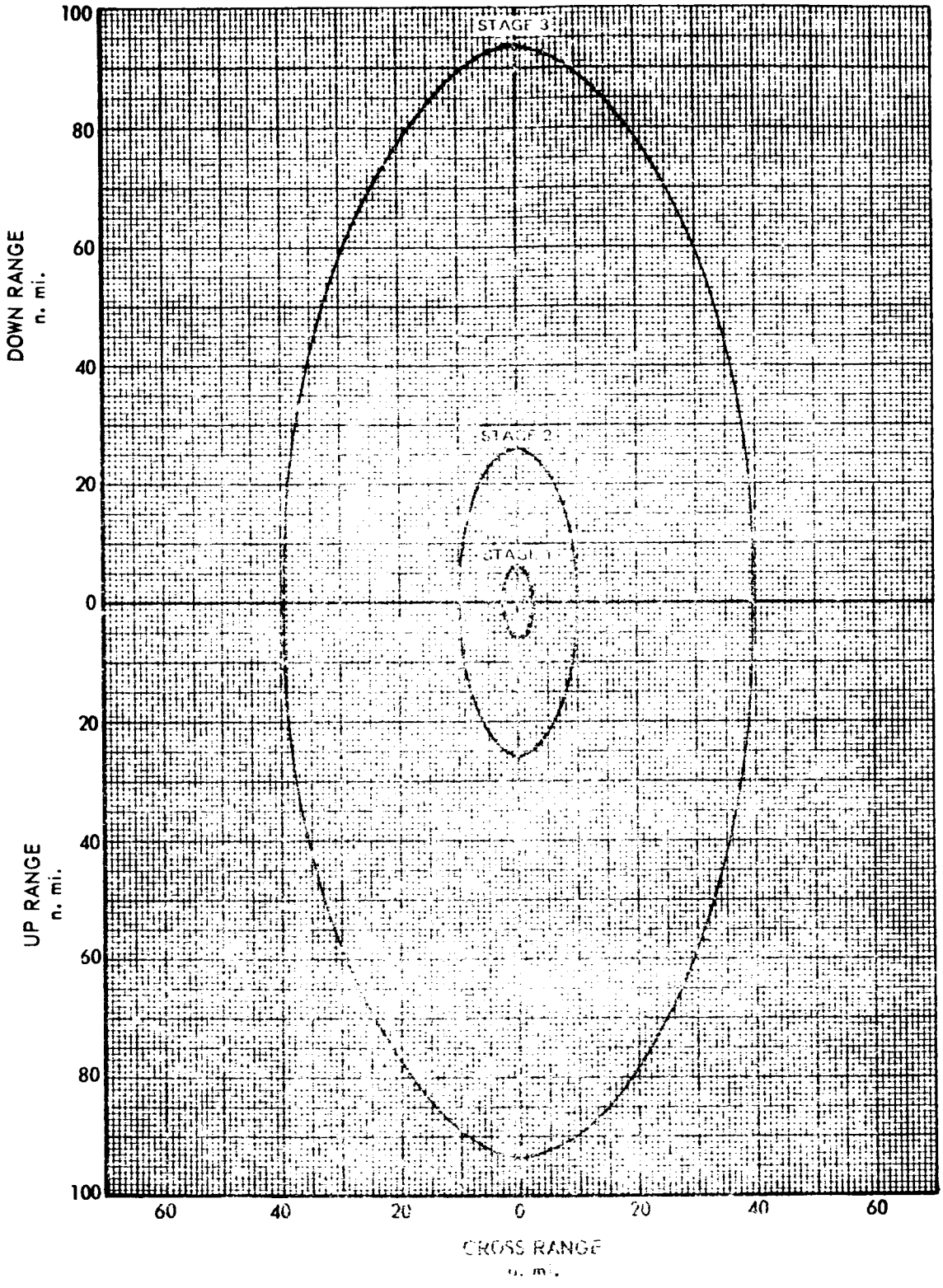

FIGURE E-22

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SCOUT S-185C, ESRO IV MISSION
ORBIT GROUND TRACK
FOR FIRST FOUR REVOLUTIONS

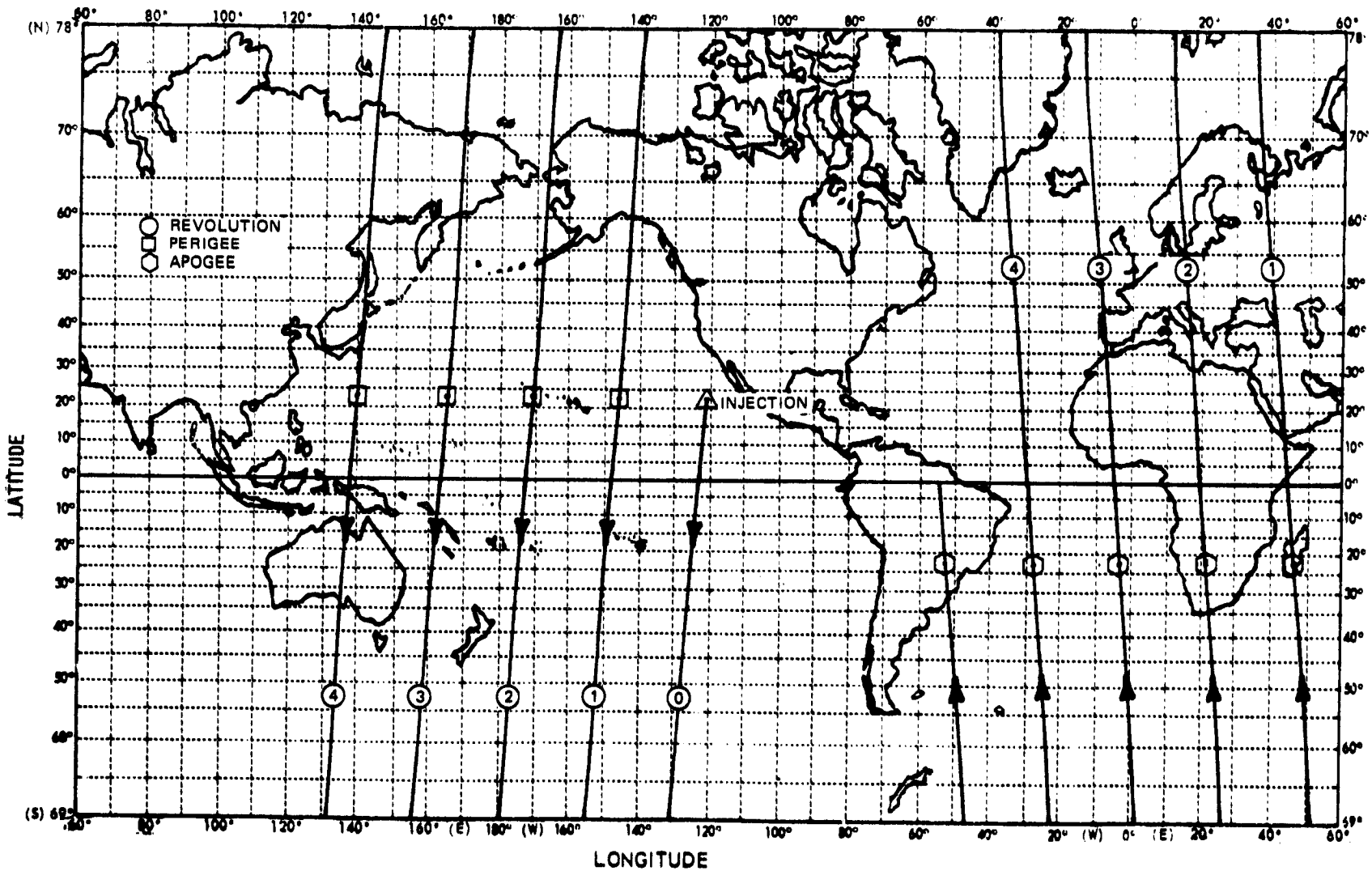

FIGURE E-23

SCOUT S-185C ESRO IV MISSION ISOPROBABILITY CONTOURS OF APOGEE/PERIGEE DEVIATIONS

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Probability That Lifetime Will Be Greater Than:	
Months	Probability
12	0.998
18	0.980

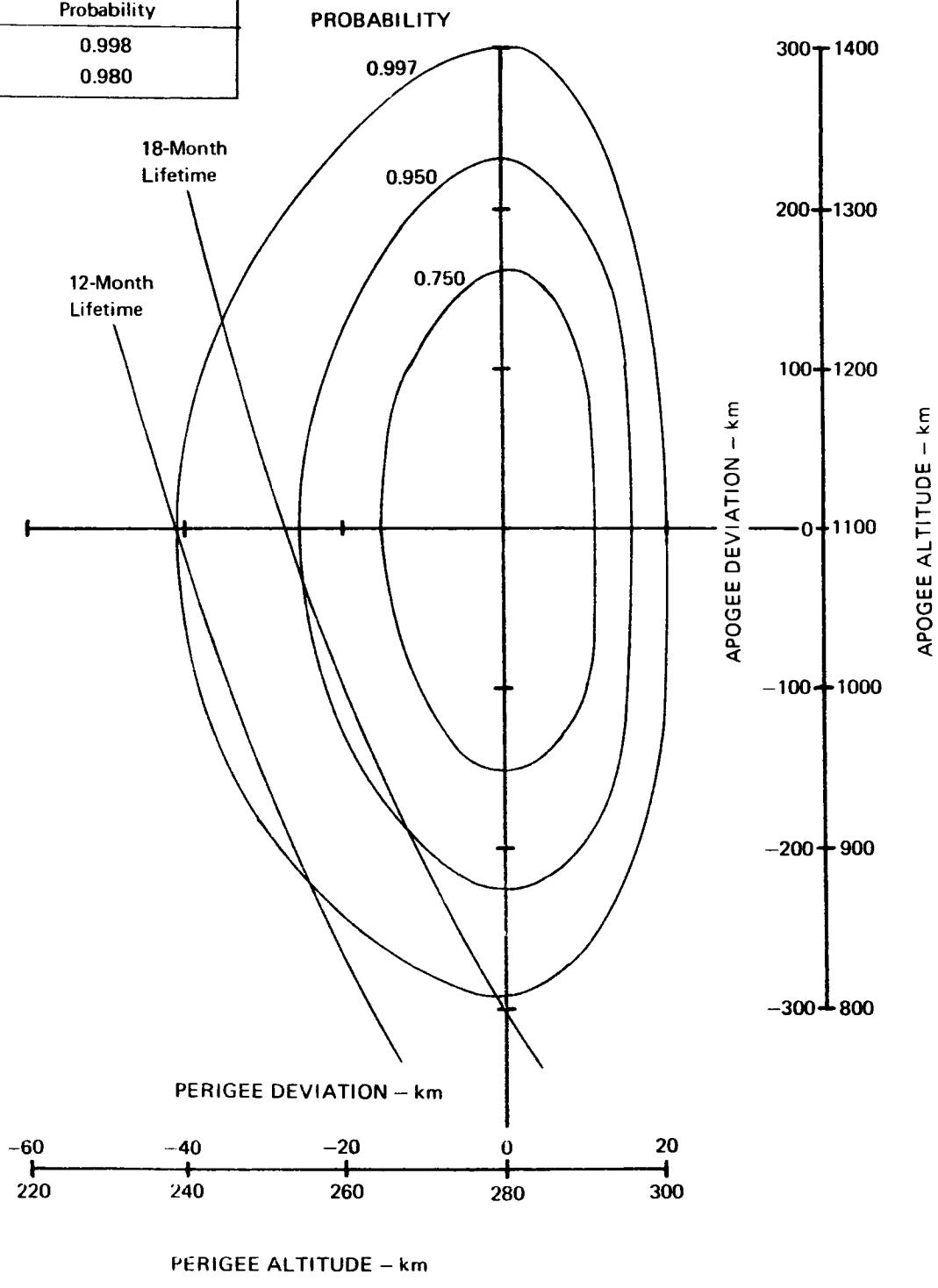

FIGURE E-24

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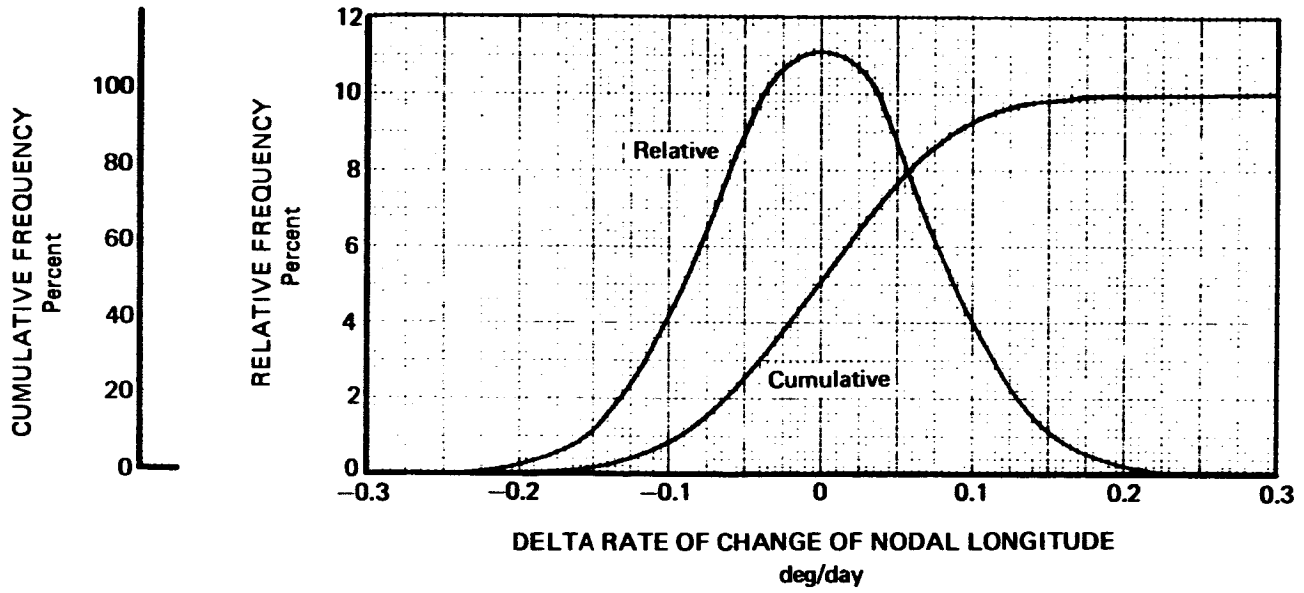
SCOUT S-185C ESRO IV MISSION PREDICTED DEVIATIONS IN RATE OF CHANGE OF NODAL LONGITUDE AND ARGUMENT OF PERIGEE VS FREQUENCY



Time Rate of Change of:	Nominal Value	One-Standard Deviation
Nodal Longitude, deg/day	0.0979	±0.0703
Argument of Perigee, deg/day	−3.5016	±0.0785

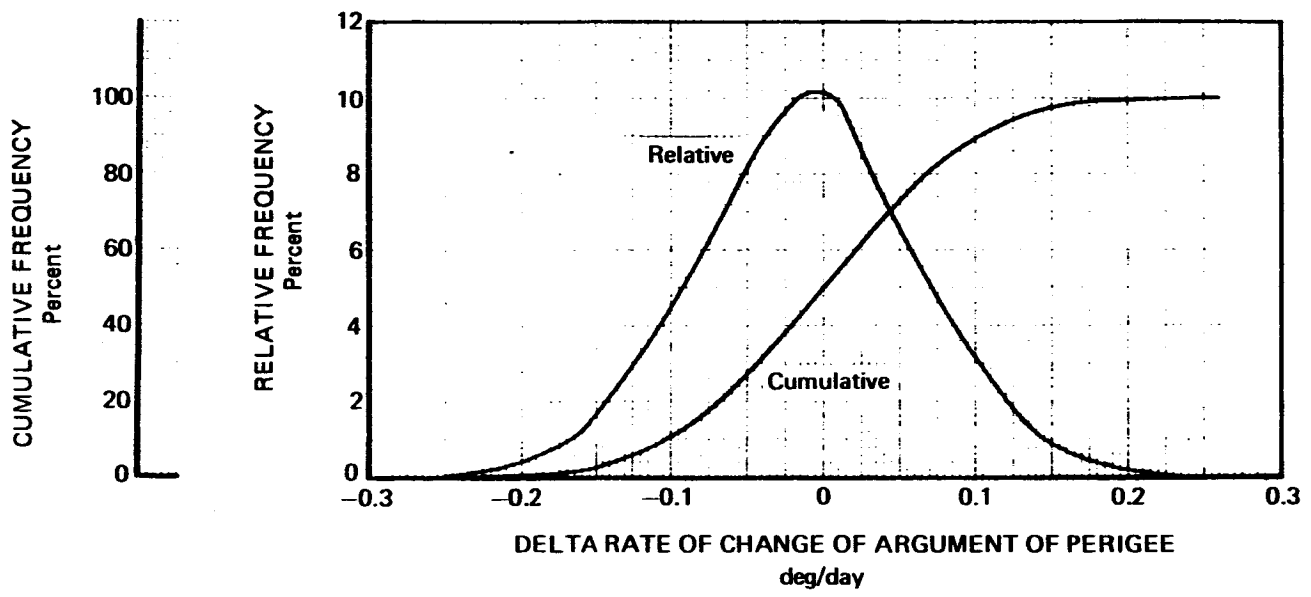


FIGURE E-25

TABLE E-11

SCOUT S-185C
CONTROL SYSTEM FUELING REQUIREMENTS

	2nd Stage	3rd Stage
Specific Impulse, sec	134	153
Predicted Dynamic Pressure at Stage Ignition, psf	39.97	0.00
Coast Time, sec	60.00	136.97
Minimum Allowable Unregulated N_2 Pressure at Lift-Off, psig	2200	2200
Predicted Maximum H_2O_2 Consumption - Boost Phase, lbs	68.2	13.2
Predicted Maximum Total H_2O_2 Consumption, lbs	99.9 (1)	15.8 (1) (2)
Required H_2O_2 on Board at Lift-Off, lbs	155 (3)	17 (4)
Predicted Minimum Retro Time, sec	-	1.7 (5)

(1) The predicted maximum H_2O_2 consumption is based on a 99.5% probability, 95% confidence level.
(2) The 15.8-lb total includes two pounds of H_2O_2 for retro (1.5 seconds duration).
(3) The 155-lb total includes three pounds unusable.
(4) The 17-lb total includes one pound unusable.
(5) Based on 17 lbs total H_2O_2 on board at lift-off.

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TABLE E-12

SCOUT S-185C
CONTROL SYSTEM SETTINGS

	PITCH AND YAW	ROLL
FIRST-STAGE BOOST		
Displacement Gain, K_D, deg/deg (One Surface)	6.75 ± 10%	3.0 ± 10%
Rate to Displacement Gain Ration, K_R/K_D, sec.	0.4 ± 10%	0.4 ± 10%
SECOND-STAGE BOOST		
Deadband half-width, radians	0.014 ± 10%	0.025 ± 10%
K_R/K_D, sec.	0.50 ± 10%	0.45 ± 10%
Notch Filter	"In"	None
Noise Filter	None	None
SECOND-STAGE COAST		
Deadband half-width, radians	0.014 ± 10%	0.025 ± 10%
K_R/K_D, sec.	0.50 ± 10%	0.45 ± 10%
Notch Filter	"Out"	None
Noise Filter	None	None
THIRD-STAGE BOOST		
Deadband half-width, radians	0.014 ± 10%	0.025 ± 10%
K_R/K_D, sec.	0.50 ± 10%	0.45 ± 10%
Notch Filter	"In"	None
Noise Filter	None	"In"
THIRD-STAGE COAST		
Deadband half-width, radians	0.004 ± 10%	0.00715 ± 10%
K_R/K_D, sec.	0.50 ± 10%	0.45 ± 10%
Notch Filter	"Out"	None
Noise Filter	None	"Out"

NOTE: For First-Stage Frequency Response, See Reference 6.

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TABLE E-13

SCOUT S-185C
PREDICTED FOURTH-STAGE SPIN RATE

Spin rate for the FW-4S fourth stage was predicted based on the following information:

Roll Moment of Inertia of the Payload	6.01 slug-ft^2
Total Roll Moment of Inertia of Spin-Up Items	14.90 slug-ft^2

Spin Motor Impulse:	(2) 1.0KS40 motors =	97.8 lb-sec
	(2) 1.0KS75 motors =	151.6 lb-sec
	Total =	249.4 lb-sec

The predicted spin rates at fourth-stage ignition and burnout are as follows:

Spin Rate at Fourth-Stage Ignition:

Nominal $\dot{\phi}$ Ignition = 145.5 rpm

+3 sigma $\dot{\phi}$ Ignition = 156.5 rpm

-3 sigma $\dot{\phi}$ Ignition = 134.5 rpm

Spin Rate at Fourth-Stage Burnout:

Nominal $\dot{\phi}$ Burnout = 145.5 rpm

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REFERENCES

1. Scout User's Manual, (Issue C - No Change), dated 1 September 1972.

2. VMSC-T Design Information Release No. 23-DIR-1419, "Scout Vehicle S-185C, ESRO IV Payload Mission, Pre-Flight Trajectory Data", dated 11 September 1972.

3. VMSC-T Report No. 23.420, "Analysis Procedures for Determining Scout Motor Performance", dated 20 February 1970.

4. VMSC-T Design Information Release No. 23-DIR-1279, "ALGOL III Nominal and Plus and Minus 3 Sigma Motor Performance", dated 5 August 1971.

5. VMSC-T Design Information Release No. 23-DIR-1316, Revision B, "Nominal Scout Motor Performance Data", dated 28 July 1972.

6. VMSC-T Design Information Release No. 23-DIR-1160, "ALGOL III Vehicle Design Control System Analysis", dated 28 April 1971.

APPENDIX F

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APPENDIX F

TYPICAL SCOUT FINAL FLIGHT REPORT

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VOUGHT CORPORATION
Post Office Box 225907 • Dallas, Texas 75265
an LTV company

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TITLE

SCOUT S-192C

FINAL FLIGHT REPORT

SUBMITTED UNDER
NASA Statement of Work No. I-47-8300.055A

REPORT NO.	DATED
2-19200/1R-26	30 September 1981
PROJECT	**CONTRACT NO.**
SCOUT	NAS1-15000

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REV.	DATE	REV. BY	PAGES AFFECTED	REMARKS

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1.0 SUMMARY

1.1 GENERAL

Scout vehicle S-192C was launched at 2307:16.742 PDT, 14 May 1981 (0607:16.742 GMT, 15 May 1981) from Vandenberg AFB, California (OP No. W7280). The NOVA I payload was successfully placed into orbit about the Earth. This was the second Scout flight with an ANTARES IIIA (third stage) motor and the first Scout vehicle to fly with the "D"-section modification to increase the clearance during third/fourth-stage separation. There was no interference during S-192C separation.

ANTARES IIIA nozzle shield temperature sensor T6 indicated an open circuit at 453.6 seconds flight time. The longitudinal vibrometer located on the aft flange of the ANTARES IIIA motor and the fourth-stage lateral vibrometer exhibited erratic behavior at various times during the flight. Vehicle radar beacon ceased functioning at approximately 140 seconds flight time. No other anomalies were noted during the flight.

Scout S-192C was the seventy-fifth successful launch of seventy-nine since initiation of the Scout recertification program. It was the one hundred and second NASA/DOD Scout to be launched and the eighty-third to be utilized for an orbital mission.

1.2 VEHICLE OBJECTIVES AND RESULTS (Table F-1)

The primary vehicle test objective was to provide the required boost and trajectory to place the NOVA I spacecraft into the desired orbit about the Earth. This objective was successfully accomplished. The predicted mission parameters from reference 1-1 and actual flight values obtained are as follows:

PARAMETERS	PREDICTED	FLIGHT RESULTS
Injection Altitude*, n. mi.	199.53	191.82
Injection Inertial Velocity, fps	25732.0	25766.8
Injection Inertial Flight Path Angle, deg	-0.030	-0.163
Orbit Inclination, deg	90.01	90.16

* Based on an Earth radius of 3443.93 nautical miles.

A discussion of the vehicle trajectory and injection/orbit parameters is presented in section 3.0 of this report. The vehicle predicted and actual sequence of events are presented in Table F-1.

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TABLE F-1

SCOUT S-192C
SEQUENCE OF EVENTS

ACTUAL TIME		PREDICTED TIME		
GREENWICH MEAN TIME 15 May 1981	FLIGHT TIME seconds	seconds	EVENT	HOW ACCOMPLISHED
0607:16.557	-00.185	-00.13	Stage 1 Ignition	Blockhouse
0607:16.742	000.000	000.00	1. Lift-off 2. Pitch Rate = 0.00000 deg/sec	Stage 1 Ignition
0607:16.816	000.074	000.10	Start Timer	Flyaway
0607:17.725	000.983	001.00	$\dot{\theta}_{c_1}$ = -2.04647 deg/sec	Timer Function 1
0607:22.724	005.982	006.00	$\dot{\theta}_{c_2}$ = -0.88000 deg/sec	Timer Function 2
0607:56.720	039.978	040.00	$\dot{\theta}_{c_3}$ = -0.60000 deg/sec	Timer Function 3
0608:04.718	047.976	048.00	$\dot{\theta}_{c_4}$ = -0.53800 deg/sec	Timer Function 4
0608:12.717	055.975	056.00	$\dot{\theta}_{c_5}$ = -0.36100 deg/sec	Timer Function 5
*	*	085.20	Stage 1 Burnout	
0608:42.882	086.140	086.16	1. Stage 2 Ignition 2. Activate "B" Controls 3. Separate First Stage 4. Remove First-Stage Controls 5. Switch In Body Bending Filter	Timer Function 6 Timer Function 6 Stage 2 Ignition Stage 1 Separation Timer Function 6
0608:48.713	091.971	092.00	$\dot{\theta}_{c_6}$ = -0.26300 deg/sec	Timer Function 7
0609:07.710	110.968	111.00	$\dot{\theta}_{c_7}$ = -0.15500 deg/sec	Timer Function 8
0609:22.292	125.550	125.48	Stage 2 Burnout	
N/A	N/A	128.48	Switch Out Body Bending Filter	Timer Function 9
0609:55.411	158.669	158.70	Separate Payload Heatshield	Timer Function 10
0609:57.109	160.367	160.40	1. Stage 3 Ignition 2. Activate "C" Boost Controls 3. Separate Second Stage 4. Switch In Body Bending Filter	Timer Function 11 Timer Function 11 Stage 3 Ignition Timer Function 11
0610:00.791	163.959	164.00	$\dot{\theta}_{c_8}$ = -0.09700 deg/sec	Timer Function 12
0610:36.700	199.958	200.00	$\dot{\theta}_{c_9}$ = -0.50000 deg/sec	Timer Function 13
0610:45.492	208.750	208.74	Stage 3 Burnout	
0610:50.462	213.720	213.74	1. Activate "C" Coast Controls 2. Switch Out Body Bending Filter	Timer Function 14 Timer Function 14
0611:35.600	258.858	258.91	$\dot{\theta}_{c_{10}}$ = 0.00000 deg/sec	Timer Function 15
0615:37.700	500.958	501.03	1. Spin Motor Ignition 2. Fourth-Stage Squib Ignition	Timer Function 16 Timer Function 16
0615:39.195	502.453	502.53	1. Separation Explosive Bolt Ignition 2. Separate Third Stage	Timer Function 17 Explosive Bolt Ignition
0615:39.715	502.973	503.03	Retro-Force Command	Timer Function 18
0615:44.120	507.378	507.38	Stage 4 Ignition	Squib Delay
0616:18.542	541.800	541.84	Stage 4 Burnout	
0618:46.170	689.428	677.53	S/C Despin	S/C Furnished Timer
0621:21.000	844.258	840.53	S/C Separation	S/C Furnished Timer

* Stage 2 Ignition occurred prior to first-stage burnout.

N/A = Not Available

1.3 LAUNCH CONDITIONS

The true launch azimuth was 182.10 degrees and vehicle launch elevation was 90.00 degrees. Surface weather observations at launch were:

Barometric Pressure	29.629 in. Hg
Ambient Temperature	50 °F
Relative Humidity	75%
Surface Winds	Gusting 20 knots @ 360 deg
Visibility	7 statute miles

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2.0 DATA SOURCES

2.1 TELEMETRY AND INSTRUMENTATION (Figure F-1)

Scout S-192C was equipped with a 21-channel S-band "D"-section telemetry system and a 7-channel fourth-stage telemetry system. Thirty-three temperature sensors consisting of 6 probes (0 - 800 °F) and 27 thermistors (0 - 350 °F) to measure the temperature environment of the ANTARES IIIA motor and components around the ANTARES IIIA motor nozzle, were added to the 39 measurements now considered standard on the "D"-section telemetry system. Also added were two longitudinal vibrometers (50 "g" peak-to-peak) mounted on the aft flange and nozzle flange of the ANTARES IIIA motor and a third-stage motor low-range (0 - 15 psia) pressure transducer. Roll torquing rate replaced the ±3 "g" normal acceleration on IRIG Channel 13 (14.50 KHz) and yaw torquing rate replaced Ignition System No. 2 Event Monitor on IRIG Channel 16 (40.00 KHz).

Fourth-stage special instrumentation consisted of two vibrometers (30 "g" peak-to-peak) mounted on the forward flange of the ALTAIR IIIA motor that measured the lateral and longitudinal axis vibration responses of the ALTAIR IIIA (fourth-stage) motor.

Telemetry data was received and recorded at Vandenberg AFB, CA, (TRS site), the Pacific Missile Test Center, Point Mugu, CA, and one ARIA aircraft positioned directly south of Vandenberg AFB at 06°16.0'N 120°25.7'W. Telemetry data from Vandenberg was the primary source used for first- and second-stage performance evaluation. Pt. Mugu data was the primary source for third- and fourth-stage performance evaluation. Aircraft data was used to verify fourth-stage performance and for determination of spacecraft event times. A bar graph depicting the periods of vehicle telemetry coverage from each of these sources during flight is presented as Figure F-1.

The ANTARES IIIA Nozzle Shield Temperature (T6) went to high bandedge indicating an open circuit at 453.6 seconds flight time. The ANTARES IIIA aft flange (longitudinal) vibrometer and the ALTAIR IIIA forward flange (lateral) vibrometer exhibited erratic behavior at various times during the flight. All three of these are discussed in Appendix B along with discussions of the remainder of the ANTARES IIIA special instrumentation. No other telemetry monitored anomalies were noted.

2.2 RADAR TRACKING

Metric tracking data used for vehicle flight trajectory evaluation was provided by Corrected Post-Flight Trajectory Tabulations, data items 331.00A and 331.00G and Corrected Post-Flight Trajectory magnetic tapes, data items 309.00A and 309.00G, for Operation No. W7280, Vandenberg AFB, CA. The metric data contained in the "A" item trajectory tabulation and magnetic tape were from the beacon track by the AN/FPS-16

SCOUT S-192C
VEHICLE TELEMETRY COVERAGE VS TIME

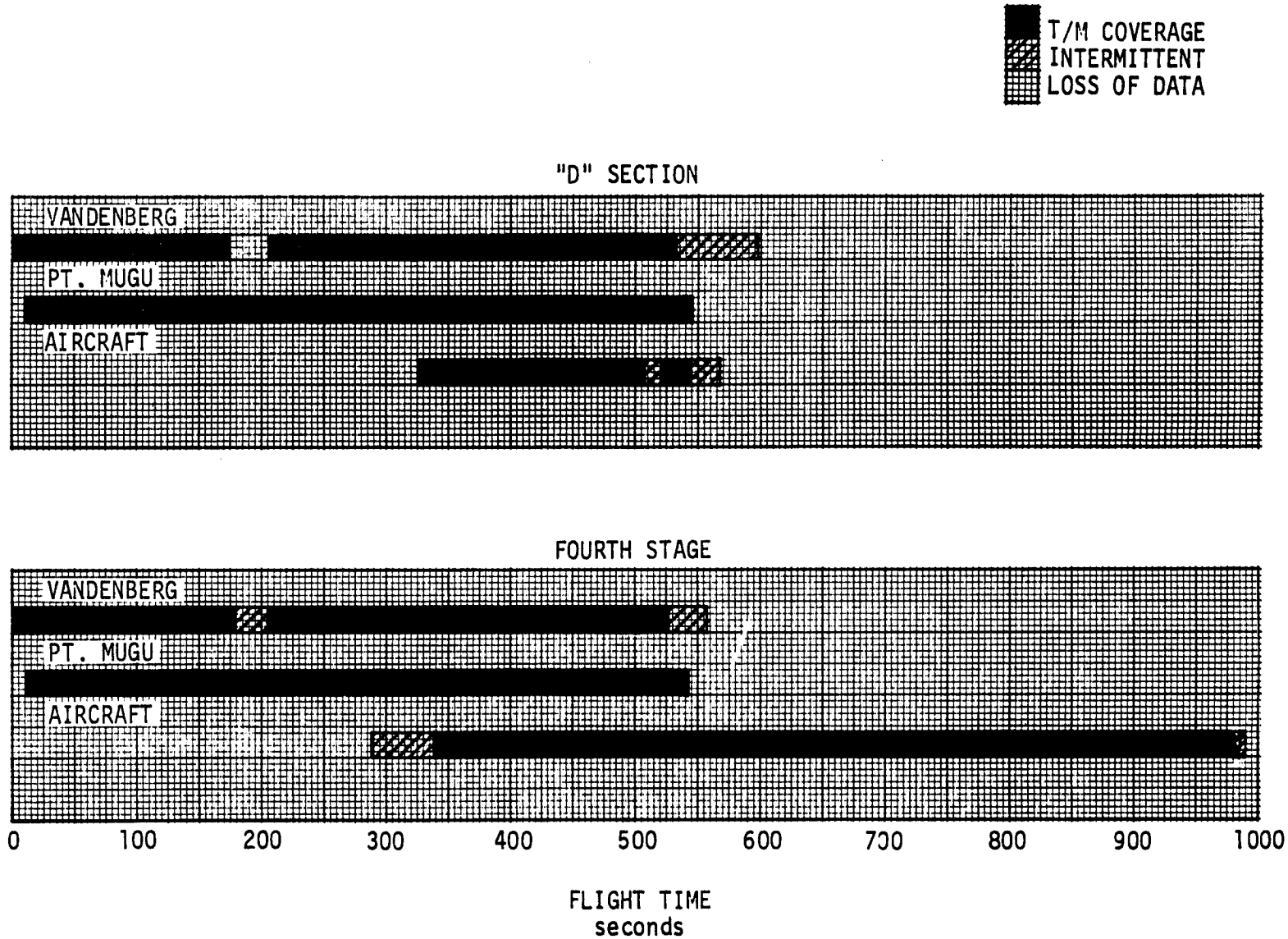

FIGURE F-1

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radar located at Vandenberg AFB (site 023002). The "G" item metric data were from the beacon track by the AN/FPS-16 located at Point Mugu (site 003004). The time periods covered were T + 5.9 to T + 141.1 seconds and T + 36.2 to T + 60.2 seconds flight time, respectively. There were no metric data available after 141.1 seconds flight time.

2.3 METEOROLOGICAL (Figures F-2 and F-3)

The measured surface wind at lift-off was gusting to 20 knots from 360 degrees. Other meteorological observations utilized for launch vehicle performance evaluation were:

(a) Vandenberg AFB, Launch Complex 5, Meteorological Tower Weather Observations at 0600 GMT, 15 May 1981, at 12, 54, 102 and 204 feet above the local ground level.

(b) Vandenberg AFB, CA, Rawinsonde, AN/GMD-1 Ascent No. 0008, released at 0600 GMT (T minus 7 minutes), 15 May 1981, from 328 to 85,000 feet altitude.

(c) Vandenberg AFB, CA, Rawinsonde AN/GMD-1 Ascent No. 0005, released at 0000 GMT (T minus 6 hours 7 minutes), 15 May 1981, from 328 to 119,800 feet altitude.

(d) Pt. Mugu, CA, Meteorological Rocket Sounding Data released at 1858 GMT (T minus 35 hours 9 minutes), 13 May 1981, from 75,458 to 232,937 feet altitude.

The atmospheric data from item (b) is shown on Figure F-2 and the wind profiles of items (b) and (c) are shown on Figure F-3.

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SCOUT S-192C
ATMOSPHERIC DATA

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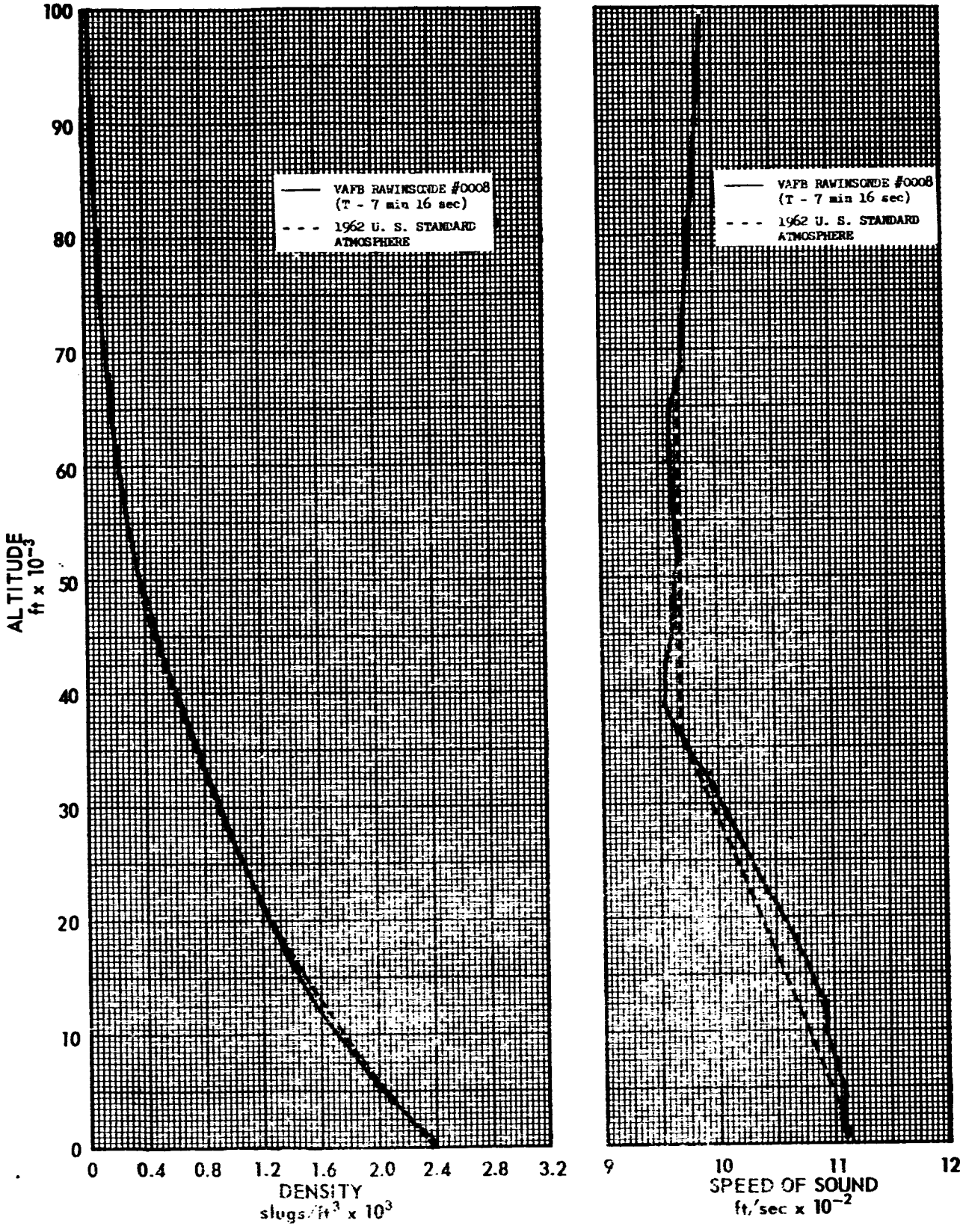

FIGURE F-2

SCOUT S-192C
WIND PROFILE

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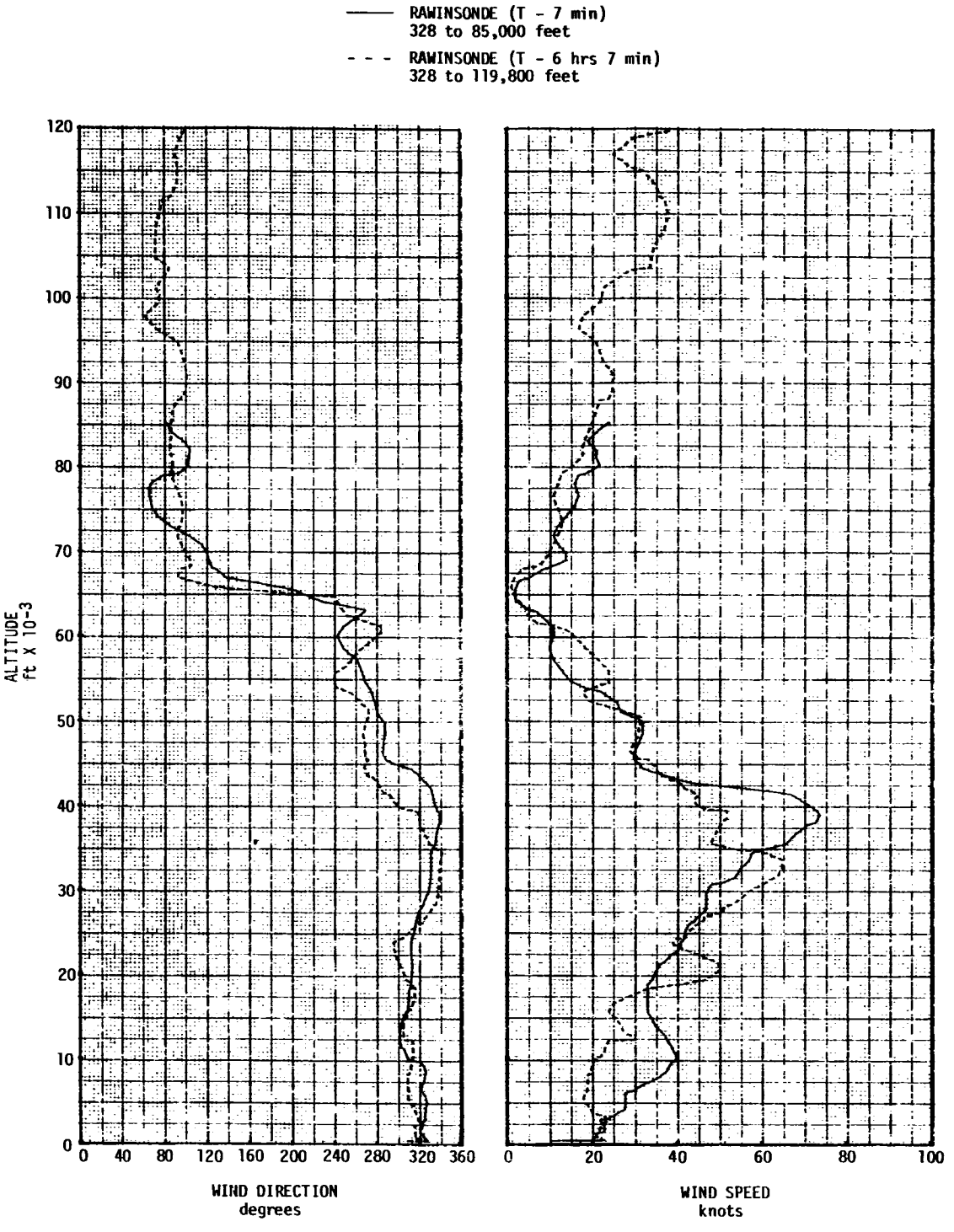

FIGURE F-3

3.0 VEHICLE FLIGHT TRAJECTORY

3.1 INJECTION PARAMETER ACCURACY

Injection parameters achieved by Scout vehicle S-192C are compared with pre-flight predicted values in the table below. The predicted values shown are from a pre-flight trajectory computed prior to launch (reference 3-1). Computed flight results shown below were based on observations by the North American Air Defense (NORAD) at Cheyenne Mountain Complex facility, Colorado Springs, Colorado (see section 3-2).

PARAMETER	PRE-FLIGHT PREDICTED	FLIGHT RESULTS	DEVIATIONS FROM PRE-FLIGHT PREDICTED
*Altitude, n. mi.	199.53	191.82	-7.71
Inertial Velocity, fps	25732.0	25766.8	+34.8
Inertial Path Angle, deg	-0.030	-0.163	-0.133
Inertial Azimuth, deg	180.014	180.160	+0.146
Geocentric Latitude, deg N	14.5313	14.4209	-0.1104
Longitude, deg W	121.9583	121.9413	-0.0170

* Based on an Earth radius of 3443.93 n. mi.

NOTE: Injection epoch was year 1981, day 135 and fractional part 0.26132618 GMT of the day.

Analysis of injection parameter deviations shows the low injection altitude resulted from lower-than-predicted altitude and path angle after third-stage burnout. These errors accumulated during the first three stages of flight and were the result of low average thrust and pitch-down thrust misalignment in the first stage and pitch-down displacements in the third stage. The +34.8 fps velocity error was due primarily to the altitude/velocity tradeoff during the long third-stage coast. The small errors in path angle and azimuth cannot be analyzed due to the lack of radar data after second-stage coast.

3.2 OSCULATING ORBITAL ELEMENTS AND ACCURACY (Figure F-4)

An elliptical orbit of 199.5 by 513.8 n. mi. at an inclination of 90.0 degrees was predicted for the NOVA I mission. The achieved orbit of 191.5 by 510.5 n. mi. was within the 0.75 isoprobability contour of apogee/perigee deviations calculated for this mission as shown on Figure F-4. The following table compares observed osculating orbital elements at injection epoch with the pre-flight predicted values. The observed data were based on mean orbital elements supplied by NORAD after 14 revolutions.

PARAMETER	PRE-FLIGHT PREDICTED	CALCULATED FROM NORAD DATA	DEVIATIONS FROM PRE-FLIGHT PREDICTED
*Perigee Altitude, n. mi.	199.5	191.5	-8.0
*Apogee Altitude, n. mi.	513.8	510.5	-3.3
Inclination, deg	90.01	90.16	+0.15
Semi-Major Axis, n. mi.	3800.58	3794.92	-5.66
Eccentricity	0.0413427	0.0420378	+0.0006951
Argument of Perigee, deg	166.22	169.63	+3.41
Period, minutes	97.948	97.729	-0.219
Mean Anomaly, deg	359.31	356.28	-3.03

* Based on an Earth radius of 3443.93 n. mi.

NOTE: Injection epoch was year 1981, day 135 and fractional part 0.26132618 GMT of the day.

3.3 POST-FLIGHT PREDICTED TRAJECTORY AND ORBIT

The post-flight predicted trajectory used as a basis for the stage-by-stage evaluation of vehicle performance is the pre-flight predicted trajectory of reference 3-1 with lift-off weights from Appendix A incorporated.

Differences between the pre-flight and post-flight predicted trajectory orbit parameters at injection are shown in the following table.

SCOUT S-192C NOVA I PAYLOAD MISSION

ISOPROBABILITY CONTOURS

OF APOGEE-PERIGEE DEVIATIONS

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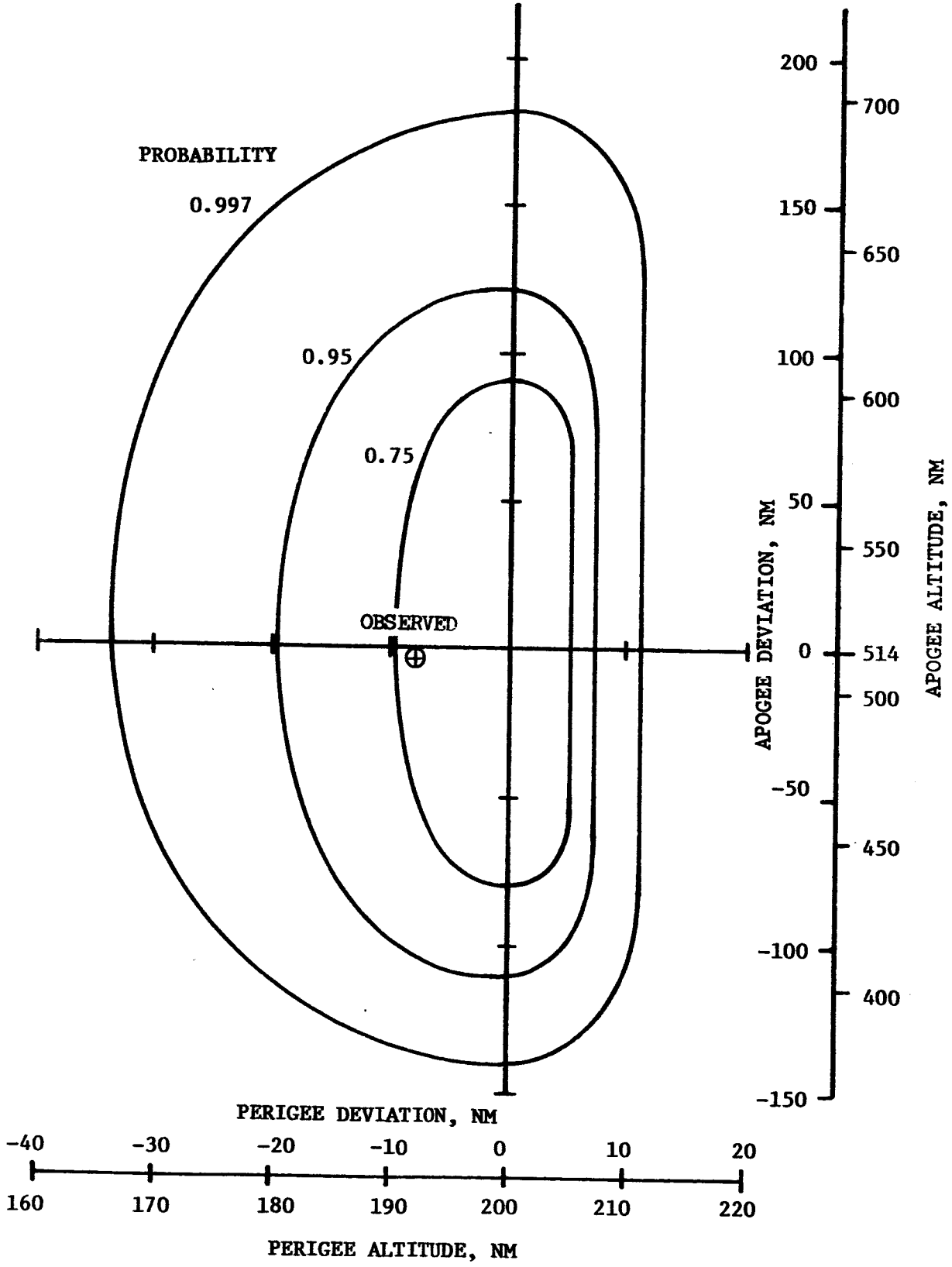

FIGURE F-4

INJECTION/ORBIT PARAMETERS	PRE-FLIGHT PREDICTED	POST-FLIGHT PREDICTED	DIFFERENCES FROM PRE-FLIGHT
*Altitude, n. mi.	199.53	199.53	0.0
Inertial Velocity, fps	25732.04	25732.16	+0.12
Inertial Path Angle, deg	-0.030	-0.030	0.0
Inertial Azimuth, deg	180.014	180.014	0.0
*Perigee Altitude, n. mi.	199.520	199.518	-0.002
*Apogee Altitude, n. mi.	513.772	513.841	+0.069
Inclination, deg	90.013	90.013	0.0

* Based on an Earth radius of 3443.93 n. mi.

3.4 BOOST PERFORMANCE SUMMARY (Table F-2)

A roll-yaw compensation unit was incorporated into the guidance system of vehicle S-192C thus eliminating the need for wind aiming at launch. Trajectory calculations showed that measured winds produced an inclination error of -0.019 degree; without roll-yaw compensation, the inclination error would have been -0.382 degree.

The loss of radar during second-stage coast precluded detailed performance analyses of the last two stages of flight. An approximation of the third-stage motor performance showed an ideal velocity deviation of -6.7 fps; the fourth-stage motor performance was not analyzed.

Ideal velocity deviations due to the performance of first- and second-stage motors were calculated to be +15.8 and -9.7 fps, respectively. Although radar data was available during first- and second-stage boost, it was of relatively poor quality, particularly velocity and azimuth.

The most significant flight disturbances were:

(a) First-stage motor total impulse was higher than predicted. The result was an ideal velocity error of +15.8 feet per second.

(b) Pitch-down disturbances during first stage produced a path angle error of -0.223 degree.

(c) Second-stage motor performance was lower than predicted. An ideal velocity error of -9.7 fps was the result.

TABLE F-2

SCOUT S-192C, NOVA I MISSION
SUMMARY OF BOOST TRAJECTORY PERFORMANCE

STAGE	FLIGHT TIME sec	TRAJECTORY PARAMETER DEVIATIONS				CONCLUSIONS (Determined during post-flight analysis)
		ALTITUDE ft	RELATIVE (INERTIAL) VELOCITY fps	RELATIVE (INERTIAL) PATH ANGLE deg	RELATIVE (INERTIAL) AZIMUTH deg	
1 BOOST	86.140 (Stage 2 Ignition)	-295	+11.4 (+10.6)	-0.223 (-0.207)	+0.015 (+0.360)	The altitude deviation was due primarily to low first-stage thrust resulting from a longer-than-predicted web burn time of +0.34 second. The higher-than-predicted relative velocity resulted from a tailwind and from higher-than-predicted motor total impulse, but was partially offset by atmospheric effects. The ideal velocity error was +15.8 fps. The lower-than-predicted path angle resulted primarily from a pitch-down thrust misalignment. Azimuth was near predicted.
2 BOOST AND COAST	158.669 (Heatshield Ejection)	-1432	+7.1 (+7.9)	-0.140 (-0.141)	[illegible]	Predicted heatshield ejection altitude and dynamic pressure were 364913 ft and 0.0087 lb/ft^2, respectively. Measured altitude and calculated dynamic pressure were 363481 ft and 0.0095 lb/ft^2, respectively.
	160.367 (Stage 3 Ignition)	-1470	+7.2 (+8.0)	-0.140 (-0.141)	-0.041 (-0.030)	The lower-than-predicted altitude resulted from trajectory errors at second-stage ignition, but was partially offset by a higher-than-predicted pitch-up displacement. The pitch-up displacement also produced a positive shift in path angle deviation. Azimuth was near predicted; the slight error was due to roll and yaw displacements. Second-stage ideal velocity error was -9.7 fps; however, the propagation of errors at second-stage ignition reduced velocity losses resulting in a change of relative velocity error from +11.4 fps at the end of first-stage to +7.2 fps at the end of second-stage boost and coast.
* 3 BOOST						
* 3 COAST						
* 4 BOOST						

* These phases of the flight of S-192C were not analyzed due to the lack of radar data after second-stage coast.

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4.0 GUIDANCE AND CONTROL

Telemetry data from Scout S-192C indicated that Guidance and Control systems operated normally throughout the flight. The vehicle was configured with ALGOL IIIA, CASTOR IIA, ANTARES IIIA and ALTAIR IIIA solid propellant motors. The heatshield had a 34-inch diameter with a nose at station -40. Standard control gain settings were used and the vehicle utilized the optional Roll-Yaw Compensation Unit in the Guidance System.

Scout S-192C was the second Scout flight with an ANTARES IIIA rocket motor. The disturbances it produced and control fuel consumption were as expected.

Calculated pitch and yaw disturbing moments experienced during first-stage operation were typical. Roll disturbing moments to the right were greater than average, but well within the control authority (21 degrees). The maximum first-stage control surface deflections were as follows:

	MAXIMUM DEFLECTION degrees		FLIGHT TIME seconds
Pitch	9.8 T.E. Dn	@	2.0
Yaw	9.7 T.E. Lt	@	23.6
Roll	3.6 CCW	@	40.4

Post-flight reconstruction of S-192C control surface response to commands indicated an apparent difference in pitch channel control gains from those measured during preflight checkout. It cannot be ascertained whether the gain differences of S-192C are associated with the Guidance System or the Telemetry System. The apparent pitch displacement gain was 6 percent higher than the preflight checkout value. The apparent pitch rate gain was 10 percent lower than the preflight checkout value. The direction of the apparent gain changes are the same as those observed on vehicle S-181C. Special tests and analyses of S-181C gain changes are documented in reference 4-1 and known biases in telemetry data, reported in reference 4-1 were taken into account for the S-192C analysis. The apparent shift in S-192C gains did not noticeably affect the stability, control or performance of the vehicle.

The total yaw torquing angle accumulated from first-stage ignition through third-stage coast was 1.2 degrees. The total roll torquing angle was approximately 0.2 degree.

C-3

Second- and third-stage disturbance levels and control fuel consumption were within the capability of the "B"- and "C"-section control systems. Second- and third-stage control fuel consumption is presented in Table F-3. Second-stage control fuel useage (52.8 lbs) was 23 percent less than the predicted mean value and 54 percent of the predicted maximum value. Third-stage control fuel useage during boost (3.5 lbs) was 32.6 percent less than the predicted mean value and 25 percent of the predicted maximum value. The total fuel useage for third-stage boost and coast to retro command was 5.5 lbs, 8 percent less than the predicted mean and 36 percent of the predicted maximum. The remaining fuel, less one pound of ullage, was expended during the 8.5-second retro time.

TABLE F-3

SCOUT S-192C
SECOND- AND THIRD-STAGE CONTROL MOTORS FUEL CONSUMPTION

STAGE	H_2O_2 CONSUMED WEIGHT pounds		
	ACTUAL	PREDICTED	
		MEAN	MAXIMUM (99.5% PROB.)
SECOND STAGE			
(H_2O_2 at Lift-Off = 119.3 lbs)			
BOOST	34.9	48.42	71.9
COAST (34.8 sec) Filter Out	17.9	19.4	29.2
TOTAL (Boost and Coast)	52.8	69.1	97.8
THIRD STAGE			
(H_2O_2 at Lift-Off = 18.4 lbs)			
BOOST (to "C" Coast Control)	3.5	5.2	13.8
COAST (289 sec) to Retro	2.0	0.8	1.5
TOTAL (Boost and Coast)	5.5(1)	6.0	15.1
RETRO	12.0	11.4 (2)	3.3 (2)(3)
Retro Time, seconds	8.5	7.1 (2)	2.1 (2)(3)

NOTES: (1) Estimated from unregulated N_2 pressure adjusted for temperature. Accuracy estimated to be ± 2.0 pounds.
(2) Predicted based on 18.4 pounds at lift-off.
(3) Predicted minimum.

5.0 PROPULSION SYSTEMS

5.1 GENERAL

Summaries of rocket motor measured and adjusted motor performance data are presented in Tables F-4 and F-5 for the ALGOL IIIA and CASTOR IIA motors assigned to Scout vehicle S-192C. Due to the lack of radar data for the third and fourth stages of flight, Table F-6 presents a summary of measured and estimated adjusted data for the third-stage ANTARES IIIA and table F-7 gives a summary of measured and predicted data for the fourth-stage ALTAIR IIIA motor. Predicted motor performance for all four stages of this vehicle is given in reference 5-1. The overlay technique for evaluating motor performance using baseline nominals was utilized for all four stages as well as the post web-time weight remaining technique outlined in reference 5-2. A summary of specific impulse and ideal velocity for Scout S-192C motors is given below.

PERFORMANCE SUMMARY

STAGE	SPECIFIC IMPULSE sec			IDEAL VELOCITY ft/sec		
	PREDICTED	DELIVERED	% VARIATION	PREDICTED	DELIVERED	% VARIATION
1st	259.43	260.182	+0.29	7401	7417	+0.22
2nd	280.97	280.658	-0.11	7047	7037	-0.14
3rd	295.55	294.691*	-0.29*	8878	8871*	-0.08*
4th	288.71	N/A**	N/A**	7842	N/A**	N/A**

* Estimated
** Not Available

5.2 POST-FLIGHT ANALYSIS (Tables F-4 through F-7)

Radar data indicated that the total impulse delivered by the ALGOL IIIA first-stage motor was 7,282,681 lb-sec which is 0.23 percent (1.80 sigma) higher than predicted. This compares to a delivered velocity which was 15.8 ft/sec (0.22%) higher than predicted. This motor was the fourth motor flown with the CSD polymer propellant. In-flight web burn time was 59.03 seconds which was 0.58 percent (0.94 sigma) longer than predicted. The shapes of the measured chamber pressure and thrust time histories compared well with the base line nominals.

The determination of total impulse from radar data indicated that the CASTOR IIA second-stage motor delivered 2,306,772 lb-sec which is 0.11 percent (-0.62 sigma) lower than predicted. This compares to a delivered velocity which was 9.7 ft/sec (-0.14%) lower than predicted. In-flight web burn time was 35.93 seconds which is 0.20% (0.23 sigma) longer than predicted. The measured chamber pressure and thrust shapes agreed well with base line data.

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TABLE F-4

SCOUT S-192
ROCKET MOTOR PERFORMANCE VS BURN TIME
(SMOOTHED DATA USED FOR POST-FLIGHT TRAJECTORY)

FIRST STAGE

MANUFACTURER: UNITED TECHNOLOGY
MOTOR TYPE: ALGOL IIIA
SERIAL NUMBER: 5504-5

ELAPSED TIME (SEC)	MEASURED CHAMBER PRESSURE (PSIA)	JET VANE DRAG (LBS) (1)	THRUST		TOTAL IMPULSE		WEIGHT REMAINING (LBS) (4)
			MEASURED (LBS) (2)	ADJUSTED (LBS) (3)	MEASURED (LB-SEC) (2)	ADJUSTED (LB-SEC) (3)	
0.00	7.0	0.	0.	0.	0.	0.	28225.79
.31	810.6	1675.	147446.	147915.	22485.	22557.	28140.36
.89	680.0	1426.	122211.	122601.	100686.	101007.	27843.47
1.39	633.1	1352.	115458.	115826.	160103.	160613.	27602.21
2.19	588.9	1439.	110078.	110429.	250318.	251116.	27237.27
3.69	546.2	1168.	104778.	105112.	411460.	412771.	26584.93
8.19	503.3	1070.	100060.	100379.	872346.	875126.	24743.64
10.19	492.3	1099.	98038.	98351.	1070443.	1073855.	23966.69
12.69	484.3	1050.	97675.	97987.	1315085.	1319276.	22999.70
16.19	484.3	1036.	98510.	98823.	1658409.	1663694.	21656.64
19.69	463.3	992.	95208.	95511.	1997415.	2003780.	20346.34
21.69	446.3	1023.	92918.	93214.	2185541.	2192505.	19597.61
24.19	442.3	994.	92430.	92724.	2417226.	2424929.	18679.45
30.19	444.3	943.	96870.	97179.	2985126.	2994638.	16493.04
36.19	461.3	989.	101356.	101679.	3579804.	3591211.	14220.58
44.19	485.3	1040.	108921.	109268.	4420911.	4434999.	10964.13
48.19	497.3	1055.	112401.	112759.	4863556.	4879055.	9237.45
52.19	509.2	1089.	115478.	115846.	5319314.	5336265.	7510.79
57.19	523.2	1159.	120866.	121251.	5910173.	5929007.	5352.45
58.99	532.2	1204.	123119.	123511.	6129759.	6149293.	4536.55
59.14	533.2	1206.	122962.	123354.	6148215.	6167808.	4462.72
59.39	531.2	1200.	122047.	122436.	6178841.	6198531.	4340.21
62.19	445.3	998.	101358.	101681.	6491609.	6512295.	3089.09
64.69	343.5	775.	77338.	77584.	6714979.	6736377.	2195.58
66.69	274.6	623.	61396.	61591.	6853712.	6875552.	1640.62
68.69	217.7	488.	47508.	47660.	6962616.	6984803.	1204.99
72.19	136.8	312.	29657.	29752.	7097656.	7120274.	664.80
74.19	101.8	239.	22158.	22229.	7149471.	7172254.	457.53
77.19	60.9	142.	12923.	12965.	7202093.	7225044.	247.04
80.19	33.9	81.	7230.	7253.	7232323.	7255370.	126.11
83.19	20.0	48.	4138.	4151.	7249375.	7272476.	57.90
86.32	10.1	28.	2342.	2349.	7259547.	7282681.	17.21

(1) DETERMINED FROM MEASURED FIN POSITION DATA
(2) DETERMINED FROM TELEMETRY DATA
(3) DETERMINED FROM RADAR DATA
(4) MOTOR CONSUMABLE WEIGHT REMAINING=PROPELLANT WEIGHT PLUS INERTS

TABLE F-5

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SCOUT S-192
ROCKET MOTOR PERFORMANCE VS BURN TIME
(SMOOTHED DATA USED FOR POST-FLIGHT TRAJECTORY)

SECOND STAGE

MANUFACTURER	MOTOR TYPE	SERIAL NUMBER
THIOKOL CORP	CASTOR IIA	385

ELAPSED TIME (SEC)	MEASURED CHAMBER PRESSURE (PSIA)	THRUST		TOTAL IMPULSE		WEIGHT REMAINING (LBS) (3)
		MEASURED (LBS) (1)	ADJUSTED (LBS) (2)	MEASURED (LB-SEC) (1)	ADJUSTED (LB-SEC) (2)	
0.00	11.0	0.	0.	0.	0.	8274.34
.21	526.7	42714.	43287.	4485.	4545.	8253.70
.46	491.2	40157.	40696.	14844.	15043.	8213.68
1.86	497.0	44018.	44609.	73766.	74757.	7984.04
3.36	510.0	46205.	46825.	141433.	143333.	7733.81
6.36	552.0	51154.	51841.	287470.	291332.	7197.29
8.36	581.5	54411.	55142.	393034.	398315.	6805.81
10.36	607.0	57461.	58233.	504906.	511689.	6396.28
12.36	634.0	60198.	61007.	622564.	630928.	5967.30
14.36	658.0	62885.	63730.	745648.	755665.	5511.28
16.36	682.0	65194.	66070.	873727.	885465.	5041.14
18.36	699.0	67300.	68204.	1006220.	1019739.	4557.46
20.36	715.0	68909.	69835.	1142429.	1157777.	4056.87
22.36	726.0	70342.	71287.	1281680.	1298899.	3547.13
23.86	731.0	71204.	72161.	1387840.	1406486.	3159.52
25.86	732.0	71802.	72766.	1530846.	1551413.	2643.79
27.86	728.0	71612.	72575.	1674261.	1696754.	2130.12
29.36	722.0	71214.	72171.	1781381.	1805313.	1746.67
30.86	709.0	70392.	71338.	1887586.	1912945.	1372.14
31.86	695.0	69206.	70136.	1957385.	1983682.	1126.46
34.96	690.0	69508.	70442.	2172391.	2201577.	372.10
35.56	667.0	67123.	68025.	2213380.	2243117.	227.09
35.86	666.2	66836.	67734.	2233474.	2263481.	157.85
35.96	649.4	65434.	66313.	2240088.	2270183.	133.41
36.46	287.1	27493.	27862.	2263319.	2293727.	47.56
36.66	161.7	15760.	15972.	2267645.	2298110.	31.58
36.86	106.4	10049.	10184.	2270226.	2300726.	22.04
37.26	59.8	5340.	5411.	2273303.	2303845.	10.67
37.86	15.9	1698.	1721.	2275415.	2305985.	2.87
38.36	4.0	440.	446.	2275949.	2306526.	.89
39.41	0.0	21.	21.	2276191.	2306772.	.00

(1) DETERMINED FROM TELEMETRY DATA
(2) DETERMINED FROM RADAR DATA
(3) MOTOR CONSUMABLE WEIGHT REMAINING=PROPELLANT WEIGHT PLUS INERTS

TABLE F-6

ORIGINAL PAGE IS
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SCOUT S-192

ROCKET MOTOR PERFORMANCE VS BURN TIME
(SMOOTHED DATA USED FOR POST-FLIGHT TRAJECTORY)

THIRD STAGE

MANUFACTURER: THIOKOL CORP
MOTOR TYPE: ANTARES IIIA
SERIAL NUMBER: E-2

ELAPSED TIME (SEC)	MEASURED CHAMBER PRESSURE (PSIA)	THRUST		TOTAL IMPULSE		WEIGHT REMAINING (LBS) (3)
		MEASURED (LBS) (1)	ADJUSTED (LBS) (2)	MEASURED (LB-SEC) (1)	ADJUSTED (LB-SEC) (2)	
0.00	10.0	0.	0.	0.	0.	2858.40
.28	595.7	12728.	12795.	1801.	1811.	2846.67
.33	618.7	12956.	13025.	2443.	2456.	2844.59
.53	629.7	13166.	13235.	5055.	5082.	2835.89
.73	603.7	12581.	12647.	7630.	7670.	2826.96
.93	605.7	12649.	12715.	10153.	10206.	2817.53
3.13	736.6	15492.	15574.	41108.	41324.	2710.47
3.33	739.6	15595.	15677.	44216.	44449.	2700.74
3.63	731.6	15451.	15532.	48873.	49131.	2685.21
4.63	743.6	15841.	15925.	64519.	64859.	2629.87
6.63	782.6	16870.	16959.	97230.	97743.	2515.81
8.13	802.6	17591.	17684.	123076.	123726.	2427.32
10.63	824.6	18581.	18679.	168292.	169180.	2269.97
12.63	833.6	19294.	19396.	206168.	207256.	2138.28
15.63	833.6	20020.	20125.	265140.	266538.	1931.62
17.63	826.6	20356.	20463.	305515.	307127.	1790.93
20.13	809.6	20571.	20679.	356674.	358556.	1614.91
21.63	792.6	20441.	20548.	387433.	389476.	1509.32
26.13	719.6	19433.	19535.	477148.	479665.	1201.57
31.13	622.7	17459.	17551.	569379.	572382.	881.48
31.63	617.7	17342.	17434.	578079.	581128.	850.85
35.63	608.7	17530.	17622.	647823.	651240.	612.20
40.63	587.7	17584.	17676.	735606.	739486.	315.31
44.13	553.7	17045.	17135.	796206.	800406.	112.47
44.83	549.7	16940.	17029.	808101.	812363.	72.35
45.03	545.8	16916.	17006.	811487.	815767.	61.32
45.43	520.1	16160.	16245.	818102.	822417.	39.76
45.63	491.2	15328.	15408.	821251.	825582.	29.50
45.83	437.5	13660.	13732.	824149.	828496.	20.05
46.43	94.4	3302.	3319.	829238.	833611.	3.47
46.63	35.1	1411.	1418.	829709.	834085.	1.93
46.83	14.6	751.	755.	829925.	834302.	1.23
47.23	5.8	293.	294.	830134.	834512.	.55
48.38	0.0	0.	0.	830302.	834681.	.00

(1) DETERMINED FROM TELEMETRY DATA
(2) DETERMINED FROM RADAR DATA (ESTIMATED)
(3) MOTOR CONSUMABLE WEIGHT REMAINING=PROPELLANT WEIGHT PLUS INERTS

TABLE F-7-

ORIGINAL PAGE IS
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SCOUT S-192
ROCKET MOTOR PERFORMANCE VS BURN TIME
(SMOOTHED DATA USED FOR POST-FLIGHT TRAJECTORY)

FOURTH STAGE

MANUFACTURER	MOTOR TYPE	SERIAL NUMBER
THIOKOL CORP	ALTAIR IIIA	E-25

ELAPSED TIME (SEC)	MEASURED CHAMBER PRESSURE (PSIA)	THRUST		TOTAL IMPULSE		WEIGHT REMAINING (LBS) (*)
		MEASURED (LBS) (1)	ADJUSTED (LBS) (2)	MEASURED (LB-SEC) (1)	ADJUSTED (LB-SEC) (2)	
0.00	0.0	0.	0.	0.	0.	608.50
.18	467.0	3663.	3695.	333.	336.	607.82
.27	512.5	4008.	4044.	679.	685.	606.75
.52	536.2	4175.	4211.	1701.	1716.	603.38
.82	549.2	4242.	4279.	2964.	2990.	599.07
1.82	641.2	4978.	5022.	7574.	7640.	582.00
2.42	701.2	5563.	5612.	10737.	10831.	571.76
3.02	737.2	5844.	5895.	14158.	14283.	560.19
3.42	771.2	6045.	6098.	16536.	16681.	551.65
3.82	785.2	6182.	6236.	18982.	19148.	543.11
4.22	768.2	6079.	6133.	21434.	21622.	534.52
4.62	764.2	6015.	6068.	23853.	24062.	525.74
8.12	804.2	6509.	6566.	45771.	46172.	447.14
9.62	816.2	6667.	6726.	55653.	56140.	412.99
12.12	818.2	6805.	6864.	72492.	73128.	353.78
14.12	804.2	6750.	6809.	86047.	86801.	306.23
16.12	775.2	6558.	6616.	99355.	100225.	259.34
18.62	720.2	6164.	6218.	115257.	116267.	203.29
20.62	658.2	5670.	5720.	127092.	128205.	160.76
23.62	550.2	4810.	4852.	142812.	144063.	104.60
26.12	512.1	4485.	4524.	154431.	155784.	62.99
28.02	476.6	4194.	4231.	162676.	164101.	33.09
28.62	459.8	4066.	4101.	165154.	166601.	24.34
29.02	444.5	3933.	3968.	166754.	168215.	18.72
29.22	434.3	3817.	3850.	167529.	168996.	16.12
29.42	421.8	3758.	3791.	168286.	169761.	13.58
29.82	367.9	3271.	3300.	169692.	171179.	8.87
30.42	158.8	1372.	1384.	171085.	172584.	4.20
30.82	102.7	888.	895.	171537.	173040.	2.68
31.62	37.5	329.	332.	172024.	173531.	1.05
32.22	15.3	153.	154.	172169.	173677.	.56
34.42	0.0	0.	0.	172337.	173847.	.00

(1) DETERMINED FROM TELEMETRY DATA
(2) FROM PREFLIGHT PREDICTIONS

(*) MOTOR CONSUMABLE WEIGHT REMAINING=PROPELLANT WEIGHT PLUS INERTS

 ORIGINAL PAGE IS OF POOR QUALITY

Loss of the vehicle radar precluded an accurate performance analysis of ANTARES IIIA, S/N E-2. However, a performance analysis estimate indicated that the third-stage motor delivered 834,681 lb-sec total impulse and an ideal velocity 7 ft/sec (-0.08%) lower than predicted. The in-flight web burn time was 44.99 seconds which was 0.29 percent shorter than predicted. As this was only the second ANTARES IIIA flown on Scout vehicles, a comparison of S-192C flight data was made to a Q-1 (test motor) baseline defined from AEDC test data. Ignition performance was lower for Q-1 due to a condensation of moisture on the propellant grain resulting from a pre-firing temperature cycling test. After ignition, the measured chamber pressure and thrust traces agreed well with the baseline. A similar comparison of S/N E-2 motor (S-192C) to S/N E-1 (S-203) motor was made. This comparison showed chamber pressure and thrust differences to be about as expected for motors with 4-D carbon nozzle throat inserts which have large variations in erosion rate.

Motor impulse data for the fourth-stage motor, ALTAIR IIIA S/N E-25, was not calculated due to lack of radar data. In-flight web burn time was 29.14 seconds which is 1.49 percent lower than predicted. The shapes of the measured chamber pressure and thrust time histories compared well with base line nominals.

6.0 IGNITION-DESTRUCT SYSTEMS

6.1 IGNITION SYSTEMS

Scout S-192C ignition systems operated satisfactorily with all ignition events occurring as programmed. First-stage ignition was normal. Second- and third-stage ignition times were 20 and 33 milliseconds earlier than predicted, respectively. Spin motors and fourth-stage boost motor squib ignition occurred 72 milliseconds earlier than predicted. Fourth-stage boost motor ignition was within 2 milliseconds of predicted. Ignition event times determined from inflight telemetry are shown in Table F-1.

6.2 COMMAND-DESTRUCT SYSTEMS

Destruct action was not required during the flight of Scout S-192C; the receivers remained passive. Command control was transferred from Vandenberg AFB, CT-1, to Pt. Mugu, CT-6, at 50.46 seconds flight time as evidenced by an abrupt increase in signal strength in both receivers. Considerable loss of signal strength in both receivers, with large fluctuations, occurred from approximately 104 to 123 seconds flight time (roughly the last half of second-stage burn). This condition is attributed to motor plume attenuation. From approximately 111 to 120 seconds flight time the channel 4 relays in both receivers dropped out intermittently, indicating that the receivers were not captured full-time. Considerable plume attenuation was also noted on both receiver signal strength measurements during third-stage burn, but the signal strength remained adequate to capture the receivers. At third-stage burnout, signal strengths recovered and the receivers remained captured through retro.

7.0 STRUCTURAL ENVIRONMENT

7.1 GENERAL

Flight data indicated that the structural environment during the flight of Scout S-192C was normal. Vehicle flight loads and dynamics are presented in 7.2.

7.2 POST-FLIGHT ANALYSIS

7.2.1 FLIGHT LOADS

The maximum inflight bending moment at the critical station (sta. 103.7) for S-192C heatshield configuration (34/-40) was determined to be 71,000 in-lbs utilizing wind data taken before flight. This bending moment, which occurred at an altitude of 39,000 feet when the wind had a speed of 73.5 knots and an azimuth of 338 degrees, is 23.2% of the flight allowable bending moment for the critical station.

7.2.2 FLIGHT DYNAMICS

The peak value of longitudinal and transverse acceleration associated with stage ignitions and heatshield separation were within the range normally encountered. The methods described in reference 7-1 were used in evaluating fourth-stage dynamics.

The spin motion monitor installed in this vehicle to record the angular displacement between the third and fourth stages during spin-up indicated that the spin rate at third/fourth-stage separation was 137.8 rpm. This value is 0.52 sigma above the predicted rate of 135.7 rpm. After stage separation, the linear decay in the spin rate indicated that torque due to rolling friction in the spin bearing was 43.1 inch-pounds.

After third/fourth-stage separation and prior to fourth-stage ignition, a sine wave with an amplitude of 0.0101 "g" in the longitudinal acceleration trace indicated that the fourth stage was coning with a half-cone angle of 0.76 degree. The initial rates at separation were 0.08 deg/sec in pitch and 0.12 deg/sec in yaw. The half-cone angle due to these initial rates was calculated to be 0.16 degree. The observed nutation frequency after separation was 2.20 Hertz. The calculated nutation frequency based on predicted inertia properties and the measured spin rate was 2.15 Hertz.

This was the first vehicle to fly with the "D"-section modification to increase the clearance during third/fourth-stage separation (reference 7-2). There was no interference during S-192C separation.

Ignition transients caused additional fourth-stage tip-off. A change in the sinusoidal oscillations of the normal and transverse accelerations produced a new calculated half-cone angle of 2.18 degrees.

The effects of mass unbalance and thrust misalignment cannot be separated during motor thrusting; they both produce a steady offset in the output of the normal and transverse accelerometers. Since there is no reason to believe that a sudden change in dynamic unbalance occurs at motor ignition, the step offset of the normal and transverse accelerometer readings is assumed to be due entirely to the lateral force caused by thrust misalignment. Scout S-192C flight records showed a step offset of 0.012 "g" and 0.010 "g" in the normal and transverse accelerometers, respectively. These values indicate that the lateral force due to thrust misalignment is 4.7 lbs, taking into account the crosstalk of these accelerometers with longitudinal accelerations as determined from records of second- and third-stage operation.

Fourth-stage flight records showed oscillations of 47.1 Hertz in normal and transverse accelerations at third/fourth-stage separation, fourth-stage ignition and burn. This frequency of oscillations is caused by a response of the accelerometers to flexible body motion and not rigid body motion.

Fourth-stage motion was analyzed during the coast period immediately after burnout and at the end of the telemetry records. Immediately after burnout the fourth stage was coning with a half-cone angle of 1.09 degrees. The same half-cone angle value was indicated at the end of the telemetry records. This value is higher than the half-cone angle observed on previous Scout flights; however, it is less than a +3-sigma value.

8.0 THERMAL ENVIRONMENT

All nine measured component temperatures commonly known as standard flight temperatures, were below their respective maximum allowable values during the flight of Scout S-192C. Comparisons of expected, achieved and maximum allowable temperatures for these nine standard measurements are presented in table F-8 with the approximate time when the peak temperature occurred. Third-stage separation from the fourth stage (approximately 502 seconds) is the time shown for those temperatures that continued to increase after third-stage operation. The peak temperatures expected are based on an average of temperature rises at that location observed from previous Scout flights added to the initial lift-off temperatures measured on Scout S-192C. The guidance package temperature is controlled by hearers at 180 $\pm 10^{\circ}$ F.

Thirty-three special temperatures were measured on this flight in addition to the nine standard ones. The special temperatures were used to confirm satisfactory operating temperatures for the ANTARES IIIA rocket motor and for components around the motor nozzle.

TABLE F-8

SCOUT S-192C
COMPONENT FLIGHT TEMPERATURES
(STANDARD INSTRUMENTATION)

COMPONENT (Station X/Y/Z)	TEMPERATURE °F			APPROXIMATE FLIGHT TIME OF PEAK TEMPERATURE seconds
	PEAK* EXPECTED	PEAK ACHIEVED	MAXIMUM ALLOWABLE	
CASTOR IIA Nozzle 474.66/100.00/115.20	92	81	700	160
ANTARES IIIA Nozzle Shield 228.00/100.00/87.72	241** 196-336***	148	430	502
Guidance Package 112.96/100.00/100.00	180 ± 10	185	200	436
Rate Gyro Heatshield 211.78/89.63/100.00	98-135	98	300	502
Second-Stage N_2 Tank 446.96/85.40/98.00	50	50	160	114
Third-Stage N_2 Tank 203.70/85.44/100.00	71	74	160	502
Base "A" Ambient 819.00/83.00/108.00	87	79	> 250	86
Upper "B" Ambient 476.54/102.20/82.53	153	156	> 225	160
Lower "D" Ambient 107.99/102.20/89.70	113	90	220	380

* Corrected for measured initial temperatures of S-192C.
** Temperature expected with new nozzle shield.
*** Temperature expected with previous nozzle shield.

APPENDIX 1

VEHICLE WEIGHT DATA

The weight changes between the preflight weight and lift-off weight data for vehicle S-192C are shown in table F-9. The vehicle weight, center-of-gravity and roll and pitch moments of inertia versus percent of fuel consumed for postflight conditions are presented in table F-10.

TABLE F-9

SCOUT S-192C
CHANGES BETWEEN PRE-FLIGHT AND LIFT-OFF WEIGHTS

ITEM NO.	ITEM	PRE-FLIGHT WEIGHT pounds	LIFT-OFF WEIGHT pounds	DELTA WEIGHT pounds
	FOURTH STAGE	437.11	437.97	(+0.86)
1.a	Payload	364.2	365.11	+0.91
1.b	Spacecraft Balance Weight, Upr	5.06	4.70	-0.36
1.b	Spacecraft Balance Weight, Upr	0.0	0.50	+0.50
1.c	Spacecraft Balance Weight, Lwr	0.2	0.00	-0.20
2.a	ALTAIR - Inert	54.86	54.34	-0.52
2.b	Ignition Harness	0.92	0.78	-0.14
2.c	Tape	0.50	0.33	-0.17
2.d	Upper Balance Weight	1.00	1.92	+0.92
2.e	Lower Balance Weight	1.00	0.85	-0.15
2.g	T/M - Bracket Mounted	8.60	8.68	+0.08
3.d	Instrumentation	0.77	0.76	-0.01
	THIRD STAGE			(0.00)
	SECOND STAGE			(0.00)
	FIRST STAGE			(0.00)
	TOTAL WEIGHT CHANGES (First-Stage Ignition)			+0.86

TABLE F-10

SCOUT S-192C
POST-FLIGHT WEIGHT, C. G., AND MOMENT OF INERTIA
FOR WEIGHT OF FUEL CONSUMED

	WEIGHT pounds	C.G. SCOUT STATION inches	I_{xx} slug-ft^2	I_{yy} slug-ft^2
Fourth-Stage Burnout	451.19	24.41	6.50	89.82
75%	603.31	34.85	8.84	136.83
50%	755.44	41.08	10.67	166.64
25%	907.56	45.22	11.97	187.78
Fourth-Stage Ignition	1059.69	48.17	12.76	203.87
Spin-up Items	1099.66	50.12	13.81	228.38
Third-Stage Burnout	1829.59	98.32	37.31	1934.07
75%	2545.06	115.92	66.90	2442.06
50%	3260.54	125.80	88.09	2754.77
25%	3976.01	132.12	100.87	2975.35
Third-Stage Ignition	4691.49	136.52	105.25	3144.02
Less Heatshield	6700.11	213.82	191.06	25092.86
Second-Stage Burnout	6974.19	206.76	206.10	28031.35
75%	9051.50	238.53	299.68	36058.32
50%	11128.81	258.44	367.84	41600.69
25%	13206.12	272.09	410.55	45824.92
Second-Stage Ignition	15283.43	282.03	427.80	49263.29
First-Stage Burnout	19553.05	371.92	886.24	185223.72
75%	26609.50	446.02	1547.55	284379.57
50%	33665.95	489.05	2023.28	346818.36
25%	40722.40	517.17	2313.46	391579.05
First-Stage Ignition	47778.85	536.98	2418.18	426453.21

APPENDIX REFERENCES

1-1 Vought Corporation Letter 2-19200/1L-23 to NASA Langley Research Center, Hampton, Virginia, from Scout Program Manager, dated 12 May 1981.

3-1 Vought Corporation Design Information Release 23-DIR-2259, "Pre-Flight Final Trajectory and Stage Impact Points; Scout Vehicle S-192C, NOVA I Payload," Revision A, dated 16 April 1981.

4-1 Vought Corporation Report No. 2-16000/3R-27, "Scout S-181C Final Flight Report Addendum A," dated 27 August 1973.

5-1 Vought Corporation Design Information Release 23-DIR-1598, "Assignment and Performance Prediction of Motors for Vehicle S-192C," Revision H, dated 9 October 1980.

5-2 Vought Corporation Report No. 2-18300/OR-9, "Scout S-203 Final Flight Report," Revision A, dated 29 August 1980.

7-1 Vought Corporation Report No. 23.523, "Scout Loads and Dynamics Post Flight Procedures," dated 6 November 1972.

7-2 Vought Corporation Design Information Release 23-DIR-2270, "Scout 3rd Stage to 4th Stage Clearance at Separation," dated 6 February 1981.

APPENDIX G

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APPENDIX G

OPERATIONS PLAN

APPENDIX G

COORDINATED OPERATIONS PLAN

Page

Each and every Scout operation was a coordinated effort and each operation was covered by a plan. The NASA/DOD Joint Operating Agreement for Scout launch operations at Vandenberg Air Force Base that covered Phase VI was signed by both NASA and the Air Force, effective on July 1, 1970. This agreement superseded the original agreement of 1962. This agreement defines administrative and technical management for the WTR launches. A typical joint operating agreement is inserted in this appendix as G-1. - - - - - - - - - - - - - - - - - - 739

The Operation Plan that was published for each Scout launch, was the responsibility of the Scout Prime Contractor (LTV). Its purpose was to provide planning data for the Mission Director, Payload Agency, Program Personnel, and other interested government observers. A typical Operation Plan (using Scout S-188) is inserted in this appendix as G-2. - - - - - - - - - - - - - - - - - - - 757

G-1

NASA/DOD SCOUT AGREEMENT

(Includes Typical Minutes of a Meeting)

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SCOUT (SLV-1)

MEMORANDUM OF AGREEMENT
BETWEEN
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
AND
AIR FORCE SYSTEMS COMMAND

10 JANUARY 1970

This agreement will supersede the NASA/DOD Scout System Organizational Agreement and the Joint Operation Agreement for NASA/DOD Scout Launch Operations at PMR, both dated 21 June 1962 and the NASA/DOD Scout Agreement, dated 21 April 1969, effective 1 October 1970.

Concur:

Date: 16 JAN 1970
DAVID H. BARGER, Colonel, USAF
Deputy for Launch Vehicles
Space and Missile Systems
Organization (AFSC)

Concur:

Date:
EDGAR M. CORTRIGHT
Director, NASA LaRC

Approved:

Date: 9 MAR 70
ROY H. WORTHINGTON, JR.
Colonel, USAF
Director, Ballistics and Space Sys.
DCS/Systems
AFSC HQ

Approved:

Date: 2/5/70
DR. JOHN E. NAUGLE
for Associate Administrator
Office of Space Science and
Applications
NASA HQ.

(Original on file at HQ NASA (SV) Wash., DC)

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NASA/DOD SCOUT AGREEMENT

I. PURPOSE

This agreement establishes the responsibilities and working relationships of the Department of Defense and the National Aeronautics and Space Administration organizations involved in maintaining a Scout launch vehicle capability to satisfy the requirements of both agencies. This agreement supersedes the previous NASA/DOD Scout Agreement, dated April 21, 1969.

II. OBJECTIVES

The objectives of the NASA/DOD organizations described in this agreement are to:

A. Satisfy the launch vehicle requirements for those programs assigned to Scout.

B. Provide a standard, cost effective launch vehicle in the lower payload weight regime to perform space probe, atmospheric reentry, and earth orbit missions.

C. Maintain a Scout launch capability at the NASA Wallops Station and at Vandenberg Air Force Base.

III. POLICY

This agreement has been derived from the following basic policy guidelines for the joint use of the Scout program:

A. Mutual NASA and DOD agreement is necessary on decisions affecting the ability to fulfill mission requirements, joint funding or stated policy objectives of NASA or DOD.

B. It is advantageous to the Government to utilize single agency management for this program.

C. Single agency contracts will be utilized in the Scout program where recognizable economies can be realized without jeopardizing mission success.

D. A single logistics program will be provided to satisfy the total program requirements.

E. Standardized vehicle hardware, Aerospace Ground Equipment (AGE), and checkout procedures will be utilized to the maximum extent possible. Configuration control will be exercised to maintain standardization.

F. NASA will be responsible for maintaining a vehicle processing and launch capability at Wallops Station, Virginia and Vandenberg AFB.

G. DOD will be responsible for managing and supervising the vehicle processing and launch capability at Vandenberg AFB.

H. NASA will be responsible for managing and supervising the vehicle processing and launch capability at Wallops Station, Virginia.

IV. DEFINITIONS

The following definitions apply to the terms used in this agreement:

A. Scout launch vehicle system includes:

1. All flight components less payload.

2. All NASA/LTV furnished AGE required to prepare the vehicle for launch.

3. All facilities used in preparation and launch of the vehicle.

4. Spares for vehicle and AGE.

B. Payload - To be defined for each mission by the LTV Payload/Vehicle Interface Drawing.

C. Launch Agency - That organization which is primarily responsible for managing and supervising the operation and maintenance of the Scout vehicle system at the launch sites.

D. Mission Director - A designated program representative at the launch site. He has the authority for the final launch release after all launch vehicle systems are declared launch ready.

V. ORGANIZATION AND RESPONSIBILITIES

A. NASA/DOD Scout Coordinating Committee

The broad policy guidelines of the Scout launch vehicle system are established by the NASA/DOD Scout Coordinating

Committee. Decisions of this Committee will be implemented through designated NASA and DOD offices as outlined in this agreement. This Committee is composed of members representing NASA Headquarters, NASA Langley Research Center, Air Force Systems Command Headquarters, and Air Force Space and Missile Systems Organization (SAMSO) and will meet at frequent intervals to effect efficient program coordination. Chairman of this Committee will be the NASA Headquarters representative. Secretary will be the SAMSO representative. Specific Committee functions will include the following:

1. Definition of development objectives to achieve the growth and flexibility necessary to meet future mission requirements.

2. Conceptual configuration control of the Scout launch vehicle system.

3. Evaluation of mission requirements which would necessitate deviation from the standardized vehicle concept. Every reasonable effort will be exerted to negotiate a compromise which will permit accomplishment of mission objectives with minimum effect on the standard launch vehicle configuration.

4. Master System Scheduling: This will involve the establishment of production, point of vehicle assembly, and launch schedules to meet NASA and DOD mission requirements in the most economical and reliable manner.

5. Establishment of cost sharing agreements between DOD and NASA for procurement of the Scout launch vehicle system.

B. NASA Headquarters

This organization is responsible for NASA Scout program management and provides general NASA program requirements and forecasts. The Scout Program Manager at NASA Headquarters also serves as Chairman of the NASA/DOD Scout Coordinating Committee. In this function he is responsible for:

1. Translation of Committee decisions into program direction.

2. Management of NASA and DOD funds provided to support the Scout system. This will include the preparation of financial forecasts to indicate funding requirements for each of the participating programs.

C. NASA Langley Research Center

Within this organization the Scout Project Office has been designated as the office of primary responsibility for technical management of the Scout launch vehicle system. This office will be responsible for accomplishing the following specific tasks, as well as providing the technical and contractual management for the Scout system:

1. Incorporate decisions of the NASA/DOD Scout Coordinating Committee into the technical direction and contract management of the Scout Program.

2. Accomplish cost accounting and control of Scout assigned program funds.

3. For NASA and DOD missions prepare program and range documentation, establish mission requirements, and perform mission planning.

4. Conduct Mission Working Group Meetings to assure timely accomplishment of integration of payloads with the Scout vehicle and launch complex.

5. Identify Mission Director for NASA missions.

6. Provide launch services at Wallops Station and at Vandenberg Air Force Base.

7. Provide a qualified Scout launch team as required to support DOD programs.

8. Review NASA/DOD Scout Coordinating Committee recommendations for technical acceptability and furnish technical evaluations of proposed system changes to the Committee.

D. Air Force System Command Headquarters

This organization provides representation to the NASA/DOD Scout Coordinating Committee, general DOD program requirements and forecasts, and resources necessary to fulfill DOD responsibilities assigned by this agreement.

E. Air Force Space and Missile Systems Organization

Air Force Space and Missile Systems Organization is responsible for coordinating DOD missions, schedules, and vehicle configuration requirements; participating in meetings concerning

reliability, procedures, systems, reviews, etc.; managing and supervising the Vandenberg AFB contractor launch team; and providing a mission director for DOD missions.

F. SLV-1 Boosted Systems Office, 6595th Aerospace Test Wing

The 6595th ASTWg has been delegated the responsibility for management and supervision of the Vandenberg AFB contractor launch team. In this capacity, the 6595th ASTWg will:

1. Review and approve the Configuration Control Operating System for Scout, all contractor prepared range documentation, dress rehearsal and countdown procedures.

2. Provide a single point of contact for Air Force Western Test Range support.

3. Control access to Vandenberg AFB Scout facilities.

4. Participate in reliability, procedures and engineering meetings.

5. Provide the launch conductor for all Vandenberg AFB Scout launches.

6. Supervise the launch team safety program for Scout operations.

G. NASA Langley Research Center, Mission Support Office

This office represents the Langley Research Center in all Scout operations at Vandenberg AFB. This office is also assigned responsibility for:

1. Supervising and coordinating the activities of all NASA personnel assigned to Vandenberg AFB in support of the Scout program.

2. Supervising and coordinating the Vandenberg AFB portion of the Logistics Support System.

H. Joint NASA/DOD Scout Offices

1. The office at Vandenberg AFB is comprised of the Chief of the SLV-1 Boosted Systems Office, 6595th ASTWg, and the Head of the Langley MSO at Vandenberg AFB. Detailed operating

relationships will be described in a NASA/DOD Joint Operating Agreement for Scout Launch Operations at Vandenberg AFB, which will be developed within the bounds of this agreement. The responsibilities of this office include:

a. Assurance that all Scout system documentation is technically correct and in accordance with AFWTR requirements.

b. Coordination and submission of all vehicle documentation to AFWTR.

2. The Wallops Island office is comprised of designated representatives of the Scout Project Office and the Air Force Space and Missile Systems Organization for DOD launches from this site. The primary purpose of this office is to coordinate compliance with range requirements, schedules, range documentation, and "quick look" reports.

VI. VANDENBERG AFB ACCESS

All organizations are responsible for insuring that representatives of news media and/or foreign Governments are not allowed access to Vandenberg AFB operations except under provisions approved by both the Commander, ISTRAD (SAC) and the Commander, 6595th ASTWg (AFSC).

VII. In addition to the above, a joint operating agreement for VAFB and NASA LaRC was signed for July 1, 1970.

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SCOUT

JOINT OPERATING AGREEMENT

FOR VANDENBERG AFB OPERATIONS

BETWEEN

NASA, LANGLEY RESEARCH CENTER

AND

SPACE AND MISSILE SYSTEMS ORGANIZATION

1 JULY 1970

This agreement implements the provisions of the NASA/DOD Scout Agreement between NASA Hq and AFSC Hq, dated 10 January 1970, and supersedes the Joint Operating Agreement NASA/DOD Scout Launch Operations at PMR, dated 21 June 1962.

Concur:

Date: 18 June 1970
HERBERT S. HOLDSAMBECK, Colonel, USAF
Commander, 6595th Aerospace Test Wing
Space & Missile Test Center (AFSC)

Concur:

Date: 6-19-70
WILLIAM D. HINSHAW
Head, LaRC Mission Support Office

Approved:

Date: 30 June 1970
DAVID H. BARGER, Colonel, USAF
Deputy for Launch Vehicles
Space & Missile Systems Organization
(AFSC)

Approved:

Date:
EDGAR M. CORTRIGHT
Director, NASA LaRC

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NASA/DOD Joint Operating Agreement for Scout Launch Operations at Vandenberg AFB

1. Purpose

This agreement implements the provisions of the NASA/DOD Scout Agreement, dated 10 January 1970. It establishes the method of operation for the NASA/DOD Scout vehicle system and launch facilities at Vandenberg Air Force Base (VAFB), California. It defines the responsibilities and operating relationships in general terms between the NASA and the DOD field organizations at VAFB and in specific terms between the NASA Langley Research Center, Mission Support Office (LaRC/MSO) and the 6595th Space Test Group, Scout Boosted Systems Division (SB). The provisions of this agreement are designed to foster the continued cooperative relationship which has been developed between the Air Force and the NASA Scout offices at VAFB. In no case is it intended or desired to suppress the meaningful contributions to the success of the Scout program of either organization.

2. Scope

This agreement applies to all users of and participants in the Scout system at VAFB. It is intended to supplement existing Air Force and NASA rules and procedures.

3. Policy

This agreement has been derived from the policy statements enumerated in the NASA/DOD Scout Agreement, dated 10 January 1970 and expanded as follows:

3.1 The NASA contract for VAFB launch services will be administered by the LaRC/MSO. The contractor will be responsive to the technical direction of the SB which is the launch agency at VAFB.

3.2 The Joint NASA/DOD Scout Office at VAFB will serve as the official point of contact with Space and Missile Test Center (SAMTEC) and/or host base for all VAFB Scout operations. The LaRC/MSO will sponsor all NASA payload and vehicle inputs and the SB will sponsor all DOD payload and vehicle inputs into the joint office for inclusion into the system. Conversely, the LaRC/MSO will maintain liaison with all NASA support agencies and the SB will maintain liaison with all DOD support agencies.

3.3 The Mission Director is identified by the mission agency and has total mission release authority. Launch vehicle readiness and release authority lies with the Joint NASA/DOD Scout Office as a function of the mission agency.

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3.4 For all Scout vehicles carrying NASA payloads, the LaRC/Scout Project Office (SPO) will continue to exercise a technical override authority over all aspects of the launch operation. This override ability is necessary for the project office to fulfill the responsibilities assigned to them within the NASA organization.

3.5 During the prelaunch and launch phases of the vehicle assembly, test, and checkout, representatives of the LaRC/SPO shall monitor operations. This monitoring is intended to provide technical and operational cognizance to the LaRC/SPO of any material, component, or systems difficulty if any should arise. However, no field changes will be made without the concurrence of the Joint NASA/DOD Scout Office.

3.6 Mutual NASA/LaRC and Air Force/Space and Missile Systems Organization (SAMSO) approval is required to alter provisions of this agreement. On an exception basis, by mutual consent of the field offices and to facilitate mission success, these guidelines may be modified within the bounds of the establishing document.

4. Definitions

4.1 Administrative Management: That management which will ensure administrative compliance with the contract.

4.2 Technical Management: That management which will ensure compliance with the technical requirements of the Statement of Work.

4.3 Mission Director: A spacecraft mission or program director for each Scout vehicle launch will be assigned by either the NASA or the DOD as appropriate. The director has overall mission responsibility and commensurate authority for mission decisions, spacecraft preparation, and for furnishing to the Joint NASA/DOD Scout Office vehicle criteria necessary for successful mission accomplishment. He will define, in advance of the operation, the minimum mandatory requirements for spacecraft operation. The spacecraft requirements and procedures will be suitably defined in the integrated countdown manual and coordinated with the Mission Director. He shall participate directly in the launch operations to assure mission readiness. The director also has full authority to stop or hold the countdown when the minimum requirements for completion of his mission objectives are not being met.

4.4 Operations Director: The Operations Director is the mission agency representative of the Joint NASA/DOD Scout Office. He will maintain the interface between the Launch Control Officer and the Mission Director. He has technical override responsibility and may monitor and review all vehicle tests and procedures.

4.5 Launch Control Officer: The Launch Control Officer, assigned by the SB, is the Launch Conductor referred to in the 10 January 1970 NASA/

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DOD Scout Agreement. This officer maintains the launch vehicle operational interface between the Contractor Test Conductor, government engineers, payload engineers, and the range.

4.6 Contractor Test Conductor: The Contractor Test Conductor is responsible to the Launch Control Officer for preparing and verifying the integrity of the booster vehicle for launch. This will include the detailed direction of the contractor work force for preparation, checkout, and correction of discrepancies prior to launch.

4.7 Technical Override: The authority to order a test or operation to proceed or to be stopped.

5. Responsibilities

5.1 The NASA/LaRC/MSO is responsible for the following.

5.1.1 Exercise administrative management of the Scout launch services contract at VAFB to facilitate accomplishment of launch mission objectives.

5.1.2 Provide the NASA representative to the Joint NASA/DOD Scout Office. This representative will provide a single point of contact at VAFB for the NASA/LaRC, NASA/Kennedy (VAFB operations), NASA support services contractors, and the various NASA payload agencies and associated contractors.

5.1.3 Assign a NASA representative to serve as consultant to the Launch Control Officer during DOD launches.

5.1.4 Manage and coordinate the VAFB portion of the Scout logistic support system.

5.1.5 Provide the capability for local procurement of range stock and other services as required.

5.1.6 Coordinate support from the NASA shop support services contractor.

5.1.7 Maintain the supply accounts for all NASA furnished equipment. (This will include equipment turned over to NASA from Air Force accounts).

5.1.8 Serve as the official point of contact with Space and Missile Test Center (SAMTEC) and/or host base for all transactions and schedules related to NASA Scout payloads.

5.1.9 Review and approve requests for use of the dynamic balance facilities by other agencies.

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5.1.10 Ensure that applicable NASA agreements regarding support, safety, coordination, information release, and VAFB access are observed within the framework of the Joint NASA/DOD Agreement.

5.1.11 Review and approve locally originated change requests for impact on material requirements and funding.

5.2 The SB is the launch agency and is responsible for the following.

5.2.1 Exercise technical direction of the contractor in the operation and maintenance of the VAFB Scout systems.

5.2.2 Provide the DOD representatives to the Joint NASA/DOD Scout Office. This representative will provide a single point of contact at VAFB for various DOD agencies and associated contractors, including the Navy Astronautics Group (NAVASTROGRU), SAMSO, SAMTEC, and the host base.

5.2.3 Assign a Launch Control Officer to each vehicle shipped to VAFB. This officer is responsible for maintaining technical cognizance of launch vehicle storage and processing from arrival at VAFB through assembly, checkout, and launch. His specific duties will include the following.

5.2.3.1 Monitor on a daily basis the details of vehicle processing and evaluate the contractor's field quality control program.

5.2.3.2 Monitor test procedures and evaluate results.

5.2.3.3 Evaluate the documentation and disposition of noted discrepancies.

5.2.3.4 Evaluate final readiness of the launch vehicle and supporting systems prior to launch.

5.2.3.5 Authorize the Contractor Test Conductor to open and close procedural tasks during electronic functional, dress rehearsal, and countdown.

5.2.3.6 Direct and release range support which includes telemetry support, beacon checks, and destruct checks during electronic functional, dress rehearsal, and countdown.

5.2.3.7 Authorize major changes in vehicle status such as fueling, arming the ignition and destruct systems, vehicle erection, and payload umbilical retraction during dress rehearsal and countdown.

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5.2.3.8 Coordinate the complex and range safety functions during pad operations, including dress rehearsal and countdown.

5.2.3.9 Determine and report status of launch vehicle and range readiness during electronic functional, dress rehearsal, and countdown.

5.2.4 Ensure a highly reliable test evaluation and launch capability is maintained at all times.

5.2.4.1 Conduct facility readiness review meetings to include a review of the maintenance of drawings, GSE logbooks, and other documentation; periodic maintenance; and the planned repair or modification of facilities and GSE. The SB has approval authority for planned repairs or modifications which would prevent launch of a DOD vehicle within a 30-calendar day notice.

5.2.4.2 Ensure the contractor maintains a fully qualified launch team. The SB will coordinate with the contractor and LaRC/MSO to establish and maintain a training and qualification program to include individual and crew training.

5.2.4.3 Conduct miscellaneous engineering meetings as necessary to resolve site peculiar problems.

5.2.4.4 Attend reliability and engineering review meetings.

5.2.4.5 Ensure that the provisions of the Scout Standardization and Configuration Control Manual are followed.

5.2.5 Review field test procedures, techniques, and policies and recommend, as appropriate, changes that would improve launch base operations. This will include the following.

5.2.5.1 Conduct a periodic review and inspection of housekeeping practices to ensure that the contractor follows satisfactory procedures.

5.2.5.2 Coordinate safety inspections. Ensure that the contractor's safety program complies with the applicable regulations and manuals. The SB is responsible for ensuring the safety of all operations and

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has the authority to stop any operation which it considers unsafe. Accidents will be reported and investigated in accordance with AFR 127-4 and the "USAF-NASA Agreement for Joint Space Program Accident Investigation," dated 4 April 1966. The SB will ensure that, as a minimum, the following regulations and manuals are adhered to.

Range Safety Manual, AFWTRM 127-1

Explosive Safety Manual, AFM 127-100 (including SAC supplement and 1STRAD supplement)

Accident Prevention Handbook, AFM 127-101

1STRADM 127-200

Missile & Space Safety Handbook, AFM 127-201

Range Safety Division, Launch Complex Safety Operating Procedures, Annex J, SLC-5

5.2.6 Control access to all VAFB Scout facilities.

5.2.6.1 Maintain facility lock key control.

5.2.6.2 Prepare security guard instructions and authorize and control access to the VAFB facilities.

5.2.7 Serves as the official point of contact between the Scout program and SAMTEC and/or host base for all transactions and schedules related to the support of Scout operations, except that support specifically related to NASA payloads.

5.2.7.1 Coordinate the scheduling of SAMTEC and host base support.

5.2.7.2 Coordinate schedules for other organizations using, on a non-interference basis, the dynamic balance facilities and the pyrotechnic test facility.

5.2.7.3 Furnish host base services via the procedures outlined in the following:

AFWTR/1STRAD Host-Tenant Support Agreement for Support of All Units at VAFB, (AFWTR [WTLO] 2201/ 1STRAD [DPL] 1-1)

Memorandum of Agreement between 1STRAD and AFSC Units for Support of AFSC Contractors at VAFB

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5.2.8 Provide management support and direction as necessary to ensure a smooth turnover of launch operations to the contractor. Items which will assist in providing a smooth turnover are as follows.

5.2.8.1 Turn over to the contractor the two sets of drawings with a list of drawing shortages, LTV specifications, and procedures.

5.2.8.2 Furnish to the contractor a listing of the LTV and the NASA furnished mobile and portable GSE available at VAFB. This listing will include the location and condition of each piece of equipment.

5.2.8.3 Coordinate with the contractor to ensure his personnel can obtain maximum benefit from the Air Force personnel's experience. This will include training, instructions, and, if possible, processing a "certification" vehicle.

5.2.8.4 Transfer to NASA the accountability for Air Force supplies and special equipment.

5.2.9 Maintain accountability for Scout real property/ real property installed equipment at VAFB.

5.3 The Joint NASA/DOD Scout Office at VAFB is comprised of designated representatives of the LaRC/MSO and the SB and is responsible for the following.

5.3.1 Ensure that all Scout vehicle documentation accurately depicts the current Scout vehicle system configuration and is submitted to SAMTEC in accordance with the time, format, and content criteria established by SAMTEC.

5.3.2 Provide a central point of contact for Scout launch operations at VAFB. The office will represent both SAMSO and LaRC in negotiations with SAMTEC to ensure support of planned and programmed requirements. The office will also obtain from either SAMSO or the LaRC/SPO, as appropriate, the policy guidance and information required to satisfy all SAMTEC vehicle requirements.

5.3.3 Provide the prime point of contact with the Mission Director for an up-to-date compilation of all vehicle documentation required along with the required mission peculiar information.

5.3.4 Review and approve the dress rehearsal and countdown procedures.

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5.3.5 Plan for the launch test requirements during the conceptual phases of assigned programs.

5.3.6 Formulate requirements for the Statement of Work and participate as a technical consultant on Source Selection Boards and technical negotiations panels for contracts involving VAFB operations.

5.3.7 Review contractor manpower requirements/estimates for prelaunch, launch, and test activities.

5.3.8 Plan the major modification for Scout facilities and GSE at VAFB.

5.3.9 Ensure that the immediate and long-range requirements for both the NASA and the DOD are being satisfied.

5.3.10 Coordinate with the contractor to develop proper flow of information. Ensure adequate accessibility and/or distribution of drawings, specifications, records, Daily Work Items (DWI's), various studies, and reports. Ensure adequate coordination of daily work schedules. Ensure adequate coordination and approval, as appropriate, of processing schedules (R-Day Schedules).

5.3.11 Provide office space for co-location of the contractor, the LaRC/MSO, and the SB offices.

5.3.12 Ensure that the Scout System Standardization and Configuration Control Manual is updated as necessary. Initially this will reflect the change in launch crew responsibility and the SB's role in management and supervision.

5.3.13 Develop detailed procedures to ensure proper review, disposition, documentation, and approval of discrepancies and engineering changes to equipment not included in the provisions of the Scout System Standardization and Configuration Control Manual. Such equipment will include the dynamic balance facility, the mobile telemetry van, and the Scout range sequencer.

G-2

SCOUT 188 OPERATIONS SUMMARY

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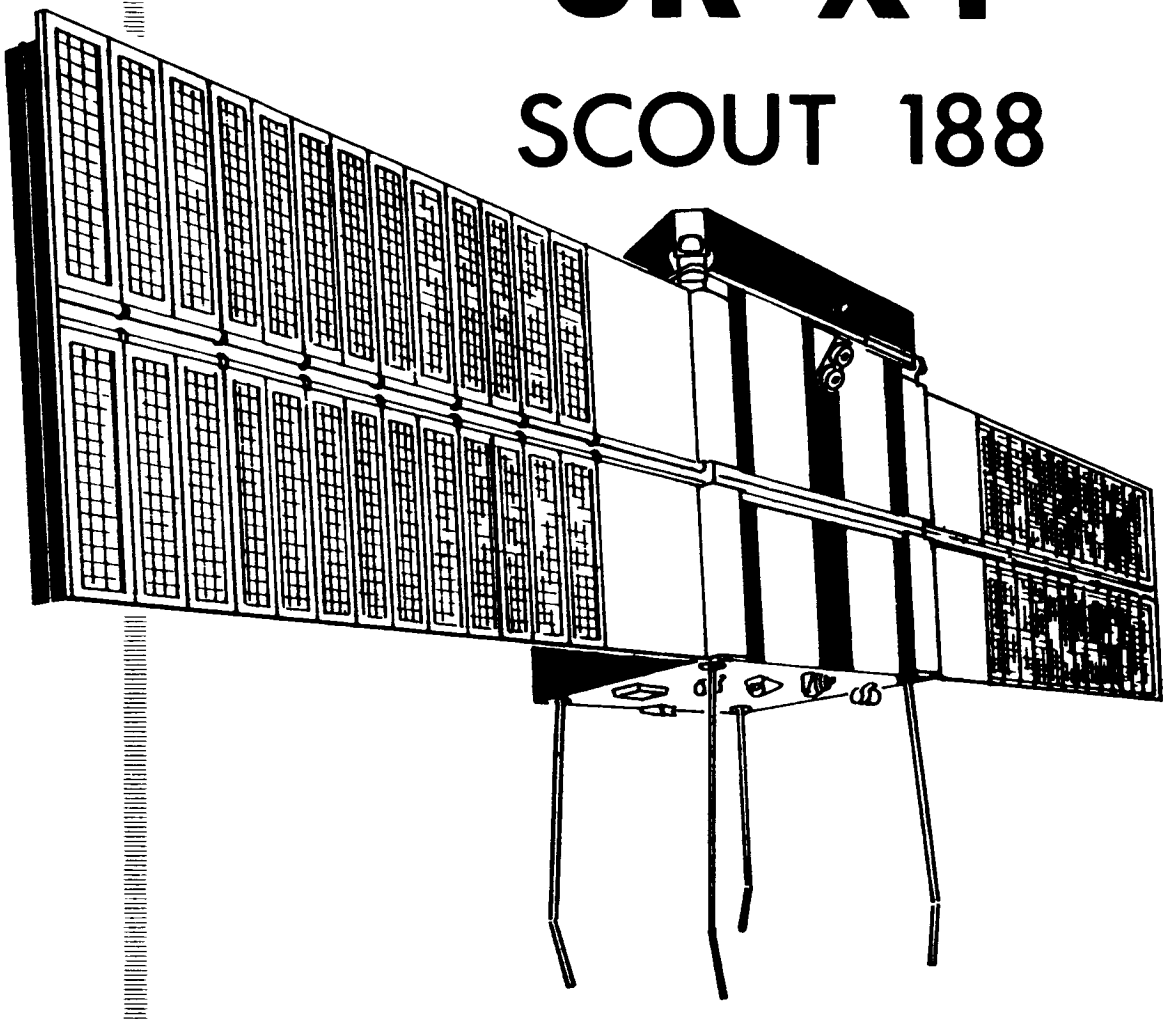
ULOW 178
22 February 1974

UK-X4

SCOUT 188



OPERATIONS SUMMARY

MINISTRY OF DEFENCE (PE) U.K.
LANGLEY RESEARCH CENTER, U.S.A.
JOHN F. KENNEDY SPACE CENTER, NASA
WESTERN LAUNCH OPERATIONS DIVISION

FEBRUARY 1974 ULOW 178

APPENDIX G-2

UK-X4

OPERATIONS SUMMARY

Prepared by

John F. Kennedy Space Center
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Unmanned Launch Operations
Western Test Range

P.O. Box 425 - Lompoc, California 93436

UK-X4

OPERATIONS SUMMARY

This document has been prepared to provide the Mission Director, experimenters, program personnel, and official observers with a launch operations support summary and a description of Mission Director Center operations.

APPROVED: C.R. Fuentes

C.R. Fuentes
UK-X4 Operations Coordinator

UK-X4

OPERATIONS SUMMARY

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X4

OPERATIONS SUMMARY

1 MISSION

1.1 Mission Objectives

The United Kingdom, Satellite Project X4, is essentially a test vehicle. The principle objective of the X4 Satellite Project is to provide information useful in future applications with satellites requiring high pointing accuracy to celestial and earth targets.

1.2 Mission Description

The X4 spacecraft is scheduled to be launched from Space Launch Complex-5 (SLC-5), Vandenberg Air Force Base (VAFB), California on 27 February 1974. The National Aeronautics and Space Administration (NASA) will utilize a four stage, solid propellant Scout Launch Vehicle to launch the spacecraft on a flight azimuth of 192.157 degrees.

The mission requirements are that the spacecraft be launched into a fully sunlit orbit and remain in full sunlight for a period of six months. The orbit is circular at a height of 750 km. The inclination of the orbit plane to the earth's equator is 98.4° so that, at this altitude the precession rate of the nodes of the orbit round the equator is exactly equal to the mean rate of the sun's motion round the ecliptic. The initial position of the spacecraft in the ascending mode is such that the line of nodes is at right angles to the plane containing the Solar meridian. For a Spring launch the ascending node must be on the down meridian. The maximum lifetime for this nominal orbit to eclipse is 262 days.

The orbital parameters of the X4 spacecraft are listed in Table g-1, and the spacecraft is pictured in Figure G-1

Table g-1. X4 Orbital Parameters

Apogee	750 kilometers
Perigee	750 kilometers
Inclination	98.4 degrees
Period	97.7 minutes

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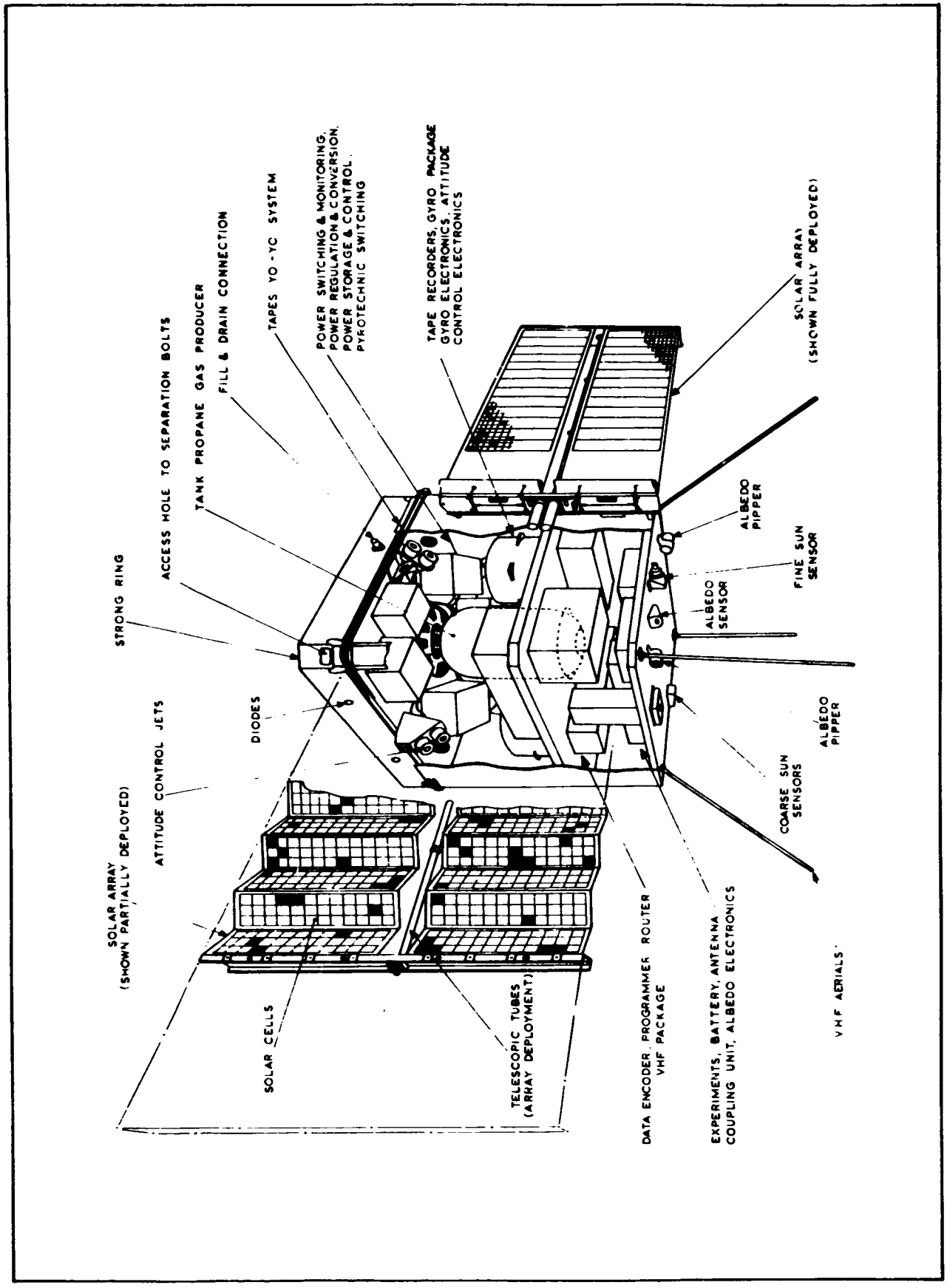

Figure G-1. The X4 Spacecraft

1.3 Experiments

The scientific payload consists of the five experiments summarized in Table g-2.

Table g- 2. X4 Experiments

EXPERIMENT	DESCRIPTION	PURPOSE
A	A model of the spacecraft dynamics drives the jet logic. Actual motion is measured by gyroscopes which update the model.	To demonstrate an accuracy, using gas jets only, of better than 3 arc minutes.
B	Four pyroelectric detectors are used. Incident radiation to all is chopped at 80 Hz. Two of the detectors view the same part of the earth. The other two provide a signal for Experiment C.	To measure the performance in orbit of components of an operational infra-red sensor. To provide eclipse warning for Experiment C.
C	Canopus star sensor with the image split into two equal halves by a refracting prism. These are focussed onto the plate of an image dissector tube by a Fabry lens. A small sensor field of view of 4° x 2° is used to give high signal/noise ratio. The large annual variation in Canopus/ Sun angle is corrected via a stepper motor.	To demonstrate an inexpensive Canopus sensor of high reliability To check the photometric calibration of the sensor. To measure the density of sun reflecting particles near the spacecraft. To determine interference generated by the ejected propane gas.
D	A 100-element photo-diode array is used as the basis for an earth albedo sensor with a digital output.	To demonstrate a basic sensing element with application in digital sun and earth albedo sensors.
E	Two patches of 0.005 inch thick silicon solar cells, with wrap-around contacts, are carried on the array.	To measure degradation in orbit.

1.4 Launch Vehicle Description

The NASA/DOD Scout Vehicle 188 is a four-stage solid-propellant rocket powered vehicle (Figure G-2) The 73-foot high launch vehicle has a maximum diameter of 40 inches and weighs approximately 23 tons at lift-off. A 3-axis gyro reference system guides the Scout vehicle through third-stage burnout; the unguided fourth stage is spin stabilized prior to its separation from the third stage. Manufacturers specifications for principal vehicle parameters are listed in Table g-2.

1.5 Spacecraft Description

The general configuration of the X4 spacecraft is shown in Figure 1. The X4 spacecraft is basically a rectangular box body with sides of 665 mm (27.181 in.) by 835 mm (32.873 in.). The interior is divided into two compartments. The floors and side panels are of honeycomb sandwich construction with machined corners to provide light-weight fixing points. The experiments housings and subsystem components are mounted to the floor. The spacecraft is connected with an interface section to the fourth stage of the Scout vehicle and held with a separation clamp.

The Data Handling system of the X4 spacecraft consists of a telemetry transmitter and a four track recorder. The satellite will be controlled from a single ground station located in the United Kingdom (UK).

The solar array is composed of four panels. A pair of these are held between stretchers attached to a telescoping boom. There are two boom assemblies, one on each side of the spacecraft. In the launch configuration the solar array is folded, accordian fashion, against the sides of the spacecraft. The booms are operated by nitrogen gas to effect deployment. The solar array, deployed, has a span of 2500 mm (99.5 in.).

Attitude control forces for the satellite are developed by a propane gas jet system. A cylindrical tank with hemi-spherical ends mounted centrally in the satellite will contain 4 kg of propane in liquid form at launch. The liquid is stored in the tank under pressure and is fed via a reducing valve mounted on top of the tank to a boiling coil, which is wound round and fixed to the side of the tank. Gaseous propane is taken from the boiling coil, via a pressure reducing valve to two ring mains, each controlled by normally open stop valves. Each ring main feeds a set of six control jets, only one set of which is in operation at a time.

The spacecraft is equipped with a Yo-yo Despin System, as a function of attitude control. Following yo-yo deployment, gas jets reduce spin rates to less than 0.25°/sec. To achieve Sun lock, this system operates in conjunction with Secondary and Primary Coarse Sun Sensors and Fine Sun Sensors.

In launch mode, four VHF antennas extend from the top of the spacecraft.

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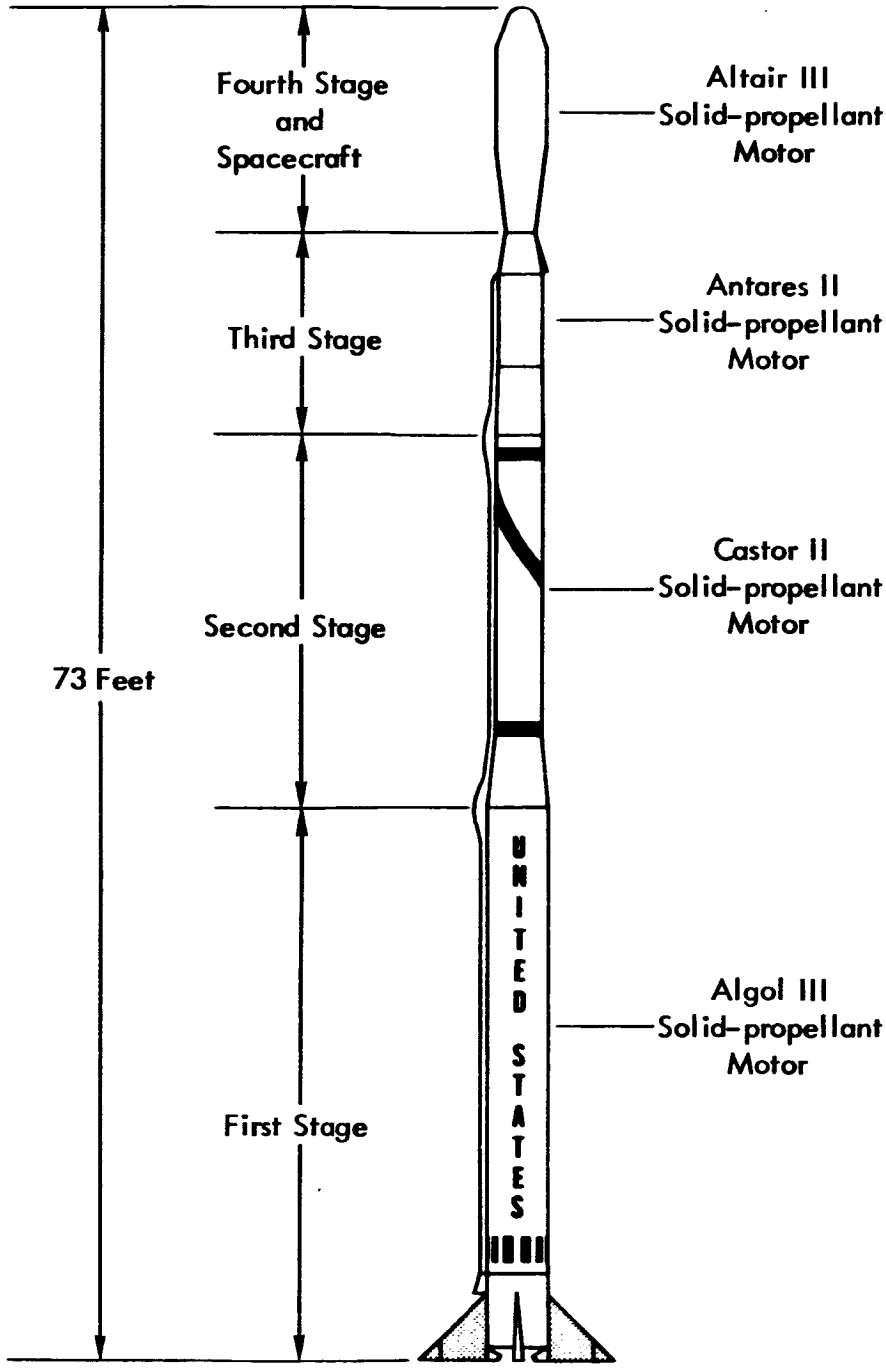

Figure G-2. Scout Launch Vehicle

Table g-3. Scout Launch Vehicle Parameters

Name	ALGOL III	CASTOR II A-TX-354-3	ANTARES II-X259-B3	FW-4S ALTAIR III (XSR-57-UT-1)
Thrust (lb)	122,624	74,104	23,433	6,723
Propellant	Solid	Solid	Solid	Solid
Fuel weight (lb)	28,074	8,295	2,588	609
Gross weight (lb)	32,264	10,407	3,354	717
Guidance	Aerodynamic tip and jet vane control	H_2O_2 reaction motors	H_2O_2 reaction motors	Unguided, spin stabilized
Tracking aids			302 C-2A-2 radar beacon	
Telemetry			2230.5 MHz	2210.5 MHz

NOTES:

1. Maximum thrust.
2. Total weight of stages at ignition.
3. Attitude reference is the gyro package.
4. Tracking is available up to ignition of the fourth stage. A third stage C-band radar beacon operates at a frequency of 5555.0 MHz, 500 watts, single pulse.
5. The telemetry system is a standard IRIG PAM/FM/FM.
6. Reference: LTV Scout Preflight Trajectory Data, dated October 19, 1972.

1.6 Expected Sequence of Events

The major launch events and expected time of occurence are listed in Table g-3.

2 LAUNCH CONSTRAINTS

2.1 Launch Window

The 30 minute launch window opens at 1909 PDT and closes at 1939 PDT.

2.2 Vehicle

The launch vehicle parameters shall be monitored during launch countdown to verify that vehicle systems are within allowable limits.

2.3 Spacecraft

The Spacecraft has a single telemetry transmitter which will radiate during the spacecraft prelaunch checkout, launch countdown, and ascent phase. All X4 spacecraft systems shall be operational prior to launch.

2.4 Range Tracking and Data

Prior to launch, it is necessary to receive verification that each of the following items required for range tracking and data is operating satisfactorily.

- Beacon Radar (SVAFB)
- 7044 Computer
- NASA Telemetry and Doppler
- Range Telemetry Station
- Communications

2.5 Range Safety

Range Safety must be satisfied that existing winds are within the limits established for protection of life and property. Wind samples shall be taken during prelaunch activity to be sure that those conditions exist before permission to launch can be given. Two primary radar tracking systems shall be operational for the launch. The launch corridor shall be clear of ships and other activity prior to granting final launch approval.

3 INSTRUMENTATION SUPPORT

3.1 Telemetry Support

Range telemetry recording (figure G-3) of the launch vehicle is expected from lift-off through fourth stage burnout. Spacecraft telemetry will continue operating throughout the launch phase. The NASA Telemetry Ground Station will provide telemetry data and Doppler tracking during launch to 680 seconds.

Table g-4. Major Launch Events

EVENT		TIME (T + sec)
Lift-off		0.00
Start Timer		0.10
Pitch 1	-1.91411 deg/sec	1.00
Pitch 2	-0.68667 deg/sec	6.00
Pitch 3	-0.51000 deg/sec	36.00
Pitch 4	-0.41000 deg/sec	46.00
Pitch 5	-0.28571 deg/sec	56.00
Second-stage Ignition/First-stage Separation		81.01 ✓
Pitch 6	-0.15952 deg/sec	98.00
Second-stage Burnout		120.68 ✓
Pitch 7	-0.23860 deg/sec	140.00
Pitch 8	-0.13067 deg/sec	155.00
Payload Heatshield Separation		178.98
Second-stage Separation/Third-stage Ignition		180.68
Third-stage Burnout		217.33 ✓
Activate Coast Controls		222.33
Pitch 9	-0.50000 deg/sec	230.00
Pitch 10	0.00000 deg/sec	306.18 ✓
Spin Motor Ignition		630.95 ✓
Third-stage Separation		632.45 ✓
Fourth-stage Ignition		637.30 ✓
Fourth-stage Burnout		667.90 ✓
Yo-Yo Release		952.45
Spacecraft Separation		962.45

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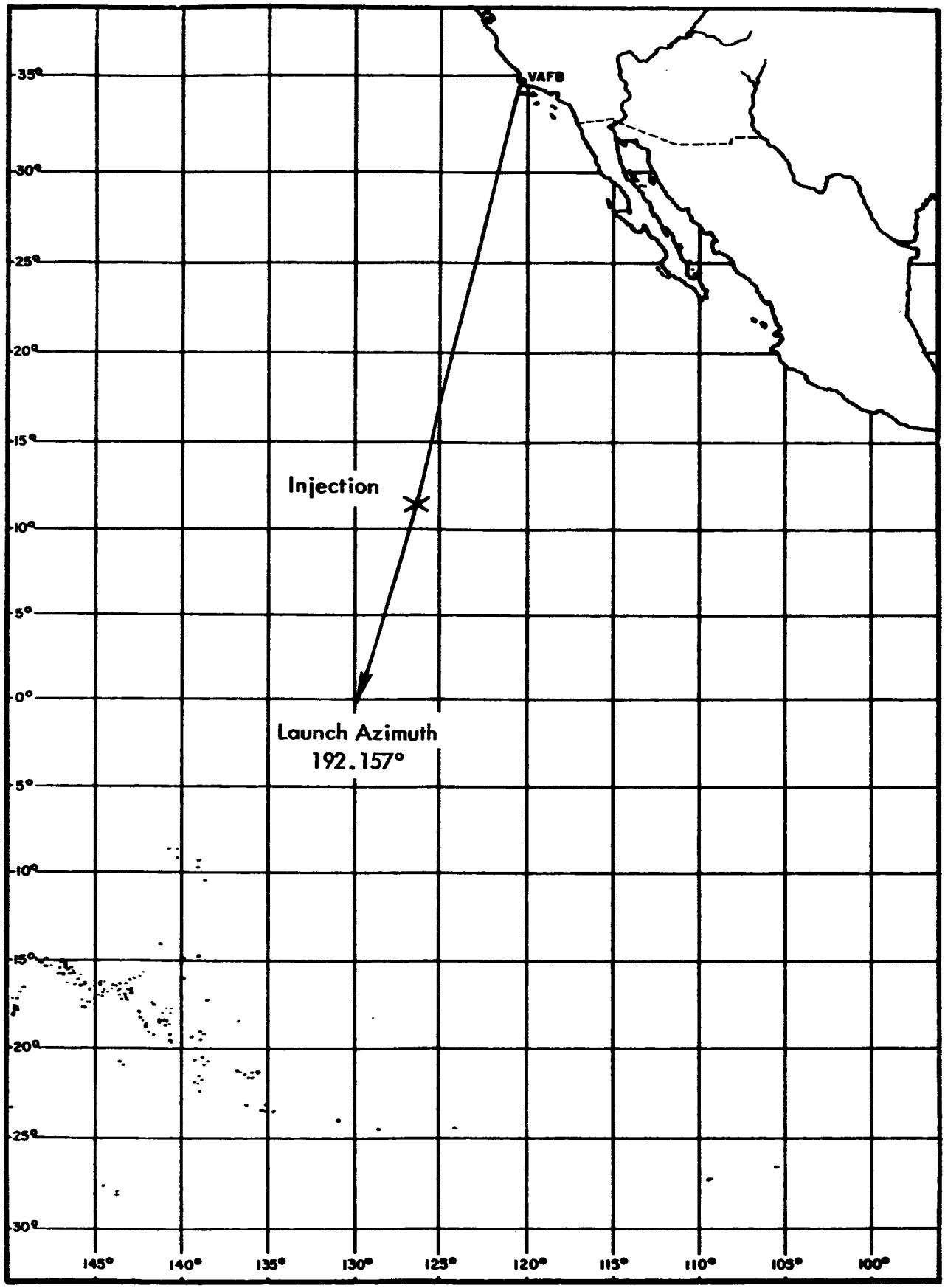

Figure G-3. Downrange Telemetry Coverage

3.2 Optical Coverage

Cinetheodolites and engineering sequential cameras will obtain optical coverage from lift-off through loss of vision - weather permitting.

3.3 Communications

Thirteen consoles are located in the MDC. Each console is individually programmed for the mission. Each console contains controls for VDL, ADL, Red Ball, SCAMA MOPS, and a monitor speaker (Figure G-4. For complete instructions on the operations of MDC communications control panels, refer to the Appendix of this Operations Summary.

4 LAUNCH OPERATIONS

4.1 Launch Countdown R-0 Day

The launch countdown will begin at 1209 PDT on launch day and is 7 hours long. There are manual overrides and technical holds built into the system that may be used if any system malfunctions or if the countdown is ahead of schedule.

4.2 NASA-WLOD Telemetry Support

The NASA-KSC-WLOD Telemetry Station, located in Building 836 provides vehicle telemetry recording, spacecraft telemetry support, and spacecraft Doppler measurement.

Launch vehicle systems engineers are provided data during Countdown Tests and from lift-off through LOS. The Scout launch vehicle carries one telemetry link on the third stage, which is received and processed, for real-time display.

Doppler (frequency shift due to relative velocity measurements) will be made continuously during launch using the spacecraft received signal. This Doppler data will be plotted in realtime in the Mission Director Center to enable evaluation of vehicle velocity performance. Doppler data will also be transmitted to GSFC in real time for plotting in the Operations Control Center.

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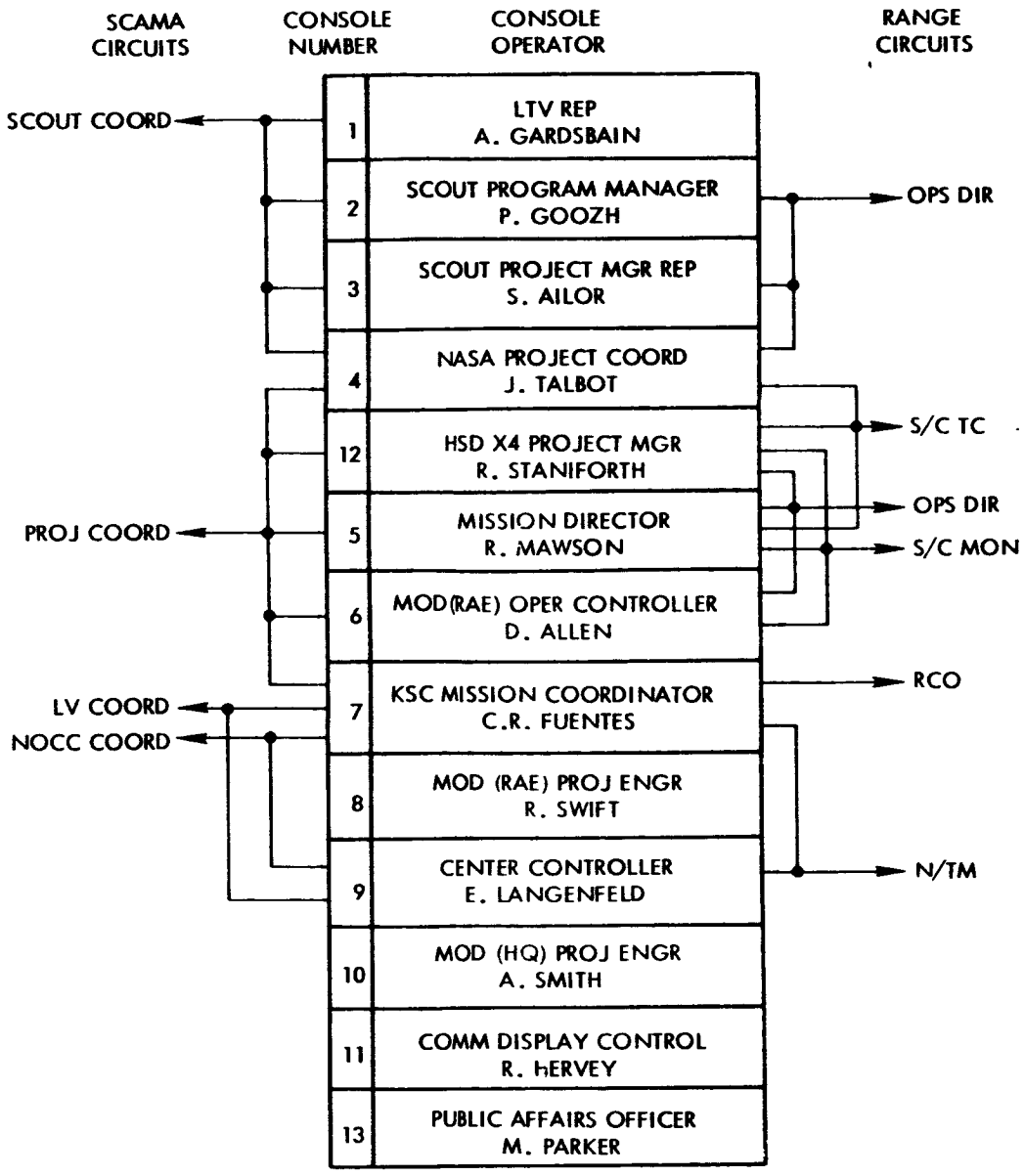

NOTE: All consoles have MOPS capability

LEGEND:

LV COORD	-	Launch Vehicle Coordinator
NOCC COORD	-	Network Operations Control Center - Coordinators
N/TM	-	NASA Telemetry Station
OPS DIR	-	Operations Director
PROJ COORD	-	Project Coordinator
RCO	-	Range Control Officer
SCOUT COORD	-	Scout Coordinator
S/C MON	-	Spacecraft Monitor
S/C TC	-	Spacecraft Test Conductor

Figure G-4. Mission Director Center Console Communications

APPENDIX -2

Western Launch Operations Division Support Facilities and Instrumentation have been compiled into this appendix to be used in conjunction with the Operations Summary.

OPERATIONS SUMMARY

APPENDIX-2

1 INTRODUCTION

To expedite the orientation process, the layout and description of WLOD Support Facilities and Instrumentation located in the Mission Director Center, Building 840, Telemetry Station and Spacecraft Laboratory Building 836, and the Blockhouse SLC-5 have been compiled into this appendix. In addition, detailed instructions for operation of the five types of voice communications have been included to assist the console user.

2 MISSION DIRECTOR CENTER

The Mission Director Center is located in Room B209, on the second floor of Building 840 (Figures 1 and 2), SVAFB. Separated from it by a glass partition is an Observation Room (B207) which has seating for 45 persons. A Missile Operations Phone System speaker is in the Observation Room for monitoring vehicle and spacecraft countdown information.

3 MISSION DIRECTOR CENTER DISPLAYS

Plotting Boards

There are two X-Y plotting boards, each capable of receiving two sets of information simultaneously and making continuous plots on 29-inch square charts. Information for plotting board number one and the impact prediction data for board number two (Table g-5) are received from the 7044 Computer in Range Operations, Building 488, SVAFB. Radial velocity versus time (Doppler) is received from the NASA Spacecraft Laboratory, Building 836, SVAFB.

Table g-5. Flight Parameter Plotting Board Information

BOARD NO. 1	BOARD NO. 2
Present position information	Vehicle impact prediction and velocity information:
Downrange vs altitude	Vehicle impact prediction
Downrange vs crossrange	Radial velocity vs time (Doppler shift data)

Range Readiness Board

The Range Readiness Board displays tracking and major Range instrumentation support status, which is indicated by green or red lights controlled from the Display Controller Console.

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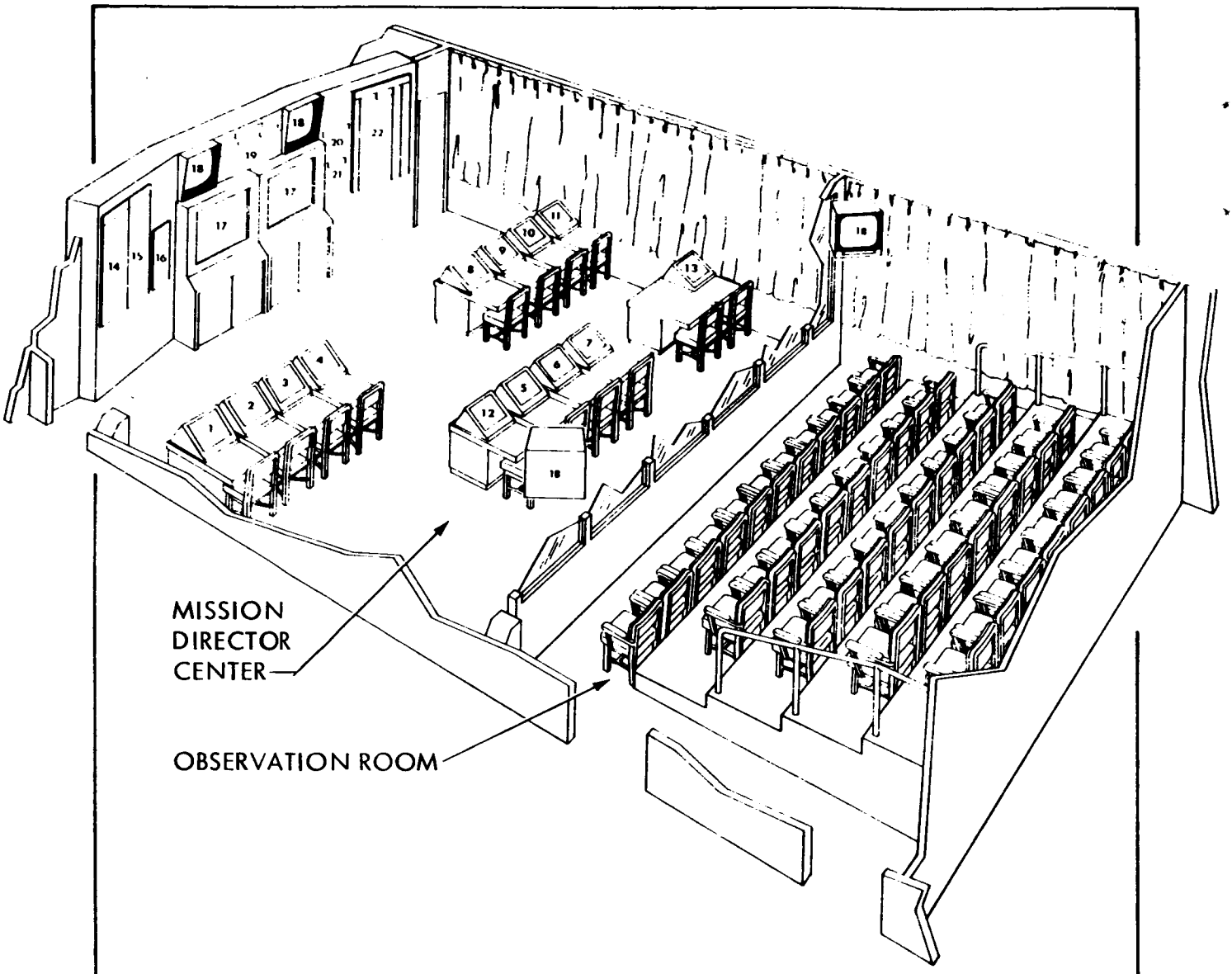

1 MISSION ASSIGNED
2 MISSION ASSIGNED
3 MISSION ASSIGNED
4 MISSION ASSIGNED
5 MISSION ASSIGNED
6 MISSION DIRECTOR
7 KSC MISSION COORDINATOR
8 MISSION ASSIGNED
9 CENTER CONTROLLER
10 COMMUNICATOR
11 COMM/DISPLAY CONTROL
12 MISSION ASSIGNED
13 PUBLIC AFFAIRS OFFICER
14 PERSONNEL BOARD
15 RANGE READINESS BOARD
16 COUNTDOWN TASK DISPLAY
17 PLOTTING BOARDS
18 TV MONITORS
19 LAUNCH DATA
20 LAUNCH ELAPSE TIME
21 COUNTDOWN INDICATOR
22 VEHICLE EVENTS BOARD

Figure G-5. Mission Director Center and Observation Room

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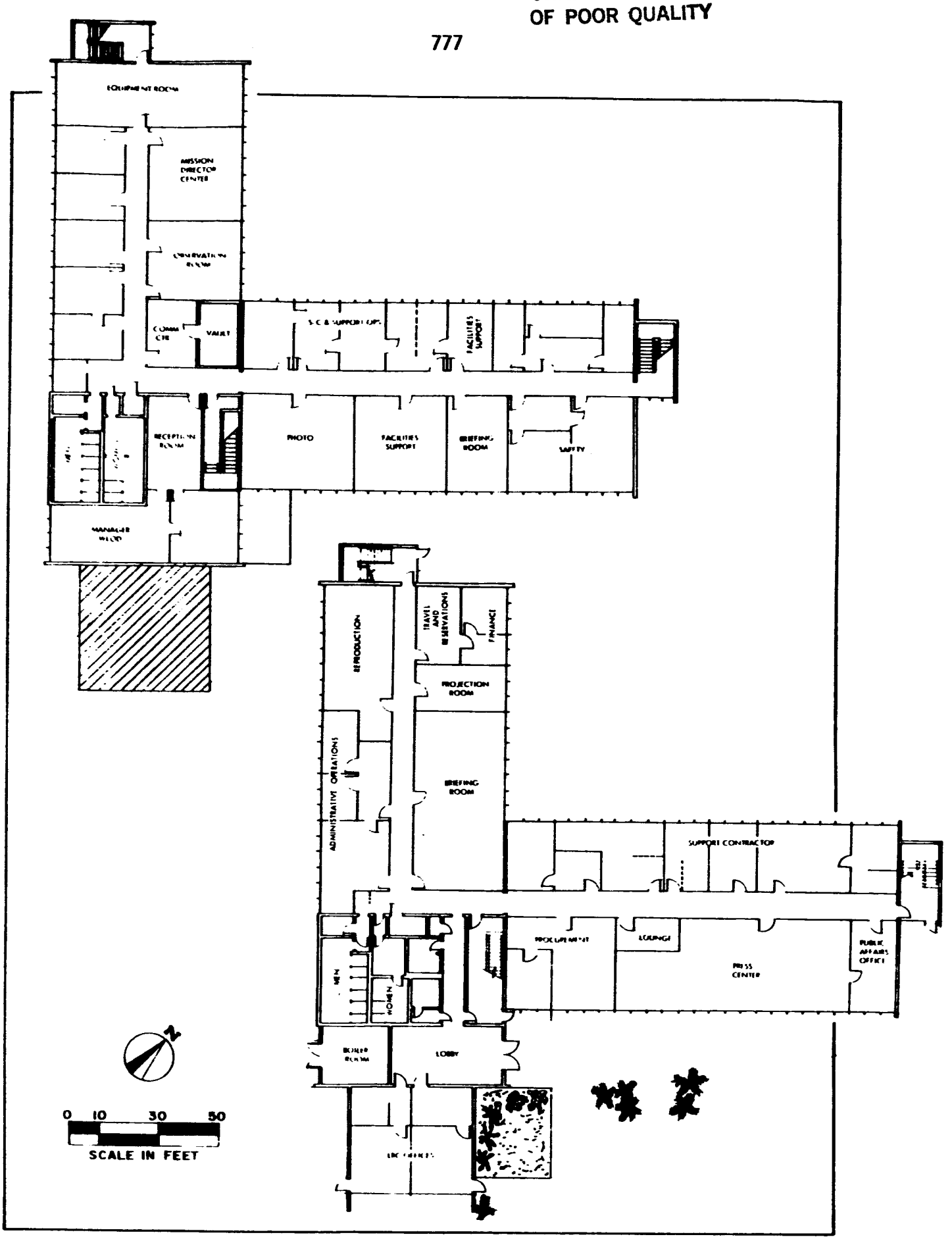

Figure G-6 Engineering and Operations, Building 840

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Space is provided for listing key mission personnel and their location during launch operations.

Vehicle Events Board

The Vehicle Events Board has two columns for listing time of occurrence of vehicle and spacecraft events: one for expected time, the other for actual time. Green or red lights are manually switched to indicte event occurrence or nonoccurrence.

Television

The two television monitors provide gantry and pad surveillance until lift-off.

MDC Clocks

A countdown clock indicates the count status during the launch operation. There are two clocks synchronized to WWV, one showing the Greenwich Mean Time and one Local Time.

Countdown Chart

A Countdown Chart displays the Terminal Countdown Sequence with the pad status indicated by a red or amber strip.

4 VOICE COMMUNICATIONS

The following five types of voice communications are used in the MDC:

- Missile Operations Phone System (MOPS)
- Administrative Direct Lines (ADL)
- Switching Conferencing and Monitoring Arrangement (SCAMA)
- Red Ball
- Voice Direct Lines (VDL)

5 CONSOLE OPERATION

The MDC Consoles are each equipped to handle the five voice communications lines. To assist the console user a typical panel (Figure G-7) indicated the location of these various controls. Instructions for operation follow the illustration.

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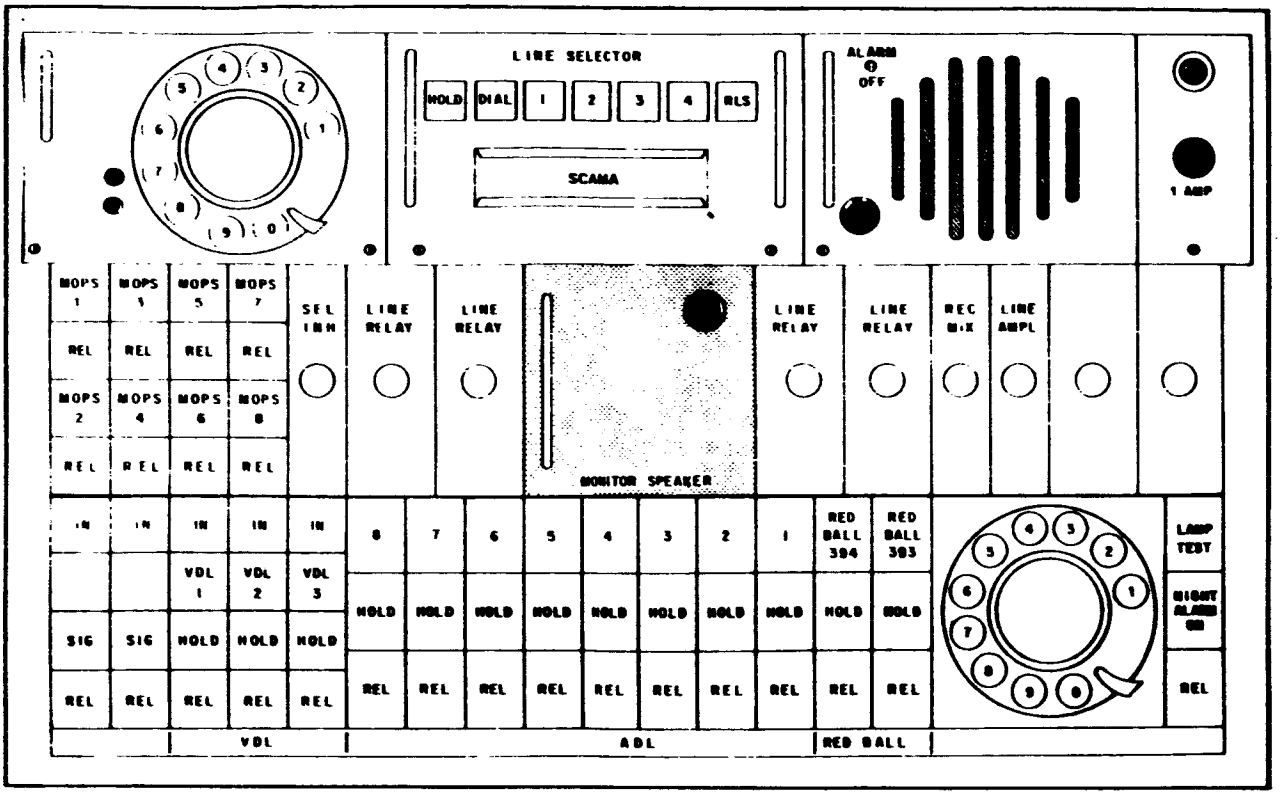

Figure G-7. Typical MDC Console Panel

6 MISSILE OPERATIONS PHONE SYSTEM (MOPS)

To transmit on a selected channel:

1. Press the proper MOPS 1 through MOPS 8 button, which will become brightly illuminated when the circuit is activated.
2. Push the PRESS-TO-TALK button on the headset extension cord. This button, when in a closed position, prevents background noise on the network.

The remaining seven circuits will have monitoring capability only, and if activated, will be dimly illuminated. A monitoring circuit can be converted to transmit, and vice versa. To change selected circuits:

1. Release the circuit in use by pressing the REL button directly under it.
2. Press the MOPS button for the channel desired for transmitting.
3. Press the MOPS button for the original channel to place it in a monitor status.

7 ADMINISTRATIVE DIRECT LINES (ADL)

To select an outside line, press one of the eight numerical buttons not illuminated, then, (using the dial at lower right) dial as follows:

TO REACH:	DIAL:
FTS (Federal Tel System)	4 - Area Code - Number
Long Distance	0 - (VAFB Operator)
VAFB Extension	X - X X X X
Lompoc	9 - 7 3 X - X X X X

A flashing numerical button on a telephone control module alerts the console monitor to an incoming call, which is answered by pressing the flashing button, thereby converting the circuit to a conventional telephone.

To hold a line in use so another call may be answered, and then return to the first conversation, press:

1. The HOLD button of the line in use.
2. The button for the incoming call, which completes that circuit.
3. The REL button to release the circuit upon completion of the second call.
4. The illuminated HOLD button to resume the first call.

NOTE: The dial at upper left is not utilized.

8 VOICE DIRECT LINES (VDL)

To reach a party on the other end of the line, press the appropriate VDL button. To answer an incoming call, press the flashing IN button, which opens the line for voice communication. To hold a call while answering another line:

1. Press the HOLD button of the line in use.
2. Press the button for the incoming call, and upon completion, press the REL button, clearing the line.
3. Press the VDL button of the call being held to release the HOLD and permit continuation of the conservation.

9 SWITCHING CONFERENCING AND MONITORING ARRANGEMENT (SCAMA)

The SCAMA network serves as a voice communication system between GSFC, Greenbelt, Maryland, and 51 communication points in the NASA Space Tracking and Data Acquisition Network (STDN), including KSC-WLOD. To use the network:

1. Press the appropriate SCAMA labeled button.
2. When Goddard Voice Control answers, identify yourself as "WTR Launch Area", and request Goddard Voice Control to connect you with the desired station.
3. An incoming SCAMA call will illuminate the appropriate button and sound the audio alarm. Answer by pressing the SCAMA button.
4. Upon completion of conversation, press the REL button.

10 RED BALL TELEPHONE LINES

The Red Ball system is for use during a missile launch operation. To select a Red Ball line, press either of the two Red Ball unilluminated buttons, and a dial tone will be heard in the headset. An incoming call activates a flashing light to alert the monitor. Pressing the flashing button permits the circuit to be used as a conventional telephone. Press the HOLD button of the line in use to answer another call, and upon conclusion of the call, release it by pressing the REL button. To reach a Red Ball number within VAFB, dial only the last three digits.

11 SPACECRAFT LABORATORY

The NASA-KSC-WLOD Telemetry Station, located in Building 836 (Figures G-8 and G-9), provides vehicle telemetry coverage, magnetic tape recording, spacecraft telemetry support, and spacecraft Doppler measurement.

Doppler measurements will be made continuously during launch using the spacecraft received signal. Data received will be plotted in real time in the MDC to enable an instantaneous evaluation of vehicle performance.

Antenna systems used for vehicle and spacecraft support include: fixed antennas located on the 450-foot tower adjacent to the spacecraft laboratory, tracking antennas located on the laboratory roof, and the 28-foot parabolic tracking antenna located on the Santa Ynez Ridge, approximately one-half mile south of the laboratory. Spacecraft interrogation commands are sent from a transmitter in the laboratory via a Yagi antenna on the 450-foot tower.

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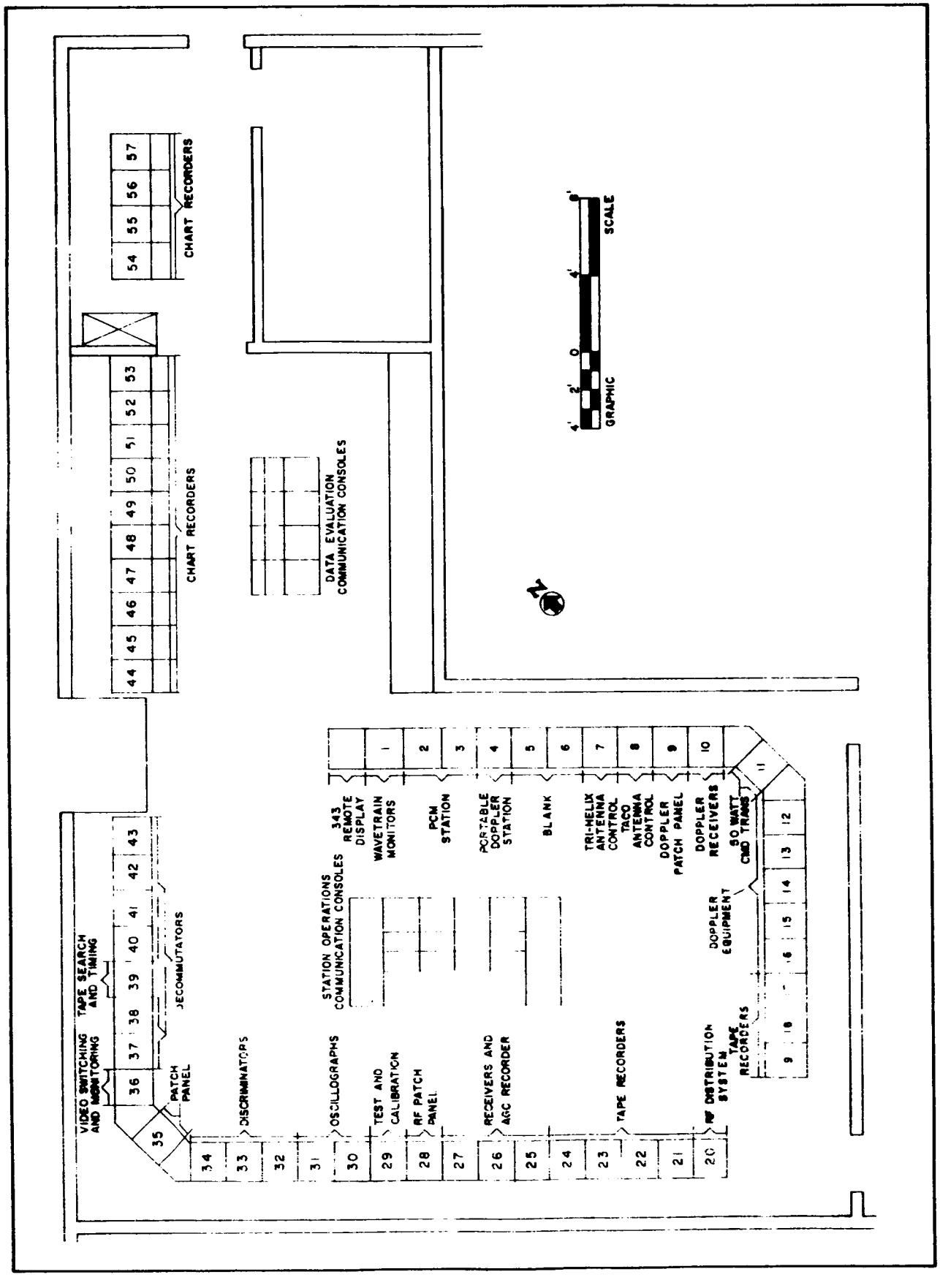

Figure G-8. Telemetry Station, Building 836

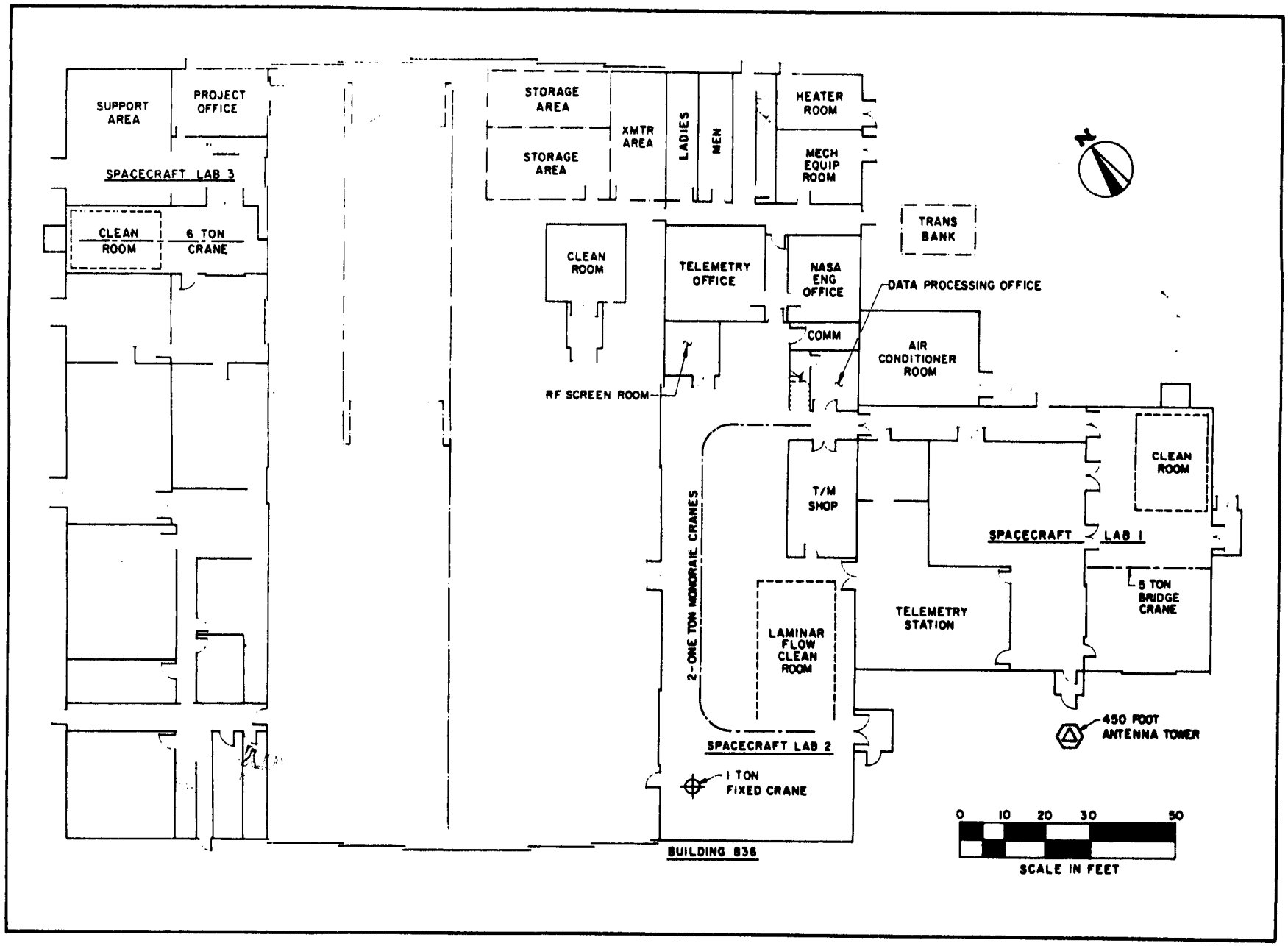

Figure G-9. NASA Spacecraft Laboratory, Building 836

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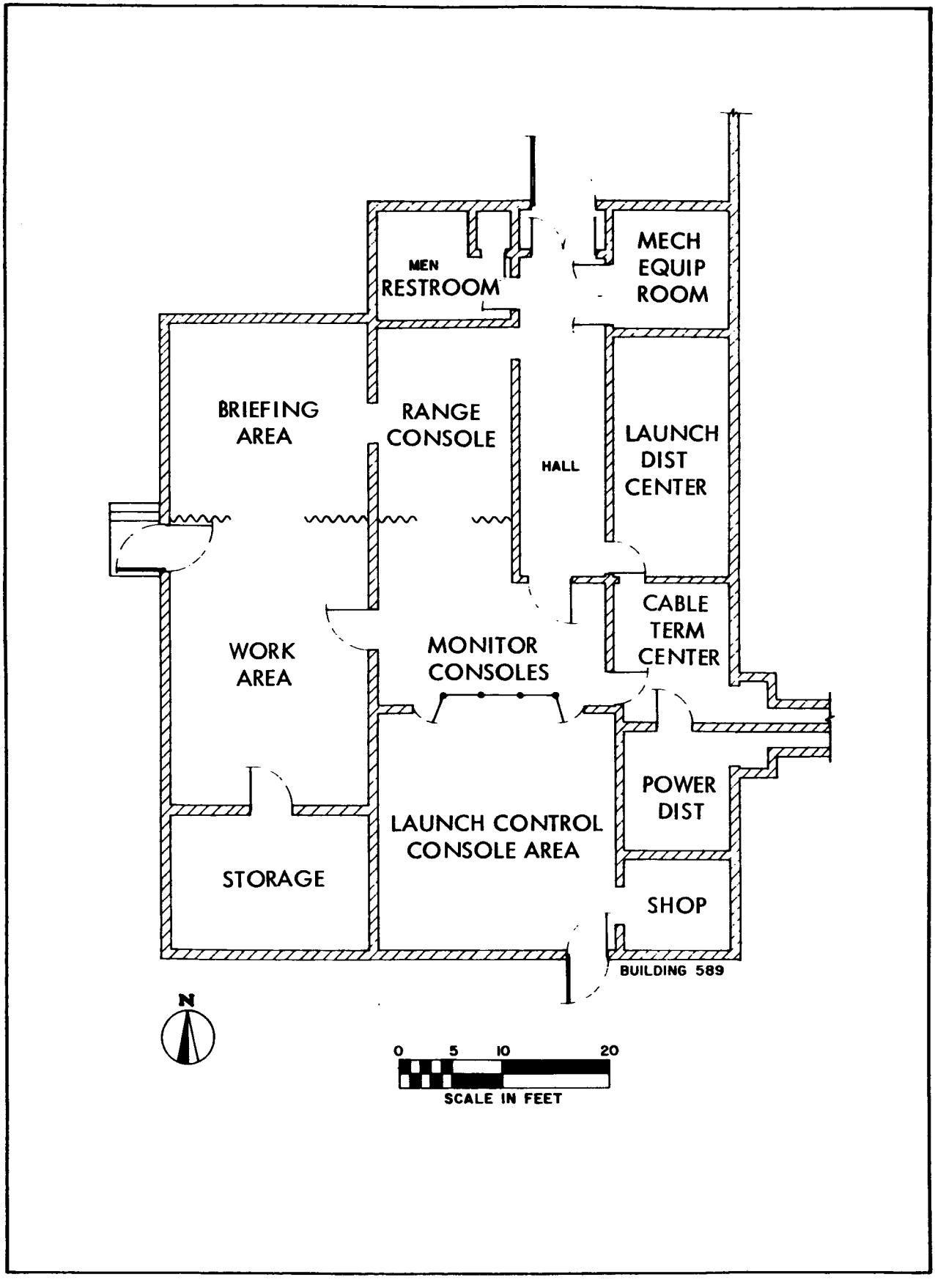

Figure G-10. Scout Blockhouse, Building 589

APPENDIX H

APPENDIX H

OBLIGATION OF FUNDS MEMORANDUM

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National Aeronautics and
Space Administration

Langley Research Center
Hampton, Virginia
23665

NASA

JAN 11 1982

Reply to Attn of: 158A(SL-4272/EIC)

TO: OLE-9/NASA Headquarters
Attn: Paul E. Goozh

FROM: 158A/Scout Project Office

SUBJECT: Obligation of Funds

Through December 31, 1981, the status of funds managed by the Scout Project Office is as follows. The amounts shown in brackets are the amounts actually funded.

	LRC-PROGRAM AUTHORITY	SUB-AUTHORIZATION	OBLIGATION	UNOBLIGATED
NASA-PRODUCTION (490)	($180,650,006.08)	($2,087,905.65)	($180,594,720.56)	($55,285.52)
1961	1,200,000.00		1,200,000.00	0
* 1962	6,573,808.07	9,009.85	6,573,808.07	0
1963	8,054,000.00		8,054,000.00	0
1964	8,100,000.00		8,100,000.00	0
1965	5,688,300.00		5,688,300.00	0
1966	7,600,000.00		7,600,000.00	0
1967	5,399,602.00		5,399,602.00	0
1968	5,163,000.00		5,163,000.00	0
1969	12,466,212.53	24,775.47	12,466,212.53	0
1970	12,899,026.24	134,664.86	12,899,026.24	0
1971	12,416,294.03	123,769.97	12,416,294.03	0
1972	14,221,104.75	122,895.25	14,221,104.75	0
1973	15,233,832.83	336,937.65	15,233,832.83	0
1974	6,734,136.92	201,784.78	6,734,136.92	0
1974 IMS	499,449.53	7,994.00	499,449.53	0
1975	11,013,496.26	69,985.74	11,013,496.26	0
1975 IMS	279,000.00	22,000.00	279,000.00	0
1976	9,740,756.92	415,243.08	9,740,756.92	0
1976 IMS	300,000.00		300,000.00	0
197T	3,297,000.00		3,297,000.00	0
197T	100,000.00		100,000.00	0
1977	6,820,518.00	270,482.00	6,816,766.40	3,751.60
1977 IMS	250,000.00		250,000.00	0
** 1978	15,665,549.10	118,363.00+	15,665,449.10	100.00
1978 IMS	315,450.90		315,450.90	0
1979	10,143,800.00	165,000.00	10,139,632.48	4,177.52
1979 IMS	191,200.00		191,200.00	0
1980	39,068.00	65,000.00	38,918.00	150.00
1980 IMS	195,400.00		195,400.00	0
1981	50,000.00		2,893.60	47,106.40

* $24,713.54 originally an S.A. to WFC included in LaRC asWFC part of LaRC.
** Withdrawal $100,000 funding for Battelle contract.
\+ $637.00 unobligated at WFC.
E Error in computer.

	LRC-PROGRAM AUTHORITY	SUB-AUTHORIZATION	OBLIGATION	UNOBLIGATED
NASA-S.R.T. (180)	($4,952,414.33)	($9,489.90)	($4,952,144.33)	($270.00)
1964	115,000.00		115,000.00	0
1965	735,000.00		735,000.00	0
1966	883,915.00		883,915.00	0
1967	650,000.00		650,000.00	0
1968	401,000.00		401,000.00	0
1969	413,813.00		413,813.00	0
1970	608,760.00		608,760.00	0
1971	288,799.00		288,799.00	0
1972	348,670.00		348,670.00	0
1973	193,456.10	9,489.90	193,186.10	270.00
1974	214,980.00		214,980.00	0
1975	74,000.00		74,000.00	0
* 1976	25,021.23		25,021.23	0
NASA-ADVANCED STUDIES (680)	($231,935.00)		($226,140.00)	($5,795.00)
1971	200,000.00		200,000.00	0
1972	31,935.00		26,140.00	5,795.00
NASA-DEVELOPMENT (890)	($22,853,083.75)	($296,407.18)	($22,853,083.75)	
1959-S	3,810,488.00		3,810,488.00	0
1959	3,365,593.25		3,365,593.25	0
1960	2,978,043.04		2,978,043.04	0
1961	6,600,000.00		6,600,000.00	0
1962	2,899,877.42	11,340.00	2,899,877.42	0
1963	3,199,082.04	285,067.18	3,199,082.04	0
NASA-SEAM (497)	($23,434,762.47)	($404,391.48)	($23,434,762.47)	
1964	3,339,992.22	60,007.78	3,339,992.22	0
1965	7,410,006.42	84,520.00	7,410,006.42	0
1966	3,915,150.01	84,753.52	3,915,150.01	0
1967	3,915,504.21	66,688.79	3,915,504.21	0
1968	4,854,109.61	108,421.39	4,854,109.61	0
NASA-DELTA (492)	($1,491,915.00)		($1,466,915.00)	($25,000.00)
1964	430,000.00		430,000.00	0
1965	548,758.00		548,758.00	0
1966	488,157.00		488,157.00	0
1981	25,000.00		0	25,000.00

*Total authority for LaRC $59K - SPO $25K.

	LRC-PROGRAM AUTHORITY	SUB-AUTHORIZATION	OBLIGATION	UNOBLIGATED
NASA-C OF F (5315)				
1962	$1,433,131.43		$1,433,131.43	0
NASA-Marshall Suballotment (C of F)				
1962	28,000.00		28,000.00	0
NASA-Wallops Suballotment (C of F)(8296)				
1977	83,201.69		83,201.69	0
NASA-Goddard Suballotment				
1962	11,558.00		11,588.00	0
1965 (870)	20,000.00		20,000.00	0
1966 (870)(871)	84,247.00		84,247.00	0
1967 (497-92)	3,975.00		3,975.00	0
1969 (874)	5,000.00		5,000.00	0
1979 (662)	2,600.00		2,600.00	0
1980 (879)	3,250.00		3,250.00	0
NASA-Lewis Suballotment (180)				
1962	71,000.00		71,000.00	0
1963	8,000.00		8,000.00	0
1964	130,000.00		130,000.00	0
NASA-Ames Suballotment (711)				
1969	200,000.00		200,000.00	0
NASA-San Marco (894-400)	($2,957,702.98)	($265,945.87)	($2,957,702.98)	
1963	1,774,374.99	91,540.73	1,774,374.99	0
1964	187,225.99	150,507.14	187,225.99	0
1965	500,000.00	0	500,000.00	0
1966	350,000.00	0	350,000.00	0
1967	76,102.00	23,898.00	76,102.00	0
1968	70,000.00	0	70,000.00	0
NASA-San Marco (490-400) DIRECT STO	($2,563,000.00)		($2,562,438.00)	($562.00)
1970 (SAS-A)	547,000.00		547,000.00	0
1971 (SSS-A)	547,000.00		546,600.00	400.00
1972 (SAS-B)	597,000.00		597,000.00	0
1974 (SAS-A)	36,506.00		36,506.00	0
1974 (SAS-B)	45,543.00		45,543.00	0
1974 (SSS-A)	951.00		789.00	162.00
1975 (SAS-C)	780,000.00		780,000.00	0
1976 (SAS-C)	9,000.00		9,000.00	0

	LRC-PROGRAM AUTHORITY	SUB-AUTHORIZATION	OBLIGATION	UNOBLIGATED
TRUST FUNDS (T00)	($12,581,116.76)	($248,449.38)	($12,581,116.76)	
Italy (894)	($2,762,613.58)	($161,780.56)	($2,762,613.58)	
1964 (001)	200,000.00		200,000.00	0
1965 (001)	480,465.00		480,465.00	0
1967 (001)	29,672.84		29,672.84	0
1969 (008A)	48,009.06		48,009.06	0
1970 (008A)	232,490.66	17,509.34	232,490.66	0
1973 (008B)	1,118,376.02	144,271.22	1,118,376.02	0
1975 (008B)	653,600.00		653,600.00	0
ESRO (490)	($5,992,759.18)	($63,668.82)	($5,992,759.18)	
IB 1970 (.011)	1,878,671.11	24,099.89	1,878,671.11	0
IB 1971 (.011)	350,000.00		350,000.00	0
IV 1970 (.016)	50,000.00		50,000.00	0
IV 1971 (.016)	1,482,652.04	17,347.96	1,482,652.04	0
IV 1972 (.016)	785,000.00	15,000.00	785,000.00	0
IV 1973 (,016)	324,613.03	7,220.97	324,613.03	0
IB 1975 (.011)	210,656.00		210,656.00	0
IV 1976 (.016)	911,167.00		911,167.00	0
UK-X4 (490)	($3,825,744.00)	($23,000.00)	($3,825,744.00)	
1972 (.019)	35,000.00	15,000.00	35,000.00	0
1973 (.019)	1,337,373.00	8,000.00	1,337,373.00	0
1974 (.019)	1,695,786.00		1,695,786.00	0
1975 (.019)	680,597.00		680,597.00	0
1975 STO DIRECT	76,988.00		76,988.00	0
REIMBURSABLE-INTERNATIONAL	($11,627,936.71)	($168,950.00)	($11,230,558.20)	($397,378.51)
Italy (483)	($1,879,114.71)*	($7,550.00)	($1,638,697.60)	($240,417.11)
1977	183,363.00		183,363.00	0
1978	476,145.26	3,500.00	476,145.26	0
1978 STO DIR.(GSFC)	198,560.00		198,560.00	0
1978 STO DIR.(GSFC)	4,069.00**		4,069.00	0
1979	55,699.00	4,050.00	55,698.89	0.11
1979 STO DIR.(DCASO)	511.00		511.00	0
1979 STO DIR.(GSFC)	35,600.00**		35,600.00	0
1979 STO DIR.(GSFC)	931.00**		931.00	0
1980	85,430.00		7,374.00	78,056.00
1980 STO DIR.(GSFC)	3,394.00**		3,394.00	0
1980 STO DIR.(GSFC)	100,000.00		100,000.00	0
1981	162,361.00		0	162,361.00
1981 STO DIR.(GSFC)	540,000.45		540,000.45	0
1981 STO DIR.(GSFC)	23,046.00**		23,046.00	0
1981 STO DIR.(DCASO)	5,304.00		5,304.00	0
1981 STO DIR.(WFC)**	4,701.00		4,701.00	0

*Incl. $51,741 RPM.
**RPM.

	LRC-PROGRAM AUTHORITY	SUB-AUTHORIZATION	OBLIGATION	UNOBLIGATED
REIMBURSABLE-INTERNATIONAL Continued				
UK-5 (483)	($872,589.00)		($872,588.15)	($0.85)
1974	58,325.00		58,325.00	0
1974 STO DIR.	664,525.00		664,525.00	0
1975	65,000.00		65,000.00	0
1976 STO DIR.	73,431.00		73,431.00	0
1976	11,308.00		11,307.15	0.85
AEROS-B (483)	($4,030,900.00)		($4,030,900.42)	($-0.42)
1974	2,584,945.87		2,584,945.87	0
1974 (02)	55,054.13		55,054.13	0
1975	1,005,294.56		1,005,294.56	0
1975 (02)	6,700.44		6,700.44	0
1975 STO DIR.	273,258.00		273,258.00	0
1975 DIR.STO(GSFC)	45,275.00		45,275.00	0
1976 DIR.STO(KSC)	14,707.04		14,707.04	0
1976 (02)	24,617.17		24,617.17	0
1977 (02)	20,418.64		20,418.64	0
1978 (02)	629.15		629.57	-0.42
UK-6 (483)	($4,845,333.00)	($161,400.00)	($4,688,372.03)	($156,960.97)
1975	98,000.00		98,000.00	0
1976	2,203,600.00	86,400.00	2,203,726.00	-126.00
1976 (02)	2,553.31		2,553.31	0
1977 (01)	65,000.00		65,000.00	0
1977 (02)	3,804.36		3,804.36	0
1977 (03)	73,000.00		72,475.10	524.90
1978	1,576,638.83	75,000.00	1,576,666.24	-27.41
1978 (01)	40,000.00		40,000.00	0
1978 (01)GSFC DIR.	10,000.00		10,000.00	0
1978 (02)	2,050.81		2,050.81	0
1978 (03)	3,000.00		3,000.00	0
1979 (01)	24,300.00		24,300.00	0
1979 (02)	20,166.32		19,897.32	269.00
1979 (03)	69,800.00		69,800.00	0
1979 (01) WFC DIR.	120,133.45		120,133.45	0
1979 (02) WFC DIR.	43.05		43.05	0
1979 (03) WFC DIR.	108,158.85		108,158.85	0
1980	264,567.17*		264,567.17	0
1980 (02)	4,400.00		2,585.37	1,814.63
1980 (03) HQ. DIR.	51,962.20		0	51,962.20
1980 (04) HQ. DIR.	101,937.00		0	101,937.00
1980 HQ. Excess	606.65		0	606.65
1981	1,272.51		1,272.51	0
1981 (02)	338.49		338.49	0

*MIPR amount is shown: 506 rounded off to higher amount. ($264,568.00.

	LRC-PROGRAM AUTHORITY	RPM	OBLIGATION	UNOBLIGATED
REIMBURSABLE-SCOUT	($116,470,278.96)	($1,492,302.78)	($112,206,143.61)	($5,756,438.13)
AEC-SCOUTS (495)	($2,617,563.60)		($2,617,563.60)	
1963 (AL)	26,563.60		26,563.60	0
1963	2,371,000.00		2,371,000.00	0
1974	220,000.00		220,000.00	0
NAVY-SCOUTS (492)	($10,656,948.00)		($10,656,948.00)	
1961				
R61-7154	1,800,000.00		1,800,000.00	0
1962	($7,900,000.00)		($7,900,000.00)	
R62-7086	975,000.00		975,000.00	0
R62-7087	4,500,000.00		4,500,000.00	0
R62-7098	2,325,000.00		2,325,000.00	0
R62-7195	100,000.00		100,000.00	0
1965				
R65-34-174	3,348.00		3,348.00	0
1971 (NRL)				
R71-F0-921	2,600.00		2,600.00	0
1975 (NRL)				
R3-0206	65,000.00		65,000.00	0
1977 (NRL)				
77-F-D043	94,000.00		94,000.00	0
1980 (NRL)				
80-MPP-0015	654,762.00		654,762.00	0
1980 HQ. DIR. (DCASO)	5,238.00		5,238.00	0
1981 (NRL)				
81-MPP-1004	130,952.00		130,952.00	0
1981 HQ. DIR. (DCASO)	1,048.00		1,048.00	0

	LRC-PROGRAM AUTHORITY	RPM	OBLIGATION	UNOBLIGATED
REIMBURSABLE-SCOUT Continued				
AIR FORCE-SCOUT	($103,195,767.36)	($1,492,302.78)	($98,931,632.01)	($5,756,438.13)
62-6-27	($11,122,996.30)		($11,122,996.30)	
1962	7,262,382.00		7,262,382.00	0
1963	893,286.00		893,286.00	0
1964	260,281.00		260,281.00	0
1965	1,275,506.00		1,275,506.00	0
1966	643,427.00	[643,500.00]	643,427.00	0
1967	520,612.00		520,612.00	0
1969	267,502.30		267,502.30	0
63-20 (Dev.)(890)				
1963	500,000.00		500,000.00	0
63-29-13 (Navy)	($7,463,380.99)		($7,463,380.99)	
1962	975,670.00		975,670.00	0
1963	3,465,000.00		3,465,000.00	0
1964	464,000.00		464,000.00	0
1965	1,255,299.00		1,255,299.00	0
1966	1,086,380.58	[1,086,400.00]	1,086,380.58	0
1969	217,031.41		217,031.41	0
63-29 VAFB Field Team (Indirect Funding)				
1969	($158,350.00)		($158,350.00)	
63-32-6	($1,944,298.00)		($1,944,298.00)	
1962	456,298.00		456,298.00	0
1963	1,488,000.00		1,488,000.00	0
65-42-1	($400,000.00)		($400,000.00)	
1965	200,000.00		200,000.00	0
1966	200,000.00		200,000.00	0
66-95-17 (Navy)	($17,485,135.95)		($17,485,135.95)	
1967	11,220,266.21		11,220,266.21	0
1968	3,529,924.69		3,529,924.69	0
1970	1,020,931.00		1,020,931.00	0
1971	1,613,355.28		1,613,355.28	0
1972	32,507.77		32,507.77	0
1973	64,151.00		64,151.00	0
1974	4,000.00		4,000.00	0
66-95 VAFB Field Team (Indirect Funding)			($520,931.00)	
1967	($210,372.00)		($210,372.00)	
1968	(164,200.00)		(164,200.00)	
1969 (O.R.)	(12,109.00)		(12,109.00)	
1970	(134,250.00)		(134,250.00)	

	LRC-PROGRAM AUTHORITY	RPM & S.A.	OBLIGATION	UNOBLIGATED
REIMBURSABLE-SCOUT Continued				
AIR FORCE-SCOUT Continued				
68-F-0071-23	($64,279,956.12)	($1,492,302.78)	($60,015,820.77)	($5,756,438.13)
NAVY	($48,093,201.19)	($682,057.71)	($42,852,515.17)	($5,922,743.73)
1968	3,892,734.50		3,892,734.50(1)	0
1968 (02)	14,682.25		14,682.25(2)	0
1972	569,521.00		569,521.00	0
1974	11,643,778.52		11,643,778.52	0
1974 (02)	1,855.16	619.05	2,474.21	0
1975	1,200,000.00		1,200,000.00	0
1976	4,700,927.24		5,249,927.20	-548,999.96
1976 (02)		2,309.59	2,309.59	0
* 197T (02)		11,534.61	11,534.61	0
1977	2,266,067.84	2,266,070.66	2,266,067.84	0
1977 (02)		4,831.20	4,831.20	0
1978	4,164,185.00		4,164,185.00	0
1978 (02)		14,064.52	14,064.52	0
1979	2,035,923.37		2,019,578.44	16,344.93
1979 S.A.		14,076.55	13,366.08	710.47
1979 (02)		29,736.99	29,736.99	0
1979 HQ.DIR.DCASO	16,135.00		16,135.00	0
1980	12,787,197.13		7,125,270.67	5,661,926.46
1980 (02)		23,385.20	23,277.18	108.02
1980 S.A.(WTR)		25,000.00	24,274.62	725.38
1980 HQ.DIR.DCASO	102,245.00		102,245.00	0
1981	4,410,174.00		3,701,561.74	708,612.26
1981 (01)		465,500.00	447,045.32	18,454.68
1981 (02)		85,000.00	67,824.90	17,175.10
1981 (02) S.A.(KSC)		1,000.00	1,000.00	0
1981 (11)	184,000.00		170,361.13	13,638.87
1981 HQ.DIR	51,756.18		0	51,756.18
1981 HQ.DIR.DCASO	38,957.00		38,957.00	0
1981 (02) HQ.	3,500.00		0	3,500.00
1981 HQ.DIR.(JSC)	6,562.00		6,562.00	0
1981 HQ.DIR.(03)	3,000.00		0	3,000.00
1981 S.A. (KSC)		5,000.00	3,741.82	1,258.18
1981 S.A. (GSFC)				
1982 (02)			14,242.85	-14,242.85
1982 (04)			426.09	-426.09
1982 (11)			10,797.90	-10,797.90

*Included in FY76 allotment.
(1) $10,035.20 (GBL) not in computer.
(2) $14,344.25 not in computer.
S.A. Subauthorization.

	LRC PROGRAM AUTHORITY	RPM & S.A.	OBLIGATION	UNOBLIGATED
REIMBURSABLE-SCOUT Continued				
68-F-0071-23 Continued				
AIR FORCE	($16,186,754.93)	($810,245.07)	($17,163,305.60)	($-116,305.60)
1976 (P76)	1,972,000.00		1,423,000.04	548,999.96
1976 (P76)(02)		14,638.44	14,638.44	0
1978 (M19)	999,000.00		999,000.00	0
1979 (P76)(02)		945.73	945.73	0
1979 (02)		1,100.00	1,100.00	0
1979 HQ.DIR.(P76)	578.28		0	578.28
1980	1,956,867.65		2,235,708.08	-278,840.43
1980 (P76)(02)		8,837.55	8,811.60	25.95
1980 (02)		6,366.13	6,342.13	24.00
1980 S.A.(GSFC)		20,857.22	20,793.00	64.22
1980 HQ.DIR(DCASO)	15,809.00		15,809.00	0
1981	11,036,968.00		11,618,809.93	-581,841.93
1981 (01)		465,500.00	447,045.31	18,454.69
1981 (02)		33,390.16	22,038.30	11,351.86
1981 (11)	112,000.00		105,638.87	6,361.13
1981 (02) S.A.(GSFC)		609.84	609.84	0
1981 HQ.DIR.(JSC)	6,563.00		0	6,563.00
1981 HQ.DIR.(DCASO)	86,969.00		23,810.00	63,159.00
1981 S.A.(WFC)		228,000.00	197,673.68	30,326.32
1981 (02)HQ.				
1981 S.A. (GSFC)		30,000.00	0	30,000.00
1982 (02)			10,733.75	-10,733.75
1982 (11)			10,797.90	-10,797.90

S.A. Subauthorization

	LRC-PROGRAM AUTHORITY	OBLIGATION	UNOBLIGATED
REIMBURSABLE SCOUT Continued			
AIR FORCE-NONSCOUT	($9,588,963.65)	($9,588,963.65)	
609A (59-4-7, 59-5-11, 59-6-7)			
1960	5,603,061.78	5,603,061.78	0
1961	1,115,874.28	1,115,874.28	0
62-12-2			
1962	264,395.01	264,395.01	0
62-13-6			
1962	482,794.20	482,794.20	0
62-14-11	($1,324,347.38)	($1,324,347.38)	
1962	832,317.74	832,317.74	0
1963	480,414.20	480,414.20	0
1965	11,615.44	11,615.44	0
63-27-1			
1963	100,000.00	100,000.00	0
63-30			
1963	5,301.00	5,301.00	0
63-44-8	($132,110.00)	($132,110.00)	
1964	67,600.00	67,600.00	0
1966	61,360.00	61,360.00	0
1968	3,150.00	3,150.00	0
64-30-5	($223,080.00)	($223,080.00)	
1964	185,500.00	185,500.00	0
1965	2,900.00	2,900.00	0
1966	34,680.00 [34,700.00]	34,680.00	0
66-87-1			
1967	248,000.00	248,000.00	0
RST-535			
1975	90,000.00	90,000.00	0

	LRC-PROGRAM AUTHORITY	OBLIGATION	UNOBLIGATED
STO DIRECT			
IMS	($78,000.00)	($78,000.00)	
HEADQUARTERS	($46,000.00)	($46,000.00)	
1972	21,000.00	21,000.00	0
1975	25,000.00	25,000.00	0
WALLOPS	($32,000.00)	($32,000.00)	
1975	10,000.00	10,000.00	0
1976	10,000.00	10,000.00	0
197T	3,000.00	3,000.00	0
1977	9,000.00	9,000.00	0
OTHERS	($1,213,700.00)	($1,213,700.00)	
Air Force-1966(FW4)	100,000.00	100,000.00	0
PL00 - 1969	98,700.00	98,700.00	0
Marshall - 1973	4,000.00	4,000.00	0
Marshall - 1977	250,000.00	250,000.00	0
Battelle - 1978	100,000.00	100,000.00	0
Battelle - 1980	661,000.00	661,000.00	0
DCASO	($1,385,000.00)	($1,385,000.00)	0
1968	37,000.00	37,000.00	0
1969	109,000.00	109,000.00	0
1970	118,000.00	118,000.00	0
1971	112,000.00	112,000.00	0
1972	138,000.00	138,000.00	0
1973	125,000.00	125,000.00	0
1974	250,000.00	250,000.00	0
1975	100,000.00	100,000.00	0
1976	100,000.00	100,000.00	0
1977	100,000.00	100,000.00	0
1978	100,000.00	100,000.00	0
1979	60,000.00	60,000.00	0
1980	36,000.00	36,000.00	0

Elaine I. Crawford

Elaine I. Crawford
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APPENDIX I

APPENDIX I

SCOUT JOB ORDERS

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CURRENT NASA SCOUT R AND D PROGRAM NUMBERS

AGENCYWIDE CODE	J.O. #	JOB
490-00-00-00-00-FY-04-93	E1001	Conversion DOD funds FY63 through FY71
490-00-00-00-00-FY-04-00	E1003	Conversion of funds FY63 through FY71
894-00-00-00-00-FY-0T-00	E1004	Conversion San Marco funds FY63 through FY71
490-00-00-00-00-FY-04-92	E1005	Correction of Navy funds FY60 through FY64
490-00-00-00-00-FY-04-95	E1006	Correction of AEC funds FY60 through FY64
492-00-00-00-00-FY-04-00	E1007	Corrections of Delta funds FY60 through FY64
497-00-00-00-00-FY-04-00	E1008	Correction of SEAM funds FY60 through FY64
890-00-00-00-00-FY-04-00	E1009	Correction of NASA development funds FY59-FY64
890-00-00-00-00-FY-04-93	E1010	Correction of AF development funds FY60-FY64
894-00-00-00-00-FY-04-00	E1011	Correction of NASA San Marco funds FY60-FY64
894-02-02-43-00-FY-04-00	E3137E	Costs of Phase IIIProgram of U.S. San Marco Sup.
490-02-02-44-00-FY-04-00	E4000	NASA Phase IV Costs
894-04-10-44-00-FY-0T-00	E4000J	San Marco Phase IV Accumul. Costs on 80X8979.001
490-02-02-44-00-FY-04-00	E4144A	PAET-A Management
490-02-04-44-00-FY-04-00	E4144B	PAET-A Mission Integration
490-02-02-44-00-FY-04-00	E4144C	PAET-A Preflight Planning
490-02-02-44-00-FY-04-00	E4144D	PAET-A Data Analysis
490-02-02-44-00-FY-04-00	E4144E	PAET-A Systems Engineering
490-02-02-44-00-FY-04-00	E4144F	PAET-A Reliability
490-02-02-44-00-FY-04-00	E4144G	PAET-A Standardization
490-01-01-44-00-FY-04-00	E4144H	PAET-A Vehicle Processing
490-02-04-44-00-FY-04-00	E4144I	PAET-A Range Costs
490-01-03-44-00-FY-04-00	E4144J	PAET-A Mission Peculiars
490-02-02-44-00-FY-04-00	E4144K	PAET-A Certification Trng.
490-02-03-44-00-FY-04-00	E4144L	PAET-A Logistics Admin.
490-01-03-44-00-FY-04-00	E4144M	PAET-A Spares
490-02-01-44-00-FY-04-00	E4144N	PAET-A Launch Site Services
490-02-01-44-00-FY-04-00	E4144O	PAET-A G.S.E.
490-02-02-44-00-FY-04-00	E4144P	PAET-A LTV Support
490-01-01-44-00-FY-04-00	E4144Q	PAET-A Special Programs
490-02-02-44-00-FY-04-00	E4144R	PAET-A Special Programs
490-02-02-44-00-FY-04-00	E4144S	PAET-A Program Support
490-01-01-44-00-FY-04-00	E4144T	PAET-A Production Support
490-02-02-44-00-FY-02-00	E4144U	PAET-A Travel
490-01-06-44-00-FY-04-00	E4144V	PAET-A Tooling Maintenance
490-02-08-44-00-FY-04-00	E4144W	PAET-A Incentive
490-02-05-44-00-FY-04-00	E4144X	PAET-A Shipping
490-01-01-44-00-FY-04-00	E4144Y	PAET-A Vehicle Procurement
490-01-02-44-00-FY-04-00	E4144Z	PAET-A Motor Procurement
490-22-66-44-00-FY-04-93	E4157A	NA-12 Management
490-21-66-44-00-FY-04-93	E4157B	NA-12 Mission Integration
490-21-66-44-00-FY-04-93	E4157C	NA-12 Preflight Planning
490-21-66-44-00-FY-04-93	E4157D	NA-12 Data Analysis
490-22-66-44-00-FY-04-93	E4157E	NA-12 Systems Engineering
490-22-66-44-00-FY-04-93	E4157F	NA-12 Reliability
490-22-66-44-00-FY-04-93	E4157G	NA-12 Standardization
490-01-66-44-00-FY-04-93	E4157H	NA-12 Vehicle Processing
490-21-66-44-00-FY-04-93	E4157I	NA-12 Range Costs
490-01-66-44-00-FY-04-93	E4157J	NA-12 Mission Peculiars
490-22-66-44-00-FY-04-93	E4157K	NA-12 Certification Trng.
490-22-66-44-00-FY-04-93	E4157L	NA-12 Logistics Admin.
490-01-66-44-00-FY-04-93	E4157M	NA-12 Spares
490-21-66-44-00-FY-04-93	E4157N	NA-12 Launch Site Services
490-22-66-44-00-FY-04-93	E4157O	NA-12 G.S.E.
490-22-66-44-00-FY-04-93	E4157P	NA-12 LTV Support
490-21-66-44-00-FY-04-93	E4157Q	NA-12 Special Programs
490-22-66-44-00-FY-04-93	E4157R	NA-12 Special Programs
490-01-66-44-00-FY-04-93	E4157S	NA-12 Program Support
490-01-66-44-00-FY-04-93	E4157T	NA-12 Production Support
490-22-66-44-00-FY-02-93	E4157U	NA-12 Travel
490-01-66-44-00-FY-04-93	E4157V	NA-12 Tooling Maintenance
490-22-66-44-00-FY-04-93	E4157W	NA-12 Incentive
490-22-66-44-00-FY-04-93	E4157X	NA-12 Shipping
490-01-66-44-00-FY-04-93	E4157Y	NA-12 Vehicle Procurement
490-01-66-44-00-FY-04-93	E4157Z	NA-12 Motor Procurement

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NASA SCOUT R AND D PROGRAM NUMBERS Continued

AGENCYWIDE CODE	J. O. #	JOB
490-22-66-44-00-FY-04-93	E4162A	NA-13 Management
490-21-66-44-00-FY-04-93	E4162B	NA-13 Mission Integration
490-21-66-44-00-FY-04-93	E4162C	NA-13 Preflight Planning
490-21-66-44-00-FY-04-93	E4162D	NA-13 Data Analysis
490-22-66-44-00-FY-04-93	E4162E	NA-13 Systems Engineering
490-22-66-44-00-FY-04-93	E4162F	NA-13 Reliability
490-22-66-44-00-FY-04-93	E4162G	NA-13 Standardization
490-01-66-44-00-FY-04-93	E4162H	NA-13 Vehicle Processing
490-21-66-44-00-FY-04-93	E4162I	NA-13 Range Costs
490-01-66-44-00-FY-04-93	E4162J	NA-13 Mission Peculiars
490-22-66-44-00-FY-04-93	E4162K	NA-13 Certification Trng.
490-22-66-44-00-FY-04-93	E4162L	NA-13 Logistics Admin.
490-01-66-44-00-FY-04-93	E4162M	NA-13 Spares
490-21-66-44-00-FY-04-93	E4162N	NA-13 Launch Site Services
490-22-66-44-00-FY-04-93	E4162O	NA-13 G.S.E.
490-22-66-44-00-FY-04-93	E4162P	NA-13 LTV Support
490-21-66-44-00-FY-04-93	E4162Q	NA-13 Special Programs
490-22-66-44-00-FY-04-93	E4162R	NA-13 Special Programs
490-01-66-44-00-FY-04-93	E4162S	NA-13 Program Support
490-01-66-44-00-FY-04-93	E4162T	NA-13 Production Support
490-22-66-44-00-FY-02-93	E4162U	NA-13 Travel
490-01-66-44-00-FY-04-93	E4162V	NA-13 Tooling Maintenance
490-22-66-44-00-FY-04-93	E4162W	NA-13 Incentive
490-22-66-44-00-FY-04-93	E4162X	NA-13 Shipping
490-01-66-44-00-FY-04-93	E4162Y	NA-13 Vehicle Procurement
490-01-66-44-00-FY-04-93	E4162Z	NA-13 Motor Procurement
490-02-02-55-00-FY-04-00	E5000	Phase V Program Costs
490-02-02-55-00-FY-04-00	E5000A	Phase V Program Management
490-02-04-55-00-FY-04-00	E5000B	Phase V Program Mission Integration
490-02-02-55-00-FY-04-00	E5000E	Phase V Program Systems Engineering
490-02-02-55-00-FY-04-00	E5000F	Phase V Program Reliability
490-02-02-55-00-FY-04-00	E5000G	Phase V Program Standardization
490-01-01-55-00-FY-04-00	E5000H	Phase V Program Vehicle Processing
490-02-04-55-00-FY-04-00	E5000I	Phase V Program Range Costs
490-01-04-55-00-FY-04-00	E5000J	Phase V Program Mission Peculiars
490-02-02-55-00-FY-04-00	E5000K	Phase V Program Certification Training
490-02-03-55-00-FY-04-00	E5000L	Phase V Program Logistics Administration
490-01-03-55-00-FY-04-00	E5000M	Phase V Program Spares
490-02-01-55-00-FY-04-00	E5000O	Phase V Program G.S.E.
490-02-02-55-00-FY-04-00	E5000P	Phase V Program LTV Support
490-01-01-55-00-FY-04-00	E5000Q	Phase V Program Special Programs
490-02-02-55-00-FY-04-00	E5000R	Phase V Program Special Programs
490-02-02-55-00-FY-04-00	E5000S	Phase V Program Support
490-01-01-55-00-FY-04-00	E5000T	Phase V Program Production Support
490-02-02-55-00-FY-04-00	E5000U	Phase V LRC Support
490-02-02-55-00-FY-02-00	E5000U	Phase V Travel
490-01-06-55-00-FY-04-00	E5000V	Phase V Program Tooling Maintenance
490-03-01-55-00-FY-04-00	E5000W	Phase V Program Product Improvement
490-02-05-55-00-FY-04-00	E5000X	Phase V Program Progress Reports
490-01-01-55-00-FY-04-00	E5000Y	Phase V Program Vehicle Procurement
490-01-02-55-00-FY-04-00	E5000Z	Phase V Program Motor Procurement
490-22-66-55-00-FY-04-93	E5001	Phase V Program DOD Program Costs
490-22-66-55-00-FY-04-93	E5001A	Phase V Program DOD Management
490-21-66-55-00-FY-04-93	E5001B	Phase V Program DOD Mission Integration
490-21-66-55-00-FY-04-93	E5001C	Phase V Program DOD Preflight Planning
490-21-66-55-00-FY-04-93	E5001D	Phase V Program DOD Data Analysis
490-22-66-55-00-FY-04-93	E5001E	Phase V Program DOD Systems Engineering
490-22-66-55-00-FY-04-93	E5001F	Phase V Program DOD Reliability
490-22-66-55-00-FY-04-93	E5001G	Phase V Program DOD Standardization
490-01-66-55-00-FY-04-93	E5001H	Phase V Program DOD Vehicle Processing
490-21-66-55-00-FY-04-93	E5001I	Phase V Program DOD Range Costs
490-01-66-55-00-FY-04-93	E5001J	Phase V Program DOD Mission Peculiars
490-22-66-55-00-FY-04-93	E5001K	Phase V Program DOD Certification Training
490-22-66-55-00-FY-04-93	E5001L	Phase V Program DOD Logistics Administration

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AGENCYWIDE CODE	J. O. #	JOB
490-01-66-55-00-FY-04-93	E5001M	Phase V Program DOD Spares
490-21-66-55-00-FY-04-93	E5001N	Phase V Program DOD Launch Site Services
490-22-66-55-00-FY-04-93	E5001O	Phase V Program DOD G.S.E.
490-22-66-55-00-FY-04-93	E5001P	Phase V Program DOD LTV Support
490-21-66-55-00-FY-04-93	E5001Q	Phase V Program DOD Special Programs
490-22-66-55-00-FY-04-93	E5001R	Phase V Program DOD Special Programs
490-01-66-55-00-FY-04-93	E5001S	Phase V Program DOD Program Support
490-01-66-55-00-FY-04-93	E5001T	Phase V Program DOD Production Support
490-22-66-55-00-FY-02-93	E5001U	Phase V Program DOD Travel
490-01-66-55-00-FY-04-93	E5001V	Phase V Program DOD Tooling Maintenance
490-22-66-55-00-FY-04-93	E5001W	Phase V Program DOD Incentive
490-22-66-55-00-FY-04-93	E5001X	Phase V Program DOD Shipping
490-01-66-55-00-FY-04-93	E5001Y	Phase V Program DOD Vehicle Procurement
490-01-66-55-00-FY-04-93	E5001Z	Phase V Program DOD Motor Procurement
490-02-02-55-00-FY-04-00	E5170A	SAS-B Program Management
490-02-04-55-00-FY-04-00	E5170B	SAS-B Mission Integration
490-02-02-55-00-FY-04-00	E5170C	SAS-B Preflight Planning
490-02-02-55-00-FY-04-00	E5170D	SAS-B Data Analysis
490-02-02-55-00-FY-04-00	E5170E	SAS-B Systems Engineering
490-02-02-55-00-FY-04-00	E5170F	SAS-B Reliability
490-02-02-55-00-FY-04-00	E5170G	SAS-B Standardization
490-01-01-55-00-FY-04-00	E5170H	SAS-B Vehicle Processing
490-02-04-55-00-FY-04-00	E5170I	SAS-B Range Costs
490-21-66-55-00-FY-04-93	E5170J	Navy Standby Mission Peculiars
490-02-02-55-00-FY-04-00	E5170K	SAS-B Certification Training
490-02-03-55-00-FY-04-00	E5170L	SAS-B Logistics
490-01-03-55-00-FY-04-00	E5170M	SAS-B Spares
490-02-01-55-00-FY-04-00	E5170N	SAS-B Launch Site Services
490-22-66-55-00-FY-04-93	E5170O	Navy Standby G.S.E.
490-02-02-55-00-FY-04-00	E5170P	SAS-B LTV Support
490-01-01-55-00-FY-04-00	E5170Q	SAS-B Special Programs
490-02-02-55-00-FY-04-00	E5170R	SAS-B Special Programs
490-02-02-55-00-FY-04-00	E5170S	SAS-B Program Support
490-21-66-55-00-FY-04-93	E5170T	Navy Standby Production Support
490-22-66-55-00-FY-02-93	E5170U	Navy Standby LRC Support
490-01-06-55-00-FY-04-00	E5170V	SAS-B Tooling Maintenance
490-03-01-55-00-FY-04-00	E5170W	SAS-B Product Improvement
490-02-05-55-00-FY-04-00	E5170X	SAS-B Progress Reports
490-01-01-55-00-FY-04-00	E5170Y	SAS-B Vehicle Procurement
490-01-02-55-00-FY-04-00	E5170Z	SAS-B Motor Procurement
490-04-01-05-00-FY-0T-00	E5172	ESRO-1B (Trust Fund from ESRO)
490-04-01-05-00-FY-0T-00	E5172A	ESRO-1B Program Management
490-04-01-05-00-FY-0T-00	E5172B	ESRO-1B Mission Integration
490-04-01-05-00-FY-0T-00	E5172C	ESRO-1B Preflight Planning
490-04-01-05-00-FY-0T-00	E5172D	ESRO-1B Data Analysis
490-04-01-05-00-FY-0T-00	E5172E	ESRO-1B Systems Engineering
490-04-01-05-00-FY-0T-00	E5172F	ESRO-1B Reliability
490-04-01-05-00-FY-0T-00	E5172G	ESRO-1B Standardization
490-04-01-05-00-FY-0T-00	E5172H	ESRO-1B Vehicle Processing
490-04-01-05-00-FY-0T-00	E5172I	ESRO-1B Range Costs
490-04-01-05-00-FY-0T-00	E5172J	ESRO-1B Mission Peculiars
490-04-01-05-00-FY-0T-00	E5172K	ESRO-1B Certification Training
490-04-01-05-00-FY-0T-00	E5172L	ESRO-1B Logistics Administration
490-04-01-05-00-FY-0T-00	E5172M	ESRO-1B Spares
490-04-01-05-00-FY-0T-00	E5172N	ESRO-1B Launch Site Services
490-04-01-05-00-FY-0T-00	E5172O	ESRO-1B G.S.E.
490-04-01-05-00-FY-0T-00	E5172P	ESRO-1B LTV Support
490-04-01-05-00-FY-0T-00	E5172Q	ESRO-1B Special Programs
490-04-01-05-00-FY-0T-00	E5172R	ESRO-1B Special Programs
490-04-01-05-00-FY-0T-00	E5172S	ESRO-1B Program Support
490-04-01-05-00-FY-0T-00	E5172T	ESRO-1B Production Support
490-04-01-05-00-FY-0T-00	E5172U	ESRO-1B Travel and Management
490-04-01-05-00-FY-0T-00	E5172V	ESRO-1B Tooling Maintenance
490-04-01-05-00-FY-0T-00	E5172W	ESRO-1B Incentive

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AGENCYWIDE CODE	J. O. #	JOB
490-04-01-05-00-FY-0T-00	E5172X	ESRO-1B Shipping
490-04-01-05-00-FY-0T-00	E5172Y	ESRO-1B Vehicle Procurement
490-04-01-05-00-FY-0T-00	E5172Z	ESRO-1B Motor Procurement
894-04-10-45-00-FY-0T-00	E5173J	San Marco Equipment and Services
490-22-66-55-00-FY-04-93	E5176A	NA-14 Management
490-21-66-55-00-FY-04-93	E5176B	NA-14 Mission Integration
490-21-66-55-00-FY-04-93	E5176C	NA-14 Preflight Planning
490-21-66-55-00-FY-04-93	E5176D	NA-14 Data Analysis
490-22-66-55-00-FY-04-93	E5176E	NA-14 Systems Engineering
490-22-66-55-00-FY-04-93	E5176F	NA-14 Reliability
490-22-66-55-00-FY-04-93	E5176G	NA-14 Standardization
490-01-66-55-00-FY-04-93	E5176H	NA-14 Vehicle Processing
490-21-66-55-00-FY-04-93	E5176I	NA-14 Range Costs
490-01-66-55-00-FY-04-93	E5176J	NA-14 Mission Peculiars
490-22-66-55-00-FY-04-93	E5176K	NA-14 Certification Trng.
490-22-66-55-00-FY-04-93	E5176L	NA-14 Logistics Admin.
490-01-66-55-00-FY-04-93	E5176M	NA-14 Spares
490-21-66-55-00-FY-04-93	E5176N	NA-14 Launch Site Services
490-22-66-55-00-FY-04-93	E5176O	NA-14 G.S.E.
490-22-66-55-00-FY-04-93	E5176P	NA-14 LTV Support
490-21-66-55-00-FY-04-93	E5176Q	NA-14 Special Programs
490-22-66-55-00-FY-04-93	E5176R	NA-14 Special Programs
490-01-66-55-00-FY-04-93	E5176S	NA-14 Program Support
490-01-66-55-00-FY-04-93	E5176T	NA-14 Production Support
490-22-66-55-00-FY-02-93	E5176U	NA-14 Travel
490-01-66-55-00-FY-04-93	E5176V	NA-14 Tooling Maintenance
490-22-66-55-00-FY-04-93	E5176W	NA-14 Incentive
490-22-66-55-00-FY-04-93	E5176X	NA-14 Shipping
490-01-66-55-00-FY-04-93	E5176Y	NA-14 Vehicle Procurement
490-01-66-55-00-FY-04-93	E5176Z	NA-14 Motor Procurement
490-02-00-66-00-FY-04-00	E6000	Phase VI NASA Program
490-02-02-66-00-FY-04-00	E6000A	Phase VI Program Management
490-02-04-66-00-FY-04-00	E6000B	Phase VI Mission Integration
490-02-02-66-00-FY-04-00	E6000E	Phase VI Systems Engineering
490-02-02-66-00-FY-04-00	E6000F	Phase VI Reliability
490-02-02-66-00-FY-04-00	E6000G	Phase VI Standardization
490-01-01-66-00-FY-04-00	E6000H	Phase VI Vehicle Processing
490-02-04-66-00-FY-04-00	E6000I	Phase VI Range Costs
894-04-10-46-00-FY-0T-00	E6000J	Phase VI San Marco
490-02-02-66-00-FY-04-00	E6000K	Phase VI Certification Training
490-02-03-66-00-FY-04-00	E6000L	Phase VI Logistics Administration
490-01-03-66-00-FY-04-00	E6000M	Phase VI Spares
490-02-01-66-00-FY-04-00	E6000O	Phase VI G.S.E.
490-02-02-66-00-FY-04-00	E6000P	Phase VI LTV Support
490-01-01-66-00-FY-04-00	E6000Q	Phase VI Special Programs
490-02-02-66-00-FY-04-00	E6000R	Phase VI Special Programs
490-02-02-66-00-FY-04-00	E6000S	Phase VI Program Support
490-01-01-66-00-FY-04-00	E6000T	Phase VI Production Support
490-02-02-66-00-FY-04-00	E6000U	Phase VI LRC Support
490-02-02-66-00-FY-02-00	E6000U	Phase VI Travel
490-01-06-66-00-FY-04-00	E6000V	Phase VI Tooling Maintenance
490-03-01-66-00-FY-04-00	E6000W	Phase VI Product Improvement
490-02-05-66-00-FY-04-00	E6000X	Phase VI Shipping
490-01-01-66-00-FY-04-00	E6000Y	Phase VI Vehicle Procurement
490-01-02-66-00-FY-04-00	E6000Z	Phase VI Motor Procurement
490-22-66-66-00-FY-04-93	E6001	Phase VI DOD Program (66-95)
490-22-66-66-00-FY-04-93	E6001A	Phase VI DOD Management
490-21-66-66-00-FY-04-93	E6001B	Phase VI DOD Mission Integration
490-21-66-66-00-FY-04-93	E6001C	Phase VI DOD Preflight Planning
490-21-66-66-00-FY-04-93	E6001D	Phase VI DOD Data Analysis
490-22-66-66-00-FY-04-93	E6001E	Phase VI DOD Systems Engineering
490-22-66-66-00-FY-04-93	E6001F	Phase VI DOD Reliability
490-22-66-66-00-FY-04-93	E6001G	Phase VI DOD Standardization
490-01-66-66-00-FY-04-93	E6001H	Phase VI DOD Vehicle Processing
490-21-66-66-00-FY-04-93	E6001I	Phase VI DOD Range Costs

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AGENCYWIDE CODE	J. O. #	JOB
490-01-66-66-00-FY-04-93	E6001J	Phase VI DOD Mission Peculiars
490-22-66-66-00-FY-04-93	E6001K	Phase VI DOD Certification Training
490-22-66-66-00-FY-04-93	E6001L	Phase VI DOD Logistics Administration
490-01-66-66-00-FY-04-93	E6001M	Phase VI DOD Spares
490-21-66-66-00-FY-04-93	E6001N	Phase VI DOD Launch Site Services
490-22-66-66-00-FY-04-93	E6001O	Phase VI DOD G.S.E.
490-22-66-66-00-FY-04-93	E6001P	Phase VI DOD LTV Support
490-21-66-66-00-FY-04-93	E6001Q	Phase VI DOD Special Programs
490-22-66-66-00-FY-04-93	E6001R	Phase VI DOD Special Programs
490-01-66-66-00-FY-04-93	E6001S	Phase VI DOD Program Support
490-01-66-66-00-FY-04-93	E6001T	Phase VI DOD Production Support
490-22-66-66-00-FY-04-93	E6001U	Phase VI DOD LRC Support
490-01-66-66-00-FY-04-93	E6001V	Phase VI DOD Tooling Maintenance
490-22-66-66-00-FY-04-93	E6001W	Phase VI DOD Product Improvement
490-22-66-66-00-FY-04-93	E6001X	Phase VI DOD Shipping
490-01-66-66-00-FY-04-93	E6001Y	Phase VI DOD Vehicle Procurement
490-01-66-66-00-FY-04-93	E6001Z	Phase VI DOD Motor Procurement
490-22-68-66-00-FY-04-93	E6002	Phase VI DOD Program (68-71)
490-22-68-66-00-FY-04-93	E6002A	Phase VI DOD Management
490-21-68-66-00-FY-04-93	E6002B	Phase VI DOD Mission Integration
490-21-68-66-00-FY-04-93	E6002C	Phase VI DOD Preflight Planning
490-21-68-66-00-FY-04-93	E6002D	Phase VI DOD Data Analysis
490-22-68-66-00-FY-04-93	E6002E	Phase VI DOD Systems Engineering
490-22-68-66-00-FY-04-93	E6002F	Phase VI DOD Reliability
490-22-68-66-00-FY-04-93	E6002G	Phase VI DOD Standardization
490-01-68-66-00-FY-04-93	E6002H	Phase VI DOD Vehicle Processing
490-21-68-66-00-FY-04-93	E6002I	Phase VI DOD Range Costs
490-01-68-66-00-FY-04-93	E6002J	Phase VI DOD Mission Peculiars
490-22-68-66-00-FY-04-93	E6002K	Phase VI DOD Certification Training
490-22-68-66-00-FY-04-93	E6002L	Phase VI DOD Logistics Administration
490-01-68-66-00-FY-04-93	E6002M	Phase VI DOD Spares
490-21-68-66-00-FY-04-93	E6002N	Phase VI DOD Launch Site Services
490-22-68-66-00-FY-04-93	E6002O	Phase VI DOD G.S.E.
490-22-68-66-00-FY-04-93	E6002P	Phase VI DOD LTV Support
490-21-68-66-00-FY-04-93	E6002Q	Phase VI DOD Special Programs
490-22-68-66-00-FY-04-93	E6002R	Phase VI DOD Special Programs
490-01-68-66-00-FY-04-93	E6002S	Phase VI DOD Program Support
490-01-68-66-00-FY-04-93	E6002T	Phase VI DOD Production Support
490-22-68-66-00-FY-04-93	E6002U	Phase VI DOD LRC Support
490-01-68-66-00-FY-04-93	E6002V	Phase VI DOD Tooling Maintenance
490-22-68-66-00-FY-04-93	E6002W	Phase VI DOD Product Improvement
490-22-68-66-00-FY-04-93	E6002X	Phase VI DOD Shipping
490-01-68-66-00-FY-04-93	E6002Y	Phase VI DOD Vehicle Procurement
490-01-68-66-00-FY-04-93	E6002Z	Phase VI DOD Motor Procurement
490-04-10-46-00-FY-04-83	E6004J	Completion of Scout C Trust Fund Program
490-22-66-06-00-FY-04-93	E6178A	NA-16 Program Management
490-21-66-06-00-FY-04-93	E6178B	NA-16 Mission Integration
490-21-66-06-00-FY-04-93	E6178C	NA-16 Preflight Planning
490-21-66-06-00-FY-04-93	E6178D	NA-16 Data Analysis
490-22-66-06-00-FY-04-93	E6178E	NA-16 Systems Engineering
490-22-66-06-00-FY-04-93	E6178F	NA-16 Reliability
490-22-66-06-00-FY-04-93	E6178G	NA-16 Standardization
490-01-66-06-00-FY-04-93	E6178H	NA-16 Vehicle Processing
490-21-66-06-00-FY-04-93	E6178I	NA-16 Range Costs
490-01-66-06-00-FY-04-93	E6178J	NA-16 Mission Peculiars
490-22-66-06-00-FY-04-93	E6178K	NA-16 Certification Training
490-22-66-06-00-FY-04-93	E6178L	NA-16 Logistics Administration
490-01-66-06-00-FY-04-93	E6178M	NA-16 Spares
490-21-66-06-00-FY-04-93	E6178N	NA-16 Launch Site Services
490-22-66-06-00-FY-04-93	E6178O	NA-16 G.S.E.
490-22-66-06-00-FY-04-93	E6178P	NA-16 LTV Support
490-21-66-06-00-FY-04-93	E6178Q	NA-16 Special Programs
490-22-66-06-00-FY-04-93	E6178R	NA-16 Special Programs
490-01-66-06-00-FY-04-93	E6178S	NA-16 Program Support

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AGENCYWIDE CODE	J. O. #	JOB
490-01-66-06-00-FY-04-93	E6178T	NA-16 Production Support
490-22-66-06-00-FY-02-93	E6178U	NA-16 Travel
490-01-66-06-00-FY-04-93	E6178V	NA-16 Tooling Maintenance
490-22-66-06-00-FY-04-93	E6178W	NA-16 Incentive
490-22-66-06-00-FY-04-93	E6178X	NA-16 Shipping
490-01-66-06-00-FY-04-93	E6178Y	NA-16 Vehicle Procurement
490-01-66-06-00-FY-04-93	E6178Z	NA-16 Motor Procurement
490-22-76-06-00-FY-04-93	E6179	S-179 IMS Costs
490-22-76-06-00-FY-04-93	E6179A	AF-P76-5 Management
490-21-76-06-00-FY-04-93	E6179B	AF-P76-5 Mission Integration
490-21-76-06-00-FY-04-93	E6179C	AF-P76-5 Preflight Planning
490-21-76-06-00-FY-04-93	E6179D	AF-P76-5 Data Analysis
490-22-76-06-00-FY-04-93	E6179E	AF-P76-5 Systems Engineering
490-22-76-06-00-FY-04-93	E6179F	AF-P76-5 Reliability
490-22-76-06-00-FY-04-93	E6179G	AF-P76-5 Standardization
490-01-76-06-00-FY-04-93	E6179H	AF-P76-5 Vehicle Processing
490-21-76-06-00-FY-04-93	E6179I	AF-P76-5 Range Costs
490-01-76-06-00-FY-04-93	E6179J	AF-P76-5 Mission Peculiars
490-22-76-06-00-FY-04-93	E6179K	AF-P76-5 Certification Training
490-22-76-06-00-FY-04-93	E6179L	AF-P76-5 Logistics Administration
490-01-76-06-00-FY-04-93	E6179M	AF-P76-5 Spares
490-21-76-06-00-FY-04-93	E6179N	AF-P76-5 Launch Site Services
490-22-76-06-00-FY-04-93	E6179O	AF-P76-5 G.S.E.
490-22-76-06-00-FY-04-93	E6179P	AF-P76-5 LTV Support
490-21-76-06-00-FY-04-93	E6179Q	AF-P76-5 Special Programs
490-22-76-06-00-FY-04-93	E6179R	AF-P76-5 Special Programs
490-01-76-06-00-FY-04-93	E6179S	AF-P76-5 Program Support
490-01-76-06-00-FY-04-93	E6179T	AF-P76-5 Production Support
490-22-76-06-00-FY-02-93	E6179U	AF-P76-5 Travel
490-01-76-06-00-FY-04-93	E6179V	AF-P76-5 Tooling Maintenance
490-21-76-06-00-FY-04-93	E6179W	AF-P76-5 Incentive
490-22-76-06-00-FY-04-93	E6179X	AF-P76-5 Shipping
490-01-76-06-00-FY-04-93	E6179Y	AF-P76-5 Vehicle Procurement
490-01-76-06-00-FY-04-93	E6179Z	AF-P76-5 Motor Procurement
490-02-00-66-00-FY-04-00	E6180	S-180 IMS Costs
490-02-02-26-00-FY-04-00	E6180A	CAS-A Program Management
490-02-04-26-00-FY-04-00	E6180B	CAS-A Mission Integration
490-02-02-26-00-FY-04-00	E6180C	CAS-A Preflight Planning
490-02-02-26-00-FY-04-00	E6180D	CAS-A Data Analysis
490-02-02-26-00-FY-04-00	E6180E	CAS-A Systems Engineering
490-02-02-26-00-FY-04-00	E6180F	CAS-A Reliability
490-02-02-26-00-FY-04-00	E6180G	CAS-A Standardization
490-01-01-26-00-FY-04-00	E6180H	CAS-A Vehicle Processing
490-02-04-26-00-FY-04-00	E6180I	CAS-A Range Costs
490-01-04-26-00-FY-04-00	E6180J	CAS-A Mission Peculiars
490-02-02-26-00-FY-04-00	E6180K	CAS-A Certification Training
490-02-03-26-00-FY-04-00	E6180L	CAS-A Logistics Administration

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NASA SCOUT R AND D PROGRAM NUMBERS Continued

AGENCYWIDE CODE	J. O. #	JOB
490-01-03-26-00-FY-04-00	E6180M	CAS-A Spares
490-02-01-26-00-FY-04-00	E6180N	CAS-A Launch Site Services
490-02-01-26-00-FY-04-00	E6180O	CAS-A G.S.E.
490-02-02-26-00-FY-04-00	E6180P	CAS-A LTV Support
490-01-01-26-00-FY-04-00	E6180Q	CAS-A Special Programs
490-02-02-26-00-FY-04-00	E6180R	CAS-A Special Programs
490-02-02-26-00-FY-04-00	E6180S	CAS-A Program Support
490-01-01-26-00-FY-04-00	E6180T	CAS-A Production Support
490-02-02-26-00-FY-02-00	E6180U	CAS-A Travel
490-01-06-26-00-FY-04-00	E6180V	CAS-A Tooling Maintenance
490-02-06-26-00-FY-04-00	E6180W	CAS-A Investigations/Incentives
490-02-05-26-00-FY-04-00	E6180X	CAS-A Shipping
490-01-01-26-00-FY-04-00	E6180Y	CAS-A Vehicle Procurement
490-01-02-26-00-FY-04-00	E6180Z	CAS-A Motor Procurement
490-02-00-66-00-FY-04-00	E6181	S-181 IMS Costs
490-02-02-06-00-FY-04-00	E6181A	AEROS-A Program Management
490-02-04-06-00-FY-04-00	E6181B	AEROS-A Mission Integration
490-02-02-06-00-FY-04-00	E6181C	AEROS-A Preflight Planning
490-02-02-06-00-FY-04-00	E6181D	AEROS-A Data Analysis
490-02-02-06-00-FY-04-00	E6181E	AEROS-A Systems Engineering
490-02-02-06-00-FY-04-00	E6181F	AEROS-A Reliability
490-02-02-06-00-FY-04-00	E6181G	AEROS-A Standardization
490-01-01-06-00-FY-04-00	E6181H	AEROS-A Vehicle Processing
490-02-04-06-00-FY-04-00	E6181I	AEROS-A Range Costs
490-01-04-06-00-FY-04-00	E6181J	AEROS-A Mission Peculiars
490-02-02-06-00-FY-04-00	E6181K	AEROS-A Certification Training
490-02-03-06-00-FY-04-00	E6181L	AEROS-A Logistics Administration
490-01-03-06-00-FY-04-00	E6181M	AEROS-A Spares
490-02-01-06-00-FY-04-00	E6181N	AEROS-A Launch Site Services
490-02-01-06-00-FY-04-00	E6181O	AEROS-A G.S.E.
490-02-02-06-00-FY-04-00	E6181P	AEROS-A LTV Support
490-01-01-06-00-FY-04-00	E6181Q	AEROS-A Special Programs
490-02-02-06-00-FY-04-00	E6181R	AEROS-A Special Programs
490-02-02-06-00-FY-04-00	E6181S	AEROS-A Program Support
490-01-01-06-00-FY-04-00	E6181T	AEROS-A Production Support
490-02-02-06-00-FY-02-00	E6181U	AEROS-A Travel
490-01-06-06-00-FY-04-00	E6181V	AEROS-A Tooling Maintenance
490-02-06-06-00-FY-04-00	E6181W	AEROS-A Investigations/Incentives
490-02-05-06-00-FY-04-00	E6181X	AEROS-A Shipping
490-01-01-06-00-FY-04-00	E6181Y	AEROS-A Vehicle Procurement
490-01-02-06-00-FY-04-00	E6181Z	AEROS-A Motor Procurement
490-22-66-06-00-FY-04-93	E6182	S-182 IMS Costs
490-22-66-06-00-FY-04-93	E6182A	NA-15 Program Management
490-21-66-06-00-FY-04-93	E6182B	NA-15 Mission Integration
490-21-66-06-00-FY-04-93	E6182C	NA-15 Preflight Planning
490-21-66-06-00-FY-04-93	E6182D	NA-15 Data Analysis
490-22-66-06-00-FY-04-93	E6182E	NA-15 Systems Engineering
490-22-66-06-00-FY-04-93	E6182F	NA-15 Reliability

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NASA SCOUT R AND D PROGRAM NUMBERS Continued

AGENCYWIDE CODE	J. O. #		JOB
490-22-66-06-00-FY-04-93	E6182G	NA-15	Standardization
490-01-66-06-00-FY-04-93	E6182H	NA-15	Vehicle Processing
490-21-66-06-00-FY-04-93	E6182I	NA-15	Range Costs
490-01-66-06-00-FY-04-93	E6182J	NA-15	Mission Peculiars
490-22-66-06-00-FY-04-93	E6182K	NA-15	Certification Training
490-22-66-06-00-FY-04-93	E6182L	NA-15	Logistics Administration
490-01-66-06-00-FY-04-93	E6182M	NA-15	Spares
490-21-66-06-00-FY-04-93	E6182N	NA-15	Launch Site Services
490-22-66-06-00-FY-04-93	E6182O	NA-15	G.S.E.
490-22-66-06-00-FY-04-93	E6182P	NA-15	LTV Support
490-21-66-06-00-FY-04-93	E6182Q	NA-15	Special Programs
490-22-66-06-00-FY-04-93	E6182R	NA-15	Special Programs
490-01-66-06-00-FY-04-93	E6182S	NA-15	Program Support
490-01-66-06-00-FY-04-93	E6182T	NA-15	Production Support
490-22-66-06-00-FY-02-93	E6182U	NA-15	Travel
490-01-66-06-00-FY-04-93	E6182V	NA-15	Tooling Maintenance
490-22-66-06-00-FY-04-93	E6182W	NA-15	Investigations/Incentives
490-22-66-06-00-FY-04-93	E6182X	NA-15	Shipping
490-01-66-06-00-FY-04-93	E6182Y	NA-15	Vehicle Procurement
490-01-66-06-00-FY-04-93	E6182Z	NA-15	Motor Procurement
490-02-00-66-00-FY-04-00	E6183	S-183	IMS Costs
490-02-02-06-00-FY-04-00	E6183A	UK-4	Program Management
490-02-04-06-00-FY-04-00	E6183B	UK-4	Mission Integration
490-02-02-06-00-FY-04-00	E6183C	UK-4	Preflight Planning
490-02-02-06-00-FY-04-00	E6183D	UK-4	Data Analysis
490-02-02-06-00-FY-04-00	E6183E	UK-4	Systems Engineering
490-02-02-06-00-FY-04-00	E6183F	UK-4	Reliability
490-02-02-06-00-FY-04-00	E6183G	UK-4	Standardization
490-01-01-06-00-FY-04-00	E6183H	UK-4	Vehicle Processing
490-02-04-06-00-FY-04-00	E6183I	UK-4	Range Costs
490-01-04-06-00-FY-04-00	E6183J	UK-4	Mission Peculiars
490-02-02-06-00-FY-04-00	E6183K	UK-4	Certification Training
490-02-03-06-00-FY-04-00	E6183L	UK-4	Logistics Administration
490-01-03-06-00-FY-04-00	E6183M	UK-4	Spares
490-02-01-06-00-FY-04-00	E6183N	UK-4	Launch Site Services
490-02-01-06-00-FY-04-00	E6183O	UK-4	G.S.E.
490-02-02-06-00-FY-04-00	E6183P	UK-4	LTV Support
490-01-01-06-00-FY-04-00	E6183Q	UK-4	Special Programs
490-02-02-06-00-FY-04-00	E6183R	UK-4	Special Programs
490-02-02-06-00-FY-04-00	E6183S	UK-4	Program Support
490-01-01-06-00-FY-04-00	E6183T	UK-4	Production Support
490-02-02-06-00-FY-02-00	E6183U	UK-4	Travel
490-01-06-06-00-FY-04-00	E6183V	UK-4	Tooling Maintenance
490-02-05-06-00-FY-04-00	E6183W	UK-4	Investigations and Incentives
490-02-05-06-00-FY-04-00	E6183X	UK-4	Shipping
490-01-01-06-00-FY-04-00	E6183Y	UK-4	Vehicle Procurement
490-01-02-06-00-FY-04-00	E6183Z	UK-4	Motor Procurement

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AGENCYWIDE CODE	J. O. #	JOB
490-02-00-66-00-FY-04-00	E6184	S-184 IMS Costs
490-02-02-36-00-FY-04-00	E6184A	MTS-A Program Management
490-02-04-36-00-FY-04-00	E6184B	MTS-A Mission Integration
490-02-02-36-00-FY-04-00	E6184C	MTS-A Preflight Planning
490-02-02-36-00-FY-04-00	E6184D	MTS-A Data Analysis
490-02-02-36-00-FY-04-00	E6184E	MTS-A Systems Engineering
490-02-02-36-00-FY-04-00	E6184F	MTS-A Reliability
490-02-02-36-00-FY-04-00	E6184G	MTS-A Standardization
490-01-01-36-00-FY-04-00	E6184H	MTS-A Vehicle Processing
490-02-04-36-00-FY-04-00	E6184I	MTS-A Range Costs
490-01-04-36-00-FY-04-00	E6184J	MTS-A Mission Peculiars
490-02-02-36-00-FY-04-00	E6184K	MTS-A Certification Training
490-02-03-36-00-FY-04-00	E6184L	MTS-A Logistics Administration
490-01-03-36-00-FY-04-00	E6184M	MTS-A Spares
490-02-01-36-00-FY-04-00	E6184N	MTS-A Launch Site Services
490-02-01-36-00-FY-04-00	E6184O	MTS-A G.S.E.
490-02-02-36-00-FY-04-00	E6184P	MTS-A LTV Support
490-01-01-36-00-FY-04-00	E6184Q	MTS-A Special Programs
490-02-02-36-00-FY-04-00	E6184R	MTS-A Special Programs
490-02-02-36-00-FY-04-00	E6184S	MTS-A Program Support
490-01-01-36-00-FY-04-00	E6184T	MTS-A Production Support
490-02-02-36-00-FY-02-00	E6184U	MTS-A Travel
490-01-06-36-00-FY-04-00	E6184V	MTS-A Tooling Maintenance
490-02-08-06-00-FY-04-00	E6184W	MTS-A Investigations and Incentives
490-02-05-36-00-FY-04-00	E6184X	MTS-A Shipping
490-01-01-36-00-FY-04-00	E6184Y	MTS-A Vehicle Procurement
490-01-02-36-00-FY-04-00	E6184Z	MTS-A Motor Procurement
490-04-02-06-00-FY-0T-00	E6185	S-185 IMS Costs
490-04-02-06-00-FY-0T-00	E6185A	ESRO-IV Management
490-04-02-06-00-FY-0T-00	E6185B	ESRO-IV Mission Integration
490-04-02-06-00-FY-0T-00	E6185C	ESRO-IV Preflight Planning
490-04-02-06-00-FY-0T-00	E6185D	ESRO-IV Data Analysis
490-04-02-06-00-FY-0T-00	E6185E	ESRO-IV Systems Engineering
490-04-02-06-00-FY-0T-00	E6185F	ESRO-IV Reliability
490-04-02-06-00-FY-0T-00	E6185G	ESRO-IV Standardization
490-04-02-06-00-FY-0T-00	E6185H	ESRO-IV Vehicle Processing
490-04-02-06-00-FY-0T-00	E6185I	ESRO-IV Range Costs
490-04-02-06-00-FY-0T-00	E6185J	ESRO-IV Mission Peculiars
490-04-02-06-00-FY-0T-00	E6185K	ESRO-IV Certification Training
490-04-02-06-00-FY-0T-00	E6185L	ESRO-IV Logistics Administration
490-04-02-06-00-FY-0T-00	E6185M	ESRO-IV Spares
490-04-02-06-00-FY-0T-00	E6185N	ESRO-IV Launch Site Services
490-04-02-06-00-FY-0T-00	E6185O	ESRO-IV G.S.E.
490-04-02-06-00-FY-0T-00	E6185P	ESRO-IV LTV Support
490-04-02-06-00-FY-0T-00	E6185Q	ESRO-IV Special Programs
490-04-02-06-00-FY-0T-00	E6185R	ESRO-IV Special Programs

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NASA SCOUT R AND D PROGRAM NUMBERS Continued

AGENCYWIDE CODE	J. O. #	JOB
490-04-02-06-00-FY-0T-00	E6185S	ESRO-IV Program Support
490-04-02-06-00-FY-0T-00	E6185T	ESRO-IV Production Support
490-04-02-06-00-FY-0T-00	E6185U	ESRO-IV Travel
490-04-02-06-00-FY-0T-00	E6185V	ESRO-IV Tooling Maintenance
490-04-02-06-00-FY-0T-00	E6185W	ESRO-IV Investigations and Incentives
490-04-02-06-00-FY-0T-00	E6185X	ESRO-IV Shipping
490-04-02-06-00-FY-0T-00	E6185Y	ESRO-IV Vehicle Procurement
490-04-02-06-00-FY-0T-00	E6185Z	ESRO-IV Motor Procurement
490-04-08-06-00-FY-0T-00	E6186	S-186 IMS Costs
490-04-08-06-00-FY-04-83	E6186A	AEROS-B Management
490-04-08-06-00-FY-04-83	E6186B	AEROS-B Mission Integration
490-04-08-06-00-FY-04-83	E6186C	AEROS-B Preflight Planning
490-04-08-06-00-FY-04-83	E6186D	AEROS-B Data Analysis
490-04-08-06-00-FY-04-83	E6186E	AEROS-B Systems Engineering
490-04-08-06-00-FY-04-83	E6186F	AEROS-B Reliability
490-04-08-06-00-FY-04-83	E6186G	AEROS-B Standardization
490-04-08-06-00-FY-04-83	E6186H	AEROS-B Vehicle Processing
490-04-08-06-00-FY-04-83	E6186I	AEROS-B Range Costs
490-04-08-06-00-FY-04-83	E6186J	AEROS-B Mission Peculiars
490-04-08-06-00-FY-04-83	E6186K	AEROS-B Certification Training
490-04-08-06-00-FY-04-83	E6186L	AEROS-B Logistics Administration
490-04-08-06-00-FY-04-83	E6186M	AEROS-B Spares
490-04-08-06-00-FY-04-83	E6186N	AEROS-B Launch Site Services
490-04-08-06-00-FY-04-83	E6186O	AEROS-B G.S.E.
490-04-08-06-00-FY-04-83	E6186P	AEROS-B LTV Support
490-04-08-06-00-FY-04-83	E6186Q	AEROS-B Special Programs
490-04-08-06-00-FY-04-83	E6186R	AEROS-B Special Programs
490-04-08-06-00-FY-04-83	E6186S	AEROS-B Program Support
490-04-08-06-00-FY-04-83	E6186T	AEROS-B Production Support
490-04-08-06-00-FY-02-83	E6186U	AEROS-B Travel
490-04-08-06-00-FY-04-83	E6186V	AEROS-B Tooling Maintenance
490-04-08-06-00-FY-04-83	E6186W	AEROS-B Failure Investigations and Incentives
490-04-08-06-00-FY-04-83	E6186X	AEROS-B Shipping
490-04-08-06-00-FY-04-83	E6186Y	AEROS-B Vehicle Procurement
490-04-08-06-00-FY-04-83	E6186Z	AEROS-B Motor Procurement
490-02-00-66-00-FY-04-00	E6187	S-137 IMS Costs
490-02-02-46-00-FY-04-00	E6187A	UK-5 Program Management
490-02-04-46-00-FY-04-00	E6187B	UK-5 Mission Integration
490-02-02-46-00-FY-04-00	E6187C	UK-5 Preflight Planning
490-02-02-46-00-FY-04-00	E6187D	UK-5 Data Analysis
490-02-02-46-00-FY-04-00	E6187E	UK-5 Systems Engineering
490-02-02-46-00-FY-04-00	E6187F	UK-5 Reliability
490-02-02-46-00-FY-04-00	E6187G	UK-5 Standardization
490-01-01-46-00-FY-04-00	E6187H	UK-5 Vehicle Processing
490-04-15-46-00-FY-04-83	E6187I	UK-5 Range Costs
490-01-04-46-00-FY-04-00	E6187J	UK-5 Mission Peculiars
490-02-02-46-00-FY-04-00	E6187K	UK-5 Certification Training

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490-02-03-46-00-FY-04-00	E6187L	UK-5 Logistics Administration
490-01-03-46-00-FY-04-00	E6187M	UK-5 Spares
490-02-01-46-00-FY-04-00	E6187N	UK-5 Launch Site Services
490-02-01-46-00-FY-04-00	E6187O	UK-5 G.S.E.
490-02-02-46-00-FY-04-00	E6187P	UK-5 LTV Support
490-01-01-46-00-FY-04-00	E6187Q	UK-5 Special Programs
490-02-02-46-00-FY-04-00	E6187R	UK-5 Special Programs
490-02-02-46-00-FY-04-00	E6187S	UK-5 Program Support
490-01-01-46-00-FY-04-00	E6187T	UK-5 Production Support
490-02-02-46-00-FY-02-00	E6187U	UK-5 Travel
490-01-06-46-00-FY-04-00	E6187V	UK-5 Tooling Maintenance
490-02-08-46-00-FY-04-00	E6187W	UK-5 Investigations and Incentives
490-04-15-46-00-FY-04-83	E6187X	UK-5 Shipping
490-01-01-46-00-FY-04-00	E6187Y	UK-5 Vehicle Procurement
490-01-02-46-00-FY-04-00	E6187Z	UK-5 Motor Procurement
490-02-16-66-00-FY-04-00	E6188	S-188 IMS Costs
490-04-16-06-00-FY-0T-00	E6188A	UK-X4 Program Management
490-04-16-06-00-FY-0T-00	E6188B	UK-X4 Mission Integration
490-04-16-06-00-FY-0T-00	E6188C	UK-X4 Preflight Planning
490-04-16-06-00-FY-0T-00	E6188D	UK-X4 Data Analysis
490-04-16-06-00-FY-0T-00	E6188E	UK-X4 Systems Engineering
490-04-16-06-00-FY-0T-00	E6188F	UK-X4 Reliability
490-04-16-06-00-FY-0T-00	E6188G	UK-X4 Standardization
490-04-16-06-00-FY-0T-00	E6188H	UK-X4 Vehicle Processing
490-04-16-06-00-FY-0T-00	E6188I	UK-X4 Range Costs
490-04-16-06-00-FY-0T-00	E6188J	UK-X4 Mission Peculiars
490-04-16-06-00-FY-0T-00	E6188K	UK-X4 Certification Training
490-04-16-06-00-FY-0T-00	E6188L	UK-X4 Logistics Administration
490-04-16-06-00-FY-0T-00	E6188M	UK-X4 Spares
490-04-16-06-00-FY-0T-00	E6188N	Uk-X4 Launch Site Services
490-04-16-06-00-FY-0T-00	E6188O	UK-X4 G.S.E.
490-04-16-06-00-FY-0T-00	E6188P	UK-X4 LTV Support
490-04-16-06-00-FY-0T-00	E6188Q	UK-X4 Special Programs
490-04-16-06-00-FY-0T-00	E6188R	UK-X4 Special Programs
490-04-16-06-00-FY-0T-00	E6188S	UK-X4 Program Support
490-04-16-06-00-FY-0T-00	E6188T	UK-X4 Production Support
490-04-16-06-00-FY-0T-00	E6188U	UK-X4 Travel
490-04-16-06-00-FY-0T-00	E6188V	UK-X4 Tooling Maintenance
490-04-16-06-00-FY-0T-00	E6188W	UK-X4 Investigations and Incentives
490-04-16-06-00-FY-0T-00	E6188X	UK-X4 Shipping
490-04-16-06-00-FY-0T-00	E6188Y	UK-X4 Vehicle Procurement
490-04-16-06-00-FY-0T-00	E6188Z	UK-X4 Motor Procurement
490-02-00-66-00-FY-04-00	E6189	S-189 IMS Costs
490-02-02-06-00-FY-04-00	E6189A	ANS-A Program Management
490-02-04-06-00-FY-04-00	E6189B	ANS-A Mission Integration
490-02-02-06-00-FY-04-00	E6189C	ANS-A Preflight Planning
490-02-02-06-00-FY-04-00	E6189D	ANS-A Data Analysis
490-02-02-06-00-FY-04-00	E6189E	ANS-A Systems Engineering

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490-02-02-06-00-FY-04-00	E6189F	ANS-A Reliability
490-02-02-06-00-FY-04-00	E6189G	ANS-A Standardization
490-01-01-06-00-FY-04-00	E6189H	ANS-A Vehicle Processing
490-02-04-06-00-FY-04-00	E6189I	ANS-A Range Costs
490-01-04-06-00-FY-04-00	E6189J	ANS-A Mission Peculiars
490-02-02-06-00-FY-04-00	E6189K	ANS-A Certification Training
490-02-03-06-00-FY-04-00	E6189L	ANS-A Logistics Administration
490-01-03-06-00-FY-04-00	E6189M	ANS-A Spares
490-02-01-06-00-FY-04-00	E6189N	ANS-A Launch Site Services
490-02-01-06-00-FY-04-00	E6189O	ANS-A G.S.E.
490-02-02-06-00-FY-04-00	E6189P	ANS-A LTV Support
490-01-01-06-00-FY-04-00	E6189Q	ANS-A Special Programs
490-02-02-06-00-FY-04-00	E6189R	ANS-A Special Programs
490-02-02-06-00-FY-04-00	E6189S	ANS-A Program Support
490-01-01-06-00-FY-04-00	E6189T	ANS-A Production Support
490-02-02-06-00-FY-02-00	E6189U	ANS-A Travel
490-01-06-06-00-FY-04-00	E6189V	ANS-A Tooling Maintenance
490-02-08-06-00-FY-04-00	E6189W	ANS-A Failure Investigations and Incentives
490-02-05-06-00-FY-04-00	E6189X	ANS-A Shipping
490-01-01-06-00-FY-04-00	E6189Y	ANS-A Vehicle Procurement
490-01-02-06-00-FY-04-00	E6189Z	ANS-A Motor Procurement
490-02-00-66-00-FY-04-00	E6190	S-190 IMS Costs
490-02-02-46-00-FY-04-00	E6190A	San Marco C-2 Program Management
490-02-04-46-00-FY-04-00	E6190B	San Marco C-2 Mission Integration
490-02-02-46-00-FY-04-00	E6190C	San Marco C-2 Preflight Planning
490-02-02-46-00-FY-04-00	E6190D	San Marco C-2 Data Analysis
490-02-02-46-00-FY-04-00	E6190E	San Marco C-2 Systems Engineering
490-02-02-46-00-FY-04-00	E6190F	San Marco C-2 Reliability
490-02-02-46-00-FY-04-00	E6190G	San Marco C-2 Standardization
490-01-01-46-00-FY-04-00	E6190H	San Marco C-2 Vehicle Processing
490-02-04-46-00-FY-04-00	E6190I	San Marco C-2 Range Costs
894-04-10-46-00-FY-04-83	E6190J	San Marco C-2 Mission Peculiars
490-02-02-46-00-FY-04-00	E6190K	San Marco C-2 Certification Training
490-02-03-46-00-FY-04-00	E6190L	San Marco C-2 Logistics Administration
490-01-03-46-00-FY-04-00	E6190M	San Marco C-2 Spares
490-02-01-46-00-FY-04-00	E6190N	San Marco C-2 Launch Site Services
490-02-01-46-00-FY-04-00	E6190O	San Marco C-2 G.S.E.
490-02-02-46-00-FY-04-00	E6190P	San Marco C-2 LTV Support
490-01-01-46-00-FY-04-00	E6190Q	San Marco C-2 Special Programs
490-02-02-46-00-FY-04-00	E6190R	San Marco C-2 Special Programs
490-02-02-46-00-FY-04-00	E6190S	San Marco C-2 Program Support
490-01-01-46-00-FY-04-00	E6190T	San Marco C-2 Production Support
490-02-02-46-00-FY-02-00	E6190U	San Marco C-2 Travel
490-01-06-46-00-FY-04-00	E6190V	San Marco C-2 Tooling Maintenance
490-02-08-46-00-FY-04-00	E6190W	San Marco C-2 Investigations and Incentives
490-02-05-46-00-FY-04-00	E6190X	San Marco C-2 Shipping
490-01-01-46-00-FY-04-00	E6190Y	San Marco C-2 Vehicle Procurement
490-01-02-46-00-FY-04-00	E6190Z	San Marco C-2 Motor Procurement

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NASA SCOUT R AND D PROGRAM NUMBERS Continued

AGENCYWIDE CODE	J. O. #	JOB
490-02-00-66-00-FY-04-00	E6191	S-191 IMS Costs
490-02-02-16-00-FY-04-00	E6191A	NPE (Hawkeye) Program Management
490-02-04-16-00-FY-04-00	E6191B	NPE (Hawkeye) Mission Integration
490-02-02-16-00-FY-04-00	E6191C	NPE (Hawkeye) Preflight Planning
490-02-02-16-00-FY-04-00	E6191D	NPE (Hawkeye) Data Analysis
490-02-02-16-00-FY-04-00	E6191E	NPE (Hawkeye) Systems Engineering
490-02-02-16-00-FY-04-00	E6191F	NPE (Hawkeye) Reliability
490-02-02-16-00-FY-04-00	E6191G	NPE (Hawkeye) Standardization
490-01-01-16-00-FY-04-00	E6191H	NPE (Hawkeye) Vehicle Processing
490-02-04-16-00-FY-04-00	E6191I	NPE (Hawkeye) Range Costs
490-01-04-16-00-FY-04-00	E6191J	NPE (Hawkeye) Mission Peculiars
490-02-02-16-00-FY-04-00	E6191K	NPE (Hawkeye) Certification Training
490-02-03-16-00-FY-04-00	E6191L	NPE (Hawkeye) Logistics Administration
490-01-03-16-00-FY-04-00	E6191M	NPE (Hawkeye) Spares
490-02-01-16-00-FY-04-00	E6191N	NPE (Hawkeye) Launch Site Services
490-02-01-16-00-FY-04-00	E6191O	NPE (Hawkeye) G.S.E.
490-02-02-16-00-FY-04-00	E6191P	NPE (Hawkeye) LTV Support
490-01-01-16-00-FY-04-00	E6191Q	NPE (Hawkeye) Special Programs
490-02-02-16-00-FY-04-00	E6191R	NPE (Hawkeye) Special Programs
490-02-02-16-00-FY-04-00	E6191S	NPE (Hawkeye) Program Support
490-01-01-16-00-FY-04-00	E6191T	NPE (Hawkeye) Production Support
490-02-02-16-00-FY-02-00	E6191U	NPE (Hawkeye) Travel
490-01-06-16-00-FY-04-00	E6191V	NPE (Hawkeye) Tooling Maintenance
490-02-08-16-00-FY-04-00	E6191W	NPE (Hawkeye) Failure Investigations/Incentives
490-02-05-16-00-FY-04-00	E6191X	NPE (Hawkeye) Shipping
490-01-01-16-00-FY-04-00	E6191Y	NPE (Hawkeye) Vehicle Procurement
490-01-02-16-00-FY-04-00	E6191Z	NPE (Hawkeye) Motor Procurement
490-22-68-06-00-FY-04-93	E6192	S-192 IMS Costs
490-22-68-06-00-FY-04-93	E6192A	NA-22 Program Management
490-21-68-06-00-FY-04-93	E6192B	NA-22 Mission Integration
490-21-68-06-00-FY-04-93	E6192C	NA-22 Preflight Planning
490-21-68-06-00-FY-04-93	E6192D	NA-22 Data Analysis
490-22-68-06-00-FY-04-93	E6192E	NA-22 Systems Engineering
490-22-68-06-00-FY-04-93	E6192F	NA-22 Reliability
490-22-68-06-00-FY-04-93	E6192G	NA-22 Standardization
490-01-68-06-00-FY-04-93	E6192H	NA-22 Vehicle Processing
490-21-68-06-00-FY-04-93	E6192I	NA-22 Range Costs
490-01-68-06-00-FY-04-93	E6192J	NA-22 Mission Peculiars
490-22-68-06-00-FY-04-93	E6192K	NA-22 Certification Training
490-22-68-06-00-FY-04-93	E6192L	NA-22 Logistics Administration
490-01-68-06-00-FY-04-93	E6192M	NA-22 Spares
490-21-68-06-00-FY-04-93	E6192N	NA-22 Launch Site Services
490-22-68-06-00-FY-04-93	E6192O	NA-22 G.S.E.
490-22-68-06-00-FY-04-93	E6192P	NA-22 LTV Support
490-21-68-06-00-FY-04-93	E6192Q	NA-22 Special Programs
490-22-68-06-00-FY-04-93	E6192R	NA-22 Sepcial Programs
490-01-68-06-00-FY-04-93	E6192S	NA-22 Program Support

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NASA SCOUT R AND D PROGRAM NUMBERS Continued

AGENCYWIDE CODE	J. O. #	JOB
490-01-68-06-00-FY-04-93	E6192T	NA-22 Production Support
490-22-68-06-00-FY-02-93	E6192U	NA-22 Travel
490-01-68-06-00-FY-04-93	E6192V	NA-22 Tooling Maintenance
490-21-68-06-00-FY-04-93	E6192W	NA-22 Failure Investigations/Incentives
490-22-68-06-00-FY-04-93	E6192X	NA-22 Shipping
490-01-68-06-00-FY-04-93	E6192Y	NA-22 Vehicle Procurement
490-01-68-06-00-FY-04-93	E6192Z	NA-22 Motor Procurement
490-02-00-77-00-FY-04-00	E7000	Phase VII NASA Program
490-02-02-77-00-FY-04-00	E7000A	Phase VII Program Management
490-02-04-77-00-FY-04-00	E7000B	Phase VII Mission Integration
490-02-02-77-00-FY-04-00	E7000C	Phase VII General Preflight Planning
490-02-02-77-00-FY-04-00	E7000D	Phase VII General Data Reduction
490-02-02-77-00-FY-04-00	E7000E	Phase VII Systems Engineering
490-02-02-77-00-FY-04-00	E7000F	Phase VII Reliability
490-02-02-77-00-FY-04-00	E7000G	Phase VII Standardization
490-01-01-77-00-FY-04-00	E7000H	Phase VII Vehicle Processing
490-02-04-77-00-FY-04-00	E7000I	Phase VII Range Costs
894-04-10-47-00-FY-0T-00	E7000J	Phase VII San Marco
490-02-02-77-00-FY-04-00	E7000K	Phase VII Certification Training
490-02-03-77-00-FY-04-00	E7000L	Phase VII Logistics Administration
490-01-03-77-00-FY-04-00	E7000M	Phase VII Spares
490-02-01-77-00-FY-04-00	E7000O	Phase VII G.S.E.
490-02-02-77-00-FY-04-00	E7000P	Phase VII LTV Support
490-01-01-77-00-FY-04-00	E7000Q	Phase VII Special Programs
490-02-02-77-00-FY-04-00	E7000R	Phase VII Special Programs
490-02-02-77-00-FY-04-00	E7000S	Phase VII Program Support
490-01-01-77-00-FY-04-00	E7000T	Phase VII Production Support
490-02-02-77-00-FY-04-00	E7000U	Phase VII LRC Support
490-02-02-77-00-FY-02-00	E7000U	Phase VII Travel
490-01-06-77-00-FY-04-00	E7000V	Phase VII Tooling Maintenance
490-03-01-77-00-FY-04-00	E7000W	Phase VII Product Improvement
490-02-05-77-00-FY-04-00	E7000X	Phase VII Shipping
490-01-01-77-00-FY-04-00	E7000Y	Phase VII Vehicle Procurement
490-01-02-77-00-FY-04-00	E7000Z	Phase VII Motor Procurement
490-22-66-77-00-FY-04-93	E7001	Phase VII DOD Program (66-95)
490-22-66-77-00-FY-04-93	E7001A	Phase VII DOD Management
490-21-66-77-00-FY-04-93	E7001B	Phase VII DOD Mission Integration
490-21-66-77-00-FY-04-93	E7001C	Phase VII DOD Preflight Planning
490-21-66-77-00-FY-04-93	E7001D	Phase VII DOD Data Analysis
490-22-66-77-00-FY-04-93	E7001E	Phase VII DOD Systems Engineering
490-22-66-77-00-FY-04-93	E7001F	Phase VII DOD Reliability
490-22-66-77-00-FY-04-93	E7001G	Phase VII DOD Standardization
490-01-66-77-00-FY-04-93	E7001H	Phase VII DOD Vehicle Processing
490-21-66-77-00-FY-04-93	E7001I	Phase VII DOD Range Costs
490-01-66-77-00-FY-04-93	E7001J	Phase VII DOD Mission Peculiars
490-22-66-77-00-FY-04-93	E7001K	Phase VII DOD Certification Training
490-22-66-77-00-FY-04-93	E7001L	Phase VII DOD Logistics Administration
490-01-66-77-00-FY-04-93	E7001M	Phase VII DOD Spares

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AGENCYWIDE CODE	J. O. #	JOB
490-21-66-77-00-FY-04-93	E7001N	Phase VII DOD Launch Site Services
490-22-66-77-00-FY-04-93	E7001O	Phase VII DOD G.S.E.
490-22-66-77-00-FY-04-93	E7001P	Phase VII DOD LTV Support
490-21-66-77-00-FY-04-93	E7001Q	Phase VII DOD Special Programs
490-22-66-77-00-FY-04-93	E7001R	Phase VII DOD Special Programs
490-01-66-77-00-FY-04-93	E7001S	Phase VII DOD Program Support
490-01-66-77-00-FY-04-93	E7001T	Phase VII DOD Production Support
490-22-66-77-00-FY-04-93	E7001U	Phase VII DOD LRC Support
490-22-66-77-00-FY-02-93	E7001U	Phase VII DOD Travel
490-01-66-77-00-FY-04-93	E7001V	Phase VII DOD Tooling Maintenance
490-03-66-77-00-FY-04-93	E7001W	Phase VII DOD Product Improvement
490-22-66-77-00-FY-04-93	E7001X	Phase VII DOD Shipping
490-01-66-77-00-FY-04-93	E7001Y	Phase VII DOD Vehicle Procurement
490-01-66-77-00-FY-04-93	E7001Z	Phase VII DOD Motor Procurement
490-22-68-77-00-FY-04-93	E7002	Phase VII DOD Program (68-71)
490-22-68-77-00-FY-04-93	E7002A	Phase VII DOD Management
490-21-68-77-00-FY-04-93	E7002B	Phase VII DOD Mission Integration
490-21-68-77-00-FY-04-93	E7002C	Phase VII DOD Preflight Planning
490-21-68-77-00-FY-04-93	E7002D	Phase VII DOD Data Analysis
490-22-68-77-00-FY-04-93	E7002E	Phase VII DOD Systems Engineering
490-22-68-77-00-FY-04-93	E7002F	Phase VII DOD Reliability
490-22-68-77-00-FY-04-93	E7002G	Phase VII DOD Standardization
490-01-68-77-00-FY-04-93	E7002H	Phase VII DOD Vehicle Processing
490-21-68-77-00-FY-04-93	E7002I	Phase VII DOD Range Costs
490-01-68-77-00-FY-04-93	E7002J	Phase VII DOD Mission Peculiars
490-22-68-77-00-FY-04-93	E7002K	Phase VII DOD Certification Training
490-22-68-77-00-FY-04-93	E7002L	Phase VII DOD Logistics Administration
490-01-68-77-00-FY-04-93	E7002M	Phase VII DOD Spares
490-21-68-77-00-FY-04-93	E7002N	Phase VII DOD Launch Site Services
490-22-68-77-00-FY-04-93	E7002O	Phase VII DOD G.S.E.
490-22-68-77-00-FY-04-93	E7002P	Phase VII DOD LTV Support
490-21-68-77-00-FY-04-93	E7002Q	Phase VII DOD Special Programs
490-22-68-77-00-FY-04-93	E7002R	Phase VII DOD Special Programs
490-01-68-77-00-FY-04-93	E7002S	Phase VII DOD Program Support
490-01-68-77-00-FY-04-93	E7002T	Phase VII DOD Production Support
490-22-68-77-00-FY-04-93	E7002U	Phase VII DOD LRC Support
490-22-68-77-00-FY-02-93	E7002U	Phase VII DOD Travel
490-01-68-77-00-FY-04-93	E7002V	Phase VII DOD Tooling Maintenance
490-03-68-77-00-FY-04-93	E7002W	Phase VII DOD Product Improvement
490-22-68-77-00-FY-04-93	E7002X	Phase VII DOD Shipping
490-01-68-77-00-FY-04-93	E7002Y	Phase VII DOD Vehicle Procurement
490-01-68-77-00-FY-04-93	E7002Z	Phase VII DOD Motor Procurement
490-01-02-39-00-FY-04-95	E7005Z	Phase VII Sandia Motor Procurement
490-01-04-77-00-75-04-92	E7006Z	NRL Altair III - WR30206 Authorization

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AGENCYWIDE CODE	J.O. #	JOB
490-02-00-77-00-FY-04-00	E7007	IMS on Division Support
490-02-02-77-00-FY-04-00	E7007R	LRC Division Support of Scout Project
490-02-00-88-00-FY-04-00	E7007W	Scout Long Range Plans Study
490-01-05-35-00-FY-04-93	E7008Z	SAMSO-RST-535-BE3 Motors (3)
490-01-04-77-00-FY-04-92	E7009Z	Altair IIIA (TEM640-1) for NRL
490-02-02-47-00-FY-04-00	E7010J	San Marco - NASA Funded Activity
490-02-05-47-00-FY-04-00	E7010X	NASA San Marco Shipping
490-04-10-47-00-FY-04-83	E7020J	San Marco-D Program
879-21-22-03-00-80-04-51	E7050	Field Engineer to Inspect BE-3 in French Guiana
490-04-10-47-00-FY-04-83	E7050J	San Marco-D Procurements
490-04-10-47-00-FY-04-83	E7050X	San Marco GBL's
490-04-10-47-00-FY-04-83	E7080X	San Marco Contractor Shipping Requirements
490-02-00-77-00-FY-04-00	E7100	IMS Computer Services
490-02-04-67-00-FY-04-00	E7100B	Computer Services
490-02-04-67-00-FY-04-00	E7100C	Postflight Data Processing
490-22-68-07-00-FY-04-93	E7192	Phase VII NOVA-I Program
490-22-68-07-00-FY-04-93	E7192A	NOVA-I Management
490-21-68-07-00-FY-04-93	E7192B	NOVA-I Mission Integration
490-21-68-07-00-FY-04-93	E7192C	NOVA-I Preflight Planning
490-21-68-07-00-FY-04-93	E7192D	NOVA-I Data Analysis
490-22-68-07-00-FY-04-93	E7192E	NOVA-I Systems Engineering
490-22-68-07-00-FY-04-93	E7192F	NOVA-I Reliability
490-22-68-07-00-FY-04-93	E7192G	NOVA-I Standardization
490-01-68-07-00-FY-04-93	E7192H	NOVA-I Vehicle Processing
490-21-68-07-00-FY-04-93	E7192I	NOVA-I Range Costs
490-01-68-07-00-FY-04-93	E7192J	NOVA-I Mission Peculiars
490-22-68-07-00-FY-04-93	E7192K	NOVA-I Certification Training
490-22-68-07-00-FY-04-93	E7192L	NOVA-I Logistics Administration
490-01-68-07-00-FY-04-93	E7192M	NOVA-I Spares
490-21-68-07-00-FY-04-93	E7192N	NOVA-I Launch Site Services
490-22-68-07-00-FY-04-93	E7192O	NOVA-I G.S.E.
490-22-68-07-00-FY-04-93	E7192P	NOVA-I LTV Support
490-21-68-07-00-FY-04-93	E7192Q	NOVA-I Special Programs
490-22-68-07-00-FY-04-93	E7192R	NOVA-I Special Programs
490-01-68-07-00-FY-04-93	E7192S	NOVA-I Program Support
490-01-68-07-00-FY-04-93	E7192T	NOVA-I Production Support
490-22-68-07-00-FY-02-93	E7192U	NOVA-I Travel
490-01-68-07-00-FY-04-93	E7192V	NOVA-I Tooling Maintenance
490-21-68-07-00-FY-04-93	E7192W	NOVA-I Failure Investigation/Incentive
490-22-68-07-00-FY-04-93	E7192X	NOVA-I Shipping
490-02-00-77-00-FY-04-00	E7193	S-193 IMS Costs
490-02-02-37-00-FY-04-00	E7193A	Smithsonian Mission (GP-A) Program Management
490-02-04-37-00-FY-04-00	E7193B	Smithsonian Mission (GP-A) Mission Integration
490-02-02-37-00-FY-04-00	E7193C	Smithsonian Mission (GP-A) Preflight Planning
490-02-02-37-00-FY-04-00	E7193D	Smithsonian Mission (GP-A) Data Analysis
490-02-02-37-00-FY-04-00	E7193E	Smithsonian Mission (GP-A) Systems Engineering
490-02-02-37-00-FY-04-00	E7193F	Smithsonian Mission (GP-A) Reliability
490-02-02-37-00-FY-04-00	E7193G	Smithsonian Mission (GP-A) Standardization
490-01-01-37-00-FY-04-00	E7193H	Smithsonian Mission (GP-A) Vehicle Processing

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AGENCYWIDE CODE	J. O. #	JOB
490-02-04-37-00-FY-04-00	E7193I	Smithsonian Mission (GP-A) Range Costs
490-01-04-37-00-FY-04-00	E7193J	Smithsonian Mission (GP-A) Mission Peculiars
490-02-02-37-00-FY-04-00	E7193K	Smithsonian Mission (GP-A) Certification Training
490-02-03-37-00-FY-04-00	E7193L	Smithsonian Mission (GP-A) Logistics Administration
490-01-03-37-00-FY-04-00	E7193M	Smithsonian Mission (GP-A) Spares
490-02-01-37-00-FY-04-00	E7193N	Smithsonian Mission (GP-A) Launch Site Services
490-02-01-37-00-FY-04-00	E7193O	Smithsonian Mission (GP-A) G.S.E.
490-02-02-37-00-FY-04-00	E7193P	Smithsonian Mission (GP-A) LTV Support
490-01-01-37-00-FY-04-00	E7193Q	Smithsonian Mission (GP-A) Special Programs
490-02-02-37-00-FY-04-00	E7193R	Smithsonian Mission (GP-A) Special Programs
490-02-02-37-00-FY-04-00	E7193S	Smithsonian Mission (GP-A) Program Support
490-01-01-37-00-FY-04-00	E7193T	Smithsonian Mission (GP-A) Production Support
490-02-02-37-00-FY-02-00	E7193U	Smithsonian Mission (GP-A) Travel
490-01-06-37-00-FY-04-00	E7193V	Smithsonian Mission (GP-A) Tooling Maintenance
490-02-08-37-00-FY-04-00	E7193W	Smithsonian Mission (GP-A) Failure Invest./Incent.
490-02-05-37-00-FY-04-00	E7193X	Smithsonian Mission (GP-A) Shipping
490-01-01-37-00-FY-04-00	E7193Y	Smithsonian Mission (GP-A) Vehicle Procurement
490-01-02-37-00-FY-04-00	E7193Z	Smithsonian Mission (GP-A) Motor Procurement
490-02-00-77-00-FY-04-00	E7194	S-194 IMS Costs
490-02-02-57-00-FY-04-00	E7194A	SAS-C Program Management
490-02-04-57-00-FY-04-00	E7194B	SAS-C Mission Integration
490-02-02-57-00-FY-04-00	E7194C	SAS-C Preflight Planning
490-02-02-57-00-FY-04-00	E7194D	SAS-C Data Analysis
490-02-02-57-00-FY-04-00	E7194E	SAS-C Systems Engineering
490-02-02-57-00-FY-04-00	E7194F	SAS-C Reliability
490-02-02-57-00-FY-04-00	E7194G	SAS-C Standardization
490-01-01-57-00-FY-04-00	E7194H	SAS-C Vehicle Processing
894-04-10-57-00-FY-0T-00	E7194I	SAS-C Range Costs
490-01-04-57-00-FY-04-00	E7194J	SAS-C Mission Peculiars
490-02-02-57-00-FY-04-00	E7194K	SAS-C Certification Training
490-02-03-57-00-FY-04-00	E7194L	SAS-C Logistics Administration
490-01-03-57-00-FY-04-00	E7194M	SAS-C Spares
490-02-01-57-00-FY-04-00	E7194N	SAS-C Launch Site Services
490-02-01-57-00-FY-04-00	E7194O	SAS-C G.S.E.
490-02-02-57-00-FY-04-00	E7194P	SAS-C LTV Support
490-01-01-57-00-FY-04-00	E7194Q	SAS-C Special Programs
490-02-02-57-00-FY-04-00	E7194R	SAS-C Special Programs
490-02-02-57-00-FY-04-00	E7194S	SAS-C Program Support
490-01-01-57-00-FY-04-00	E7194T	SAS-C Production Support
490-02-02-57-00-FY-02-00	E7194U	SAS-C Travel
490-01-06-57-00-FY-04-00	E7194V	SAS-C Tooling Maintenance
490-02-08-57-00-FY-04-00	E7194W	SAS-C Failure Investigations and Incentives
490-02-05-57-00-FY-04-00	E7194X	SAS-C Shipping
490-01-01-57-00-FY-04-00	E7194Y	SAS-C Vehicle Procurement
490-01-02-57-00-FY-04-00	E7194Z	SAS-C Motor Procurement

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AGENCYWIDE CODE	J. O. #	JOB
490-22-68-07-00-FY-04-93	E7195	S-195 IMS Costs
490-22-68-07-00-FY-04-93	E7195A	NA-17 Program Management
490-21-68-07-00-FY-04-93	E7195B	NA-17 Mission Integration
490-21-68-07-00-FY-04-93	E7195C	NA-17 Preflight Planning
490-21-68-07-00-FY-04-93	E7195D	NA-17 Data Analysis
490-22-68-07-00-FY-04-93	E7195E	NA-17 Systems Engineering
490-22-68-07-00-FY-04-93	E7195F	NA-17 Reliability
490-22-68-07-00-FY-04-93	E7195G	NA-17 Standardization
490-01-68-07-00-FY-04-93	E7195H	NA-17 Vehicle Processing
490-21-68-07-00-FY-04-93	E7195I	NA-17 Range Costs
490-01-68-07-00-FY-04-93	E7195J	NA-17 Mission Peculiars
490-22-68-07-00-FY-04-93	E7195K	NA-17 Certification Training
490-22-68-07-00-FY-04-93	E7195L	NA-17 Logistics Administration
490-01-68-07-00-FY-04-93	E7195M	NA-17 Spares
490-21-68-07-00-FY-04-93	E7195N	NA-17 Launch Site Services
490-22-68-07-00-FY-04-93	E7195O	NA-17 G.S.E.
490-22-68-07-00-FY-04-93	E7195P	NA-17 LTV Support
490-21-68-07-00-FY-04-93	E7195Q	NA-17 Special Programs
490-22-68-07-00-FY-04-93	E7195R	NA-17 Special Programs
490-01-68-07-00-FY-04-93	E7195S	NA-17 Program Support
490-01-68-07-00-FY-04-93	E7195T	NA-17 Production Support
490-22-68-07-00-FY-02-93	E7195U	NA-17 Travel
490-01-68-07-00-FY-04-93	E7195V	NA-17 Tooling Maintenance
490-21-68-07-00-FY-04-93	E7195W	NA-17 Failure Investigations and Incentives
490-22-68-07-00-FY-04-93	E7195X	NA-17 Shipping
490-01-68-07-00-FY-04-93	E7195Y	NA-17 Vehicle Procurement
490-01-68-07-00-FY-04-93	E7195Z	NA-17 Motor Procurement
490-02-00-77-00-FY-04-00	E7196	S-196 IMS Costs
490-02-02-17-00-FY-04-00	E7196A	DAD-A Program Management
490-02-04-17-00-FY-04-00	E7196B	DAD-A Mission Integration
490-02-02-17-00-FY-04-00	E7196C	DAD-A Preflight Planning
490-02-02-17-00-FY-04-00	E7196D	DAD-A Data Analysis
490-02-02-17-00-FY-04-00	E7196E	DAD-A Systems Engineering
490-02-02-17-00-FY-04-00	E7196F	DAD-A Reliability
490-02-02-17-00-FY-04-00	E7196G	DAD-A Standardization
490-01-01-17-00-FY-04-00	E7196H	DAD-A Vehicle Processing
490-02-04-17-00-FY-04-00	E7196I	DAD-A Range Costs
490-01-04-17-00-FY-04-00	E7196J	DAD-A Mission Peculiars
490-02-02-17-00-FY-04-00	E7196K	DAD-A Certification Training
490-02-03-17-00-FY-04-00	E7196L	DAD-A Logistics Administration
490-01-03-17-00-FY-04-00	E7196M	DAD-A Spares
490-02-01-17-00-FY-04-00	E7196N	DAD-A Launch Site Services
490-02-01-17-00-FY-04-00	E7196O	DAD-A G.S.E.
490-02-02-17-00-FY-04-00	E7196P	DAD-A LTV Support

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AGENCYWIDE CODE	J. O. #	JOB
490-01-01-17-00-FY-04-00	E7196Q	DAD-A Special Programs
490-02-02-17-00-FY-04-00	E7196R	DAD-A Special Programs
490-02-02-17-00-FY-04-00	E7196S	DAD-A Program Support
490-01-01-17-00-FY-04-00	E7196T	DAD-A Production Support
490-02-02-17-00-FY-02-00	E7196U	DAD-A Travel
490-01-06-17-00-FY-04-00	E7196V	DAD-A Tooling Maintenance
490-02-08-17-00-FY-04-00	E7196W	DAD-A Failure Investigations and Incentives
490-02-05-17-00-FY-04-00	E7196X	DAD-A Shipping
490-01-01-17-00-FY-04-00	E7196Y	DAD-A Vehicle Procurement
490-01-02-17-00-FY-04-00	E7196Z	DAD-A Motor Procurement
490-22-68-07-00-FY-04-00	E7197	S-197 IMS Costs
490-22-68-07-00-FY-04-93	E7197A	NA-18 Program Management
490-21-68-07-00-FY-04-93	E7197B	NA-18 Mission Integration
490-21-68-07-00-FY-04-93	E7197C	NA-18 Preflight Planning
490-21-68-07-00-FY-04-93	E7197D	NA-18 Data Analysis
490-22-68-07-00-FY-04-93	E7197E	NA-18 Systems Engineering
490-22-68-07-00-FY-04-93	E7197F	NA-18 Reliability
490-22-68-07-00-FY-04-93	E7197G	NA-18 Standardization
490-01-68-07-00-FY-04-93	E7197H	NA-18 Vehicle Processing
490-21-68-07-00-FY-04-93	E7197I	NA-18 Range Costs
490-01-68-07-00-FY-04-93	E7197J	NA-18 Mission Peculiars
490-22-68-07-00-FY-04-93	E7197K	NA-18 Certification Training
490-22-68-07-00-FY-04-93	E7197L	NA-18 Logistics Administration
490-01-68-07-00-FY-04-93	E7197M	NA-18 Spares
490-21-68-07-00-FY-04-93	E7197N	NA-18 Launch Site Services
490-22-68-07-00-FY-04-93	E7197O	NA-18 G.S.E.
490-22-68-07-00-FY-04-93	E7197P	NA-18 LTV Support
490-21-68-07-00-FY-04-93	E7197Q	NA-18 Special Programs
490-22-68-07-00-FY-04-93	E7197R	NA-18 Special Programs
490-01-68-07-00-FY-04-93	E7197S	NA-18 Program Support
490-01-68-07-00-FY-04-93	E7197T	NA-18 Production Support
490-22-68-07-00-FY-02-93	E7197U	NA-18 Travel
490-01-68-07-00-FY-04-93	E7197V	NA-18 Tooling Maintenance
490-21-68-07-00-FY-04-93	E7197W	NA-18 Failure Investigations
490-22-68-07-00-FY-04-93	E7197X	NA-18 Shipping
490-01-68-07-00-FY-04-93	E7197Y	NA-18 Vehicle Procurement
490-01-68-07-00-FY-04-93	E7197Z	NA-18 Motor Procurement
490-04-17-27-00-FY-04-83	E7198	S-198 IMS Costs
490-04-17-27-00-FY-04-83	E7198A	UK-6 Program Management
490-04-17-27-00-FY-04-83	E7198B	UK-6 Mission Integration
490-04-17-27-00-FY-04-83	E7198C	UK-6 Preflight Planning
490-04-17-27-00-FY-04-83	E7198D	UK-6 Data Analysis
490-04-17-27-00-FY-04-83	E7198E	UK-6 Systems Engineering
490-04-17-27-00-FY-04-83	E7198F	UK-6 Reliability
490-04-17-27-00-FY-04-83	E7198G	UK-6 Standardization
490-04-17-27-00-FY-04-83	E7198H	UK-6 Vehicle Processing
490-04-17-27-00-FY-04-83	E7198I	UK-6 Range Costs

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AGENCYWIDE CODE	J. O. #	JOB
490-04-17-27-00-FY-04-83	E7198J	UK-6 Mission Peculiars
490-04-17-27-00-FY-04-83	E7198K	UK-6 Certification Training
490-04-17-27-00-FY-04-83	E7198L	UK-6 Logistics Administration
490-04-17-27-00-FY-04-83	E7198M	UK-6 Spares
490-04-17-27-00-FY-04-83	E7198N	UK-6 Launch Site Services
490-04-17-27-00-FY-04-83	E7198O	UK-6 G.S.E.
490-04-17-27-00-FY-04-83	E7198P	UK-6 LTV Support
490-04-17-27-00-FY-03-83	E7198Q	UK-6 Special Programs
490-04-17-27-00-FY-04-83	E7198R	UK-6 Special Programs
490-04-17-27-00-FY-04-83	E7198S	UK-6 Program Support
490-04-17-27-00-FY-04-83	E7198T	UK-6 Production Support
490-04-17-27-00-FY-02-83	E7198U	UK-6 Travel
490-04-17-27-00-FY-04-83	E7198V	UK-6 Tooling Maintenance
490-04-17-27-00-FY-04-83	E7198W	UK-6 Failure Investigations
490-02-17-27-00-FY-04-00	E7198WW	UK-6 Study of Anomaly
490-04-17-27-00-FY-04-83	E7198X	UK-6 Shipping
490-04-17-27-00-FY-04-83	E7198Y	UK-6 Vehicle Procurement
490-04-17-27-00-FY-04-83	E7198Z	UK-6 Motor Procurement
490-22-68-07-00-FY-04-93	E7199	S-199 IMS Costs
490-22-68-07-00-FY-04-93	E7199A	NA-24 Program Management
490-21-68-07-00-FY-04-93	E7199B	NA-24 Mission Integration
490-21-68-07-00-FY-04-93	E7199C	NA-24 Preflight Planning
490-21-68-07-00-FY-04-93	E7199D	NA-24 Data Analysis
490-22-68-07-00-FY-04-93	E7199E	NA-24 Systems Engineering
490-22-68-07-00-FY-04-93	E7199F	NA-24 Reliability
490-22-68-07-00-FY-04-93	E7199G	NA-24 Standardization
490-01-68-07-00-FY-04-93	E7199H	NA-24 Vehicle Processing
490-21-68-07-00-FY-04-93	E7199I	NA-24 Range Costs
490-01-68-07-00-FY-04-93	E7199J	NA-24 Mission Peculiars
490-22-68-07-00-FY-04-93	E7199K	NA-24 Certification Training
490-22-68-07-00-FY-04-93	E7199L	NA-24 Logistics Administration
490-01-68-07-00-FY-04-93	E7199M	NA-24 Spares
490-21-68-07-00-FY-04-93	E7199N	NA-24 Launch Site Services
490-22-68-07-00-FY-04-93	E7199O	NA-24 G.S.E.
490-22-68-07-00-FY-04-93	E7199P	NA-24 LTV Support
490-21-68-07-00-FY-04-93	E7199Q	NA-24 Special Programs
490-22-68-07-00-FY-04-93	E7199R	NA-24 Special Programs
490-01-68-07-00-FY-04-93	E7199S	NA-24 Program Support
490-01-68-07-00-FY-04-93	E7199T	NA-24 Production Support
490-22-68-07-00-FY-02-93	E7199U	NA-24 Travel
490-01-68-07-00-FY-04-93	E7199V	NA-24 Tooling Maintenance
490-21-68-07-00-FY-04-93	E7199W	NA-24 Failure Investigation/Incentives
490-22-68-07-00-FY-04-93	E7199X	NA-24 Shipping
490-01-68-07-00-FY-04-93	E7199Y	NA-24 Vehicle Procurement
490-01-68-07-00-FY-04-93	E7199Z	NA-24 Motor Procurement

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AGENCYWIDE CODE	J. O. #	JOB
490-22-68-07-00-FY-04-93	E7200	S-200 IMS Costs
490-22-68-07-00-FY-04-93	E7200A	NA-19 Program Management
490-21-68-07-00-FY-04-93	E7200B	NA-19 Mission Integration
490-21-68-07-00-FY-04-93	E7200C	NA-19 Preflight Planning
490-21-68-07-00-FY-04-93	E7200D	NA-19 Data Analysis
490-22-68-07-00-FY-04-93	E7200E	NA-19 Systems Engineering
490-22-68-07-00-FY-04-93	E7200F	NA-19 Reliability
490-22-68-07-00-FY-04-93	E7200G	NA-19 Standardization
490-01-68-07-00-FY-04-93	E7200H	NA-19 Vehicle Processing
490-21-68-07-00-FY-04-93	E7200I	NA-19 Range Costs
490-01-68-07-00-FY-04-93	E7200J	NA-19 Mission Peculiars
490-22-68-07-00-FY-04-93	E7200K	NA-19 Certification Training
490-22-68-07-00-FY-04-93	E7200L	NA-19 Logistics Administration
490-01-68-07-00-FY-04-93	E7200M	NA-19 Spares
490-21-68-07-00-FY-04-93	E7200N	NA-19 Launch Site Services
490-22-68-07-00-FY-04-93	E7200O	NA-19 G.S.E.
490-22-68-07-00-FY-04-93	E7200P	NA-19 LTV Support
490-21-68-07-00-FY-04-93	E7200Q	NA-19 Special Programs
490-22-68-07-00-FY-04-93	E7200R	NA-19 Special Programs
490-01-68-07-00-FY-04-93	E7200S	NA-19 Program Support
490-01-68-07-00-FY-04-93	E7200T	NA-19 Production Support
490-22-68-07-00-FY-02-93	E7200U	NA-19 Travel
490-01-68-07-00-FY-04-93	E7200V	NA-19 Tooling Maintenance
490-21-68-07-00-FY-04-93	E7200W	NA-19 Failure Investigation/Incentives
490-22-68-07-00-FY-04-93	E7200X	NA-19 Shipping
490-01-68-07-00-FY-04-93	E7200Y	NA-19 Vehicle Procurement
490-01-68-07-00-FY-04-93	E7200Z	NA-19 Motor Procurement
490-02-00-77-00-FY-04-00	E7201	S-201 IMS Costs
490-02-02-17-00-FY-04-00	E7201A	HCMM Program Management
490-02-04-17-00-FY-04-00	E7201B	HCMM Mission Integration
490-02-02-17-00-FY-04-00	E7201C	HCMM Preflight Planning
490-02-02-17-00-FY-04-00	E7201D	HCMM Data Analysis
490-02-02-17-00-FY-04-00	E7201E	HCMM Systems Engineering
490-02-02-17-00-FY-04-00	E7201F	HCMM Reliability
490-02-02-17-00-FY-04-00	E7201G	HCMM Standardization
490-01-01-17-00-FY-04-00	E7201H	HCMM Vehicle Processing
490-02-04-17-00-FY-04-00	E7201I	HCMM Range Costs
490-01-04-17-00-FY-04-00	E7201J	HCMM Mission Peculiars
490-02-02-17-00-FY-04-00	E7201K	HCMM Certification Training
490-02-03-17-00-FY-04-00	E7201L	HCMM Logistics Administration
490-01-03-17-00-FY-04-00	E7201M	HCMM Spares
490-02-01-17-00-FY-04-00	E7201N	HCMM Launch Site Services
490-02-01-17-00-FY-04-00	E7201O	HCMM G.S.E.
490-02-02-17-00-FY-04-00	E7201P	HCMM LTV Support
490-01-01-17-00-FY-04-00	E7201Q	HCMM Special Programs
490-02-02-17-00-FY-04-00	E7201R	HCMM Special Programs

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490-02-02-17-00-FY-04-00	E7201S	HCMM Program Support
490-01-01-17-00-FY-04-00	E7201T	HCMM Production Support
490-02-02-17-00-FY-02-00	E7201U	HCMM Travel
490-01-06-17-00-FY-04-00	E7201V	HCMM Tooling Maintenance
490-02-08-17-00-FY-04-00	E7201W	HCMM Failure Investigations
490-02-05-17-00-FY-04-00	E7201X	HCMM Shipping
490-01-01-17-00-FY-04-00	E7201Y	HCMM Vehicle Procurement
490-01-02-17-00-FY-04-00	E7201Z	HCMM Motor Procurement
490-02-00-77-00-FY-04-00	E7202	S-202 IMS Costs
490-02-02-37-00-FY-04-00	E7202A	SAGE-A Program Management
490-02-04-37-00-FY-04-00	E7202B	SAGE-A Mission Integration
490-02-02-37-00-FY-04-00	E7202C	SAGE-A Preflight Planning
490-02-02-37-00-FY-04-00	E7202D	SAGE-A Data Analysis
490-02-02-37-00-FY-04-00	E7202E	SAGE-A Systems Engineering
490-02-02-37-00-FY-04-00	E7202F	SAGE-A Reliability
490-02-02-37-00-FY-04-00	E7202G	SAGE-A Standardization
490-01-01-37-00-FY-04-00	E7202H	SAGE-A Vehicle Processing
490-02-04-37-00-FY-04-00	E7202I	SAGE-A Range Costs
490-01-04-37-00-FY-04-00	E7202J	SAGE-A Mission Peculiars
490-02-02-37-00-FY-04-00	E7202K	SAGE-A Certification Training
490-02-03-37-00-FY-04-00	E7202L	SAGE-A Logistics Administration
490-01-03-37-00-FY-04-00	E7202M	SAGE-A Spares
490-02-01-37-00-FY-04-00	E7202N	SAGE-A Launch Site Services
490-02-01-37-00-FY-04-00	E7202O	SAGE-A G.S.E.
490-02-02-37-00-FY-04-00	E7202P	SAGE-A LTV Support
490-01-01-37-00-FY-04-00	E7202Q	SAGE-A Special Programs
490-02-02-37-00-FY-04-00	E7202R	SAGE-A Special Programs
490-02-02-37-00-FY-04-00	E7202S	SAGE-A Program Support
490-01-01-37-00-FY-04-00	E7202T	SAGE-A Production Support
490-02-02-37-00-FY-02-00	E7202U	SAGE-A Travel
490-01-06-37-00-FY-04-00	E7202V	SAGE-A Tooling Maintenance
490-02-08-37-00-FY-04-00	E7202W	SAGE-A Failure Investigations
490-02-05-37-00-FY-04-00	E7202X	SAGE-A Shipping
490-01-01-37-00-FY-04-00	E7202Y	SAGE-A Vehicle Procurement
490-01-02-37-00-FY-04-00	E7202Z	SAGE-A Motor Procurement
490-02-00-77-00-FY-04-00	E7203	S-203 IMS Costs
490-02-02-17-00-FY-04-00	E7203A	MAGSAT Program Management
490-02-04-17-00-FY-04-00	E7203B	MAGSAT Mission Integration
490-02-02-17-00-FY-04-00	E7203C	MAGSAT Preflight Planning
490-02-02-17-00-FY-04-00	E7203D	MAGSAT Data Analysis
490-02-02-17-00-FY-04-00	E7203E	MAGSAT Systems Engineering
490-02-02-17-00-FY-04-00	E7203F	MAGSAT Reliability
490-02-02-17-00-FY-04-00	E7203G	MAGSAT Standardization
490-01-01-17-00-FY-04-00	E7203H	MAGSAT Vehicle Processing
490-02-04-17-00-FY-04-00	E7203I	MAGSAT Range Costs

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AGENCYWIDE CODE	J.O. #	JOB
490-01-04-17-00-FY-04-00	E7203J	MAGSAT Mission Peculiars
490-02-02-17-00-FY-04-00	E7203K	MAGSAT Certification Training
490-02-03-17-00-FY-04-00	E7203L	MAGSAT Logistics Administration
490-01-03-17-00-FY-04-00	E7203M	MAGSAT Spares
490-02-01-17-00-FY-04-00	E7203N	MAGSAT Launch Site Services
490-02-01-17-00-FY-04-00	E7203O	MAGSAT G.S.E.
490-02-02-17-00-FY-04-00	E7203P	MAGSAT LTV Support
490-01-01-17-00-FY-04-00	E7203Q	MAGSAT Special Programs
490-02-02-17-00-FY-04-00	E7203R	MAGSAT Special Programs
490-02-02-17-00-FY-04-00	E7203S	MAGSAT Program Support
490-01-01-17-00-FY-04-00	E7203T	MAGSAT Production Support
490-02-02-17-00-FY-02-00	E7203U	MAGSAT Travel
490-01-06-17-00-FY-04-00	E7203V	MAGSAT Tooling Maintenance
490-02-08-17-00-FY-04-00	E7203W	MAGSAT Failure Investigations
490-02-05-17-00-FY-04-00	E7203X	MAGSAT Shipping
490-01-01-17-00-FY-04-00	E7203Y	MAGSAT Vehicle Procurement
490-01-02-17-00-FY-04-00	E7203Z	MAGSAT Motor Procurement
490-22-68-07-00-FY-04-93	E7204	S-204 IMS Costs
490-22-68-07-00-FY-04-93	E7204A	NA-22 Program Management
490-21-68-07-00-FY-04-93	E7204B	NA-22 Mission Integration
490-21-68-07-00-FY-04-93	E7204C	NA-22 Preflight Planning
490-21-68-07-00-FY-04-93	E7204D	NA-22 Data Analysis
490-22-68-07-00-FY-04-93	E7204E	NA-22 Systems Engineering
490-22-68-07-00-FY-04-93	E7204F	NA-22 Reliability
490-22-68-07-00-FY-04-93	E7204G	NA-22 Standardization
490-01-68-07-00-FY-04-93	E7204H	NA-22 Vehicle Processing
490-21-68-07-00-FY-04-93	E7204I	NA-22 Range Costs
490-01-68-07-00-FY-04-93	E7204J	NA-22 Mission Peculiars
490-22-68-07-00-FY-04-93	E7204K	NA-22 Certification Training
490-22-68-07-00-FY-04-93	E7204L	NA-22 Logistics Administration
490-01-68-07-00-FY-04-93	E7204M	NA-22 Spares
490-21-68-07-00-FY-04-93	E7204N	NA-22 Launch Site Services
490-22-68-07-00-FY-04-93	E7204O	NA-22 G.S.E.
490-22-68-07-00-FY-04-93	E7204P	NA-22 LTV Support
490-21-68-07-00-FY-04-93	E7204Q	NA-22 Special Programs
490-22-68-07-00-FY-04-93	E7204R	NA-22 Special Programs
490-01-68-07-00-FY-04-93	E7204S	NA-22 Program Support
490-01-68-07-00-FY-04-93	E7204T	NA-22 Production Support
490-22-68-07-00-FY-02-93	E7204U	NA-22 Travel
490-01-68-07-00-FY-04-93	E7204V	NA-22 Tooling Maintenance
490-21-68-07-00-FY-04-93	E7204W	NA-22 Failure Investigations
490-22-68-07-00-FY-04-93	E7204X	NA-22 Shipping
490-01-68-07-00-FY-04-93	E7204Y	NA-22 Vehicle Procurement
490-01-68-07-00-FY-04-93	E7204Z	NA-22 Motor Procurement

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NASA SCOUT R AND D PROGRAM NUMBERS Continued

AGENCYWIDE CODE	J.O. #	JOB
490-22-68-07-00-FY-04-93	E7205	S-205 IMS Costs
490-22-68-07-00-FY-04-93	E7205A	S00S-2 Program Management
490-21-68-07-00-FY-04-93	E7205B	S00S-2 Mission Integration
490-21-68-07-00-FY-04-93	E7205C	S00S-2 Preflight Planning
490-21-68-07-00-FY-04-93	E7205D	S00S-2 Data Analysis
490-22-68-07-00-FY-04-93	E7205E	S00S-2 Systems Engineering
490-22-68-07-00-FY-04-93	E7205F	S00S-2 Reliability
490-22-68-07-00-FY-04-93	E7205G	S00S-2 Standardization
490-01-68-07-00-FY-04-93	E7205H	S00S-2 Vehicle Processing
490-21-68-07-00-FY-04-93	E7205I	S00S-2 Range Costs
490-01-68-07-00-FY-04-93	E7205J	S00S-2 Mission Peculiars
490-22-68-07-00-FY-04-93	E7205K	S00S-2 Certification Training
490-22-68-07-00-FY-04-93	E7205L	S00S-2 Logistics Administration
490-01-68-07-00-FY-04-93	E7205M	S00S-2 Spares
490-21-68-07-00-FY-04-93	E7205N	S00S-2 Launch Site Services
490-22-68-07-00-FY-04-93	E7205O	S00S-2 G.S.E.
490-22-68-07-00-FY-04-93	E7205P	S00S-2 LTV Support
490-21-68-07-00-FY-04-93	E7205Q	S00S-2 Special Programs
490-22-68-07-00-FY-04-93	E7205R	S00S-2 Special Programs
490-01-68-07-00-FY-04-93	E7205S	S00S-2 Program Support
490-01-68-07-00-FY-04-93	E7205T	S00S-2 Production Support
490-22-68-07-00-FY-02-93	E7205U	S00S-2 Travel
490-01-68-07-00-FY-04-93	E7205V	S00S-2 Tooling Maintenance
490-21-68-07-00-FY-04-93	E7205W	S00S-2 Failure Investigations
490-22-68-07-00-FY-04-93	E7205X	S00S-2 Shipping
490-01-68-07-00-FY-04-93	E7205Y	S00S-2 Vehicle Procurement
490-01-68-07-00-FY-04-93	E7205Z	S00S-2 Motor Procurement
490-02-00-47-00-FY-04-00	E7206	S-206 IMS Costs
490-02-02-47-00-FY-04-00	E7206A	San Marco D-L Program Management
490-02-04-47-00-FY-04-00	E7206B	San Marco D-L Mission Integration
490-02-02-47-00-FY-04-00	E7206C	San Marco D-L Preflight Planning
490-02-02-47-00-FY-04-00	E7206D	San Marco D-L Data Analysis
490-02-02-47-00-FY-04-00	E7206E	San Marco D-L Systems Engineering
490-02-02-47-00-FY-04-00	E7206F	San Marco D-L Reliability
490-02-02-47-00-FY-04-00	E7206G	San Marco D-L Standardization
490-01-01-47-00-FY-04-00	E7206H	San Marco D-L Vehicle Processing
490-04-10-47-00-FY-04-83	E7206I	San Marco D-L Range Costs
490-04-10-47-00-FY-04-83	E7206J	San Marco D-L Mission Peculiars
490-02-02-47-00-FY-04-00	E7206K	San Marco D-L Certification Training
490-02-03-47-00-FY-04-00	E7206L	San Marco D-L Logistics Administration
490-01-03-47-00-FY-04-00	E7206M	San Marco D-L Spares
490-02-01-47-00-FY-04-00	E7206N	San Marco D-L Launch Site Services
490-02-01-47-00-FY-04-00	E7206O	San Marco D-L G.S.E.
490-02-02-47-00-FY-04-00	E7206P	San Marco D-L LTV Support
490-01-01-47-00-FY-04-00	E7206Q	San Marco D-L Special Programs

NASA SCOUT R AND D PROGRAM NUMBERS Continued

AGENCYWIDE CODE	J.O. #	JOB
490-02-02-47-00-FY-04-00	E7206R	San Marco D-L Special Programs
490-02-02-47-00-FY-04-00	E7206S	San Marco D-L Program Support
490-01-01-47-00-FY-04-00	E7206T	San Marco D-L Production Support
490-02-02-47-00-FY-02-00	E7206U	San Marco D-L Travel
490-01-06-47-00-FY-04-00	E7206V	San Marco D-L Tooling Maintenance
490-02-08-47-00-FY-04-00	E7206W	San Marco D-L Failure Investigations
490-02-05-47-00-FY-04-00	E7206X	San Marco D-L Shipping
490-01-01-47-00-FY-04-00	E7206Y	San Marco D-L Vehicle Procurement
490-01-02-47-00-FY-04-00	E7206Z	San Marco D-L Motor Procurement
490-02-00-47-00-FY-04-00	E7207	S-207 IMS Costs
490-02-02-47-00-FY-04-00	E7207A	San Marco D-M Program Management
490-02-04-47-00-FY-04-00	E7207B	San Marco D-M Mission Integration
490-02-02-47-00-FY-04-00	E7207C	San Marco D-M Preflight Planning
490-02-02-47-00-FY-04-00	E7207D	San Marco D-M Data Analysis
490-02-02-47-00-FY-04-00	E7207E	San Marco D-M Systems Engineering
490-02-02-47-00-FY-04-00	E7207F	San Marco D-M Reliability
490-02-02-47-00-FY-04-00	E7207G	San Marco D-M Standardization
490-01-01-47-00-FY-04-00	E7207H	San Marco D-M Vehicle Processing
490-04-10-47-00-FY-04-83	E7207I	San Marco D-M Range Costs
490-04-10-47-00-FY-04-83	E7207J	San Marco D-M Mission Peculiars
490-02-02-47-00-FY-04-00	E7207K	San Marco D-M Cerfitication Training
490-02-03-47-00-FY-04-00	E7207L	San Marco D-M Logistics Administration
490-01-03-47-00-FY-04-00	E7207M	San Marco D-M Spares
490-02-01-47-00-FY-04-00	E7207N	San Marco D-M Launch Site Services
490-02-01-47-00-FY-04-00	E7207O	San Marco D-M G.S.E.
490-02-02-47-00-FY-04-00	E7207P	San Marco D-M LTV Support
490-01-01-47-00-FY-04-00	E7207Q	San Marco D-M Special Programs
490-02-02-47-00-FY-04-00	E7207R	San Marco D-M Special Programs
490-02-02-47-00-FY-04-00	E7207S	San Marco D-M Program Support
490-01-01-47-00-FY-04-00	E7207T	San Marco D-M Production Support
490-02-02-47-00-FY-02-00	E7207U	San Marco D-M Travel
490-01-06-47-00-FY-04-00	E7207V	San Marco D-M Tooling Maintenance
490-02-08-47-00-FY-04-00	E7207W	San Marco D-M Failure Investigations
490-02-05-47-00-FY-04-00	E7207X	San Marco D-M Shipping
490-01-01-47-00-FY-04-00	E7207Y	San Marco D-M Vehicle Procurement
490-01-02-47-00-FY-04-00	E7207Z	San Marco D-M Motor Procurement
490-02-02-88-00-FY-04-00	E8000	Phase VIII NASA Program Costs
490-02-02-88-00-FY-04-00	E8000A	Phase VIII Program Management
490-02-04-88-00-FY-04-00	E8000B	Phase VIII Mission Integration
490-02-02-88-00-FY-04-00	E8000C	Phase VIII Preflight Planning
490-02-02-88-00-FY-04-00	E8000E	Phase VIII Systems Engineering
490-02-02-88-00-FY-04-00	E8000F	Phase VIII Reliability
490-02-02-88-00-FY-04-00	E8000G	Phase VIII Standardization
490-01-01-88-00-FY-04-00	E8000H	Phase VIII Vehicle Processing
490-02-04-88-00-FY-04-00	E8000I	Phase VIII Range Costs

NASA SCOUT R AND D PROGRAM NUMBERS Continued

AGENCYWIDE CODE	J.O. #	JOB
490-04-10-48-00-FY-04-83	E8000J	Phase VIII San Marco
490-02-02-88-00-FY-04-00	E8000K	Phase VIII Certification Training
490-02-03-88-00-FY-04-00	E8000L	Phase VIII Logistics Administration
490-01-03-88-00-FY-04-00	E8000M	Phase VIII Spares
490-02-01-88-00-FY-04-00	E8000O	Phase VIII G.S.E.
490-02-02-88-00-FY-04-00	E8000P	Phase VIII LTV Support
490-01-01-88-00-FY-04-00	E8000Q	Phase VIII Special Programs
490-02-02-88-00-FY-04-00	E8000R	Phase VIII Special Programs
490-02-02-88-00-FY-04-00	E8000S	Phase VIII Program Support
490-01-01-88-00-FY-04-00	E8000T	Phase VIII Production Support
490-02-02-88-00-FY-04-00	E8000U	Phase VIII LRC Support
490-02-02-88-00-FY-02-00	E8000U	Phase VIII Travel
490-01-06-88-00-FY-04-00	E8000V	Phase VIII Tooling Maintenance
490-03-01-88-00-FY-04-00	E8000W	Phase VIII Product Improvement
490-02-05-88-00-FY-04-00	E8000X	Phase VIII Shipping
490-01-01-88-00-FY-04-00	E8000Y	Phase VIII Vehicle Procurement
490-01-02-88-00-FY-04-00	E8000Z	Phase VIII Motor Procurement
490-22-68-88-00-FY-04-93	E8002	Phase VIII DOD Program (68-71)
490-22-68-88-00-FY-04-93	E8002A	Phase VIII DOD Management
490-21-68-88-00-FY-04-93	E8002B	Phase VIII DOD Mission Integration
490-21-68-88-00-FY-04-93	E8002C	Phase VIII DOD Preflight Planning
490-21-68-88-00-FY-04-93	E8002D	Phase VIII DOD Data Analysis
490-22-68-88-00-FY-04-93	E8002E	Phase VIII DOD Systems Engineering
490-22-68-88-00-FY-04-93	E8002F	Phase VIII Reliability
490-22-68-88-00-FY-04-93	E8002G	Phase VIII DOD Standardization
490-01-68-88-00-FY-04-93	E8002H	Phase VIII DOD Vehicle Processing
490-21-68-88-00-FY-04-93	E8002I	Phase VIII DOD Range Costs
490-01-68-88-00-FY-04-93	E8002J	Phase VIII DOD Mission Peculiars
490-22-68-88-00-FY-04-93	E8002K	Phase VIII DOD Certification Training
490-22-68-88-00-FY-04-93	E8002L	Phase VIII DOD Logistics Administration
490-01-68-88-00-FY-04-93	E8002M	Phase VIII DOD Spares
490-21-68-88-00-FY-04-93	E8002N	Phase VIII DOD Launch Site Services
490-22-68-88-00-FY-04-93	E8002O	Phase VIII DOD G.S.E.
490-22-68-88-00-FY-04-93	E8002P	Phase VIII DOD LTV Support
490-21-68-88-00-FY-04-93	E8002Q	Phase VIII DOD Special Programs
490-22-68-88-00-FY-04-93	E8002R	Phase VIII DOD Special Programs
490-01-68-88-00-FY-04-93	E8002S	Phase VIII DOD Program Support
490-01-68-88-00-FY-04-93	E8002T	Phase VIII DOD Production Support
490-22-68-88-00-FY-04-93	E8002U	Phase VIII DOD LRC Support
490-22-68-88-00-FY-02-93	E8002U	Phase VIII DOD Travel
490-01-68-88-00-FY-04-93	E8002V	Phase VIII DOD Tooling Maintenance
490-03-68-88-00-FY-04-93	E8002W	Phase VIII DOD Product Improvement
490-22-68-88-00-FY-04-93	E8002X	Phase VIII DOD Shipping
490-01-68-88-00-FY-04-93	E8002Y	Phase VIII DOD Vehicle Procurement
490-01-68-88-00-FY-04-93	E8002Z	Phase VIII DOD Motor Procurement

NASA SCOUT R AND D PROGRAM NUMBERS Continued

AGENCYWIDE CODE	J.O. #	JOB
490-03-00-88-00-FY-04-00	E8003	Phase VIII Major Improvements
490-02-02-88-00-FY-04-00	E8003R	Phase VIII Minor Product Improvements
490-03-00-88-00-FY-04-00	E8003U	Phase VIII Developments
490-03-00-88-00-FY-02-00	E8003U	Phase VIII Travel and Manpower
490-03-01-88-00-FY-04-00	E8003Y	New Guidance System
490-03-02-88-00-FY-04-00	E8003Z	Development of New Third-stage Motor
490-22-80-88-00-FY-04-93	E8005	AF Program Costs
490-22-80-88-00-FY-04-93	E8005A	AF Management
490-21-80-88-00-FY-04-93	E8005B	AF Mission Integration
490-21-80-88-00-FY-04-93	E8005C	AF Preflight Planning
490-21-80-88-00-FY-04-93	E8005D	AF Data Analysis
490-22-80-88-00-FY-04-93	E8005E	AF Systems Engineering
490-22-80-88-00-FY-04-93	E8005F	AF Reliability
490-22-80-88-00-FY-04-93	E8005G	AF Standardization
490-01-80-88-00-FY-04-93	E8005H	AF Vehicle Processing
490-21-80-88-00-FY-04-93	E8005I	AF Range Costs
490-01-80-88-00-FY-04-93	E8005J	AF Mission Peculiars
490-22-80-88-00-FY-04-93	E8005K	AF Certification Training
490-22-80-88-00-FY-04-93	E8005L	AF Logistics Administration
490-01-80-88-00-FY-04-93	E8005M	AF Spares
490-21-80-88-00-FY-04-93	E8005N	AF Launch Site Services
490-22-80-88-00-FY-04-93	E8005O	AF G.S.E.
490-22-80-88-00-FY-04-93	E8005P	AF LTV Support
490-21-80-88-00-FY-04-93	E8005Q	AF Special Programs
490-22-80-88-00-FY-04-93	E8005R	AF Special Programs
490-01-80-88-00-FY-04-93	E8005S	AF Program Support
490-01-80-88-00-FY-04-93	E8005T	AF Production Support
490-22-80-88-00-FY-02-93	E8005U	AF Travel
490-01-80-88-00-FY-04-93	E8005V	AF Tooling Maintenance
490-03-80-88-00-FY-04-93	E8005W	AF Product Improvement
490-22-80-88-00-FY-04-93	E8005X	AF Shipping
490-01-80-88-00-FY-04-93	E8005Y	AF Vehicle Procurement
490-01-80-88-00-FY-04-93	E8005Z	AF Motor Procurement
490-01-38-88-00-FY-04-92	E8006Z	5 Altair III Motors for NRL-MIPR 80-MPP-0015
490-01-48-88-00-FY-04-92	E8007Z	1 Altair III Motor for NRL-MIPR 81-MPP-1004
490-02-02-47-00-FY-04-00	E8010J	San Marco-NASA Funded Activity
490-02-05-47-00-FY-04-00	E8010X	NASA San Marco Shipping
490-04-10-47-00-FY-04-83	E8020J	San Marco-D Program
490-04-10-47-00-FY-04-83	E8050J	San Marco-D Procurements
490-04-10-47-00-FY-04-83	E8050X	San Marco GBL's
490-04-10-47-00-FY-04-83	E8080X	San Marco Contractor Shipping Requirements
662-11-52-02-00-FY-04-31	E8203	2 MAGSAT Models for GSFC
490-22-68-08-00-FY-04-93	E8208	Vehicle 208 IMS Costs
490-22-68-08-00-FY-04-93	E8208A	NA-24 Management
490-21-68-08-00-FY-04-93	E8208B	NA-24 Mission Integration
490-21-68-08-00-FY-04-93	E8208C	NA-24 Preflight Planning

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AGENCYWIDE CODE	J.O. #	JOB
490-21-68-08-00-FY-04-93	E8208D	NOVA-II Data Analysis
490-22-68-08-00-FY-04-93	E8208E	NOVA-II Systems Engineering
490-22-68-08-00-FY-04-93	E8208F	NOVA-II Reliability
490-22-68-08-00-FY-04-93	E8208G	NOVA-II Standardization
490-01-68-08-00-FY-04-93	E8208H	NOVA-II Vehicle Processing
490-21-68-08-00-FY-04-93	E8208I	NOVA-II Range Costs
490-01-68-08-00-FY-04-93	E8208J	NOVA-II Mission Peculiars
490-22-68-08-00-FY-04-93	E8208K	NOVA-II Certification Training
490-22-68-08-00-FY-04-93	E8208L	NOVA-II Logistics Administration
490-01-68-08-00-FY-04-93	E8208M	NOVA-II Spares
490-21-68-08-00-FY-04-93	E8208N	NOVA-II Launch Site Services
490-22-68-08-00-FY-04-93	E8208O	NOVA-II G.S.E.
490-22-68-08-00-FY-04-93	E8208P	NOVA-II LTV Support
490-21-68-08-00-FY-04-93	E8208Q	NOVA-II Special Programs
490-22-68-08-00-FY-04-93	E8208R	NOVA-II Special Programs
490-01-68-08-00-FY-04-93	E8208S	NOVA-II Program Support
490-01-68-08-00-FY-04-93	E8208T	NOVA-II Production Support
490-22-68-08-00-FY-02-93	E8208U	NOVA-II Travel
490-01-68-08-00-FY-04-93	E8208V	NOVA-II Tooling Maintenance
490-21-68-08-00-FY-04-93	E8208W	NOVA-II Failure Investigation
490-22-68-08-00-FY-04-93	E8208X	NOVA-II Shipping
490-01-68-08-00-FY-04-93	E8208Y	NOVA-II Vehicle Procurement
490-01-68-08-00-FY-04-93	E8208Z	NOVA-II Motor Procurement
490-22-80-28-00-FY-04-93	E8209	Vehicle 209 IMS Costs
490-22-80-28-00-FY-04-93	E8209A	AF-15 Management
490-21-80-28-00-FY-04-93	E8209B	AF-15 Mission Integration
490-21-80-28-00-FY-04-93	E8209C	AF-15 Preflight Planning
490-21-80-28-00-FY-04-93	E8209D	AF-15 Data Analysis
490-22-80-28-00-FY-04-93	E8209E	AF-15 Systems Engineering
490-22-80-28-00-FY-04-93	E8209F	AF-15 Reliability
490-22-80-28-00-FY-04-93	E8209G	AF-15 Standardization
490-01-80-28-00-FY-04-93	E8209H	AF-15 Vehicle Processing
490-21-80-28-00-FY-04-93	E8209I	AF-15 Range Costs
490-01-80-28-00-FY-04-93	E8209J	AF-15 Mission Peculiars
490-22-80-28-00-FY-04-93	E8209K	AF-15 Certification Training
490-22-80-28-00-FY-04-93	E8209L	AF-15 Logistics Administration
490-01-80-28-00-FY-04-93	E8209M	AF-15 Spares
490-21-80-28-00-FY-04-93	E8209N	AF-15 Launch Site Services
490-22-80-28-00-FY-04-93	E8209O	AF-15 G.S.E.
490-22-80-28-00-FY-04-93	E8209P	AF-15 LTV Support
490-21-80-28-00-FY-04-93	E8209Q	AF-15 Special Programs
490-22-80-28-00-FY-04-93	E8209R	AF-15 Special Programs
490-01-80-28-00-FY-04-93	E8209S	AF-15 Program Support
490-01-80-28-00-FY-04-93	E8209T	AF-15 Production Support
490-22-80-28-00-FY-02-93	E8209U	AF-15 Travel
490-01-80-28-00-FY-04-93	E8209V	AF-15 Tooling Maintenance
490-21-80-28-00-FY-04-93	E8209W	AF-15 Failure Investigation
490-22-80-28-00-FY-04-93	E8209X	AF-15 Shipping
490-01-80-28-00-FY-04-93	E8209Y	AF-15 Vehicle Procurement
490-01-80-28-00-FY-04-93	E8209Z	AF-15 Motor Procurement

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AGENCYWIDE CODE	J.O. #	JOB
490-22-68-08-00-FY-04-93	E8210	Vehicle 210 IMS Costs
490-22-68-08-00-FY-04-93	E8210A	NOVA-III Management
490-21-68-08-00-FY-04-93	E8210B	NOVA-III Mission Integration
490-21-68-08-00-FY-04-93	E8210C	NOVA-III Preflight Planning
490-21-68-08-00-FY-04-93	E8210D	NOVA-III Data Analysis
490-22-68-08-00-FY-04-93	E8210E	NOVA-III Systems Engineering
490-22-68-08-00-FY-04-93	E8210F	NOVA-III Reliability
490-22-68-08-00-FY-04-93	E8210G	NOVA-III Standardization
490-01-68-08-00-FY-04-93	E8210H	NOVA-III Vehicle Processing
490-21-68-08-00-FY-04-93	E8210I	NOVA-III Range Costs
490-01-68-08-00-FY-04-93	E8210J	NOVA-III Mission Peculiars
490-22-68-08-00-FY-04-93	E8210K	NOVA-III Certification Training
490-22-68-08-00-FY-04-93	E8210L	NOVA-III Logistics Administration
490-01-68-08-00-FY-04-93	E8210M	NOVA-III Spares
490-21-68-08-00-FY-04-93	E8210N	NOVA-III Launch Site Services
490-22-68-08-00-FY-04-93	E8210O	NOVA-III G.S.E.
490-22-68-08-00-FY-04-93	E8210P	NOVA-III LTV Support
490-21-68-08-00-FY-04-93	E8210Q	NOVA-III Special Programs
490-22-68-08-00-FY-04-93	E8210R	NOVA-III Special Programs
490-01-68-08-00-FY-04-93	E8210S	NOVA-III Program Support
490-01-68-08-00-FY-04-93	E8210T	NOVA-III Production Support
490-22-68-08-00-FY-02-93	E8210U	NOVA-III Travel
490-01-68-08-00-FY-04-93	E8210V	NOVA-III Tooling Maintenance
490-21-68-08-00-FY-04-93	E8210W	NOVA-III Failure Investigation
490-22-68-08-00-FY-04-93	E8210X	NOVA-III Shipping
490-01-68-08-00-FY-04-93	E8210Y	NOVA-III Vehicle Procurement
490-01-68-08-00-FY-04-93	E8210Z	NOVA-III Motor Procurement
490-22-80-28-00-FY-04-93	E8211	Vehicle 211 IMS Costs
490-22-80-28-00-FY-04-93	E8211A	AF-16 Management
490-21-80-28-00-FY-04-93	E8211B	AF-16 Mission Integration
490-21-80-28-00-FY-04-93	E8211C	AF-16 Preflight Planning
490-21-80-28-00-FY-04-93	E8211D	AF-16 Data Analysis
490-22-80-28-00-FY-04-93	E8211E	AF-16 Systems Engineering
490-22-80-28-00-FY-04-93	E8211F	AF-16 Reliability
490-22-80-28-00-FY-04-93	E8211G	AF-16 Standardization
490-01-80-28-00-FY-04-93	E8211H	AF-16 Vehicle Processing
490-21-80-28-00-FY-04-93	E8211I	AF-16 Range Costs
490-01-80-28-00-FY-04-93	E8211J	AF-16 Mission Peculiars
490-22-80-28-00-FY-04-93	E8211K	AF-16 Certification Training
490-22-80-28-00-FY-04-93	E8211L	AF-16 Logistics Administration
490-01-80-28-00-FY-04-93	E8211M	AF-16 Spares
490-21-80-28-00-FY-04-93	E8211N	AF-16 Launch Site Services
490-22-80-28-00-FY-04-93	E8211O	AF-16 G.S.E.
490-22-80-28-00-FY-04-93	E8211P	AF-16 LTV Support
490-21-80-28-00-FY-04-93	E8211Q	AF-16 Special Programs

NASA SCOUT R AND D PROGRAM NUMBERS Continued

AGENCYWIDE CODE	J.O. #	JOB
490-22-80-28-00-FY-04-93	E8211R	AF-16 Special Programs
490-01-80-28-00-FY-04-93	E8211S	AF-16 Program Support
490-01-80-28-00-FY-04-93	E8211T	AF-16 Production Support
490-22-80-28-00-FY-02-93	E8211U	AF-16 Travel
490-01-80-28-00-FY-04-93	E8211V	AF-16 Tooling Maintenance
490-21-80-28-00-FY-04-93	E8211W	AF-16 Failure Investigation
490-22-80-28-00-FY-04-93	E8211X	AF-16 Shipping
490-01-80-28-00-FY-04-93	E8211Y	AF-16 Vehicle Procurement
490-01-80-28-00-FY-04-93	E8211Z	AF-16 Motor Procurement
490-22-68-08-00-FY-04-93	E8212	Vehicle 212 IMS Costs
490-22-68-08-00-FY-04-93	E8212A	SOOS-1 Management
490-21-68-08-00-FY-04-93	E8212B	SOOS-1 Mission Integration
490-21-68-08-00-FY-04-93	E8212C	SOOS-1 Preflight Planning
490-21-68-08-00-FY-04-93	E8212D	SOOS-1 Data Analysis
490-22-68-08-00-FY-04-93	E8212E	SOOS-1 Systems Engineering
490-22-68-08-00-FY-04-93	E8212F	SOOS-1 Reliability
490-22-68-08-00-FY-04-93	E8212G	SOOS-1 Standardization
490-01-68-08-00-FY-04-93	E8212H	SOOS-1 Vehicle Processing
490-21-68-08-00-FY-04-93	E8212I	SOOS-1 Range Costs
490-01-68-08-00-FY-04-93	E8212J	SOOS-1 Mission Peculiars
490-22-68-08-00-FY-04-93	E8212K	SOOS-1 Certification Training
490-22-68-08-00-FY-04-93	E8212L	SOOS-1 Logistics Administration
490-01-68-08-00-FY-04-93	E8212M	SOOS-1 Spares
490-21-68-08-00-FY-04-93	E8212N	SOOS-1 Launch Site Services
490-22-68-08-00-FY-04-93	E8212O	SOOS-1 G.S.E.
490-22-68-08-00-FY-04-93	E8212P	SOOS-1 LTV Support
490-21-68-08-00-FY-04-93	E8212Q	SOOS-1 Special Programs
490-22-68-08-00-FY-04-93	E8212R	SOOS-1 Special Programs
490-01-68-08-00-FY-04-93	E8212S	SOOS-1 Program Support
490-01-68-08-00-FY-04-93	E8212T	SOOS-1 Production Support
490-22-68-08-00-FY-02-93	E8212U	SOOS-1 Travel
490-01-68-08-00-FY-04-93	E8212V	SOOS-1 Tooling Maintenance
490-21-68-08-00-FY-04-93	E8212W	SOOS-1 Failure Investigation
490-22-68-08-00-FY-04-93	E8212X	SOOS-1 Shipping
490-01-68-08-00-FY-04-93	E8212Y	SOOS-1 Vehicle Procurement
490-01-68-08-00-FY-04-93	E8212Z	SOOS-1 Motor Procurement
490-22-80-28-00-FY-04-93	E8213	Vehicle 213 IMS Costs
490-22-80-28-00-FY-04-93	E8213A	AF-17 Management
490-21-80-28-00-FY-04-93	E8213B	AF-17 Mission Integration
490-21-80-28-00-FY-04-93	E8213C	AF-17 Preflight Planning
490-21-80-28-00-FY-04-93	E8213D	AF-17 Data Analysis
490-22-80-28-00-FY-04-93	E8213E	AF-17 Systems Engineering
490-22-80-28-00-FY-04-93	E8213F	AF-17 Reliability
490-22-80-28-00-FY-04-93	E8213G	AF-17 Standardization
490-01-80-28-00-FY-04-93	E8213H	AF-17 Vehicle Processing

NASA SCOUT R AND D PROGRAM NUMBERS Continued

AGENCYWIDE CODE	J.O. #	JOB	
490-21-80-28-00-FY-04-93	E8213I	AF-17	Range Costs
490-01-80-28-00-FY-04-93	E8213J	AF-17	Mission Peculiars
490-22-80-28-00-FY-04-93	E8213K	AF-17	Certification Training
490-22-80-28-00-FY-04-93	E8213L	AF-17	Logistics Administration
490-01-80-28-00-FY-04-93	E8213M	AF-17	Spares
490-21-80-28-00-FY-04-93	E8213N	AF-17	Launch Site Services
490-22-80-28-00-FY-04-93	E8213O	AF-17	G.S.E.
490-22-80-28-00-FY-04-93	E8213P	AF-17	LTV Support
490-21-80-28-00-FY-04-93	E8213Q	AF-17	Special Programs
490-22-80-28-00-FY-04-93	E8213R	AF-17	Special Programs
490-01-80-28-00-FY-04-93	E8213S	AF-17	Program Support
490-01-80-28-00-FY-04-93	E8213T	AF-17	Production Support
490-22-80-28-00-FY-02-93	E8213U	AF-17	Travel
490-01-80-28-00-FY-04-93	E8213V	AF-17	Tooling Maintenance
490-21-80-28-00-FY-04-93	E8213W	AF-17	Failure Investigation
490-22-80-28-00-FY-04-93	E8213X	AF-17	Shipping
490-01-80-28-00-FY-04-93	E8213Y	AF-17	Vehicle Procurement
490-01-80-28-00-FY-04-93	E8213Z	AF-17	Motor Procurement
490-22-80-28-00-FY-04-93	E8214	Vehicle 214 IMS Costs	
490-22-80-28-00-FY-04-93	E8214A	AF-18	Management
490-21-80-28-00-FY-04-93	E8214B	AF-18	Mission Integration
490-21-80-28-00-FY-04-93	E8214C	AF-18	Preflight Planning
490-21-80-28-00-FY-04-93	E8214D	AF-18	Data Analysis
490-22-80-28-00-FY-04-93	E8214E	AF-18	Systems Engineering
490-22-80-28-00-FY-04-93	E8214F	AF-18	Reliability
490-22-80-28-00-FY-04-93	E8214G	AF-18	Standardization
490-01-80-28-00-FY-04-93	E8214H	AF-18	Vehicle Processing
490-21-80-28-00-FY-04-93	E8214I	AF-18	Range Costs
490-01-80-28-00-FY-04-93	E8214J	AF-18	Mission Peculiars
490-22-80-28-00-FY-04-93	E8214K	AF-18	Certification Training
490-22-80-28-00-FY-04-93	E8214L	AF-18	Logistics Administration
490-01-80-28-00-FY-04-93	E8214M	AF-18	Spares
490-21-80-28-00-FY-04-93	E8214N	AF-18	Launch Site Services
490-22-80-28-00-FY-04-93	E8214O	AF-18	G.S.E.
490-22-80-28-00-FY-04-93	E8214P	AF-18	LTV Support
490-21-80-28-00-FY-04-93	E8214Q	AF-18	Special Programs
490-22-80-28-00-FY-04-93	E8214R	AF-18	Special Programs
490-01-80-28-00-FY-04-93	E8214S	AF-18	Program Support
490-01-80-28-00-FY-04-93	E8214T	AF-18	Production Support
490-22-80-28-00-FY-02-93	E8214U	AF-18	Travel
490-01-80-28-00-FY-04-93	E8214V	AF-18	Tooling Maintenance
490-21-80-28-00-FY-04-93	E8214W	AF-18	Failure Investigation
490-22-80-28-00-FY-04-93	E8214X	AF-18	Shipping
490-01-80-28-00-FY-04-93	E8214Y	AF-18	Vehicle Procurement

NASA SCOUT R AND D PROGRAM NUMBERS Continued

AGENCYWIDE CODE	J.O. #	JOB
490-01-80-28-00-FY-04-93	E8214Z	AF-18 Motor Procurement
490-22-80-28-00-FY-04-93	E8215	Vehicle 215 IMS Costs
490-22-80-28-00-FY-04-93	E8215A	AF-19 Management
490-21-80-28-00-FY-04-93	E8215B	AF-19 Mission Integration
490-21-80-28-00-FY-04-93	E8215C	AF-19 Preflight Planning
490-21-80-28-00-FY-04-93	E8215D	AF-19 Data Analysis
490-22-80-28-00-FY-04-93	E8215E	AF-19 Systems Engineering
490-22-80-28-00-FY-04-93	E8215F	AF-19 Reliability
490-22-80-28-00-FY-04-93	E8215G	AF-19 Standardization
490-01-80-28-00-FY-04-93	E8215H	AF-19 Vehicle Processing
490-21-80-28-00-FY-04-93	E8215I	AF-19 Range Costs
490-01-80-28-00-FY-04-93	E8215J	AF-19 Mission Peculiars
490-22-80-28-00-FY-04-93	E8215K	AF-19 Certification Training
490-22-80-28-00-FY-04-93	E8215L	AF-19 Logistics Administration
490-01-80-28-00-FY-04-93	E8215M	AF-19 Spares
490-21-80-28-00-FY-04-93	E8215N	AF-19 Launch Site Services
490-22-80-28-00-FY-04-93	E8215O	AF-19 G.S.E.
490-22-80-28-00-FY-04-93	E8215P	AF-19 LTV Support
490-21-80-28-00-FY-04-93	E8215Q	AF-19 Special Programs
490-22-80-28-00-FY-04-93	E8215R	AF-19 Special Programs
490-01-80-28-00-FY-04-93	E8215S	AF-19 Program Support
490-01-80-28-00-FY-04-93	E8215T	AF-19 Production Support
490-22-80-28-00-FY-02-93	E8215U	AF-19 Travel
490-01-80-28-00-FY-04-93	E8215V	AF-19 Tooling Maintenance
490-21-80-28-00-FY-04-93	E8215W	AF-19 Failure Investigation
490-22-80-28-00-FY-04-93	E8215X	AF-19 Shipping
490-01-80-28-00-FY-04-93	E8215Y	AF-19 Vehicle Procurement
490-01-80-28-00-FY-04-93	E8215Z	AF-19 Motor Procurement
490-22-68-08-00-FY-04-93	E8216	Vehicle 216 IMS Costs
490-22-68-08-00-FY-04-93	E8216A	S00S-3 Management
490-21-68-08-00-FY-04-93	E8216B	S00S-3 Mission Integration
490-21-68-08-00-FY-04-93	E8216C	S00S-3 Preflight Planning
490-21-68-08-00-FY-04-93	E8216D	S00S-3 Data Analysis
490-22-68-08-00-FY-04-93	E8216E	S00S-3 Systems Engineering
490-22-68-08-00-FY-04-93	E8216F	S00S-3 Reliability
490-22-68-08-00-FY-04-93	E8216G	S00S-3 Standardization
490-01-68-08-00-FY-04-93	E8216H	S00S-3 Vehicle Processing
490-21-68-08-00-FY-04-93	E8216I	S00S-3 Range Costs
490-01-68-08-00-FY-04-93	E8216J	S00S-3 Mission Peculiars
490-22-68-08-00-FY-04-93	E8216K	S00S-3 Certification Training
490-22-68-08-00-FY-04-93	E8216L	S00S-3 Logistics Administration
490-01-68-08-00-FY-04-93	E8216M	S00S-3 Spares
490-21-68-08-00-FY-04-93	E8216N	S00S-3 Launch Site Services
490-22-68-08-00-FY-04-93	E8216O	S00S-3 G.S.E.
490-22-68-08-00-FY-04-93	E8216P	S00S-3 LTV Support

NASA SCOUT R & D PROGRAM NUMBERS Continued

AGENCYWIDE CODE	J.O. #	JOB
490-21-68-08-00-FY-04-93	E8216Q	S00S-3 Special Programs
490-22-68-08-00-FY-04-93	E8216R	S00S-3 Special Programs
490-01-68-08-00-FY-04-93	E8216S	S00S-3 Program Support
490-01-68-08-00-FY-04-93	E8216T	S00S-3 Production Support
490-22-68-08-00-FY-02-93	E8216U	S00S-3 Travel
490-01-68-08-00-FY-04-93	E8216V	S00S-3 Tooling Maintenance
490-21-68-08-00-FY-04-93	E8216W	S00S-3 Failure Investigation
490-22-68-08-00-FY-04-93	E8216X	S00S-3 Shipping
490-01-68-08-00-FY-04-93	E8216Y	S00S-3 Vehicle Procurement
490-01-68-08-00-FY-04-93	E8216Z	S00S-3 Motor Procurement
490-22-68-08-00-FY-04-93	E8217	Vehicle 217 IMS Costs
490-22-68-08-00-FY-04-93	E8217A	S00S-4 Management
490-21-68-08-00-FY-04-93	E8217B	S00S-4 Mission Integration
490-21-68-08-00-FY-04-93	E8217C	S00S-4 Preflight Planning
490-21-68-08-00-FY-04-93	E8217D	S00S-4 Data Analysis
490-22-68-08-00-FY-04-93	E8217E	S00S-4 Systems Engineering
490-22-68-08-00-FY-04-93	E8217F	S00S-4 Reliability
490-22-68-08-00-FY-04-93	E8217G	S00S-4 Standardization
490-01-68-08-00-FY-04-93	E8217H	S00S-4 Vehicle Processing
490-21-68-08-00-FY-04-93	E8217I	S00S-4 Range Costs
490-01-68-08-00-FY-04-93	E8217J	S00S-4 Mission Peculiars
490-22-68-08-00-FY-04-93	E8217K	S00S-4 Certification Training
490-22-68-08-00-FY-04-93	E8217L	S00S-4 Logistics Administration
490-01-68-08-00-FY-04-93	E8217M	S00S-4 Spares
490-21-68-08-00-FY-04-93	E8217N	S00S-4 Launch Site Services
490-22-68-08-00-FY-04-93	E8217O	S00S-4 G.S.E.
490-22-68-08-00-FY-04-93	E8217P	S00S-4 LTV Support
490-21-68-08-00-FY-04-93	E8217Q	S00S-4 Special Programs
490-22-68-08-00-FY-04-93	E8217R	S00S-4 Special Programs
490-01-68-08-00-FY-04-93	E8217S	S00S-4 Program Support
490-01-68-08-00-FY-04-93	E8217T	S00S-4 Production Support
490-22-68-08-00-FY-02-93	E8217U	S00S-4 Travel
490-01-68-08-00-FY-04-93	E8217V	S00S-4 Tooling Maintenance
490-21-68-08-00-FY-04-93	E8217W	S00S-4 Failure Investigation
490-22-68-08-00-FY-04-93	E8217X	S00S-4 Shipping
490-01-68-08-00-FY-04-93	E8217Y	S00S-4 Vehicle Procurement
490-01-68-08-00-FY-04-93	E8217Z	S00S-4 Motor Procurement
490-85-03-13-00-FY-04-00	R4887	Correct Prior Years IMS Data
490-85-23-00-FY-04-00	R4888	Correct Prior Years IMS Data
180 32-51-14-00-FY-04-00	R5241	First-Stage Boosters - Scout
8296-5001-000-FY-07-53	C829601	Cosmodyne Shelter and Battery Preparation Room, WTR

APPENDIX J

APPENDIX J

FINANCIAL UPDATE OF SCOUT PHASES I, II, & III

PRECEDING PAGE BLANK NOT FILMED

APPENDIX J

TABLES

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TABLE J-1 - PHASE I FINAL COST SUMMARY (9 Scouts).

Vehicle		$11,516,661.42
Engineering Coordination		56,338.32
Motors		6,781,333.20
Launch Services		1,031,811.49
*TOTAL DEVELOPMENT		$19,386,199.43
**Total Cost 9 Vehicles Launched	$13,360,140.58	
Total Cost X-254 Motor Development	1,411,100.00	
Total Cost Algol IIA Motor Development	2,234,889.00	
Total Cost Castor II Motor Development	1,235,342.27	
Total Cost Jet Vanes Development	190,923.00	
Total Cost 34-Inch Heat Shield Development	142,037.00	
***Total Cost Velocity Control Development	725,747.00	
Total Cost Cold Separation Development	86,021.00	
	$19,356,354.88	

ACTUAL COST PER VEHICLE (1/9)

$1,486,899.73

MAJOR CONTRACTS

NAS1-249	NAS1-585	NAS1-330	L89844	NAS1-1928
NAS5-61	S-1010	NAS5-53	L89845	L93419
NAS1-900	S-1000	L15993	L3920	L93985

*Does not include OSSA direct development of X-258, X-259 motors ($2,250,000).
**Includes Autodestruct, ST-9, Guidance and Control Development and Vehicle Development.
***Does not include Air Force $500,000 (MIPR 63-20).

TABLE J-2 - PHASE II FINAL COST SUMMARY (10 Scouts).

Vehicles		$5,760,662.40
Motors		3,240,491.85
First Stage	$1,408,879.61	
Second Stage	588,764.24	
Third Stage	844,759.00	
Fourth Stage	398,089.00	
Spares		558,435.96
TOTAL (10 Scouts - not including specials)		$9,559,590.21

	NASA (3)	NAVY (5)	A.F. (2+4)	AEC (0)	TOTAL
01 Hardware	$2,867,877.06	$4,779,795.11	$1,911,918.04	$ 0*	$ 9,559,590.21
01 Mission Peculiars	107,051.39	48,905.00	918,879.20**	0*	1,074,915.59
02 Supporting Activities	2,392,177.99	2,140,208.20	1,005,964.00	90,000.00	5,628,350.19
03 Product Improvement	699,829.00	33,128.00	0	0*	732,957.00
TOTAL	$6,066,935.44	$7,002,116.30	$3,836,761.24	$90,000.00	$16,995,812.98

ACTUAL SCOUT COSTS PER VEHICLE

NASA 110,114,115	NAVY 111,116,118,119,120	A.F. 113, 132
$1,688,978.48	$1,400,549.46	$1,893,358.00 (113) $1,387,105.00 (132) $556,298.00 (A.F. Specials)

MAJOR CONTRACTS

NAS1-1295 - LTV	L-6990 - X-258	L-93419 - Castor
NAS1-3589 - LTV	L-93985 - X-248	L-2061 - Castor
NAS1-1330 - Aerojet	L-2570 - X-248	
NAS1-2165 - LTV	L-93985 - X-259	
NAS1-1928 - LTV	L-3920 - X-259	

*Included in Navy which furnished the vehicle.
**Includes nonrecoverable costs of canceled vehicles ($637,341.20).

TABLE J-3 - PHASE II SUMMARY.

VEHICLE NO.	PROGRAM	01 - VEHICLE HARDWARE: Hardware	01 - VEHICLE HARDWARE: Mission Peculiars	02 - SUPPORTING ACTIVITIES: Field Services	02 - SUPPORTING ACTIVITIES: Supporting Services	02 - SUPPORTING ACTIVITIES: GSE	03 - PRODUCT IMPROVEMENT	FINAL USER COST	TOTAL COST
OSSA			$ 33,890			$1,433,131		$ 1,467,021	
0									$ 1,467,021
OART									
S-110	RE-C	$ 955,959	$ 43,812	$ 175,763	$ 118,710		$ 240,367	1,534,611	
S-114	RE-B	955,959	11,303	175,763	118,711		240,368	1,502,104	
S-115	S55-B	955,959	18,046	175,763	118,711		240,368	1,508,847	
TOTAL OART		$2,867,877	$ 73,161	$ 527,289	$ 356,132		$ 721,103	$ 4,545,562	*$ 4,545,562
TOTAL NASA		$2,867,877	$ 81,140	$ 527,289	$ 356,132	$1,433,131	$ 721,103	1$ 6,012,583	
AEC (NAVY)									
S-116	AEC-A	$ 955,959	$ 0	$ 90,000 (a)	$ 110,611	$ 0	$ 6,624	$ 1,073,194	$ 90,000 (a)
NAVY						$1,487,153		$ 1,487,153	
S-111	SOLRAD-A	$ 955,959	$ 7,179	$ 25,000	$ 110,611		$ 6,626	1,105,375	
S-118	NAVY-1	955,959	12,844	25,000	110,611		6,626	1,112,131	
S-119	NAVY-2	955,959	12,844	25,000	110,611		6,626	1,112,131	
S-120	NAVY-3	955,959	12,843	25,000	110,611	3,275	6,626	1,112,132	
TOTAL NAVY		$4,779,795	$ 45,710	$ 100,000	$ 553,055	$1,490,428	$ 33,128	$7,002,116	$ 7,002,116
A.F. 62-6						$ 730,465		$ 730,465	$ 730,465
S-113	A.F.-A	$ 955,959	$ 18,279	$ 20,000	$ 168,655			$ 1,162,893	1,162,893
A.F. 63-32									
S-112	A.F. SPEC-1		$ 126,575	$ 12,500				$ 139,075	
S-117	A.F. SPEC-2		126,575	12,500				139,075	
S-121	A.F. SPEC-4		126,574	12,500				139,074	
S-126	A.F. SPEC-3		126,574	12,500				139,074	
S-132	A.F. SPEC-5	$ 955,959	394,302	20,000	$ 16,844			1,387,105	
TOTAL A.F. 63-32		$ 955,959	$ 900,600 (b)	$ 70,000	$ 16,844	$ 0	$ 0	$ 1,943,403	$ 1,943,403
TOTAL A.F.		$1,911,918	$ 918,879	$ 90,000	$ 185,499	$ 730,465	$ 0	$ 3,836,761	
TOTAL DOD		$6,691,713	$ 967,864	$ 190,000	$ 739,185	$2,217,618	$ 33,128	$10,838,877	
TOTAL USER COSTS PHASE II		$9,559,590	$1,074,915	$ 880,000	$1,098,232	$3,650,749	$ 732,957	$16,941,460	$16,941,460

*User Credit $1,513,394 Dev. Funds. (a)AEC funded. (b)$350,734 A.F. Special Funds.

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The total Phase II costs for 10 Scout vehicles are prorated from the following:

TABLE J-4 - PHASE II -01 HARDWARE.

VEHICLE EXPENDITURES (01-01)

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
20.200.672	L-48646	Upper D Sect. Mods.,S-133R	RC	$ 400.00
P10772	L-21733	Photography CVC	PB	908.05
P10941	L-29303	Fly Tape Recorder	PC	30.00
LR1-736	NAS1-1295	6 Scout Vehicles	NPANBRC	1,927,183.60
LR1-711	NAS1-1295-2	Scout Vehicles,S-110,S-139	PB	86,860.67
P2Y-021	NAS1-1295-7(c3)	34-inch Heat Shield	NPB	101,864.00
P2Z-024	NAS1-1295-8(c6)	X-258 Launcher Attach.	NPBRB	9,853.00
LR1-747	NAS1-1295-9	2 Scout Vehicles	NB	903,856.00
P2Y-078	NAS1-1295-10	Data Reduction	PA	22,148.09
P2Z-040	NAS1-1295-10	Data Reduction	NB	147,774.00
P2Y-079	NAS1-1295-11	10 Scout Vehicles	RYBRYC	289,450.00
P25-095	NAS1-1295-12	Pressure Regulator	NANPRBRC	6,943.00
P26-049	NAS1-1295-12	H_2O_2 Change to Vehicles	NANPBRC	1,785.00
P21-008	NAS1-1295-13(c1)	Autodestruct	NBRVC	75,390.00
P21-011	NAS1-1295-13(c1)	Autodestruct	VB	16,643.00
P21-054	NAS1-1295-13(c10)	Cold Separation	NRBRVC	120,318.00
P2Y-015	NAS1-1295-14(c4)	Algol Improvement	PB	10,000.00
P26-079	NAS1-1295-14(c4)	Algol Improvement	NBVC	142,738.00
P22-007	NAS1-1295-15(c11)	4 Wire Spin Motors	NPBPRC	10,746.00
P24-025	NAS1-1295-15(c18)	Spin Motors	NBPRC	3,000.00
P25-018	NAS1-1295-15(c24)	34-inch H.S.,S-114,124,129	PC	4,624.00
P25-088	NAS1-1295-15(c24)	34-inch H.S.,S-114,123,129	PAC	16,000.00
P22-020	NAS1-1295-18	Reliability	NPRBPC	324,000.00
P26-080	NAS1-1295-19	Frequency Change	NBRC	6,179.00
P03146	NAS1-1295-19(c14)	Battery Changes	NBPRC	15,996.00
P23-025	NAS1-1295-19(c14)	Battery Changes	NPBRC	30,581.00
P24-023	NAS1-1295-19(c21)	Destruct Readout	NBRVC	4,712.00
P38-018	NAS1-1295-19(c34)	Gyro Tests	NBRVC	15,441.00
P37-031	NAS1-1295-21(c28)	Armalon Heat Barrier	NRVBRC	21,320.00
P38-003	NAS1-1295-21(c30)	Safe Arm Unit Changes	NPRBPRC	6,875.00
P38-001	NAS1-1295-22(c29)	Guidance Equip. Changes	NRVB	12,047.00
P39-005	NAS1-1295-22(c35)	Training Manuals	PBC	2,917.00
20.200.070	NAS1-1295-25	S-48 Heat Shield,34-inch	PB	28,711.00
LR1-711	NAS1-1295-25(c38)	25-inch Heat Shield Refund	PC	-39,358.00
P00894	NAS1-1295-25(c38)	34-inch Heat Shields	PRB	34,368.00
P01315	NAS1-1295-25(c42)	34-inch Heat Shield Mods.	NRVB	39,813.00
P05950	NAS1-1295-25(c50)	S-66 34-inch Heat Shield	PB	29,688.00
P12035	NAS1-1295-26(c54)	Controls Changes	NPRB	34,588.00
20.200.136	NAS1-1295-26(c54)	H_2O_2 Tests	NPRB	23,072.00
20.200.093	NAS1-1295-26(c60)	Destruct and H_2O_2 Tests	PRB	31,160.00
20.200.116	NAS1-1295-26(c60)	Destruct Tests	NPRB	40,685.00
P38-009	NAS1-1295-27(c43)	Set of Jet Vanes	NRVBRC	16,930.00
LR1-711	NAS1-1295-29	Exploding Bridge Wire	PC	-42,200.00
LR1-736	NAS1-1295-29	Exploding Bridge Wire	NB	-42,200.00

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TABLE J-4 - PHASE II -01 HARDWARE Continued

VEHICLE EXPENDITURES (01-01) Continued

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
20.200.053	NAS1-1295-29	Accelerometers	PC	$ 10,000.00
20.200.222	NAS1-1295-29	Gyro Analysis	RC	1,049.69
20.200.262	NAS1-1295-29	Connectors	NPRB	87.00
20.200.342	NAS1-1295-29	Accelerometer	PC	2,176.00
P10991	NAS1-1295-29(c52)	Electrical Change	NPRB	25,903.00
20.200.019	NAS1-1295-29(c57)	S-55C Heat Shield	PB	8,204.00
20.200.386	NAS1-1295-30	Overrun	NRB	146,424.00
20.200.180	NAS1-1295-31	Overrun	PDYCD	300,000.00
20.200.067	NAS1-1295-32(c58)	Overrun	NPRB	3,697.00
20.200.224	NAS1-1295-32(c71)	Modify Heat Shield A-8	NB	4,799.00
20.200.276	NAS1-1295-32(c74)	Heat Shield Eject. Test, A-8	NB	5,890.00
20.200.315	NAS1-1295-32(c77)	Spacer Rings	NRB	2,097.00
20.200.316	NAS1-1295-35	Cannon Connector Mods.	NPRB	3,677.00
20.200.275	NAS1-1295-35(c78)	Trans. Sec. A, B, & C Mods	NBPRC	10,125.00
20.200.141	NAS1-1295-36(c64)	Jet Vane Mod. Kit, S-122	NPRB	14,497.00
20.200.448	NAS1-1928-1-1	Arm. Console, C & E Mods.	PD	3,000.00
20.200.449	NAS1-1928-14	Pressure Regulators	PD	24,237.00
20.200.465	NAS1-1928-15	6 Vehicle Mod. Kits	PD	1,553.00
60.400.715	NAS1-1970-8	Overrun	VC	6,488.30
20.200.004	NAS1-2650	Scout Vehicle	RC	313,477.00
20.200.193	NAS1-2650-3(c1)	Guidance Sup. Filter Mod	RTC	10,892.00
20.200.315	NAS1-2650-3(c4)	Spacer Rings	NRB	344.00
20.200.385	NAS1-2650-4(c6)	Connector Mod.	RC	5,000.00
20.200.682	NAS1-2650-6(c10)	Wire Ground Straps	RC	836.00
20.200.412	NAS1-2650(c8)	Transitions A, B, & C Mods.	RC	19,809.00
20.200.573	NAS1-3589-3	Recert. of S-130, S-139	RC	143,000.00
20.200.682	NAS1-3589-5	Wire Ground Straps	RC	1,227.00
60.400.004	NAS1-3589-7	Installation of BI Interval.	RC	1,497.00
60.400.064	NAS1-3589-7(c19)	Add. Meas. T/M System	RC	7,869.00
60.400.049	NAS1-3589-7(c20)	Fiberglas Spacers, S-134	RC	398.00
60.400.186	NAS1-3589-9	Vehicle Recert. Requirements	RC	40,666.00
20.200.633	NAS1-3589-11(c11)	Veh. Mod. Kits, S-133,-135,-136	RC	55,000.00
60.400.068	NAS1-3589-12	B Section Protective Shroud	RC	15,933.00
60.400.216	NAS1-3589-12	Change Dest. Receivers, S-133R	RC	2,199.00
60.400.004	NAS1-3589-16	Inst. of BI Intervalometer	RC	-228.00
20.200.600	NAS1-3657-1	Systems Engineering	RC	75,000.00
		TOTAL VEHICLE EXPENDITURES		$5,760,662.40

MOTORS EXPENDITURES (01-02)

FIRST STAGE

P2Z-068	L-8717	Ammonium Perchlorate	RBC	$ 60,769.00
P26-004	L-8717	Ammonium Perchlorate	NPBPC	18,231.00
P10485	L-15998	Radiograph, Algol IIA	NPRB	88,000.00
P10485	L-15998-2	Radiograph, Algol IIA	NPB	-14,068.20
LT-5	NAS1-1330	Aerojet B/L	RC	131.00
LR1-703	NAS1-1330	Algols	NPANB	695,000.00
P08561	NAS1-1330	Algol Igniter Seal	VC	2,503.11
P22-040	NAS1-1330	Algols	PANPVB	118,094.62
P26-004	NAS1-1330	Transporter Tooling	NB	23,135.92
P2Z-068	NAS1-1330-1	Algols	NPVBVC	5,723.23
P10484	NAS1-1330-5	Algol IIA Overrun	VC	81,714.00
P10485	NAS1-1330-5	Algol IIA Overrun	PB	11,878.00
P10485	NAS1-1330-5(c9)	Algol IIA Overrun	NB	19,253.46
P10485	NAS1-1330-9(c3)	Algol IIA Mod. Igniter	RC	3,495.00
P12-171	NAS1-1330-9(c3)	Algol Igniters	NBRC	20,423.00

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TABLE J-4 - PHASE II -01 HARDWARE Continued

MOTORS EXPENDITURES (01-02) Continued

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
THIRD STAGE Continued				
P39-003	L-3920-5	X-259 Chamber Measurements	NPBRC	$ 4,500.00
P06285	L-3920-6	X-259 A-4 for A-3	NPRB	2,070.00
P07940	L-3920-7	X-259 Rubber Cover	NPBRC	2,952.00
P04765	L-3920-9	X-259 115 Static Test	VB	2,000.00
20.200.105	L-3920-9	2 X-259 Burst Tests	VB	294.00
20.200.106	L-3920-9	X-259 Shipping Containers	VB	6,429.00
20.200.108	L-3920-9	X-259 Drawings	VB	3,054.00
20.200.109	L-3920-9	ABL Travel for X-259	VB	3,000.00
20.200.113	L-3920-9	X-259 Overrun	VB	8,191.00
20.200.166	L-3920-10	X-259A3 HPC-115 Static Fir.	VC	882.00
20.200.167	L-3920-10	X-259A3 HPC-118 Adapter	VC	450.00
20.200.168	L-3920-10	X-259 Overrun	VC	329,088.00
LR1-738	L-93985-0-2	X-259 Motor	NA	166,782.00
LR1-738	L-93985-4-2	X-259 Containers	NA	15,000.00
P24-036	L-93985-5-6	X-259 Chamber Tooling	NPBRC	5,224.00
P24-036	L-93985-5-7	Dollies	RC	3,000.00
P25-020	L-93985-6-8	Initiators	NPRB	5,000.00
P25-045	L-93985-6-9	X-259 Process Tooling	NPRB	10,000.00
P2Y-080	L-93985-7-12	X-259 Mock-up	VC	2,050.00
P24-041	L-93985-8-13	Adhesive, X-259	NB	25.00
P38-010	L-93985-8-13	X-259 Adhesive	RC	75.00
P25-045	L-93985-11-9	X-259 Process Tooling Cr.	NPB	-7,121.00
20.200.110	L-93985-12-2	X-259 Overrun	PVBVC	508.00
20.200.112	L-93985-12-2	X-259 Overrun	NVBRC	76,760.00
P00495	L-93985-12-15	Squib Evaluation	VB	15,000.00
P00805	L-93985-12-16	X-259 Squibs	VB	2,000.00
20.200.110	L-93985-12-16	X-259 Squibs	VB	124.00
20.200.110	L-93985-12-17	Burst Test, HPC-116-121	VB	5,001.00
P02568	L-93985-12-18	X-259 Static Firing,HPC113	NBVC	3,354.00
P02568	L-93985-12-19	X-259 Static Firing,HPC114	VC	2,456.00
20.200.110	L-93985-12-19	X-259 Static Firing,HPC114	VB	294.00
P02568	L-93985-12-20	X-259 Test, HPC-103	NBRC	5,940.00
20.200.101	L-93985-12-21	Hydroburst X259 HPC28 Cham.	NVBRC	2,231.00
20.200.102	L-93985-12-22	Kenvil Igniter Evaluation	NVBRC	11,770.00
20.200.103	L-93985-12-23	X-259-100-101 Skirt Repair	NVBRC	3,548.00
20.200.104	L-93985-12-24	X-259 HPC-26 Repair	NRVB	3,835.00
20.200.162	L-93985-13-19	X-259 HPC-114 Test Incr.	NBRVC	5,083.00
20.200.161	L-93985-13-20	X-259 HPC-103 Test Incr.	NBRVC	5,002.00
20.200.112	L-93985-13-24	X-259 Thermolag Repr.HPC26	VB	101.00
P04135	L-93985-13-25	X-259A3-HPC-111 Stat. Fir.	RBVC	2,500.00
20.200.163	L-93985-13-25	X-259A3 HPC-111 Stat. Fir.	NBRVC	1,030.00
20.200.164	L-93985-13-26	X-259 HPC-112 Noz. Repair	NBRVC	2,295.00
P06284	L-93985-13-27	X-259A2 Acc., Updt. HPC109	NPRB	3,000.00
20.200.165	L-93985-13-27	X-259A2 Acc., Updt. HPC109	NBRVC	4,303.00
P21-055	NAS1-1295-12(c13)	X-259 Motor Case Test	NPBRC	2,378.00
20.200.252	NAS1-3493-M2	X-259 Reject Replacement	VB	400.00
		MOTORS - THIRD STAGE SUBTOTAL		$844,759.00

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TABLE J-4 - PHASE II -01 HARDWARE Continued

MOTORS EXPENDITURES (01-02) Continued

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
FIRST STAGE Continued				
P10485	NAS1-1330-9(c4)	Algol IIA Lift Beam	RC	$ 2.00
20.200.280	NAS1-1330-11(c7)	Algol IIA Press. Chk. Clsrs.	NPRB	1,500.00
20.200.415	NAS1-1330-11(c11)	Initiator	RC	2,500.00
20.200.245	NAS1-1330-12(c12)	Algol IIA Noz. Recov. Effort	RC	75,000.00
20.200.269	NAS1-1330-12(c12)	Algol IIA Nozzle Spares	RC	12,000.00
20.200.310	NAS1-1330-12(c12)	Algol IIA Static Firing	RC	12,000.00
20.200.311	NAS1-1330-12(c12)	Algol IIA Noz. Components	RC	6,000.00
20.200.373	NAS1-1330-12(c12)	Algol Recovery Program	RC	411.31
20.200.390	NAS1-1330-12(c12)	Algol IIA-10 Static Firing	RC	3,000.00
20.200.704	NAS1-1330-12(c12)	Overrun	RC	35,490.00
60.400.072	NAS1-1330-13	Overrun	RC	5,529.00
20.200.704	NAS1-1330-14	Overrun	RC	55,510.00
60.400.073	NAS1-1330-14	Overrun, Algol IIA	VC	2,915.16
60.400.222	NAS1-1330-15	Overrun	RC	28,000.00
P08791	NAS1-2752	Algol Storage Dollies-Nev.	NVB	34,739.00
		MOTORS-FIRST STAGE SUBTOTAL		$1,408,879.61
SECOND STAGE				
P2Z-037	L-2061	Castors	NB	$ 87,782.00
P06282	L-2061	XM-33 Increase	PC	4,914.00
P22-045	L-2061	Castors	RB	39,832.00
P23-019	L-2061	Castor Tooling	PB	9,953.50
P38-019	L-2061	Castor Handling Manual	PC	462.00
P23-019	L-2061-3	Castor Tooling	RB	9,953.50
P38-019	L-2061-5	Castor Handling Manual	NBRC	1,038.00
P06282	L-2061-8	Castor Reject	NRB	11,016.00
P12-132	L-2061-9	Castor Reject	NBPRC	21,600.00
P22-045	L-2061-13	Underrun	RB	-11,919.30
LR1-740	L-93419	Thiokol XM-33	NPA	419,984.00
LR1-740	L-93419-3	Thiokol XM-33	PA	7,596.00
MEMO	L-93419-6	Motors Tabs, Paint & Logs	NPA	8,451.38
LR1-740	L-93419-16	Underrun	NA	-22,434.34
LR1-737	L-93986	Mandrels	PA	-80.50
60.400.303	NAS1-5123	Castor II Nozzle	PB	616.00
		MOTORS - SECOND STAGE SUBTOTAL		$ 588,764.24
THIRD STAGE				
P2Z-038	L-3920	2 X-259 Motors	NB	$ 76,000.00
P06286	L-3920-4	X-259 Increase	NPRB	15,971.00
P07942	L-3920-4	X-259 Tooling	NPBRC	8,835.00
P38-002	L-3920-4	X-259 Replacement Rejects	NB	20,952.00
P39-004	L-3920-4	X-259 Replacement Rejects	NB	1,143.00

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TABLE J-4 - PHASE II -01 HARDWARE Continued

MOTORS EXPENDITURES (01-02) Continued

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
THIRD STAGE Continued				
P39-003	L-3920-5	X-259 Chamber Measurements	NPBRC	$ 4,500.00
P06285	L-3920-6	X-259 A-4 for A-3	NPRB	2,070.00
P07940	L-3920-7	X-259 Rubber Cover	NPBRC	2,952.00
P04765	L-3920-9	X-259 115 Static Test	VB	2,000.00
20.200.105	L-3920-9	2 X-259 Burst Tests	VB	294.00
20.200.106	L-3920-9	X-259 Shipping Containers	VB	6,429.00
20.200.108	L-3920-9	X-259 Drawings	VB	3,054.00
20.200.109	L-3920-9	ABL Travel for X-259	VB	3,000.00
20.200.113	L-3920-9	X-259 Overrun	VB	8,191.00
20.200.166	L-3920-10	X-259A3 HPC-115 Static Fir.	VC	882.00
20.200.167	L-3920-10	X-259A3 HPC-118 Adapter	VC	450.00
20.200.168	L-3920-10	X-259 Overrun	VC	329,088.00
LR1-738	L-93985-0-2	X-259 Motor	NA	166,782.00
LR1-738	L-93985-4-2	X-259 Containers	NA	15,000.00
P24-036	L-93985-5-6	X-259 Chamber Tooling	NPBRC	5,224.00
P24-036	L-93985-5-7	Dollies	RC	3,000.00
P25-020	L-93985-6-8	Initiators	NPRB	5,000.00
P25-045	L-93985-6-9	X-259 Process Tooling	NPRB	10,000.00
P2Y-080	L-93985-7-12	X-259 Mock-up	VC	2,050.00
P24-041	L-93985-8-13	Adhesive, X-259	NB	25.00
P38-010	L-93985-8-13	X-259 Adhesive	RC	75.00
P25-045	L-93985-11-9	X-259 Process Tooling Cr.	NPB	-7,121.00
20.200.110	L-93985-12-2	X-259 Overrun	PVBVC	508.00
20.200.112	L-93985-12-2	X-259 Overrun	NVBRC	76,760.00
P00495	L-93985-12-15	Squib Evaluation	VB	15,000.00
P00805	L-93985-12-16	X-259 Squibs	VB	2,000.00
20.200.110	L-93985-12-16	X-259 Squibs	VB	124.00
20.200.110	L-93985-12-17	Burst Test, HPC-116-121	VB	5,001.00
P02568	L-93985-12-18	X-259 Static Firing,HPC113	NBVC	3,354.00
P02568	L-93985-12-19	X-259 Static Firing,HPC114	VC	2,456.00
20.200.110	L-93985-12-19	X-259 Static Firing,HPC114	VB	294.00
P02568	L-93985-12-20	X-259 Test, HPC-103	NBRC	5,940.00
20.200.101	L-93985-12-21	Hydroburst X259 HPC28 Cham.	NVBRC	2,231.00
20.200.102	L-93985-12-22	Kenvil Igniter Evaluation	NVBRC	11,770.00
20.200.103	L-93985-12-23	X-259-100-101 Skirt Repair	NVBRC	3,548.00
20.200.104	L-93985-12-24	X-259 HPC-26 Repair	NRVB	3,835.00
20.200.162	L-93985-13-19	X-259 HPC-114 Test Incr.	NBRVC	5,083.00
20.200.161	L-93985-13-20	X-259 HPC-103 Test Incr.	NBRVC	5,002.00
20.200.112	L-93985-13-24	X-259 Thermolag Repr.HPC26	VB	101.00
P04135	L-93985-13-25	X-259A3-HPC-111 Stat. Fir.	RBVC	2,500.00
20.200.163	L-93985-13-25	X-259A3 HPC-111 Stat. Fir.	NBRVC	1,030.00
20.200.164	L-93985-13-26	X-259 HPC-112 Noz. Repair	NBRVC	2,295.00
P06284	L-93985-13-27	X-259A2 Acc., Updt. HPC109	NPRB	3,000.00
20.200.165	L-93985-13-27	X-259A2 Acc., Updt. HPC109	NBRVC	4,303.00
P21-055	NAS1-1295-12(c13)	X-259 Motor Case Test	NPBRC	2,378.00
20.200.252	NAS1-3493-M2	X-259 Reject Replacement	VB	400.00
		MOTORS - THIRD STAGE SUBTOTAL		$844,759.00

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TABLE J-4 - PHASE II -01 HARDWARE Continued

MOTORS EXPENDITURES (01-02) Continued

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
FOURTH STAGE				
P24-062	L-2570	2 X-248 Motors	NRB	$ 81,000.00
P24-063	L-2570	4 X-248 Motors	PB	54,000.00
P39-017	L-2570	Squibs USNPP	NBPRC	400.00
20.200.366	L-2570	X-258 Clos. and Igniter	RC	3,420.00
20.200.473	L-2570	X-248A6 Motor	YD	16,000.00
P11886	L-2570-8	X248A6 Motors	TC	32,000.00
P11523	L-2570-9	Repair X-248A6-423	NPB	942.00
P11525	L-2570-9	Repair X-248A6-423	RB	588.00
P07724	L-2570-10	X-248 Jig Design	PB	275.00
20.200.186	L-2570-10	X-248 Incr. L-93985	RC	8,000.00
20.200.187	L-2570-10	X-248A NPP-BSB-403	NBPRC	27,733.00
20.200.188	L-2570-10	X-248 Increase	NBPRTC	2,500.00
20.200.189	L-2570-10	X-248 Inspect. BSB-261	PC	100.00
20.200.194	L-2570-11	Insp. & Rep. BSB-223-X-248	NPRB	2,470.00
20.200.007	L-2570-12	X-248A6 Chamber BSB-431	NBPRC	2,500.00
20.200.178	L-2570-12	X-248A5 BSB-409 Repair	NBPRC	858.00
20.200.301	L-2570-12	X-248A6 Chamber BSB-431	NBPRC	1,120.00
20.200.347	L-2570-16	Replacement X-248A5 Ign.	RC	1,000.00
20.200.582	L-2570-16	Static Firing Comp., X-248	PD	150.00
20.200.606	L-2570-16	Cost Incr. X-248 Ign. Instl.	RC	2,420.00
20.200.528	L-2570-17	X-248A6S Rocket Motor	RC	-3,420.00
P03004	L-6990	X-258 Motors	PB	24,000.00
P04763	L-6990	X-258 Motors	RB	48,000.00
P25-014	L-6990	X-258 Motors	NB	15,000.00
60.400.242	L-40999-2	X-248 Ign. Rem. Shp. from WTR	PE	2,500.00
P2Z-042	L-72505	X-248 Motors	RB	12,000.00
LR1-739	L-93985-1-3	X-248 Motor	NA	24,000.00
LR1-739	L-93985-4-3	X-248 Motor	NA	24,000.00
60.400.465	L-93985-14-2	Overrun, X-258 & X-259 Mtrs	PF	4,266.00
P25-049	NAS1-1295-19(c20)	X-258 Load Tests	NBRVC	10,267.00
		MOTORS - FOURTH STAGE SUBTOTAL		$ 398,089.00
		TOTAL MOTORS EXPENDITURES		$3,240,491.85

SPARES EXPENDITURES (01-03)

20.200.246	L-30538	Connectors	PC	$ 92.96
P2Z-006	NAS1-1295-7	A.F. Guidance Components	NPRB	102,506.00
P21-007	NAS1-1970	Spares	NPB	250,000.00
P22-037	NAS1-1970	Spares	NPRB	88,849.00
20.200.660	NAS1-1970-6	Additional Funds	RB	7,858.00
P26-051	NAS1-2165	Logistics Support	PC	4,907.00
20.200.420	NAS1-3420-3(c6)	Spares	RC	104,000.00
20.200.129	NAS1-3420-6(c16)	Spares	RC	223.00
		TOTAL SPARES EXPENDITURES		$ 558,435.96

TABLE J-5 - PHASE II NASA SPECIAL EXPENDITURES.

NASA SPECIALS

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
MISSION MODS (01-04)				
P22-026	NAS1-1295-7	S-110 Ign. G.S.E. Change	PB	$ 5,910.00
P24-024	NAS1-1295-12(c16)	Payload Adapters	PB	1,420.00
P24-028	NAS1-1295-15(c17)	S-115 D Section Rework	PB	500.00
P08280	NAS1-1295-22	S-113 H.S. to S-115	PB	6,243.00
P38-013	NAS1-1295-22(c33)	Range Safety Doc., S-118	PBC	10,693.00
P00494	NAS1-1295-22(c39)	Flyaway Umbilical Assy.	PC	958.00
P05951	NAS1-1295-25(c46)	S-66 Range Safety Doc.	PB	17,223.00
P11088	NAS1-1295-25(c53)	S-66 Range Safety Doc.	PB	3,000.00
20.200.225	NAS1-1295-29	Rework C from Loads	PC	1,303.00
	Subauthorization GSFC		PB	33,890.39
		MISSION MODS SUBTOTAL		$ 81,140.39
SUPPORTING ACTIVITIES (02-00)				
DCASO				
01.030.020	NAS1-553(487)	DCASO Plant Services	VC	$ 25.43
		DCASO SUBTOTAL		$ 25.43
FIELD SERVICES (02-01)				
WALLOPS STATION				
ADB100	L-15974	Stock Issues	PD	$ 870.57
P23-064	NAS1-2189	Field Team	PC	527,289.00
		WALLOPS STATION SUBTOTAL		$ 528,159.57
PRODUCTION SUPPORT (02-02)				
P10354	L-2570	X-248A6 Javelin Motor	PB	$ 1,510.00
P06071	L-2570-12	Overtime for X-248 BSB-423	PC	984.00
P39-001	L-12870	Diodes	PC	19.40
P39-019	L-13618	Connector and Sleeve	PC	13.88
ADB100	L-15974	Stock Issues	PBC	18,865.07
P06873	L-19525	ICC Regulations	PC	24.00
P10941	L-31469	Air Charter	PC	60.00
LRO-660	L-77203	Castor Revision	PC	14.97
LRO-679	L-91494	Castor Aging Program	PB	1,004.67
P38015	NAS1-1295-19	Ambient Temp. Thermistor	PC	1,492.00

TABLE J-5 - PHASE II SPECIAL EXPENDITURES Continued

NASA SPECIALS Continued

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
SUPPORTING ACTIVITIES (02-00) Continued				
PRODUCTION SUPPORT (02-02) Continued				
P38-017	NAS1-1295-28	Production Sched. Change	PB	$ 125,000.00
P39-013	NAS1-1295-28	Production Sched. Change	PB	167,000.00
P07944	NAS1-1928-8	Users Manual	VC	38,399.00
20.200.317	NAS1-1928-8(c2)	Users Manual	VC	849.00
		PRODUCTION SUPPORT SUBTOTAL		$ 355,235.99
		SUPPORTING ACTIVITIES SUBTOTAL		$ 883,420.99
PRODUCT IMPROVEMENT (03-00)				
TORQUING YAW GYRO				
P39-018	NAS1-1295-27(c36)	Torquing Yaw Gyros	PAPVBPVCPD	$ 31,202.00
20.200.173	NAS1-1295-27(c36)	Torquing Yaw Gyros	PC	1,925.00
		TORQUING YAW GYRO SUBTOTAL		$ 33,127.00
X-259				
P04133	L-3920-9	X-259 ABL Travel to WI	PB	$ 250.00
20.200.113	L-3920-9	X-259 Overrun	VBC	245,318.00
20.200.168	L-3920-10	X-259 Overrun	PB	51,741.00
20.200.169	L-3920-10	X-259 Incr. for Lewis Lab	PB	31,190.00
LR1-738	L-93985-0-2	X-259	PA	32,290.00
LR1-739	L-93985-0-2	X-259	PA	266,960.00
LR1-738	L-93985-4-2	X-259 Travel	PA	2,500.00
LR1-738	L-93985-4-2	X-259 Containers	PA	15,000.00
P2Y-080	L-93985-7-12	3 X-259 Chambers	PB	2,000.00
P05694	L-93985-10-14	Reinspection of X-259-110	PB	3,500.00
20.200.160	L-93985-13-14	X-259 HPC-110 Noz. Rep.	PB	5,350.00
20.200.169	L-93985-13-14	X-259 Overrun	PB	10,167.00
20.200.169	L-93985-13-17	X-259 Burst Test, HPC-116	PB	2,208.00
20.200.169	L-93985-13-18	X-259 Stat. Fir. HPC-113	PB	2,208.00
20.200.169	L-93985-13-22	X-259 Kenvil Igniter	PB	872.00
20.200.169	L-93985-13-24	X-259 Therm. Rep. HPC-26	PB	183.00
P2X-017	NAS1-1295-7(c2)	X-259, X-248(S-110-113)Mods.	PB	15,000.00
P2Y-020	NAS1-1295-7(c2)	X-259, X-248(S-110-113)Mods.	PB	1,239.00
		X-259 SUBTOTAL		$ 687,976.00
		PRODUCT IMPROVEMENT SUBTOTAL		$ 721,103.00
		NASA SPECIALS SUBTOTAL		$1,685,664.38

TABLE J-6 - PHASE II NAVY SPECIAL EXPENDITURES.

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
MISSION MODS (01-04)				
P2X-017	NAS1-1295-7(c2)	X-258-248 (S-111 Mods)	NB	$ 5,000.00
P24-020	NAS1-1295-7(c2)	X-258-248 (S-111 Mods)	NB	2,179.00
P22-039	NAS1-1295-12(c7)	Transit	YB	6,719.00
P37-010	NAS1-1295-19(c27)	Transit Flyaway	YC	4,333.00
P00493	NAS1-1295-22(c39)	Transit Relay Change	NB	869.00
LR1-736	NAS1-1295-25(c38)	Heat Shield Refund, 25-in.	NB	-98,390.00
P39-012	NAS1-1295-25(c38)	34-inch Heat Shields	NB	125,000.00
		MISSION MODS SUBTOTAL		$ 45,710.00
SUPPORTING ACTIVITIES (02-00)				
PRODUCTION SUPPORT (02-02)				
P38-106	L-93419-12	Thiokol Rep. to WTR	NB	$ 2,463.00
P23-045	L-94200-58	Jig - Navy Yard	NB	812.20
20.200.222	NAS1-1330-15	Transfer of Funds	NG	14,895.03
P39-013	NAS1-1295-28	Production Schedule Change	YC	153,686.00
LR1-736	NAS1-1295	Vehicle Tooling, etc.	NA	400,000.00
20.200.074	NAS1-2165-4(c5)	Transfer of Funds	NG	-15,526.03
		PRODUCTION SUPPORT SUBTOTAL		$ 556,330.20
TRAVEL				
		Travel	NB	$ 100,000.00
		TRAVEL SUBTOTAL		$ 100,000.00
		SUPPORTING ACTIVITIES SUBTOTAL		$ 671,856.23
PRODUCT IMPROVEMENT (03-00)				
TORQUING YAW GYRO				
P39-018	NAS1-1295-27(c36)	Torquing Yaw Gyro	NYB	$ 28,798.00
20.200.173	NAS1-1295-27(c36)	Torquing Yaw Gyro Increase	YBC	4,330.00
		TORQUING YAW GYRO SUBTOTAL		$ 33,128.00
		PRODUCT IMPROVEMENT SUBTOTAL		$ 33,128.00
		NAVY SPECIALS SUBTOTAL		$ 735,168.20

TABLE J-7 - PHASE II AIR FORCE SPECIAL EXPENDITURES.

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
MISSION MODS (01-04)				
P24-041	L-2569	Air Trip for Adhesive	RB	$ 76.50
P06773	L-6990	X-258 Payload Motor Case	RB	500.00
P2Z-006	NAS1-1295-7	Asset Guidance Components	RB	13,032.00
P39-006	NAS1-1295-22(c35)	Umbilical Cable A0-10	RBC	493.00
20.200.005	NAS1-1295-29(c55)	*Modify S-132, 134, 135, 136	RC	41,625.00
20.200.145	NAS1-1295-32(c66)	Change Frequencies S-138	RB	2,100.00
20.200.338	NAS1-1295-32(c66)	Change Frequencies, S-138	RB	859.00
20.200.304	NAS1-1295-32(c76)	Umbilical Cable (P/L 79)	RB	587.00
20.200.626	NAS1-1295-36	*Reinsp. C-Sec. S-127, S-134	RC	28,566.00
20.200.004	NAS1-2650	*4 FY63 Vehicles	RC	95,523.00
20.200.540	NAS1-3493-1	*Spare X-259 Casting Powder	RC	78,813.00
60.400.052	NAS1-3589-8(c23)	*Change Frequency S-136	RC	2,076.00
60.400.199	NAS1-4664	*(63-32) Nonrecoverable Costs	RC	127,699.00
60.400.374	NAS1-4795-3	*Refurb. X-259A2 Motors	RC	20,000.00
60.400.074	NAS1-4325	Systems Test Stand Fac. Ref.		400,000.00
		MISSION MODS SUBTOTAL		$ 811,949.50
SUPPORTING ACTIVITIES (02-00)				
DCASO				
45.110.018	L-40992-120	DOD Plant Services	RC	$ 737.70
		DCASO SUBTOTAL		$ 737.70
PRODUCTION SUPPORT (02-02)				
P38-017	NAS1-1295-28	Production Schedule Changes	RB	$ 125,000.00
P39-013	NAS1-1295-28	Production Schedule Changes	RB	13,314.00
P07944	NAS1-1928-8-1	Payload User's Manual	RB	45,709.00
		PRODUCTION SUPPORT SUBTOTAL		$ 184,023.00

*63-32 Nonrecoverable Costs.
**Transfer of Funds. See Phase II, 66-95, FY67.

TABLE J-7 - PHASE II SPECIAL EXPENDITURES Continued

AIR FORCE SPECIALS Continued

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
SUPPORTING ACTIVITIES (02-00) Continued				
TRAVEL				
		Travel	RBC	$ 40,000.00
		TRAVEL SUBTOTAL		$ 40,000.00
		SUPPORTING ACTIVITIES SUBTOTAL		$ 224,760.70
		AIR FORCE SPECIALS SUBTOTAL		$1,037,341.20

TABLE J-8 - PHASE II ATOMIC ENERGY COMMISION SPECIALS.

SUPPORTING ACTIVITIES (02-00)				
FIELD SERVICES (02-01)				
WALLOPS STATION				
20.200.140	NAS1-2189-3	Launch Services, S-116	TC	$ 90,000.00
		WALLOPS STATION SUBTOTAL		$ 90,000.00
		SUPPORTING ACTIVITIES SUBTOTAL		$ 90,000.00
		ATOMIC ENERGY COMMISSION SPECIALS SUBTOTAL		$ 90,000.00
		TOTAL SPECIALS EXPENDITURES		$3,548,173.78

PHASE III DETAILS

TABLE J-9 - PHASE III FINAL COST SUMMARY.

Vehicles		$13,095,114.93
Motors		5,789,538.45
First Stage	$2,863,331.52	
Second Stage	1,005,665.08	
Third Stage	1,056,228.19	
Fourth Stage	864,313.66	
Spares		978,318.26
TOTAL (14 Scouts - not including specials)		$19,862,971.64

	NASA (11)	NAVY (1)	AIR FORCE (1)	AEC (1)	TOTAL
01 Hardware	$15,606,620.48	$1,418,783.68	$1,418,783.68	$1,418,783.68	$19,862,971.52
01 Mission Peculiars	164,584.00	166,336.00	0	761,213.00	1,092,133.00
02 Supporting Activities	11,343,821.00	166,336.00	77,177.00	127,006.00	11,714,340.00
03 Product Improvement	1,797,888.00	0	500,000.00	0	2,297,888.00
TOTAL	$28,912,913.48	$1,751,455.68	$1,995,960.68	$2,307,002.68	$34,967,332.52

ACTUAL SCOUT COSTS PER VEHICLE

NASA 122, 123, 124, 127, 129, 131, 133, 134, 135, 136, 137	NAVY 125	A.F. 128	*AEC 130
$1,639,381.34	$1,585,119.39	$1,495,960.73	$2,308,002.33

MAJOR CONTRACTS

NAS1-3420 - LTV
NAS1-3589 - LTV
NAS1-3615 - LTV
NAS1-3657 - LTV
NAS1-3899 - LTV
NAS1-1330 - Aerojet
NAS1-3493 - Hercules
NAS1-3538 - Thiokol
NAS1-3698 - Hercules
NAS1-2664 - ABL
NAS1-3833 - Aerojet

*Includes nonrecoverable costs for canceled vehicles.

TABLE J-10 - PHASE III SUMMARY.

VEHICLE NO.	PROGRAM	01 - VEHICLE HARDWARE: Hardware	01 - VEHICLE HARDWARE: Mission Peculiars	02 - SUPPORTING ACTIVITIES: Field Services	02 - SUPPORTING ACTIVITIES: Supporting Services	02 - SUPPORTING ACTIVITIES: GSE	03 - PRODUCT IMPROVEMENT	FINAL USER COST	TOTAL COST
OSSA			$ 20,008	$ 15,288	$7,709,607	$1,352,215	$1,797,888	$10,895,006	$10,895,006
S-122R	ADIE-A	$ 1,418,783		198,537	7,528			1,624,848	
S-123R	S66-B	1,418,783	7,728	198,537	7,528			1,632,576	
S-131R	S.E.V.	1,418,783		198,537	7,528			1,624,848	
S-134R	S-48A	1,418,784	10,499	198,537	7,528			1,635,348	
S-135R	ADIE-B	1,418,784	17,029	198,537	7,528			1,641,878	
S-136R	S66-C	1,418,784	392	198,537	7,528			1,625,241	9,784,739
TOTAL OSSA UNITED STATES		$ 8,512,701	$ 55,656	$1,206,510	$7,754,775	$1,352,215	$1,797,888		$20,679,745
INTERNATIONAL									
S-127R	UK-C	$ 1,418,783	$ 3,080	$ 198,537	$ 7,527			$ 1,627,927	
S-137R	SM-A	1,418,784	99,887	198,537	7,527			1,724,735	
TOTAL OSSA INTERNATIONAL		$ 2,837,567	$102,967	$ 397,074	$ 15,054				$ 3,352,662
TOTAL OSSA		$11,350,268	$158,623	$1,603,584	$7,769,829	$1,352,215	$1,797,888		$24,032,407
OART									
S-124R	SERT-1	$ 1,418,784	$ 4,720	$ 198,537	$ 7,527			$ 1,629,568	
S-129R	RE-D	1,418,784		198,537	7,527			1,624,848	
S-133R	S-55C	1,418,784	1,241	198,537	7,528			1,626,090	
TOTAL OART		$ 4,256,352	$ 5,961	$ 595,611	$ 22,582				$ 4,880,506
TOTAL NASA		$15,606,620	$164,584	$2,199,195	$7,792,411	$1,352,215	$1,797,888	$28,912,913	$28,912,913
AEC									
S-130	AEC-B	$ 1,418,783	$76 ,213	$ 122,230	$ 4,776			$ 2,307,002	
NAVY									
S-125	NAVY-4	$ 1,418,783		$ 20,000	$ 146,336			$ 1,585,119	
AIR FORCE									
	63-20						$ 500,000	500,000	
S-128	62-6 A.F.-B	$ 1,418,783	$	$ 20,000	$ 57,177	$ 73,231		1,569,191	
TOTAL D.O.D.		$ 2,837,566	$ 0	$ 40,000	$ 203,513	$ 73,231	$ 500,000	$ 3,654,310	$ 3,654,310
TOTAL USER COSTS PHASE III		$19,862,969	$925,797	$2,361,425	$8,000,700	$1,425,446	$2,297,888	$34,874,225	$34,874,225

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TABLE J-11 - PHASE III -01 HARDWARE.

VEHICLE EXPENDITURES (01-01)

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
20.200.543	L-41315	Elect. Connectors, Umbilical	TC	$ 394.40
60.400.039	L-48646	Upper D Mod., S-133R	PE	851.00
60.400.002	L-50877	EX-38 Cartridges	YC	2,249.03
LR1-711	NAS1-1295-2	Scout Vehicles, S-110 - S-139	PB	1,700,362.75
P24-038	NAS1-1295-2	Scout Vehicles	PB	2,298,000.00
P2Y-078	NAS1-1295-10	Data Reduction	PB	125,625.91
P2Y-079	NAS1-1295-11	Scout Vehicles, S-110 - S-139	YBYC	305,692.00
P06351	NAS1-1295-24	Separation Systems Credit	NPB	-5,090.00
P06351	NAS1-1295-24	2 San Marco Heat Shields	PC	13,373.00
P05695	NAS1-1295-25(c47)	Heat Shield Ejection Test	PTC	10,680.00
20.200.222	NAS1-1295-29	Gyro Analysis	PTYC	7,351.31
20.200.123	NAS1-1295-29(c67)	34-inch Heat Shield RFD-2	TC	27,211.00
20.200.386	NAS1-1295-30	Overrun	YD	91,100.00
20.200.205	NAS1-1295-31	Overrun	PYC	575,000.00
P05678	NAS1-1295-32(c50)	S-52 34-inch Heat Shield, UK	PBCD	19,638.00
P27-029	NAS1-1295-32(c56)	Preflight Planning Reduction	RC	-65,720.00
20.200.170	NAS1-1295-32(c68)	34-inch Heat Shield, S-56B	PC	30,947.00
20.200.215	NAS1-1295-32(c70)	Heat Shield, 34-inch	RD	27,938.00
20.200.315	NAS1-1295-32(c77)	Spacer Rings	PCD	932.00
20.200.394	NAS1-1295-34(c81)	Recertification S-122	PD	100,000.00
20.200.524	NAS1-1295-34(c86)	Recertification S-122	PD	118,899.00
20.200.421	NAS1-1295-35	Modify Heat Shield	TC	1,800.00
20.200.489	NAS1-1295-35	H.S. A-10 for S-55c Mod.	PD	10,242.00
20.200.559	NAS1-1295-35	Heat Shield Mod.	PD	6,376.00
20.200.561	NAS1-1295-35	Modify Heat Shield	TC	1,587.00
20.200.485	NAS1-1295-35(c84)	Connector Kits	RC	2,625.00
20.200.627	NAS1-1295-36(c82)	Transducer Kits	RC	17,300.00
20.200.482	NAS1-1295-36(c85)	Resistor Kits	RC	4,695.00
20.200.589	NAS1-1295-37(c88)	H.S. 129 Test, SERT 1	PD	6,000.00
60.400.031	NAS1-1295-37(c88)	Test, H.S. 129, SERT 1	PE	1,745.00
P27-029	NAS1-1295-38	Cancellation Preflight Reports	RC	-20,099.00
P27-029	NAS1-1295-38	S-138 - S-139 Stoppage	RC	-1,457.00
20.200.554	NAS1-1295-39	Overrun	PD	250,000.00
60.400.079	NAS1-1295-39	Overrun	PE	110,000.00

TABLE J-11 -01 HARDWARE Continued

VEHICLE EXPENDITURES (01-01) Continued

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
LR1-736	NAS1-1295	6 Scout Vehicles	PANB	$ 2,402,437.89
LR1-747	NAS1-1295	Scout Vehicles	PB	300,000.00
20.200.314	NAS1-2650-3(c3)	Paint Base A Mod.	PC	626.00
20.200.004	NAS1-2650	FY63 Scout Vehicles	TCPD	710,590.95
20.200.353	NAS1-3510	Amplifiers	PD	3,755.00
20.200.354	NAS1-3550	Accelerometers	PD	10,533.00
20.200.683	NAS1-3589-1-6	Recert. Base A Hydr. Pump Unit	PD	1,656.00
60.400.010	NAS1-3589-2	Destruct Relays, S-123, S-124	PE	6,581.00
20.200.533	NAS1-3589-2(c1)	Relays S-124 and S-128	PD	4,250.00
20.200.557	NAS1-3589-2(c2)	Guid. and Control Sys. Sup.	PD	14,583.00
20.200.643	NAS1-3589-2(c3)	Fit Check, A-6 Heat Shield	PD	672.00
20.200.573	NAS1-3589-3	Recert. S-130 Series	PBDEFTC	1,165,070.00
60.400.113	NAS1-3589-5	Fab. Third-Stage Chargers	PE	1,438.00
20.200.657	NAS1-3589-5(c5)	S-128 Trajectory Revisions	RC	9,394.00
20.200.678	NAS1-3589-5(c6)	Mod. to A-2 Heat Shield	PD	4,082.00
20.200.675	NAS1-3589-5(c7)	Mod. to A-9 Heat Shield	PD	4,255.00
20.200.651	NAS1-3589-6	Replacement & Recert. Components	PE	3,315.00
60.400.156	NAS1-3589-6	Reconfiguration S-48 Sep. Sys.	PE	9,147.00
60.400.043	NAS1-3589-6(c21)	Reconfig. Beacon Battery	PE	1,926.00
20.200.640	NAS1-3589-7	Systems Checkout	YD	3,000.00
20.200.650	NAS1-3589-7	S-128 Trajectory Rev.	NB	3,303.00
60.400.165	NAS1-3589-7	Fab. Shorting Plugs	PE	7,329.00
60.400.047	NAS1-3589-8(c15)	Mod. Destruct Relay Boxes	PE	4,973.00
60.400.032	NAS1-3589-8(c19)	Mod. Kits	PE	7,002.00
60.400.151	NAS1-3589-11	Checkout on Vehicle S-129	PE	12,941.00
20.200.714	NAS1-3589-11(c11)	Recertification S-124	YC	2,400.00
60.400.050	NAS1-3589-11(c19)	Resistor	PE	-8,918.00
20.200.266	NAS1-3589-11(c20)	Repair Vinson Valve	RE	4,513.00
60.400.144	NAS1-3589-11(c28)	Four Recert. Battery Boxes	PE	245.00
60.400.166	NAS1-3589-11(c29)	Repair Base A, S-135	PE	8,203.00
60.400.071	NAS1-3589-12	Cork and Ejection Test, A-9/S-48	PE	151.00
60.400.078	NAS1-3589-12	Replacement S-128 Invest. Parts	PE	618.00
60.400.177	NAS1-3589-12	Coding Electrical Connectors	PE	1,835.00
60.400.283	NAS1-3589-12	Safe Arm Units	PE	1,047.00
60.400.071	NAS1-3589-12(c20)	Cork and Eject. Test, A-9/S-48	PE	10,000.00
60.400.099	NAS1-3589-12(c20)	Outgassing Test, S-123	PD	3,000.00

TABLE J-II -01 HARDWARE Continued

VEHICLE EXPENDITURES (01-01) Continued

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
60.400.017	NAS1-3589-12(c22)	Guidance System Wiring	PE	$ 1,956.00
60.400.116	NAS1-3589-12(c25)	Applic. Cork Insulation,A-2 H.S.	PE	2,302.00
20.200.597	NAS1-3589-13	Recertification S-123R	PE	75,000.00
60.400.295	NAS1-3589-13	Recertification S-123R	PE	18,350.00
60.400.014	NAS1-3589-13(c16)	Inv. & Test Support,S-128R Fail.	RCDE	31,030.00
60.400.016	NAS1-3589-13(c19)	Instrument Change, S-124, S-134	PE	2,400.00
60.400.023	NAS1-3589-13(c19)	Tun. Temp. Cont. Protect. Flap	PE	3,500.00
60.400.232	NAS1-3589-14	Extension of Recert. Program	PE	438,000.00
60.400.308	NAS1-3589-14	Extension of Recert. Program	PE	52,372.00
60.400.177	NAS1-3589-16	Coding Electrical Connectors	PE	-190.00
60.400.200	NAS1-3589-16(c36)	Appl. Cork Insul., A-23/S-66c	PE	1,440.00
60.400.255	NAS1-3589-16(c39)	Spring Rate Test of Spin Table	PE	-687.00
60.400.264	NAS1-3589-16(c40)	Heat Shield A-27 (SECOR)	PE	1,775.00
60.400.386	NAS1-3589-17	Overrun	PF	69,130.00
20.200.435	NAS1-3589	Recertification S-120 Series	PYD	750,000.00
60.400.097	NAS1-3589	4 Safe Arm Units	PE	3,600.00
20.200.600	NAS1-3657-1	Systems Engineering	PDTYC	330,075.00
20.200.447	NAS1-3657	Systems Engineering	PDTC	1,668,000.00
20.200.652	NAS1-3899-3	H.S. Fit & Eject. Test, AD/IB	PD	3,350.00
20.200.656	NAS1-3899-3	H.S. Fit & Eject. Test, RFD2A	TC	7,000.00
20.200.679	NAS1-3899-5	Fit & Eject. Test, A-2/S-66	PE	7,000.00
60.400.011	NAS1-3899-5	Fit & Eject. Test, A-2/S-66A	PE	2,500.00
20.200.715	NAS1-3899-10	Fit Check, A-23/S-66B	PE	727.00
60.400.203	NAS1-3899-23	Base A Sling Assy. and Vert.Hoist	PE	2,831.00
60.400.326	NAS1-3899-31	Refurb.& Repl.500-lb motor Valve	PE	16,360.00
60.400.172	NAS1-4662	Cable	RC	11,844.00
		TOTAL VEHICLE EXPENDITURES		$13,095,114.93

MOTOR EXPENDITURES (01-02)

FIRST STAGE

20.200.552	L-15998-1	Algol IIB Motors, Radiograph	NB	$ 16,000.00
20.200.721	L-47781	Algol IIB-23 Radiographic Insp.	YC	2,300.00
P2Z-068	NAS1-1330-1	Algols	RB	170,067.37
P26-004	NAS1-1330-1	Algol IIA	NANPB	228,585.00
20.200.340	NAS1-1330-7	Algol IIA Stretchout	PYD	52,894.00
20.200.227	NAS1-1330-8	Algol IIA Static Motor	PCYD	55,384.00
20.200.339	NAS1-1330-9	Algol IIA-21 Overtime	RBPYD	628.00
20.200.453	NAS1-1330-9	Algol IIA Overrun	PD	3,615.00
20.200.551	NAS1-1330-11(c7)	Fab. Algol Nozzle Cost Incr.	PD	1,546.00

TABLE J-11 -01 HARDWARE Continued

MOTOR EXPENDITURES (01-02) Continued

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
FIRST STAGE Continued				
20.200.415	NAS1-1330-11(c11)	Algol Initiator	RB	$ 2,500.00
20.200.373	NAS1-1330-12(c12)	Algol Recovery Program	YC	236,588.69
20.200.437	NAS1-1330-12(c12)	Algol IIA Nozzle Recovery	PD	71,000.00
20.200.704	NAS1-1330-12(c12)	Overrun	PA	20,000.00
20.200.548	NAS1-1330-14	Rehab. Wood Cor. Cast., Alg. IIA	PE	8,129.00
20.200.621	NAS1-1330-14(c13)	2 Expended Algol Chambers	RB	1,000.00
20.200.655	NAS1-1330-14(c14)	Algol Chamber for Fit Check	YE	750.00
60.400.224	NAS1-1330-15(c15)	Algol IIB Noz. Switch in Field	PE	750.00
60.400.223	NAS1-1330-15(c16)	Repair Algol IIB Nozzle No. 210	PE	4,240.00
P22-040	NAS1-1330	Algol IIA Motors	NPB	778,102.46
60.400.194	NAS1-3589-13	Spacer for Algol Launch Ring	PE	7,867.00
60.400.389	NAS1-3833-3	Algol IIB Overwrap	YE	1,369.00
60.400.390	NAS1-3833-3	Algol IIB Wrap Angle	YE	806.00
60.400.442	NAS1-3833-3	Algol IIB Nozzle Mod.	YE	25,097.00
60.400.472	NAS1-3833-3	Trial Shipment, Algol IIB 36	PE	4,400.00
20.200.520	NAS1-3833	24 Algol IIB Motors	PD	1,093,713.00
20.200.521	NAS1-3833	Algol IIB Spares	PD	60,000.00
60.400.241	NAS1-3899-28	Redes. Algol Hoist & Launch Ring	PE	9,000.00
60.400.313	NAS1-3899-28	Algol Hoist Ring	PE	7,000.00
		MOTORS - FIRST STAGE SUBTOTAL		$2,863,331.52
SECOND STAGE				
P22-045	L-2061	Castor Motors	RB	$ 340,000.00
60.400.054	L-35509	Castor IE5 Discrep. Eval.	PE	882.00
20.200.718	L-41002	Castor Nozzle Closure Proc.	PE	2,414.00
20.200.716	L-41003	Castor Prog. Unit Inv.	PE	1,300.00
20.200.653	L-45808	Shipment Castor I Nozzles	TC	567.74
20.200.654	L-45809	Castor I Chambers	TC	2,000.00
60.400.240	L-56006	Drilling Castor Tun. Tab Str.Tem.	PE	450.00
60.400.296	L-62039	X-Ray Castor I Nozzle, S/N 53	PE	500.00
LRI-740	L-93419	Thiokol XM-33	PA	218,016.00
60.400.108	NAS1-3589-11(c24)	Inspect. Castor Noz. No. 35	PE	463.00
60.400.129	NAS1-3589-11(c26)	Inspect. Castor Noz. No. 43	PE	463.00
60.400.118	NAS1-3899-14	Fixture for Castor Nozzles	PE	3,200.00
60.400.164	NAS1-3899-14	Drill Fixture for Castor Motor	PE	1,055.00
60.400.230	NAS1-4437	XM-33E5 Auxiliary Hardware	PE	1,450.00
60.400.355	NAS1-5034-1(c1)	Proof Press. Chk. Castor II Noz.	YE	9,521.00
60.400.121	NAS1-5034	Castor II Motors	PE	100,000.00
60.400.305	NAS1-5123	Castor II Nozzle	PE	12,411.34
		MOTORS - SECOND STAGE SUBTOTAL		$ 694,693.08

TABLE J-II -01 HARDWARE Continued

MOTORS EXPENDITURES (01-02) Continued

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
THIRD STAGE				
P2Z-044	L-3920	X-259 Motors	RB	$ 380,000.00
P38-002	L-3920-4	X-259 Replacement Rejects	PBC	23,571.00
P39-004	L-3920-4	X-259 Replacement Rejects	PC	1,286.00
20.200.105	L-3920-9	2 X-259 Burst Tests	NBRC	18,723.00
20.200.106	L-3920-9	15 X-259 Shipping Containers	NBC	5,715.00
20.200.107	L-3920-9	X-259 Documentation	NRB	6,750.00
20.200.108	L-3920-9	X-259 Drawings	NBRC	6,108.00
20.200.109	L-3920-9	ABL Travel for X-259	NBRC	6,001.00
20.200.111	L-3920-9	X-259 Increase	NPBC	236.00
20.200.113	L-3920-9	X-259 Overrun	NPANBC	92,928.00
20.200.166	L-3920-10	X-259A3 HPC-115 Static Fir.	NBRC	1,764.00
20.200.167	L-3920-10	X-259A3 HPC-118 Adapter	NBRC	900.00
20.200.168	L-3920-10	X-259 Overrun	NPB	79,706.00
20.200.175	L-3920-11	BuWeps Travel	NPRB	2,500.00
20.200.451	L-3920-12	X-259 Overrun	PD	97,844.00
20.200.581	L-45259	X-259 Nozzles Insp. and Rep.	PD	1,155.00
20.200.581	L-45259-1	X-259 Nozzles Insp. and Rep.	PD	150.00
20.200.725	L-49913	X-259 HPC-130 Bracket	PE	758.00
LR1-738	L-93985-0-2	X-259 Motor	NA	58,968.00
20.200.506	NAS1-3493-3	X-259A3 Motors	RE	-34,062.00
	NAS1-3493	Hercules Shipping	PE	2,684.80
20.200.506	NAS1-3493	X-259A3 Motors	PD	171,683.39
20.200.249	NAS1-3493	X-259A3 Quality Control	TCYD	9,400.00
20.200.252	NAS1-3493	Reject Replacement	NBPD	20,235.00
20.200.253	NAS1-3493	X-259A3 Spare Components	TC	609.00
20.200.303	NAS1-3493	X-259A3 Motor	PD	12,215.00
20.200.506	NAS1-3493	X-259A3 Motors	TC	78,880.00
20.200.527	NAS1-3664-2	X-259-109B Rad. Inspect.	PD	2,431.00
20.200.703	NAS1-4264	Repair X-259 Nozzles	RB	7,089.00
		MOTORS - THIRD STAGE SUBTOTAL		$1,056,228.19
FOURTH STAGE				
P03004	L-6990	X-258 Motors	PBTC	$ 48,000.00
P25-014	L-6990	X-258 Motors	NB	39,000.00
20.200.425	L-37230	Thread for Blank., X-248	PD	29.76
20.200.576	L-40110	2 X-258 Chambers	PD	1,446.00
60.400.029	L-49910	X-259 and X-258 Igniter Heads	PE	252.00
60.400.146	L-55985	Shipment of SD55A3 Squibs	PE	266.00
60.400.259	L-55987	Shipment of Explosives	PE	100.00

TABLE J-II -01 HARDWARE Continued

MOTORS EXPENDITURES (01-02) Continued

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
FOURTH STAGE Continued				
LR1-739	L-93985-3-3	X-249 Motors	PA	$ 48,000.00
P2Y-080	L-93985-7-11	X-258 Case	PB	300.00
60.400.237	NAS1-3589-16	X-258 and X-259 Motors	PE	335.00
20.200.706	NAS1-3664-1	Add. Funds, 8 X-258 Motors	PDE	35,017.00
60.400.101	NAS1-3664-1	X-258 Nozzle Alinement Check	PE	854.00
20.200.610	NAS1-3664-3(c1)	X-Ray Inspect., X-258 Nozzle	YDE	2,934.00
60.400.456	NAS1-3664-4	Overrun, X-258	PEF	18,817.00
20.200.476	NAS1-3664	X-258 Complete Motors	RBPD	95,353.00
20.200.641	NAS1-3698-3	5 X-258C Motors	PE	16,384.00
60.400.083	NAS1-3698-4(c4)	X-258 Nozzle	PE	3,490.00
60.400.155	NAS1-3698-6(c7)	X-258 EP-87 Investigation	PE	2,400.00
60.400.201	NAS1-3698-6(c10)	Rework X-258 Wedge Clamps	PE	400.00
60.400.228	NAS1-3698-6(c14)	X-258 Modified Igniter Hardware	PE	5,000.00
60.400.297	NAS1-3698-9(c19)	X-Ray Inhibitor Tubes, X-258	PE	7,500.00
60.400.337	NAS1-3698-9(c22)	Clean. and Ship. X-258 Noz.	PE	250.00
20.200.237	NAS1-3698	X-258 Motors	PD	261,389.00
20.200.238	NAS1-3698	X-258 Motor	TC	72,000.00
20.200.239	NAS1-3698	X-258 Motor	TC	24,000.00
20.200.242	NAS1-3698	X-258B2 Motors for Q.C.	TC	8,400.00
60.400.243	NAS1-3698	X-258 Spare Components	RTC	7,462.30
20.200.519	NAS1-3698	X-258 Tooling	PD	60,000.00
20.200.555	NAS1-3698	X-258 Motors	PD	83,383.00
	NAS1-3698	Hercules Shipping	PCPRE	10,289.60
20.200.681	NAS1-4262	Mod. to X-258 HPC-136	RB	4,612.00
60.400.315	NAS1-5060	2 X-258 Rocket Motor Cases	PE	6,650.00
		MOTORS - FOURTH STAGE SUBTOTAL		$ 864,313.66
		TOTAL MOTORS EXPENDITURES		$5,789,538.45

SPARES EXPENDITURES (01-03)

P26-050	L-8718	Logistics Service and Repair	NBPRC	$ 99,893.00
60.400.387	L-61691	Spares Repair	PF	23,098.00
20.200.177	NAS1-2165-2	Spares	PC	58,212.00
20.200.072	NAS1-2165-3(c1)	Spares	NBPRC	12,880.00
20.200.094	NAS1-2165-3(c7)	Gyro Repair	NPBRC	3,542.00
20.200.129	NAS1-2165-3(c7)	Spares	NRBPC	255.00
20.200.129	NAS1-2165-4	Spares	NBPD	2,465.00
20.200.077	NAS1-2165-4(c2)	Spares	NBPCRD	34,687.00
20.200.080	NAS1-2165-4(c2)	Spares	NBPC	57,000.00
20.200.129	NAS1-2165-4(c2)	Spares	PD	24,479.00
20.200.085	NAS1-2165-4(c3)	Spares	NPBRC	23,157.00
20.200.129	NAS1-2165-4(c11)	Spares	NBPRC	69.00

TABLE J-11 -01 HARDWARE Continued

SPARES EXPENDITURES (01-03) Continued

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
20.200.099	NAS1-2165-5(c4)	Spares Repair	NBPRC	$ 3,788.00
20.200.059	NAS1-2165-5(c6)	MIG Gyro Repair	NPBRC	3,728.00
20.200.129	NAS1-2165-5(c8)	Spares	NBPRCRD	13,050.00
20.200.129	NAS1-2165-5(c9)	Spares	NBPRC	9,687.00
20.200.129	NAS1-2165-5(c10,15)	Spares	NRBPRC	1,726.00
20.200.129	NAS1-2165-5(c12)	Spares	PD	2,850.00
20.200.278	NAS1-2165-6(13)	Spares	PC	100,023.00
20.200.129	NAS1-2165-5(c14)	Spares	NBPRC	315.00
20.200.129	NAS1-2165-6(c16)	Spares	NBPRC	12,768.00
20.200.129	NAS1-2165-8	Spares	YE	0
P26-051	NAS1-2165-11	Spares	RD	-85.00
P26-051	NAS1-2165	Logistics Support	NRBPC	221,473.00
20.200.129	NAS1-3420-1(c1)	Spares	NBPRC	17,630.16
20.200.129	NAS1-3420-1(c3)	Spares	RB	4,494.00
20.200.129	NAS1-3420-1(c4)	Spares	NBRCPD	980.00
20.200.129	NAS1-3420-2(c5)	Spares	PC	32,750.00
20.200.420	NAS1-3420-3(c6)	Spares	YCRD	45,682.00
20.200.129	NAS1-3420-4(c8)	Spares	RB	685.00
20.200.129	NAS1-3420-5(c10,14)	Spares	PERB	11,124.00
20.200.665	NAS1-3420-5(c13)	Spares	RB	1,132.00
60.400.028	NAS1-3420-6	Spares and Logistics	PE	9,490.00
20.200.129	NAS1-3420-6(c15)	Spares	PD	331.00
20.200.723	NAS1-3420-6(c17)	Battery Assembly Spares	RD	1,400.00
60.400.112	NAS1-3420-6(c17)	Battery Assembly	RC	225.00
60.400.028	NAS1-3420-14(c27)	Spares and Logistics	PB	3.33
20.200.148	NAS1-3420	Spares	PRBC	137,015.77
60.400.168	NAS1-3589-12(c31)	Repair 500-pound Motor Valve	PE	5,119.00
60.400.173	NAS1-3589-18(c32,38)	Rep. 2 Alg., 1Cas., 2 X-259 Cse.	PE	1,197.00
		TOTAL SPARES EXPENDITURES		$ 978,318.26

TABLE J-12 - PHASE III NASA SPECIAL EXPENDITURES.

MISSION MODS (01-04)

20.200.695	L-41006	Umbilical Cables, S55C	PE	$ 1,241.00
P25-106	NAS1-1295-12	SERT Telemeter	PB	2,817.00
P38-011	NAS1-1295-19(c31)	S-48 Flyaway Umbilical Arm	PC	5,499.00
P38-012	NAS1-1295-19(c32)	SERT Umbilical Flyaway	PC	763.00
P02444	NAS1-1295-21(c44)	SERT Payload Adapters	PC	1,140.00
20.200.119	NAS1-1295-29(c62)	S-52 Ballast	PC	392.00
20.200.272	NAS1-1295-32(c72)	Fit Check S-52 Rerun	PC	3,080.00
20.200.211	NAS1-1295-35(c69)	S-56B Range Safety Document	PC	17,029.00
20.200.392	NAS1-1928-6-1	Separation Systems (SM)	PC	17,980.00

TABLE J-12 - SPECIAL EXPENDITURES Continued

NASA SPECIALS Continued

MISSION MODS (01-04) Continued

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
P11089	NAS1-1928-6-2	San Marco Despin Mech.	PC	$ 65,300.00
20.200.392	NAS1-1928-6-2	Separation System (SM)	PD	16,607.00
20.200.663	NAS1-3589-6(c4)	Flt. Hardware for S-48	PD	5,000.00
20.200.637	NAS1-3899-1	Range Safety Study	PD	7,728.00
			PE	
		MISSION MODS SUBTOTAL		$ 144,576.00

SUPPORTING ACTIVITIES (02-00)

DCASO

45.110.018	L-67666	DOD Plant Services	PE	$ 217.60
45.110.018	NAS1-585	DOD Plant Services	PE	285.60
45.110.018	NAS1-900	DOD Plant Services	PE	6.80
45.110.018	NAS1-1295	DOD Plant Services	PE	4,790.58
45.110.018	NAS1-1330	DOD Plant Services	PE	1,228.80
45.110.018	NAS1-1928	DOD Plant Services	PE	1,821.83
45.110.018	NAS1-1970	DOD Plant Services	PE	112.00
45.110.018	NAS1-2165	DOD Plant Services	PE	272.05
45.110.018	NAS1-2189	DOD Plant Services	PE	136.00
45.110.018	NAS1-2650	DOD Plant Services	PE	32,539.05
45.110.018	NAS1-3420	DOD Plant Services	PE	1,541.87
45.110.018	NAS1-3493	DOD Plant Services	PE	170.31
45.110.018	NAS1-3589	DOD Plant Services	PE	12,698.02
45.110.018	NAS1-3615	DOD Plant Services	PE	4,567.24
45.110.018	NAS1-3657	DOD Plant Services	PE	19,088.00
45.110.018	NAS1-3833	DOD Plant Services	PE	2,349.27
45.110.018	NAS1-3899	DOD Plant Services	PE	262.70
45.110.018	NAS1-	DOD Plant Services	PE	20.40
		DCASO SUBTOTAL		$ 82,108.12

FIELD SERVICES (02-01)

WALLOPS STATION

ADB100	L-15974	Stock Issues	PD	$ 214.80
20.200.535	NAS1-1928	Test Fixture	PD	5,000.00

TABLE J-12 - SPECIAL EXPENDITURES Continued

NASA SPECIALS Continued

SUPPORTING ACTIVITIES (02-00) Continued

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
FIELD SERVICES (02-01) Continued				
WALLOPS STATION Continued				
P07577	NAS1-2189-3	Field Team (3 mos.)(FY64)	PC	$ 200,000.00
20.200.120	NAS1-2189-3	Field Team (3 mos.)(FY64)	PC	10,800.00
P38-022	NAS1-2189-4	Field Team	PC	-70,000.00
20.200.383	NAS1-2189-7(c3)	FY64 Launch Team	PD	0
20.200.299	NAS1-2189	Field Team (4 mos.)(FY64)	PC	365,100.00
20.200.300	NAS1-3615-4	Launch Team (8 mos.)(FY64)	PF	-6,853.00
20.200.300	NAS1-3615	Launch Team (8 mos.)(FY64)	PDF	705,061.00
20.200.426	NAS1-3615	Launch Team through 10-1-65	PD	989,812.00
		WALLOPS STATION SUBTOTAL		$2,199,134.80
WESTERN TEST RANGE				
60.400.153	NAS1-4325-1	AFWTR Repair	PE	$ 60.00
		WESTERN TEST RANGE SUBTOTAL		$ 60.00
PRODUCTION SUPPORT (02-02)				
ADB100	L-15974	Stock Issues	PCE	$ 695.40
		PRODUCTION SUPPORT SUBTOTAL		$ 695.40
		SUPPORTING ACTIVITIES SUBTOTAL		$2,281,998.32
		NASA SPECIALS SUBTOTAL		$2,426,574.32

TABLE J-13 - PHASE III NAVY SPECIAL EXPENDITURES.

SUPPORTING ACTIVITIES (02-00)

DCASO				
45.110.011	NAS1-1295	DOD Plant Services	YC	$ 26,285.37
45.110.018	NAS1-1295	DOD Plant Services	YE	891.57

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TABLE J-13 - SPECIAL EXPENDITURES Continued

NAVY SPECIALS Continued

SUPPORTING ACTIVITIES (02-00) Continued

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
DCASO Continued				
45.110.018	NAS1-1330	DOD Plant Services	YE	$ 1,121.05
45.110.018	NAS1-2165	DOD Plant Services	YE	2,079.65
45.110.011	NAS1-2650	DOD Plant Services	YC	12,736.04
45.110.018	NAS1-2650	DOD Plant Services	YE	17,679.92
45.110.011	NAS1-3420	DOD Plant Services	YBC	12,068.03
45.110.018	NAS1-3420	DOD Plant Services	YE	5,531.64
45.110.018	NAS1-3589	DOD Plant Services	YE	8,581.13
45.110.020	NAS1-3833	DOD Plant Services	YE	58,785.28
45.110.020	NAS1-3899	DOD Plant Services	YE	576.00
		DCASO SUBTOTAL		$ 146,335.68
TRAVEL				
		Travel (63-29)	YC	$ 20,000.00
		TRAVEL SUBTOTAL		$ 20,000.00
		SUPPORTING ACTIVITIES SUBTOTAL		$ 166,335.68
		NAVY SPECIALS SUBTOTAL		$ 166,335.68

TABLE J-14 - AIR FORCE SPECIAL EXPENDITURES.

SUPPORTING ACTIVITIES (02-00)

DCASO

45.110.011	L-24995	DOD Plant Services	RD	$ 33,168.20
45.110.018	NAS1-1295	DOD Plant Services	RE	210.75
45.110.018	NAS1-1928	DOD Plant Services	RE	1,793.35
45.110.018	NAS1-2617	DOD Plant Services	RE	20.90
45.110.018	NAS1-2650	DOD Plant Services	RE	397.72
45.110.018	NAS1-3589	DOD Plant Services	RE	3,289.20
45.110.018	NAS1-3615	DOD Plant Services	RE	399.73
45.110.018	NAS1-3657	DOD Plant Services	RE	16,709.24

TABLE J-14 - SPECIAL EXPENDITURES Continued

AIR FORCE SPECIALS Continued

SUPPORTING ACTIVITIES (02-00) Continued

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
DCASO Continued				
45.110.018	NAS1-3698	DOD Plant Services	RE	$ 103.20
45.110.018	NAS1-3899	DOD Plant Services	RE	1,084.73
		DCASO SUBTOTAL		$ 57,177.02
TRAVEL				
		Travel (62-6)	RC	$ 20,000.00
		TRAVEL SUBTOTAL		$ 20,000.00
		SUPPORTING ACTIVITIES SUBTOTAL		$ 77,177.02
		AIR FORCE SPECIALS SUBTOTAL		$ 77,177.02

TABLE J-15 - PHASE III ATOMIC ENERGY COMMISSION SPECIALS.

MISSION MODS (01-04)

P07718	L-2570-7	RFD-1 X-248 Cases	TC	$ 600.00
P04140	L-15971	4 X-248 AEC Cases	TC	2,400.00
20.200.440	NAS1-1295-35	RFD-2 Flyaway Cable	TC	1,100.00
20.200.580	NAS1-1295-35	RFD-2 Umbilical	TC	515.00
20.200.628	NAS1-1295-36	RFD-2 A-12 Heat Shield Test	TC	16,934.00
20.200.580	NAS1-1295-38(c90)	RFD-2 Umbilical	TC	-24.00
60.400.063	NAS1-1295-38(c90)	Mod. to MK-I Flyaway Cable	TC	200.00
60.400.132	NAS1-1295-38(c90)	Add. Funds, Mod. RFD-2 Cable	TC	258.00
P08152	NAS1-1727	9 Spin Motors	TC	3,119.00
P05900	NAS1-2556	25 Spin Motors	TC	11,444.60
20.200.562	NAS1-2650-3	Programer - RFD-2a	TC	906.00
*20.200.004	NAS1-2650-7	Canceled Completion of Contract	TC	-125,740.00
*20.200.004	NAS1-2650-11	Scout Vehicle, Completion	TC	-60,500.00
*20.200.004	NAS1-2650	Scout Vehicle	TC	910,000.00
		MISSION MODS SUBTOTAL		$ 761,212.60

*Nonrecoverable Specials.

TABLE J-15 - SPECIAL EXPENDITURES Continued

ATOMIC ENERGY COMMISSION SPECIALS Continued

SUPPORTING ACTIVITIES (02-00)

P.R. NO.	ORDER NO.	ITEM	FUNDS	TOTAL
DCASO				
45.110.011	L-24995	DOD Plant Services	TC	$ 4,776.02
		DCASO SUBTOTAL		$ 4,776.02
FIELD SERVICES (02-01)				
WALLOPS STATION				
20.200.461	NAS1-3615	Launch Services, S-130	TC	$ 122,230.00
		WALLOPS STATION SUBTOTAL		$ 122,230.00
		SUPPORTING ACTIVITIES SUBTOTAL		$ 127,006.02
		ATOMIC ENERGY COMMISSION SPECIALS SUBTOTAL		$ 888,218.62
		TOTAL SPECIALS EXPENDITURES		$3,558,305.64

APPENDIX K

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APPENDIX K

FINANCIAL UPDATE OF SCOUT PHASES IV AND V

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APPENDIX K

TABLES

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TABLE K-1 - PHASE IV (25 VEHICLES) FINAL COST SUMMARY.

	Allocation of Funds
Vehicles (-01-01)	$19,025,494.48
Motors (01-02)	8,463,131.57
First Stage	(3,280,189.48)
Second Stage	(1,694,063.01)
Third Stage	(1,620,612.73)
Fourth Stage	(1,868,266.35)
Others	1,202,013.36
Spares (01-03)	(1,126,809.86)
Shipping (01)	(75,203.50)
TOTAL (25 Scouts, not including Specials)	$28,690,639.41
COST PER SCOUT (1/25)	$1,147,625

	NASA (10)	NAVY (9)	AIR FORCE (6)	TOTAL
Vehicle Hardware (01-00)	$11,476,250	$10,328,626	$6,885,751	$28,690,627
Mission Mods (01-04)	611,993	76,170	241,634	929,797
*Supporting Activities (02-00)	15,619,935	2,085,543	846,244	18,551,722
Product Improvement (03-00)	528,454	266,879	13,754	809,087
TOTAL (25 Scouts)	$28,236,632	$12,757,218	$7,987,383	$48,981,233
Estimated Cost per Vehicle	$2,823,663	$1,417,469	$1,331,231	
Assigned Vehicles	138,139,141 144,152,153 155,159,160 161	140,142,143 146,149,154 156,157,162	145,147,148 150,151,158	

*Includes DCASO and 497.

TABLE K-2 - PHASE V (15 VEHICLES) FINAL COST SUMMARY.

Allocation of Funds

Vehicles (01-01)	$9,551,580.31
Motors (01-02)	3,988,533.88
First Stage	(1,357,320.81)
Second Stage	(935,782.75)
Third Stage	(1,039,493.25)
Fourth Stage	(655,937.07)
Others	911,120.49
Spares (01-03)	(730,370.26)
Shipping (01)	(180,750.23)
(01) TOTAL (15 Scouts, not including Mission Mods)	$14,451,234.68
HARDWARE COST PER SCOUT (1/15)	$963,415.64

	NASA (13)	NAVY (1)	ESRO (1)	TOTAL (15)
Vehicle Hardware (01-00)	$12,524,403	$ 963,416	$ 963,416	$14,451,235
Mission Mods (01-04)	1,180,377	255,286	215,104	1,650,767
Supporting Activities (02-00)*	18,046,053	1,505,979	1,323,099	20,875,131
Product Improvement (03-00)	2,778,420	0	0	2,778,420
TOTAL (15 SCOUTS)	$34,529,253	$2,724,681	$2,501,619	$39,755,553
Estimated Cost per Vehicle	$2,656,096	$2,724,681	$2,501,619	
VEHICLES ASSIGNED	163,164,165, 166,167,168, 169,170,171, 173,174,175, 177	176	172	

*Includes DCASO and 497.

TABLE K-3 - PHASES IV AND V TOTAL OBLIGATIONS.

	PHASE IV	PHASE V
NASA 490	$20,550,478.81	$30,354,687.39
NASA 497	7,686,153.37	4,174,565.06
NASA SUBTOTAL	$28,236,632.18	$34,529,252.45
DOD - NAVY 492	3,115,397.91	
DOD - A.F. (63-29)	4,565,959.79	7,407.50
DOD - A.F. (66-95)	5,075,860.13	2,717,273.68
NAVY SUBTOTAL	$12,757,217.83	$ 2,724,681.18
DOD - A.F. (62-6)	$7,987,382.90	
AIR FORCE SUBTOTAL	$7,987,382.90	
ESRO-IB		$2,501,619.00
ESRO-IB SUBTOTAL		$2,501,619.00
TOTAL	$48,981,232.91	$39,755,552.63

TABLE K-4 - OBLIGATIONS SUMMARY

	NASA				
	PHASE IV		PHASE V		
F.Y.	490	497	490	497	ESRO-IB
1962	$ 16,854.79				
1963	6,123,934.56		$ 88,804.00		
1964	1,484,215.90		41,134.00		
1965	3,463,489.68	$ 997,275.60	714,153.64	$ 169,691.95	
1966	5,492,396.68	2,604,944.86	2,091,821.32		
1967	784,837.70	1,542,312.99	4,478,212.30	1,255,001.61	
1968	1,181,308.39	2,541,619.92	2,971,987.64	2,749,871.50	
1969	671,855.47		4,626,992.23		
1970	248,740.23		8,819,941.22		$1,096,534.17
1971	315,937.95		2,988,202.29		350,000.00
1972	308,440.43		2,158,716.82		
1973	437,884.65		795,410.80		
1975	15,517.00		340,673.00		248,114.00
1976			13,337.69		
1977	5,065.38		222,533.44		
1978			2,767.00		
TOTAL	$20,550,478.81	$7,686,153.37	$30,354,687.39	$4,174,565.06	$1,694,648.17

APPENDIX K

At the time NASA TMX 72628 was published, many Scout contracts had not been completly finalized. Major contracts take many years to settle fees and rates. When finally adjusted, the Scout Project Office audits the proration of final costs to make sure that all users (agencies of spacecraft) were prorated their fair share of the final expenses. This appendix itemizes the final costs for each contract by fiscal year for Phases IV and V. The contracts in figures 105 through 114 had previously been prorated by tasks for each vehicle.

TABLE K-5 - NASA PHASE IV OBLIGATIONS BY FISCAL YEAR

FISCAL YEAR	CONTRACT	AMOUNT	
1962 NASA 490	NAS1-3589	$ 7,011.79	
	NAS1-10000	9,843.00	
	TOTAL		$ 16,854.79
1963 NASA 490	NAS1-2650	$6,025,221.00	
	NAS1-3420	70,168.67	
	NAS1-3493	28,544.89	
	TOTAL		$6,123,934.56
1964 NASA 490	L-3920	$ 22,156.00	
	NAS1-2650	41,089.00	
	NAS1-3420	36,767.68	
	NAS1-3493	586,979.61	
	NAS1-3698	674,993.61	
	NAS1-4664	121,963.50	
	DCASO	266.50	
	TOTAL		$1,484,215.90
1965 NASA 490	NAS1-2650	$ 18,684.95	
	NAS1-3420	298,387.51	
	NAS1-3493	35,901.88	
	NAS1-3589	533,481.00	
	NAS1-3698	543,736.90	
	NAS1-3833	1,564,813.00	
	NAS1-3899	26,366.00	
	NAS1-4321	2,000.00	
	NAS1-4325	8,000.00	
	NAS1-4785	35,630.00	
	NAS1-5034	205,288.00	
	NAS1-5610	187,182.00	
	NAS1-6048	3,032.65	
	Stock Issues	729.84	
	DCASO	255.95	
	TOTAL		$3,463,489.68

TABLE K-5 - NASA PHASE IV OBLIGATIONS BY FISCAL YEAR Continued

FISCAL YEAR	CONTRACT	AMOUNT	
1965 NASA 497	NAS1-4664	$ 997,275.60	
	TOTAL		$ 997,275.60
1966 NASA 490	L-61746	$ 7,983.14	
	L-70739	1,248.98	
	L-71202	175.00	
	L-71203	500.00	
	L-71204	250.00	
	L-71205	250.00	
	L-71227	383.07	
	L-80283	250.00	
	L-81957	250.00	
	L-88027	273.62	
	L-91040	2,482.52	
	L-92234	4,050.00	
	NAS1-1295	22,597.00	
	NAS1-2650	143,409.05	
	NAS1-3420	20.871.00	
	NAS1-3493	88,945.32	
	NAS1-3589	165,240.00	
	NAS1-3698	3,909.00	
	NAS1-3833	354,797.00	
	NAS1-3899	85,650.00	
	NAS1-4325	649.00	
	NAS1-4664	1,404,774.23	
	NAS1-4793	7,759.00	
	NAS1-4794	9,616.11	
	NAS1-4795	70,238.00	
	NAS1-5034	2,914.00	
	NAS1-5592	13,375.00	
	NAS1-5883	1,471,157.50	
	NAS1-6020	1,238,622.71	
	NAS1-6048	5,874.52	
	NAS1-6444	22,999.00	
	Stock Issues	-1,636.61	
	Shipping	15,368.88	
	DCASO	327,270.64	
	TOTAL		$5,492,396.68

TABLE K-5 - NASA PHASE IV OBLIGATIONS BY FISCAL YEAR Continued

FISCAL YEAR	CONTRACT	AMOUNT	
1966 NASA 497	L-68822	$ 4,481.00	
	L-71216	2,500.00	
	L-74164	11,664.00	
	L-81206	6,685.60	
	L-90295	4,811.10	
	NAS1-1330	301.00	
	NAS1-3493	95,389.00	
	NAS1-3515	55,000.00	
	NAS1-3698	141,097.52	
	NAS1-3899	44,724.00	
	NAS1-3899	18,858.00	
	NAS1-3899	56,786.80	
	NAS1-4437	32.52	
	NAS1-4664	1,356,137.72	
	NAS1-4793	10,897.00	
	NAS1-4794	13,304.78	
	NAS1-4795	80,019.00	
	NAS1-5034	630.00	
	NAS1-5592	391,913.00	
	NAS1-6020	39,972.12	
	Stock Issues & Supplies	110,515.47	
	Shipping	16.68	
	DCASO	134,408.56	
	Suballotment-WTR	24,799.99	
	TOTAL		$2,604,944.86
1967 NASA 490	L-84995	$ -44,840.00	
	L-84996	1,080.00	
	L-95861	661.20	
	L-1553110580	67.66	
	L-353110497	1,850.00	
	NAS1-4664	15,560.00	
	NAS1-4793	5,264.00	
	NAS1-4794	3,150.00	
	NAS1-4795	15,298.00	
	NAS1-5610	240,539.12	
	NAS1-5883	541,668.00	
	NAS1-6020	2,202.00	
	Shipping	1,282.52	
	DCASO	1,055.20	
	TOTAL		$ 784,837.70

TABLE K-5 - NASA PHASE IV OBLIGATIONS BY FISCAL YEAR Continued

FISCAL YEAR	CONTRACT	AMOUNT	
1967 NASA 497	L-44472	$ 10,451.92	
	L-84999	15,000.00	
	L-94090	87.49	
	L-95588	41.50	
	L-97465	16,065.00	
	NAS1-4794	6,052.00	
	NAS1-4795	153,084.00	
	NAS1-5592	-7,488.00	
	NAS1-5883	49,527.00	
	NAS1-6020	1,116,803.14	
	NAS1-6133	75.80	
	NAS1-6935	3,300.00	
	NAS1-7314	31,597.00	
	Stock Issues & Supplies	12,186.49	
	Shipping	1,331.25	
	DCASO	67,509.61	
	Suballotment-Wallops	19,994.00	
	-WTR	46,694.79	
	TOTAL		$1,542,312.99
1968 NASA 497	L-44472	$ 17,004.44	
	L-84999	22,500.00	
	L-0453120709	875.00	
	L-0853110371	177.11	
	NAS1-3657	5,117.00	
	NAS1-3899	1,570.00	
	NAS1-4664	579,125.87	
	NAS1-4794	1,100.00	
	NAS1-4795	5,061.00	
	NAS1-5592	180,498.00	
	NAS1-5610	22,882.88	
	NAS1-6020	1,363,033.52	
	NAS1-6935	155,144.00	
	NAS1-8043	13,352.05	
	Stock Issues	15,215.27	
	Shipping	22,784.39	
	DCASO	27,627.20	
	Suballotment-Wallops	71,120.35	
	-WTR	37,431.84	
	TOTAL		$2,541,619.92

TABLE K-5 - NASA PHASE IV OBLIGATIONS BY FISCAL YEAR Continued

FISCAL YEAR	CONTRACT	AMOUNT	
1968-NASA 490	L-1360400803	$ 173.26	
	NAS1-585	911.20	
	NAS1-3657	4.00	
	NAS1-4664	145,186.32	
	NAS1-4794	2,800.00	
	NAS1-4795	22,000.00	
	NAS1-5883	396.00	
	NAS1-6020	830,687.00	
	NAS1-6935	2.75	
	NAS1-7199	122,720.00	
	NAS1-10000	27,077.00	
	Shipping	26,715.66	
	DCASO	2,635.20	
	TOTAL		$1,181,308.39
1969-NASA 490	L-0352220649	$ 1,850.00	
	NAS1-3589	10,560.00	
	NAS1-3657	4,973.38	
	NAS1-6020	12,076.51	
	NAS1-6935	183.00	
	NAS1-7199	96,215.00	
	NAS1-7256	444,284.00	
	NAS1-10000	101,683.58	
	Shipping	30.00	
	TOTAL		$ 671,855.47
1970 NASA 490	NAS1-1970	$ 231.00	
	NAS1-3493	3,709.00	
	NAS1-3589	13,778.00	
	NAS1-3615	761.00	
	NAS1-3657	28,170.62	
	NAS1-3899	1,937.00	
	NAS1-4664	152,258.36	
	NAS1-6935	47,895.25	
	TOTAL		$ 248,740.23
1971 NASA 490	NAS1-4664	$ 184,384.00	
	NAS1-7256	5,243.00	
	NAS1-10000	126,310.95	
	TOTAL		$ 315,937.95

TABLE K-5 - NASA PHASE IV OBLIGATIONS BY FISCAL YEAR Continued

FISCAL YEAR	CONTRACT	AMOUNT	
1972 NASA 490	NAS1-10000	$ 308,440.43	
	TOTAL		$ 308,440.43
1973 NASA 490	NAS1-2650	$ 34,754.00	
	NAS1-3589	18,892.00	
	NAS1-3615	113.00	
	NAS1-3899	1,596.00	
	NAS1-10000	382,529.65	
	TOTAL		$ 437,884.65
1975 NASA 490	NAS1-10000	$ 15,517.00	
	TOTAL		$ 15,517.00
1977 NASA 490	NAS1-10000	$ 5,065.38	
	TOTAL		$ 5,065.38
1978 NASA 490	NAS1-10000	$ 2,600.00	
	TOTAL		$ 2,600.00

TABLE K-6 NASA PHASE V OBLIGATIONS BY FISCAL YEAR

1963 NASA 490	NAS1-10000	$ 88,804.00	
	TOTAL		$ 88,804.00
1964 NASA 490	NAS1-10000	$ 41,134.00	
	TOTAL		$ 41,124.00
1965 NASA 490	NAS1-4664	$ 5,168.00	
	NAS1-5610	594,712.00	
	NAS1-6020	111,959.64	
	NAS1-10000	2,314.00	
	TOTAL		$ 714,153.64

TABLE K-6 - NASA PHASE V OBLIGATIONS BY FISCAL YEAR Continued

FISCAL YEAR	CONTRACT	AMOUNT	
1966 NASA 490	L-84997	$ 269.77	
	NAS1-1295	-22,145.00	
	NAS1-3899	31,934.00	
	NAS1-5592	16,055.00	
	NAS1-5610	154,973.36	
	NAS1-5883	420,320.50	
	NAS1-6020	1,480,468.75	
	NAS1-7199	3,009.05	
	NAS1-10000	6,935.89	
	TOTAL		$2,091,821.32
1966 NASA 497	NAS1-6020	$ 157,318.73	
	NAS1-10000	12,373.22	
	TOTAL		$ 169,691.95
1967 NASA 490	L-84995	$ 70,602.00	
	L-84997	118.89	
	NAS1-5610	3,613,407.15	
	NAS1-6020	590,822.26	
	NAS1-6935	159,000.00	
	NAS1-10000	42,544.00	
	Shipping	1,186.00	
	DCASO	532.00	
	TOTAL		$4,478,212.30
1967 NASA 497	L-5009	$ 1,166.00	
	NAS1-5592	10,000.00	
	NAS1-5610	23,000.00	
	NAS1-6020	31,260.32	
	NAS1-6868	1,189,569.27	
	Shipping	6.02	
	TOTAL		$1,255,001.61
1968 NASA 490	L-15974	$ 7.58	
	L-84997	51,343.34	
	NAS1-5610	310,840.33	
	NAS1-5883	2,400.00	
	NAS1-5992	360.00	
	NAS1-6020	1,988,533.93	
	NAS1-6935	19,454.57	
	NAS1-7199	146,055.00	
	NAS1-7256	372,170.45	
	NAS1-10000	1,169.00	
	NAS1-10650	2.85	
	DCASO (DIRECT)	37,000.00	
	TOTAL		$2,971,987.64

TABLE K-6 - NASA PHASE V OBLIGATIONS BY FISCAL YEAR Continued

FISCAL YEAR	CONTRACT	AMOUNT	
1968 NASA 497	NAS1-5610	$ 11,556.46	
	NAS1-5883	177,092.00	
	NAS1-6020	376,902.43	
	NAS1-6935	430,489.43	
	NAS1-7256	1,749,330.49	
	NAS1-10482	181.33	
	Shipping	4,319.36	
	TOTAL		$2,749,871.50
1969 NASA 490	L-15974	$ 201.54	
	L-17522	14,260.70	
	L-66982	25.39	
	L-84994	2,000.00	
	L-0152410787	1,990.00	
	L-0352220079	2,380.00	
	NAS1-5610	1,397,207.92	
	NAS1-5880	40,699.02	
	NAS1-6020	599,933.64	
	NAS1-6935	217.00	
	NAS1-7199	77,124.00	
	NAS1-7256	1,794,304.93	
	NAS1-8584	15,750.00	
	NAS1-9154	24,176.00	
	NAS1-9258	126,792.00	
	NAS1-9273	35,703.00	
	NAS1-10000	5,324.77	
	NAS1-10695	221,263.73	
	NAS1-10900	186.61	
	Stock Issues/Supplies-WTR	1,436.44	
	-WFC	439.87	
	-LRC	6,785.90	
	Shipping	34,795.16	
	Subauthorization	24,775.47	
	San Marco Shipping	90,219.10	
	DIRECT	109,000.00	
	TOTAL		$4,626,992.23

TABLE K-6 - NASA PHASE V OBLIGATIONS BY FISCAL YEAR Continued

FISCAL YEAR	CONTRACT	AMOUNT	
1970 NASA 490	L-15974	$ 310.86	
	L-42376	1,384.00	
	L-46232	750.00	
	L-46624	1,735.00	
	L-56423	130.16	
	NAS1-5592	23,776.00	
	NAS1-5610	3,648,773.78	
	NAS1-5880	105,630.06	
	NAS1-6935	340.00	
	NAS1-7199	420,101.95	
	NAS1-7256	3,522,406.13	
	NAS1-9043	830.42	
	NAS1-10000	442.34	
	Stock Issues-IMS	222,788.29	
	Shipping	70,877.37	
	DCASO	118,000.00	
	Suballotment	134,664.86	
	S/M Direct	547,000.00	
	TOTAL		$8,819,941.22
1971 NASA 490	L-56501	$ 10,128.60	
	L-58023	16,720.55	
	L-58462	187.21	
	L-58465	3,593.75	
	L-58484	3,982.96	
	L-62709	11,566.84	
	L-63688	790.71	
	L-64916	5,000.00	
	NAS1-5880	17,090.00	
	NAS1-6020	116,186.30	
	NAS1-6935	32,939.00	
	NAS1-7256	14,346.00	
	NAS1-10000	1,375,980.79	
	NAS1-10483	89,694.00	
	NAS1-10650	11,318.33	
	NAS1-10900	19,811.94	
	NAS1-11067	5,921.00	
	Stock Issues-IMS	326,753.98	
	Shipping	143,420.36	
	Suballotment	123,769.97	
	DCASO	112,000.00	
	San Marco DIRECT(SSS-A)	547,000.00	
	TOTAL		$2,988,202.29

TABLE K-6 - NASA PHASE V OBLIGATIONS BY FISCAL YEAR Continued

FISCAL YEAR	CONTRACT	AMOUNT	
1972 NASA 490	L-64709	$ 5,375.00	
	L-71225	16,544.00	
	NAS1-6935	12,463.00	
	NAS1-10000	1,454,093.06	
	Stock Issues	6,219.06	
	Shipping	17,022.70	
	Suballotment	50,000.00	
	San Marco DIRECT(SAS-B)	597,000.00	
	TOTAL		$2,158,716.82
1973 NASA 490	NAS1-10000	$ 795,410.80	
	TOTAL		$ 795,410.80
1974 NASA 490	NAS1-10000	$ 13,337.69	
	TOTAL		$ 13,337.69
1975 NASA 490	NAS1-7256	$ 313,864.00	
	NAS1-10000	26,809.00	
	TOTAL		$ 340,673.00
1977 NASA 490	NAS1-10000	$ 222,533.44	
	TOTAL		$ 222,533.44
1978 NASA 490	NAS1-6935	$ 2,767.00	
	TOTAL		$ 2,767.00

TABLE K-7 - DOD OBLIGATIONS SUMMARY

	PHASE IV				PHASE V	
F.Y.	(62-6)	(63-29)	(66-95)	(492)	(63-29)	(66-95)
1961				$ 300,543.73		
1962	$4,953,668.25	$ 67,856.00		2,814,854.18		
1963	387,541.14	2,186,691.53			$2,046.00	
1964	154,594.80	3,285.00				
1965	1,062,037.51	1,004,742.26			5,361.50	
1966	641,427.00	1,086,381.00				
1967	520,612.00		$5,016,547.13			$2,182,283.69
1968			59,313.00			271,311.49
1969	267,502.30	217,031.00				
1971						263,678.50
TOTAL	$7,987,382.90	$4,565,959.79	$5,075,860.13	$3,115,397.91	$7,407.50	$2,717,273.68

TABLE K-8 - DOD PHASE IV OBLIGATIONS BY FISCAL YEAR

FISCAL YEAR	CONTRACT	AMOUNT	
1961 NAVY (492)	NAS1-4325	$ 300,543.73	
	NAS1-6020	22,434.34	
	TOTAL		$ 322,978.07
1962 NAVY (492)	NAS1-1295	$1,032,907.40	
	NAS1-3493	302,227.43	
	NAS1-3883	275,232.07	
	NAS1-4325	1,186,609.42	
	NAS1-5592	1,557.45	
	NAS1-6020	116.41	
	DCASO	16,204.00	
	TOTAL		$2,814,854.18
1962 A.F. (62-6)	L-2061	$ 14,458.01	
	L-3920	75,066.00	
	NAS1-1295	3,555,663.00	
	NAS1-1330	564,258.00	
	NAS1-2650	13,181.00	
	NAS1-3493	14,747.12	
	NAS1-3589	249,750.00	
	NAS1-3698	11,200.00	
	NAS1-3883	335,374.29	
	NAS1-4794	2,650.00	
	NAS1-4795	643.00	
	NAS1-6020	76,883.16	
	Shipping	4,567.46	
	Travel	31,992.17	
	DCASO	3,234.94	
	TOTAL		$4,953,668.15
1962 A.F. (63-29)	NAS1-3493	$ 856.00	
	NAS1-6020	67,000.00	
	TOTAL		$ 67,856.00
1963 A.F. (62-6)	NAS1-1330	$ 162,522.17	
	NAS1-2650	3,619.00	
	NAS1-3493	9,610.42	
	NAS1-3589	12,348.00	
	NAS1-3920	31,271.00	
	NAS1-4664	61,366.30	
	NAS1-4795	4,425.30	
	NAS1-6020	70,979.01	
	Shipping	3,510.40	
	Travel	27,889.54	
	TOTAL		$ 387,541.14

TABLE K-8 - DOD PHASE IV OBLIGATIONS BY FISCAL YEAR Continued

1963 A.F. (63-29)	L-47781	$ -337.04	
	NAS1-1295	761,175.00	
	NAS1-1330	-13,425.25	
	NAS1-2650	1,013,802.00	
	NAS1-3420	46,000.00	
	NAS1-3493	11,762.68	
	NAS1-3698	41,157.00	
	NAS1-6020	263,330.89	
	Travel	63,226.25	
	TOTAL		$2,186,691.53
1964 A.F. (62-6)	NAS1-2165	$ -13,754.00	
	NAS1-3493	2,258.26	
	NAS1-4664	85.00	
	NAS1-6020	166,005.54	
	TOTAL		$ 154,594.80
1964 A.F. (63-29)	NAS1-3493	$ 658.00	
	NAS1-3698	2,100.00	
	NAS1-5034	500.00	
	TOTAL		$ 3,258.00
1965 A.F. (62-6)	NAS1-1330	$ 1,177.46	
	NAS1-3493	8,253.00	
	NAS1-3698	33,444.00	
	NAS1-4664	579,535.00	
	NAS1-4794	8,253.00	
	NAS1-4795	3,331.70	
	NAS1-5478	5,445.75	
	NAS1-6020	421,597.60	
	DCASO	1,000.00	
	TOTAL		$1,062,037.51

TABLE K-8 - DOD PHASE IV OBLIGATIONS BY FISCAL YEAR Continued

FISCAL YEAR	CONTRACT	AMOUNT	
1965 A.F. (63-29)	L-35506	$ 718.00	
	NAS1-1295	31,012.00	
	NAS1-1330	-1,500.00	
	NAS1-3420	83,838.00	
	NAS1-3493	10,994.00	
	NAS1-3589	145,460.00	
	NAS1-3698	2,422.00	
	NAS1-3833	116,037.93	
	NAS1-4664	168,362.77	
	NAS1-5034	380,000.00	
	NAS1-6020	11,622.00	
	Shipping	17,068.88	
	DCASO	38,706.68	
	TOTAL		$1,004,742.26
1966 A.F. (62-6)	NAS1-4795	$ 5,645.00	
	NAS1-5034	380,000.00	
	NAS1-5592	32,155.73	
	NAS1-6020	195,280.05	
	Shipping	7.00	
	DCASO	28,339.22	
	TOTAL		$ 641,427.00
1966 A.F. (63-29)	NAS1-1259	$ 320.00	
	NAS1-4664	334,763.48	
	NAS1-5592	124,001.82	
	NAS1-5883	373,221.00	
	NAS1-6020	254,074.70	
	TOTAL		$1,086,381.00
1967 A.F. (62-6)	L-61717	$ 118.00	
	NAS1-5883	235,077.00	
	NAS1-6020	229,431.64	
	Shipping	7,011.27	
	Travel	23,897.21	
	DCASO	25,076.88	
	TOTAL		$ 520,612.00

TABLE K-8 - DOD PHASE IV OBLIGATIONS BY FISCAL YEAR Continued

FISCAL YEAR	CONTRACT	AMOUNT	
1967 A.F. (66-95)	L-52073	$ 8,911.50	
	NAS1-3833	111,791.43	
	NAS1-5610	747,505.00	
	NAS1-5883	293,625.00	
	NAS1-6020	17,572.00	
	NAS1-7256	1,002,481.85	
	Stock Issues	14.76	
	Shipping	15,271.29	
	Travel	57,142.79	
	DCASO	39,759.50	
	TOTAL		$2,182,283.69
1968 A.F. (66-95)	DCASO	$ 59,313.00	
	TOTAL		$ 59,313.00
1969 A.F. (63-29)	L-3920	$ 6,500.00	
	NAS1-6020	52,181.00	
	AF-04 (DIRECT)	158,350.00	
	TOTAL		$ 217,031.00
1969 A.F. (62-6)	NAS1-4664	$ 209,728.30	
	NAS1-5610	57,774.00	
	TOTAL		$ 267,052.30

TABLE K-9 - DOD PHASE V OBLIGATIONS BY FISCAL YEAR

1963 A.F. (63-29)	NAS1-1928	$ 733.00	
	NAS1-1928	1,025.00	
	NAS1-1970	288.00	
	TOTAL		$ 2,046.00
1965 A.F. (63-29)	Shipping	$ 5,361.50	
	TOTAL		$ 5,361.50

TABLE K-9 - DOD PHASE V OBLIGATIONS BY FISCAL YEAR Continued

FISCAL YEAR	CONTRACT	AMOUNT	
1967 A.F. (66-95)	L-52073	$ 8,911.50	
	NAS1-3833	111,791.48	
	NAS1-5610	747,505.00	
	NAS1-5883	293,625.00	
	NAS1-6020	17,572.00	
	NAS1-7256	1,002,481.85	
	Stock Issues	14.76	
	Shipping	15,271.29	
	Travel	57,142.79	
	DCASO	39,759.50	
	TOTAL		$2,182,283.69
1968 A.F. (66-95)	L-52075	$ 414.46	
	L-64709	5,375.00	
	NAS1-5610	1,196.00	
	NAS1-6020	1,365.00	
	NAS1-7256	155,935.74	
	NAS1-10481	6,355.00	
	Travel	100,670.29	
	TOTAL		$ 271,311.49
1971 A.F. (66-95)	NAS1-6935	$ 6,680.00	
	NAS1-7256	244,653.41	
	Travel	12,345.29	
	TOTAL		$ 263,678.50

TABLE K-10 - ESRO-IB PHASE V OBLIGATIONS BY FISCAL YEAR

1970 (ESRO-IB)	NAS1-5610	$ 713,909.90	
	NAS1-7256	1,094,288.18	
	Travel & Mgt.	70,299.38	
	Suballotment-GSFC	6,287.30	
	-KSC	17,812.59	
	Shipping	173.65	
	TOTAL		$1,902,771.00
1971 (ESRO-IB)	L-67506	$ 317,580.81	
	NAS1-7256	2,345.71	
	Travel & Mgt.	11,388.04	
	Shipping	2,725.44	
	DCASO	15,960.00	
	TOTAL		$ 350,000.00
1975 (ESRO-IB)	L-67506	$ 29,991.06	
	NAS1-5610	68,486.10	
	NAS1-7256	95,077.93	
	Shipping	17,100.91	
	DIRECT HQ.	38,192.00	
	TOTAL		$ 248,848.00

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Langley technical monitor: Lee R. Foster, Jr.
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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