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APPENDIX A – TAB 5
SYSTEM TEST DIRECTIVE
FOR
DISCOVERER SATELLITE SYSTEM
DISCOVERER SATELLITE 1103
DISCOVERER BOOSTER 296

Prepared by

SYSTEMS OPERATIONS PLANNING 61-41

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APPENDIX A - TAB 5

SUPPLEMENTAL TEST INFORMATION

A1 INTRODUCTION

This section contains descriptive material which supplements the basic text of the STD and is applicable only to the flight of Discoverer Satellite 1103. Where the material contained herein is in conflict with that in the basic text, the information in this appendix has precedence. Reference will not be made to this appendix for subsequent flight operations.

A2 CONFIGURATION

A2.1 Discoverer Satellite

A JHU/APL Doppler transmitter and an optical beacon will be carried to permit evaluation of this system. The transmitter will operate continuously on 162 mc and 216 mc; the capability to turn the transmitter off by radar command will not be incorporated. The optical tracking lights will be programmed "on" over twelve Smithsonian Astronomical Observatory camera stations during the flight.

A2.2 Recovery Capsule

A2.2.1 An AET-L payload will be carried in a Mark IV recovery capsule. The recovery capsule has the following configuration:

Thermal Batteries (2)

Life:	20 seconds
Usage:	Orbit ejection to thrust cone separation

Silver Oxide-Zinc Batteries (2)

Life:	(a) Shelf life after activation, 60 days (b) Operating life, 10 hours (min)
Usage:	Capsule beacon, capsule light, and parachute deployment events

Salt Plug (1)

Life: 45 hours (min) 54 hours (norm) 90 hours (max)
Usage: Sink capsule within 10 minutes after salt plug dissolves. Capsule will not capsize prior to this time.

Silver Peroxide-Zinc Battery (1)

Life: A minimum of 20 minutes
Usage: Capsule telemetry.

A2.2.2 The crystal-controlled GE acquisition beacon installed in the capsule has the following characteristics:

Pulse Repetition Rate	1000 to 700 pps (± 50 pps) one cycle per sec (± .01 sec)
Power Output	15 watts peak nominal
Pulse Width	30 microseconds nominal
Beacon Life	10 hours minimum
Frequency Stability	±0.04 percent

A2.2.3 A 2.0-watt telemetry transmitter (100 kc bandwidth) in the recovery capsule will transmit separation and recovery sequence-of-event data. Telemetry channels 7, 9 and 11 will be used to obtain capsule performance information. Channels 7 and 9 will initially measure the separation sequence of events and then the oscillator inputs will be switched to measure the recovery sequence of events when the thrust cone is ejected. Channel 11 will measure axial acceleration during both the separation and recovery sequence.

A2.3 Facilities and Equipment

A2.3.1 Tern Island in the French Frigate Shoals Group of the Hawaiian Islands will be used as a VHF telemetry receiving and automatic tracking station if facilities are available. If parachute deployment occurs near Tern Island or if capsule overshoot is experienced on a recovery pass in the Tern Island area, this station installation will permit automatic tracking on the capsule telemetry and for beacon signal. An azimuth and elevation angle data input will then be made to the Palo Alto Computer for determination of impact location.

A2.3.2 The following list summarizes the equipment installed at Tern Island:

a. 1 Quad-helix automatic tracking antenna, Canoga Corporation
b. 1 7-track tape recorder, Ampex FR 107B
c. 2 Nems-Clarke 1302A receivers
d. 1 Nems-Clarke 1412 receiver
e. 2 Spectrum display units, Nems-Clarke SDU 200, SDU 300
f. 1 Digital-to-teletype data converter
g. 1 System time generating system
h. 1 WWVH timing system
i. Communications (SSB/HF/UHF/RTTY)
j. 1 Visicorder
k. 1 Oscilloscope

A3 LAUNCH OPERATIONS

A3.1 Launch Time

In order to obtain adequate data from the sun position indicators, the time of launch will be between 1140 and 1500 PST.

A3.2 Recovery Force Readiness

With the exception of Paragraph 4.2.2.6, the launch criteria listed in Section 4.2 in the basic text are applicable to this flight. Paragraph 4.2.2.6 is revised as follows:

a. Three RC-121 radar aircraft
b. Seven C-119J recovery aircraft
c. Three surface ships
d. One Electra telemetry aircraft (separation sequence)
e. Three telemetry aircraft (recovery sequence)

A3.3 Telemetry Calibrations

Telemetry calibration data for real-time measurements are included in Notes 3, 8 and 13 of Table A8-1. These data are to be checked by LMSD/61-71 and verified in a TWX to LMSD/61-41 and the STC not later than two days prior to launch.

A3.4 Downrange Tracking Data

The Pvt. Joe. E. Mann will receive the 216 mc signal from the JHU/APL Doppler transmitter and will obtain accurate Dopper tracking data from this signal. These tracking data, ship attitude data, and antenna position data will be transmitted to the STC by radio teletype at the direction of the STC. The antenna position data will provide angle tracking information which, together with the Doppler data, will verify that orbit has been attained or will define the trajectory in the event that orbit is not attained.

A4 ORBIT OPERATIONS

A4.1 Command Operations

A4.1.1 Recovery on this flight is planned for Day 3 on Pass 48 but the capability to delay recovery until Day 4 on Pass 63 is incorporated. Pass 63 is programmed for normal re-entry while Passes 15, 17, 31, 33, 46, 48, and 61 are programmed for alternate re-entry selection. Pass 64 is programmed for both normal re-entry and alternate re-entry selection to assure that re-entry will occur on the Day 4 recovery pass in the Hawaiian area in the event that an inadvertent SKIP command is received by the vehicle just prior to Pass 63.

A4.1.2 Reference to these orbital programmer re-entry passes is made as follows in this Tab:

a. Passes 15, 31, 46, 61 - "Emergency alternate re-entry passes." They will permit recovery off the coast of Mexico, with certain limitations, in emergency situations.

b. Passes 17, 33 - "Alternate re-entry passes." They will permit recovery in the Hawaiian area if recovery before the normal Day 3 Pass 48 is required.

c. Pass 48 - "Normal re-entry pass." This is the planned recovery pass in the Hawaiian area; however, an alternate re-entry enable command must be sent before re-entry will occur on this pass.

d. Pass 63 - "Alternate re-entry pass." The orbital programmer tape is punched for normal re-entry on this pass. If an alternate re-entry enable command is not sent, and the alternate re-entry capability remains disabled, re-entry will occur on Pass 63.

A4.1.3 In order to preclude the possibility of an inadvertent REPEAT command being received by the satellite on Pass 62, either of the following procedures will be employed at the direction of the STC:

a. On Pass 61, VTS will send Command 1 to put the increase/decrease switch in the increase position.

b. On Pass 61, VTS will transmit final adjustments to the orbital programmer for the recovery pass. Following fade on Pass 61 and prior to beacon turn-on for Pass 62, KTS, VTS, and HTS radar command capability will be disabled by removal of the radar center pulse to prevent inadvertent adjustments to the programmer that could preclude recovery.

A4.1.4 When alternate re-entry is desired on Pass 17, Command 5 Increase (alternate re-entry enable) must not be sent until after the reset point occurs on Pass 15 (nominally 60°N). Command 5 Increase for desired alternate re-entry on Pass 17 will be sent on Pass 15 from VTS or on Pass 16 from KTS to preclude the possibility of an inadvertent Pass 15 re-entry. A similar procedure will be used on Passes 31 and 32 if alternate re-entry is desired on Pass 33, and on Passes 46 and 47 if re-entry is desired on Pass 48.

A4.2 Control Gas Supply Pressure

The control gas supply pressure measurements on Channel 16-27 (low range) and on Channel 16-33 (high-range) will be reported as specified in Table A8-1 as accurately as possible. Real-time readouts from oscilloscopes and/or meters are to be reported to the STC by voice. As soon as possible after each pass, a more accurate readout of control gas supply pressure from the Channel 16 wave train recorded on the CEC oscillograph/Datarite magazine will be sent to the STC by TWX. This parameter will be plotted at the STC on all passes.

A4.3 Recovery Force Tracking on Pass 2

All telemetry recording stations and tracking stations participating in the recovery operation (HTS, Christmas Island, South Point, Barking Sands, Tern Island, Haiti Victory and Dalton Victory) will track the satellite telemetry signal during Pass 2 and will report the following to the HCC for correlation:

a. Time of acquisition
b. Signal direction (azimuth and elevation at acquisition, at one minute intervals, and at fade)
c. Strength of signal
d. Signal deviation from nominal frequency
e. Time of signal fade.

A4.4 Readiness to Support Alternate Re-entry

All telemetry recording stations and tracking stations participating in the recovery operation will be maintained in readiness to support alternate re-entry until ETPD - 90 minutes unless otherwise directed by the STC.

A4.5 Agena Reorientation After Capsule Separation

The Agena vehicle will be reoriented after capsule separation and will resume controlled flight in the normal orbit attitude.

A5 RECOVERY OPERATIONS

A5.1 Hawaii Tracking Station Operations

A5.1.1 On the recovery pass, the HTS will track the Agena telemetry signal with the tri-helix antenna and the capsule telemetry signal with the TLM-18 antenna. Acquisition of the Agena telemetry signal with the tri-helix antenna will be accomplished using standard acquisition procedures. Procedures for acquisition of the capsule telemetry signal with the TLM-18 antenna will vary as a function of the actual orbit and predicted impact point.

In general, the TLM-18 will be positioned at the capsule acquisition azimuth using a sector scan of 20 degrees (±10 degrees) at an elevation angle of 2 degrees. At ETA - 0 for the capsule, the acquisition programmer will start and the mid point for sector scan will then be positioned to follow the acquisition programmer azimuth. When the TLM-18 acquires, auto-track will be accomplished. If the TLM-18 does not acquire by the time the acquisition programmer pre-plot indicates that the capsule is in the ionization layer, it will immediately be positioned at the predicted impact point and operated in the sector mode. The amplitude of the sector scan will be 20 degrees (±10 degrees) for impact azimuths between 345 degrees and 15 degrees. The scan amplitude will be increased 3/4 degree for each 1 degree of azimuth over 15 degrees for the eastern sector or under 345 degrees in the western sector.

Until acquisition of the capsule signal by the TLM-18, one receiver operating on signals from the tri-helix will be tuned to the 228.2-mc capsule telemetry signal. If the capsule telemetry signal is acquired with the tri-helix before TLM-18 acquisition, the tri-helix will be positioned on the capsule until positive TLM-18 acquisition after which the tri-helix will resume tracking on the Agena telemetry signal. If the TLM-18 loses the capsule signal, the tri-helix will be positioned to assist in reacquiring the capsule signals. TLM-18 angle data, recorded after auto-track has been established, will be transmitted to the PAC when requested by the System Test Director. These angle data will be reduced by the computer to provide a predicted impact point.

A5.1.2 HTS will report the system time of acquisition, antenna azimuth and elevation data and deviations from nominal frequencies to the STC as soon as possible. When the TLM-18 azimuth rate approaches 0 degrees per second or when the telemetered capsule recovery events are received, HTS will report antenna azimuth and elevation immediately to the STC and the HCC. HTS will also report confirmation of capsule separation and telemetered recovery events to the STC as specified in Table A8-1 and record all capsule telemetry signals on magnetic tape.

A5.1.3 HTS will receive all antenna bearings from South Point, Barking Sands and Tern Island for correlation with the TLM-18 bearings. This bearing information will be relayed immediately to the STC and the HCC. In addition, the HTS will receive auto-track angle data transmitted from Tern Island to the STC via SSB-TTY as backup and will relay this data to the STC if requested to do so.

A5.2 South Point Facility Operations

A5.2.1 For this operation either the manual Canoga quad-helix antenna or the motor-driven Radiation quad-helix antenna will be utilized at the PMR facility at South Point, Hawaii. Existing communications, recording, and timing systems will be used.

A5.2.2 If the orbit period is such as to permit nominal re-entry west of HTS, South Point will scan ±90 degrees about a 270-degree azimuth at an antenna elevation of 10 degrees at the rate of once per 15 seconds from ETPD - 0 until ETPD + 5 minutes.

A5.2.3 If the satellite path is between HTS and South Point, the quad-helix antenna will scan ±90 degrees about a 180-degree azimuth at the rate of once per 15 seconds from ETPD - 0 until ETPD + 5 minutes. The antenna elevation will be varied cyclically from 10 degrees to 70 degrees to 10 degrees in 20-degree steps at the rate of one step per scan.

A5.2.4 If the satellite path is east of South Point, the quad-helix antenna will scan ±90 degrees about a 90 degree azimuth at the rate of once per 15 seconds from ETPD - 0 until ETPD + 5 minutes. The antenna elevation will be varied cyclically from 10 degrees to 70 degrees to 10 degrees in 20-degree steps at the rate of one step per scan.

A5.2.5 If no capsule signals are acquired before ETPD + 5 minutes, the quad-helix antenna will be positioned at 180-degree azimuth and 10-degree elevation, and the telemetry receivers will be monitored until ETPD + 30 minutes. If HTS acquires the capsule signals, it will provide South Point with acquisition information.

A5.2.6 Once acquisition is achieved with the quad-helix antenna, the 60-foot antenna will attempt to track the capsule, using the narrower beam-width to obtain more accurate bearings at and after parachute deployment. All acquisitions will be reported immediately to HTS. The capsule parachute deployment telemetry sequence and the antenna azimuth at parachute deployment will be reported. If the parachute telemetry sequence is not received before signal fade, the system time of fade and the antenna azimuth and elevation will be reported. Subsequent to acquisition, South Point will report antenna bearings to HTS. All 60-foot antenna data, position azimuth and elevation, and suitable timing signal will be recorded on magnetic tape. This tape will be delivered to the HCC for transmittal to Sunnyvale.

A5.3 Barking Sands Facility Operations

A5.3.1 The PMR facility at Barking Sands, Kauai, is augmented by the addition of an LMSD tri-helix antenna. Barking Sands will maintain communication with HTS via toll telephone for exchange of tracking and acquisition data. At ETPD - 15 minutes, Barking Sands will position the tri-helix antenna at the acquisition azimuth and 10-degree elevation. From ETPD - 5 minutes until ETPD + 5 minutes, the Barking Sands tri-helix antenna will scan ±90 degrees about 0-degree azimuth at the scan rate of 10 degrees per second. Barking Sands will search for the capsule telemetry signal. Barking Sands is directed not to activate any tracking radars during the operation.

A5. 3. 2 Subsequent to acquisition, Barking Sands will report antenna bearings to HTS. All acquired capsule telemetry signals will be recorded on magnetic tape with a timing signal.

A5. 4 Christmas Island Facility Operations

A5. 4. 1 If the satellite path is east of Christmas Island, the quad-helix antenna will scan ±90 degrees about a 90-degree azimuth at the rate of once per 15 seconds from ETPD + 3 minutes until ETPD + 8 minutes. The antenna elevation will be varied cyclically from 10 degrees to 70 degrees to 10 degrees in 20-degree steps at the rate of one step per scan.

A5. 4. 2 If the satellite path is west of Christmas Island, the quad-helix antenna will scan ±90 degrees about a 270-degree azimuth from ETPD + 3 minutes until ETPD + 8 minutes. The antenna elevation will be varied cyclically from 10 degrees to 70 degrees to 10 degrees in 20-degree steps at the rate of one step per scan.

A5. 4. 3 If the satellite path is a near overhead pass at Christmas Island (±2° W longitude), the quad-helix antenna will scan 360 degrees in azimuth at the rate of once per 30 seconds from ETPD + 3 minutes until ETPD + 8 minutes. The antenna elevation will be varied cyclically from 10 degrees to 70 degrees to 10 degrees in 20-degree steps at the rate of one step per 360-degree azimuth.

A5. 4. 4 The Christmas Island facility will maintain continuous HF communications with the southern telemetry aircraft for exchange of acquisition and tracking information and will relay this information to the HCC as soon as possible over the SSB radio.

A5.4.5 If no capsule signals are acquired before ETPD + 8 minutes, the quad-helix antenna will be positioned at 180-degree azimuth and 10-degree elevation and the telemetry receivers will be monitored until ETPD + 30 minutes. If no signals are acquired before ETPD + 30 minutes, a negative report will be submitted to the HCC over SSB radio.

A5.4.6 Once acquisition is achieved the quad-helix antenna will manually track the capsule, and the telemetry and beacon signals will be recorded on magnetic tape. Immediately after the parachute deployment telemetry sequence is recorded, Christmas Island will so report to the HCC over the SSB radio. The antenna azimuth will be reported to the telemetry aircraft over UHF or HF radio immediately after acquisition and at intervals of one minute until parachute deployment.

A5.5 Tern Island Operations

A5.5.1 Tern Island, if available, will establish SSB voice communications with HTS on the assigned recovery operations frequency for acquisition and tracking instructions and data relay. The STC and the HCC will monitor this voice frequency. The quad-helix antenna angle data recorded after auto-track has been established will be transmitted by a separate SSB/RTTY channel directly to the PAC when requested by the System Test Director. HTS will also receive all RTTY data as back-up and will relay this data to the PAC if requested by the System Test Director. To minimize possible SSB transmission interference while receiving telemetry data, Tern Island will restrict all SSB radio transmissions until after signal fade or until the quad-helix antenna azimuth rate approaches 0 degrees per second. System time of acquisition, antenna azimuth and elevation reports, deviations from nominal frequencies, and readout of telemetered recovery sequence events are required.

A5.5.2 At ETPD - 15 minutes, the Tern Island auto-tracking quad-helix antenna will be positioned at the impact point azimuth at 10 degrees elevation. From ETPD - 5 minutes to ETPD + 15 seconds the quad-helix antenna will scan ±90 degrees about the impact azimuth at the maximum slew rate. The antenna elevation will be varied cyclically from 10 degrees to 70 degrees to 10 degrees in 20-degree steps at the rate of one step per scan. At ETPD + 15 seconds the scan mode will rotate to 180 degrees azimuth to scan the southern sector. The antenna elevation will be varied from 70 degrees to 10 degrees to 70 degrees at the rate of 20 degrees per scan.

A5.5.2.1 If no capsule signals are received by ETPD + 2 minutes the quad-helix antenna will be fixed at 30-degree elevation and a 360-degree azimuth scan initiated at the maximum slew rate and continued for two minutes. If the capsule signals are not received by ETPD + 4 minutes, the antenna will be fixed at 180-degree azimuth and 10-degree elevation and the receivers will be monitored until ETPD + 30 minutes.

A5.5.2.2 If no capsule signals are received by ETPD + 30 minutes, a negative report will be submitted to the HTS over SSB radio.

A5.6 Surface Ship Deployment and Operations

A5.6.1 The surface ship deployment procedure outlined in the basic text of the STD will not apply for this flight. A third ship will be integrated with the Recovery Force to increase downrange sea retrieval capability.

A5.6.2 The surface ships will depart with sufficient time to arrive on the initial deployment stations listed in Table A2-1 and shown in Figure A7-2 by T + 4 hours. The PAC will evaluate the tracking data after launch and will provide predicted capsule impact locations and times for each day as soon as possible (not later than T + 4 hours). At this time, the HCC will direct redeployment of the surface ships to provide coverage of possible alternate re-entry while assuring that maximum surface ship coverage of the normal Day 3 re-entry pass will be available. Redeployment of all surface ships will be made laterally on the same latitude on which they are positioned initially (8° N, 16° N, 23° N).

A5. 6. 3 Figure A7-6 shows that the nominal orbit period of 93. 0 minutes will position the Day 1 alternate re-entry pass 185 nautical miles to the east of the initial ship stations and will position the Day 2 alternate re-entry pass 635 nautical miles to the west of the initial ship stations. Considering the distance involved between these two alternate re-entry passes and the speed of the surface ships, a decision must be made by the STC shortly after Pass 2 as to the extent that the Day 1 and the Day 2 alternate re-entry passes will be covered because it will not be possible to cover both completely. An entirely different set of conditions will exist if the period varies from nominal (see Figures 7-1, A7-6) so the surface ship deployment situation must be evaluated early and continuously during the flight.

A5. 6. 4 The Haiti Victory will be positioned 60 nautical miles south of the nominal impact point and will receive and record capsule telemetry data. The quad-helix antenna, until acquisition, will scan ±90 degrees about 360-degree azimuth at the rate of once per 15 seconds beginning at ETPD - 5 minutes. From ETPD - 5 minutes until ETPD - 60 seconds, the antenna elevation will be maintained at 10 degrees. After ETPD - 60 seconds, the antenna elevation will be increased 20 degrees per scan from 10 degrees to 70 degrees. At ETPD + 15 seconds, the scan mode will rotate 180 degrees to scan the southern sector. The antenna elevation will be decreased from 70 degrees to 10 degrees at the rate of 20 degrees for each 15-second scan during this search of the southern sector. If the capsule signals are not acquired by ETPD + 2 minutes, the antenna elevation will be raised from 10 degrees to 30 degrees, and a 360-degree azimuth scan will be initiated at the slewing rate of 10 degrees per second and continued for two minutes.

If the capsule signals are not acquired by ETPD + 4 minutes, the antenna will be positioned at 180-degree azimuth and 10-degree elevation and the telemetry receivers monitored until ETPD + 30 minutes. When the capsule signals are acquired, the antenna will begin manual tracking as a function of maximum signal strength and all telemetry and beacon signals will be recorded on magnetic tape as specified in the Detailed Recording Requirements. Bearings from this antenna will be reported at intervals of one minute to HCC for relay to STC. The DF equipment will be operated normally and will be used to obtain refined capsule directional data after acquisition. When the capsule bearing becomes steady, the Haiti Victory will report position and capsule bearing to the northern Command RC-121 over UHF and to the HCC through PMR immediately, and proceed in the direction of the acquired signals. If the capsule signals are not acquired the Haiti Victory will so report over SSB radio through PMR to the HCC at ETPD + 30 minutes.

A5. 6.5 The Auxiliary Recovery Ship will be positioned at 16° N latitude directly under the satellite path on the recovery pass. This ship does not have a telemetry receiving capability and will be utilized only for sea retrieval of the capsule. Ship-to-shore radio communication will be maintained with the HCC PMR representative for direction.

A5. 6. 6 The Dalton Victory will be positioned at 8° N latitude, directly under the satellite path on the recovery pass to enable reception of the capsule telemeter signal and the capsule beacon signal in the extended range area. The quad-helix antenna, until acquisition, will scan ±90 degrees about 360-degree azimuth at 10-degrees elevation at the rate of once per 15 seconds from ETPD - 0 until ETPD + 3 minutes. From ETPD + 3 minutes until ETPD + 5 minutes, the quad-helix antenna will give full area coverage by scanning ±90 degrees about 360-degree azimuth with antenna elevation increasing and decreasing from 10 degrees to 70 degrees to 10 degrees in increments of 20 degrees per scan. The scan rate will be once per 15 seconds. After ETPD + 5 minutes the antenna will be positioned at 10-degree elevation and 180-degree azimuth. In the event the Dalton Victory acquires the capsule signals, the telemetry will be recorded on magnetic tape as specified in the Detailed Recording Requirements, and antenna acquisition and bearing will be immediately reported through PMR to the HCC. Bearings will be relayed to HCC at intervals of one minute. When the parachute deployment telemetry sequence is received or when the antenna azimuth becomes constant, the Dalton Victory will so report verbally over SSB radio through PMR to the HCC and provide ship position and antenna azimuth and elevation.

If no capsule signals are acquired by the Dalton Victory, a negative verbal report will be submitted over SSB radio through PMR to the HCC at ETPD + 30 minutes.

A5.7 Airborne Recovery Force Deployment

A5.7.1 The Airborne Recovery Force normal and alternate deployment for a nominal orbit period is presented in Figure A7-2. This force will be deployed to provide a maximum air retrieval capability in the 60x200-nautical mile primary recovery area while emphasizing capsule detection in the extended 60x440-nautical mile secondary recovery area; however, air retrieval will be attempted in the secondary area. Telemetry aircraft will also be deployed south of the secondary area to provide extended capsule detection capability, to approximately 2° S latitude, for the normal condition.

A5.7.2 Three RC-121 radar search aircraft will be deployed in the northern area to provide overlapping radar coverage of the primary and secondary air retrieval areas. A fourth RC-121 aircraft will be deployed in the extended surface recovery area to provide communications control of the forces within that area. Figure A7-4 presents the detailed deployment of the RC-121 aircraft. Each RC-121 aircraft will be equipped with SSB radio for direct communications with the HCC. Separate HF communications will be maintained with the remaining elements of the Recovery Force.

A5.7.3 Due to the extended deployment of the Recovery Force, there will be a separate RC-121 aircraft designated as Command Aircraft for the forces in each of the three operational areas. A separate HF frequency will be assigned as the control/data telling frequency in the primary recovery area (northern area) and the combined secondary and extended recovery areas (southern area).

A5.7.4 In the event that one of the four RC-121's aborts the mission, the three remaining aircraft will be deployed to assure continuous radar coverage of the primary and secondary recovery areas at the sacrifice of the extended communications control aircraft position. In this event, alternate communications will be established between Christmas Island and T/M aircraft in the extended recovery area, over HF and/or SSB radio for force control and data telling.

A5.7.5 An aircraft departing from Hickam AFB will fly a radar peaking mission for the 3 northern on-station RC-121 aircraft only prior to the recovery pass.

A5.7.6 Six C-119J recovery aircraft will be deployed in the primary recovery area and the remaining three C-119J and the C-130 aircraft if available will be deployed in the secondary recovery area. Figure A7-5 presents the detailed deployment of the recovery aircraft.

A5.7.7 The C-130 aircraft, if available, will be positioned at the highest altitude consistent with gross weight and proper cruise control and will not attempt aerial recovery above 15,000 feet altitude.

A5.7.8 A WV-2 aircraft will perform an FIC survey of the predicted impact area and will assume a final position 120 nautical miles south and 100 nautical miles west of the predicted impact point by ETPD - 30 minutes. The FIC aircraft will communicate with the primary recovery area command aircraft on the northern primary HF frequency, will search for the capsule signals, and will attempt to derive a DF bearing from any of the signals acquired. All telemetry signals received will be recorded. Signal acquisitions and bearings will be reported immediately to the primary area Command RC-121.

A5.7.9 Telemetry aircraft will be deployed along the satellite flight path as shown in Figure A7-3. Telemetry reception range of these aircraft is expected to be 120 to 150 nautical miles. Placement of these aircraft in order of position priority and the RC-121 aircraft assigned as directional controller for normal Day 3 recovery will be as follows:

Aircraft No.	Position	Control Responsibility
1	630 nautical miles North of Dalton Victory	Vega 3
2	450 nautical miles North of Dalton Victory	Vega 3
3	270 nautical miles North of Dalton Victory	Vega 3
4	240 nautical miles South of Dalton Victory	Vega 4
5	480 nautical miles South of Dalton Victory	Vega 4

The telemetry aircraft will be on station by ETPD - 1 hour. For alternate re-entry, these aircraft will be positioned to provide continuous telemetry coverage south of the predicted impact point as shown in Figure A7-3.

A5.7.10 JC-54 type aircraft will be utilized for Positions 1 through 4 while WV-2 aircraft No. 137890 will be located in Position 5 due to its long-range SSB radio capability. Telemetry aircraft No. 1 through No. 4 will establish and maintain continuous HF communications with their respective control aircraft on the primary southern area frequency. Telemetry aircraft No. 5 will establish and maintain continuous HF or SSB communications with Vega 4. In the event of communications breakdown, HF and/or SSB communications will be established between Christmas Island and Aircraft No. 4 and No. 5 for control and data telling operations.

A5.8 Airborne Recovery Force Readiness

A5.8.1 The entire Airborne Recovery Force will be maintained on ground alert status until ETPD - 6 hours to support possible alternate re-entry. A reduced force consisting of two C-119's, one RC-121, one JC-54, and one ARS support aircraft with a parajump team will be maintained in readiness from ETPD - 6 hours to ETPD - 90 minutes and will be capable of takeoff from Hickam AFB within 30 minutes after receiving notification of alternate re-entry from the STC. The remainder of the Airborne Recovery Force will be maintained on telephone alert and will be capable of takeoff from Hickam AFB within one hour after receiving notification of alternate re-entry from the STC. Flight safety considerations must not be compromised during these operations.

A5.8.2 The Recovery Test Controller will prepare plans for recovery operations which will be conducted if short notice of alternate re-entry is given by the STC. In this operation, it is recognized that an extended sea search followed by surface recovery will be the most probable course of action. If the HCC is not notified of intended alternate re-entry by ETPD - 90 minutes, preparations will be made to support alternate or normal re-entry on the following day.

A5.8.3 The Electra telemetry recording aircraft will be maintained on ground alert status at Kodiak NAS so that it can arrive on its assigned station by separation time minus 30 minutes after receiving notification of alternate re-entry from the STC. After this is no longer possible, the Electra crew will be capable of takeoff within 30 minutes after receiving notification of alternate re-entry from the STC until ETPD - 90 minutes. At this time, preparations will be made to support alternate or normal re-entry on the following day.

A5.9 Airborne Recovery Force Operations

A5.9.1 The RC-121 aircraft radar will search for the chaff and the radar reflective parachute. All radar and DF returns from elements of the Recovery Force and bearings from the surface stations will be plotted by the RC-121 aircraft as soon as possible to determine the most probable capsule location. Recovery aircraft will not be vectored toward a radar return until the radar return has been correlated with sufficient DF bearings to establish a fix.

After a fix has been established, the RC-121 Area Commander will notify the nearest recovery aircraft and then vector the aircraft to an intercept flight path. The recovery aircraft will follow the RC-121 instructions and use the DF gear for homing. In the event that no DF signals are acquired by the Recovery Force, the radar returns will be investigated at the discretion of the Task Force Commander.

A5.9.2 When the recovery aircraft makes visual contact with the capsule parachute, an air recovery will be accomplished. Repeat passes will be made, if necessary, until recovery is successful or until the capsule impacts in the water. The aircraft completing recovery will return to Hawaii as directed by the HCC and will be escorted by either a C-119J, an RC-121, the C-130, if available, or an SC-54 (Air Rescue) aircraft. The remainder of the Recovery Force will return to Hawaii as directed by the HCC.

A5.9.3 The recovery aircraft will use the DF equipment in searching for the capsule beacon signal. The crystal controlled beacon should eliminate the detuning procedures used; however, any capsule beacon or telemetry frequency deviation will be reported by KTS and HTS to the HCC through the STC and relayed to the RC-121 commanders.

A5.9.4 Should the air recovery be unsuccessful, the search aircraft will after sighting the capsule, circle the areas of water impact and drop marker aids. The aircraft will be equipped with strobe light bombs, smoke bombs, and dye markers for this purpose. In addition, four Pelican aircraft will be equipped with one RATU each to provide a beacon marker. Procedures for the employment of RATU's will be developed by the HCC with consideration given to the economical use of equipment. No improved RADARCS are available for use on this flight.

A5.9.5 The capsule beacon and flashing light minimum operating life is 10 hours and the capsule will float for a minimum of 45 hours. The RATU beacon will operate for a minimum of 18 hours.

A5.9.6 If recovery operation conditions permit, the primary recovery area Command RC-121 will transmit brief, best-available-information reports to the HCC over SSB at ETPD + 5 and 15 minutes (±2 minutes). The secondary recovery area Command RC-121 will submit brief, best-available-information reports to the HCC at ETPD + 10 and 20 minutes (±2 minutes). The extended recovery area Command RC-121 will submit brief, best-available-information reports to the HCC at ETPD + 15 and 25 minutes (±2 minutes). If the re-entry capsule is not sighted before ETPD + 30 minutes, the northern Command RC-121 will report a brief recap of most reliable data received to HCC for relay to the STC at that time. The southern Command RC-121 and extended area Command RC-121 will make their recap reports at ETPD + 35 and ETPD + 40 minutes respectively.

A5.9.7 The data to be reported are aircraft station position, magnetic signal bearing, and local time for each reliable signal acquisition. Range and azimuth with local time and aircraft station position will be reported for each valid sighting. The report shall also contain the Task Force Commander's conclusions regarding the quality of reported signals and bearings, results of triangulation attempts, and most probable impact location. These data will be relayed to the STC immediately upon receipt by the HCC so that the most productive search areas can be determined.

A5.9.8 If the capsule has not been located by ETPD + 30 minutes in the primary recovery area or ETPD + 35 minutes in the secondary and extended recovery areas, the Airborne Recovery Forces will initiate search, at the direction of the HCC, based on the latest impact prediction received from the STC. If this is not available, the HCC will direct a search of the most probable impact areas as determined from tracking triangulation and other available data.

A5.9.9 The telemetry aircraft will search for the capsule telemetry signal and the beacon signal. All capsule signals acquired will be recorded on magnetic tape with a timing signal. Capsule signal acquisitions will be reported immediately to the area Command RC-121 over the southern area HF frequency.

If possible, the parachute deployment telemetry sequence will be reported when received. The telemetry aircraft will attempt to determine the capsule bearing at fade or at parachute deployment. If this can be accomplished, the bearing and aircraft position will be reported to the area Command RC-121.

A5.9.10 If one of the telemetry aircraft visually acquires the capsule in the air or in the water, the position will be reported immediately to the area

Command RC-121. The telemetry aircraft will circle the capsule while maintaining visual contact until arrival of a surface vessel or until fuel supply requires return to base. While circling over the floating capsule, the telemetry aircraft will attempt to provide a transmission compatible with the receiving equipment on Christmas Island so that the capsule bearing from Christmas Island may be determined more accurately.

A5.10 Hawaiian Control Center Recovery Operations and Communications

A5.10.1 The HCC-STC communications will be augmented by the addition of one voice line for relay of all acquisition and capsule signal bearing information from the recovery forces to SOA. This line will be activated at ETPD - 1 hour and will be terminated as soon as the volume of data from the recovery force elements will permit. Transmission of data by voice will be conducted in strict accordance with the procedures specified in LMSD-446633, Satellite Systems Operation Procedures.

A5.10.2 The HCC will direct and control acquisition, recovery, and search operations of the Christmas Island facility, the telemetry receiving aircraft and the recovery forces. The primary communication link between the HCC and the surface elements will be the SSB frequency. The three surface ships will communicate with the HCC through PMR and the PMR representative at the HCC.

A5.10.3 The HCC will maintain a real-time analysis for integration of all incoming data to determine the most probable impact point and search areas and will relay all reported data to the STC immediately. Bearings from HTS, South Point, Barking Sands, Tern Island, Christmas Island and the ships will be plotted. The HTS TLM-18 bearing, after the azimuth rate becomes zero, and bearings reported from South Point and Barking Sands will be relayed to the Command RC-121's by the HCC as soon as possible. All bearings will be relayed immediately to the STC for analysis of the capsule trajectory.

A5.10.4 The accuracy of all reported bearings must be considered. The accuracy of the HTS TLM-18 antenna is within 1 degree. The accuracy of

The accuracy of the Barking Sands tri-helix antenna is within 5 degrees. The accuracy of the quad-helix antennas at South Point, Tern Island and on board the recovery ships is within ±2 degrees.

A5.10.5 After launch, the HCC will obtain an estimate from each recovery ship as to the ship speed which could be sustained in an easterly direction and in a westerly direction. This information will be given to the STC within 1 hour after launch.

A5.11 Air Rescue Service Support

Two parachute teams of the Air Rescue Service will be utilized as a primary capsule water retrieval element of the Recovery Force and will be subject to deployment at the discretion of the Recovery Test Controller, HCC. Detailed plans for the employment of this support will be furnished by the Recovery Test Controller.

A5.12 Emergency Alternate Re-entry

A5.12.1 The orbital programmer tape is punched so that emergency alternate re-entry can be accomplished on Passes 15, 31, 46, and 61. Emergency alternate re-entry will be selected only if the existing flight conditions preclude recovery on re-entry Passes 17, 33, 48, or 63 in the Hawaiian area. The impact latitude will be 17° N if emergency alternate re-entry is required and the following procedures are to be used.

A5.12.2 As shown in Figure A7-8, the telemetered data of the separation sequence will be out of range of both KTS and VTS. The TLM-18 antenna at VTS will track on the capsule telemetry signal and will also receive the capsule beacon signal; both signals will be recorded. Approximately five minutes of capsule angle-tracking data will be obtained and these data will be relayed immediately to the PAC for use in computing the most probable impact area. The tri-helix antenna at VTS will be positioned to record the Agena telemetry signal.

A5.12.3 The Downrange Telemetry Ship will proceed as outlined in Paragraph 5.6 toward its nominal emergency alternate re-entry position on the orbit track 120 nautical miles south of the predicted impact point. Fig. A7-9 presents the situation which will exist on this flight if the orbit period is nominal and shows that the Downrange Telemetry Ship cannot be on the desired station for Pass 15 re-entry. If the attempt is made to move the ship as close as possible to its Pass 15 station, it will be unable to support a possible emergency alternate re-entry on Pass 31. Therefore, the STC will monitor the position of the ship closely and, depending on the existing flight conditions, direct redeployment to properly utilize its capability. Figure A7-10 shows how the impact longitude at 17° N latitude varies with orbit period in this area.

A5.12.4 The Downrange Telemetry Ship forward quad-helix antenna will track on the capsule telemetry signal and will also receive the capsule beacon signal; both signals will be recorded. The aft tri-helix antenna will be positioned to record the Agena telemetry signal.

A5.12.5 Air Rescue Service aircraft at San Diego, California, and the C-130A and/or the C-119J aircraft from Edwards Air Force Base, if available, will provide support for emergency alternate re-entry operations. Air-pickup of launch data will not be made until it has been decided that the aircraft will not be needed for emergency alternate re-entry support. Specific procedures for ARS support will be developed by the local ARS Commander. The ARS will direct and control all recovery operations in this area.

A6 POST-RECOVERY OPERATIONS

A6.1 Haiti Victory Data

The Haiti Victory will proceed toward Pearl Harbor at the best speed of advance immediately after termination of the search operation. If the capsule telemetry data have been acquired, the two HRS-3 helicopters will fly it to the HCC as soon as the ship reaches HRS-3 range of Hickam Air Force Base.

A6.2 Dalton Victory Data

If the Dalton Victory acquires telemetry data from the capsule, an aircraft data pick-up will be accomplished only at the discretion of the STC.

A6.3 Christmas Island and Telemetry Aircraft Data

An aircraft will pick up recovery capsule data acquired by the Christmas Island facility and fly it to Hickam AFB on the day of recovery operations. Christmas Island and JC-54 telemetry aircraft data will be delivered to the HCC as soon as possible.

A6.4 South Point, Barking Sands, and Tern Island Data

Data from South Point, Barking Sands and Tern Island Tracking Stations, including magnetic tapes, set-up sheets, maps and/or logs of the tracking operation, will be hand-carried by PMR personnel, flown to Hickam AFB, and delivered to the HCC.

A6.5 Transport of Data to Sunnyvale

All recovery capsule data acquired by the receiving facilities in the recovery region will be hand-carried to Flight Data Reports, LMSD/61-44, on the first available commercial airline flight.

A6.6 Tracking Station Post-Recovery Operations

The tracking stations will continue observations of the Discoverer Satellite S-band beacon and telemetry transmission until the battery power is exhausted. The orbital programmer is programmed as shown in Figure A2-2. Command transmission and tracking after the recovery pass will be at the direction of the STC.

A7 TABLES AND ILLUSTRATIONS

The following tables and illustrations are applicable to the flight of Discoverer Satellite 1103/Discoverer Booster 296/AET Payload only. Each table or figure is given the basic number of the section of the general STD to which it applies, the letter A to denote Appendix material, and a number to sequence items in the same category.

Table A2-1
NOMINAL FLIGHT PLANNING DATA

ITEM	DATA
SATELLITE	
S/N	1103
Payload	AET-L
Fuel	UDMH, 3694 lb
Oxidizer	IRFNA, 9420 lb
Launch weight	15,907 lb
BOOSTER	
S/N	296
Fuel	RP-1
Oxidizer	Liquid oxygen
Launch weight (including payload)	121,258 lb
LAUNCH	
Site	VAFB, 75-3, Pad 4
Date	December 1960
Pad azimuth	181°28′ ± 15′
Launch azimuth	172°
Nominal airborne Command 5 backup	15 sec
Orbital boost time	237.9 sec
Downrange T/M ship location	13° N, 117° W
Downrange T/M ship heading	270° T
Programmer setting	5580 sec (step setting 16)
INJECTION	
Time	T + 463.4 sec
Location	22°18.3′ W, 119°8.0′ W
Altitude	147 sm (128 nm)
Azimuth (inertial)	171.0°
Nominal velocity	25,824 ft/sec
ORBIT	
Period	93.0 min (5580 sec)
Apogee	380 sm (330 nm)
Perigee	147 sm (128 nm)
Eccentricity	0.0275
Regression rate	23.39°/pass
Reset Latitudes	20° N (HTS) 32° N (VTS northbound) or 36° N (VTS southbound) 40° N (NHS northbound) or 45° N (NHS southbound) 60° N (KTS)
Inclination Angle	81.78°

Table A2-1 (Continued)

ITEM	DATA
RE-ENTRY	
Re-entry T/M aircraft nominal position and heading	
Day 1 alternate recovery (Pass 17)	60° N, 165°24' W, 163.2° true
Day 2 alternate recovery (Pass 33)	60° N, 179°30' W, 163.2° true
Day 3 normal recovery (Pass 48)	60° N, 170°16' W, 163.2° true
Day 4 alternate recovery (Pass 63)	60° N, 160°59' W, 163.2° true
RECOVERY	
Aircraft (type and quantity)	C-119's (9), RC-121's (4), T M recording (5), C-130 (1) if available
Surface Ships -- Initial Positions	
Haiti Victory	23° N, 160° W
Auxiliary	16° N, 159°18' W
Dalton Victory	8° N, 158°36' W
Surface Ship Helicopters	
HRS-3	2 on each Victory Ship
ALTERNATE RECOVERY – DAY 1	
Alternate recovery pass	17
Nominal impact area center	24° N, 156°54' W
ETPD	T + 26.5 hours
ALTERNATE RECOVERY – DAY 2	
Alternate recovery pass	33
Nominal impact area center	24° N, 171°2' W
ETPD	T + 51.3 hours
NORMAL RECOVERY – DAY 3	
Normal recovery pass	48
Nominal impact area center	24° N, 161°45' W
ETPD	T + 74.5 hours
ALTERNATE RECOVERY – DAY 4	
Alternate recovery pass	63
Nominal impact area center	24° N, 152°17' W
ETPD	T + 97.7 hours
EMERGENCY ALTERNATE RECOVERY – DAY 1	
Alternate recovery pass	15
Nominal impact area center	17° N, 109°24' W
Downrange T/M ship location	15° N, 109°13' W

Table A2-1 (Continued)

ITEM	DATA
EMERGENCY ALTERNATE RECOVERY – DAY 2	
Alternate recovery pass	31
Nominal impact area center	17° N, 123°33′ W
Downrange T/M ship location	15° N, 123°22′ W
EMERGENCY ALTERNATE RECOVERY – DAY 3	
Alternate recovery pass	46
Nominal impact area center	17° N, 114°16′ W
Downrange T/M ship location	15° N, 114°5′ W
EMERGENCY ALTERNATE RECOVERY – DAY 4	
Alternate recovery pass	61
Nominal impact area center	17° N, 104°48′ W
Downrange T/M ship location	15° N, 104°37′ W

Table A4-1

INSTRUMENTATION REQUIRED TO BE OPERATIVE AT LAUNCH

1. Agena

   a. Continuous Telemetry Channels:

      6 – Payload quantity. Subcarrier must be present

      7 – Payload quantity. Subcarrier must be present

      8 – Payload quantity. Subcarrier must be present

      10 – Payload quantity. Subcarrier must be present

      11 – Z Acceleration during ascent. Subcarrier must be present

      14 – Agena combustion chamber pressure. Subcarrier must be present

   b. Commutated Telemetry Channels:

      12 – Subcarrier must be present and commutator running

      13 – Subcarrier must be present and commutator running

      15 – Subcarrier must be present and commutator running; points 49 and 51 must be present. Channel 16, commutator points 50 and 52 are an acceptable substitution for Channel 15, commutator points 49 and 51; these must be substituted as a pair.

      16 – Subcarrier must be present and commutator running; points 2, 4, 6, 8, 10, 14, 16, 18, 20, 22, 33, and 45 must be present. Channel 1 is an acceptable substitution for Channel 16, points 20 and/or 22. Channel 11 is an acceptable substitution for Channel 16, points 2 and/or 4, 6, and 8.

      17 – Subcarrier must be present and commutator running

2. Capsule

   a. Continuous Telemetry Channels:

      7 – Subcarrier must be present

      9 – Subcarrier must be present

      11 – Subcarrier must be present

NOTE:

Approval of the operation of the instrumentation system by cognizant LMSD personnel at VAFB is required prior to launch.

Table A5-1
SS/D TIMER SEQUENCE FOR DISCOVERER SATELLITE 1103

NOMINAL TIME FROM LIFTOFF (SEC)	COMPUTER RUNNING TIME (SEC)	EVENT DESCRIPTION
	-0.1	Timer reset
0	0	Liftoff, SS/D timer start
0.1	0.1	Timer reset
0.1	0.1	Timer warning (ground function)
149		MAIN ENGINE SHUTDOWN*
150	150	Start Fairchild Timer
156	156	Programmed destruct lockout
		Uncage IRP gyros
156	156	Flight controls power ON (backup)
158.5		VERNIER SHUTDOWN*
169	169	Initiate vehicle pneumatics control
		Open pneumatic supply valve
169	169	Fire explosive bolts
169.5	169.5	Arm timer delay circuit
		-1.65°/min pitch rate from integ. pot.
169.5	169.5	Fire retro rockets
175	175	Remove -40°/min. yaw rate (no yaw correction required)
181	181	Command -3.6°/sec pitchover program (pitchover 28.8°)
181	181	Fire H/S fairing squib
189	189	Stop -3.6°/sec pitch rate
		Connect pitch H/S signal to pitch IRP gyro
189	189	Connect roll H/S signal to roll IRP gyro
194	194	Uncage integrator
		Accept Fairchild Timer and Command 5 relay signal*, **
194	194	Remove 28v dc from N_2 valve
		ORBITAL BOOST*
209		Stop SS/D Timer delay (nom. 15 sec) *
213	198	Deactivate timer delay circuit
		Fire ullage rockets
213	198	Activate H/S electrical pitch bias +4-1/2° offset
224	209	Unground integrator input
224	209	Connect accelerometer to integrator
224	209	Arm and fire gas gen squib, fire He valve, pitch and yaw pneumatics OFF
225	210	Pitch and yaw pneumatics OFF (backup)
		Open gas gen. arm and fire, He valve
		Open gas gen. arm and fire, He valve and remove J-box 28v to P and Y pneumatics OFF
225	210	Close circuit to T/M OFF SWITCH
225.5		STEADY STATE THRUST*
457.0	442	Arm pitch and yaw pneumatics

**Notation for reference only.*
***Command 6 ends timer delay (15 seconds nominal) and corrects integrator.*

Table A5-1 (Continued)

NOMINAL TIME FROM LIFTOFF (SEC)	COMPUTER RUNNING TIME (SEC)	EVENT DESCRIPTION
457.0	442	Engine cutoff safety switch
463.4	448.4	Engine shutdown by integrator*** Disconnect accelerometer Ground integrator input
463.4	448.4	Activate pitch and yaw pneumatics
		REORIENTATION*
483	468	Pneumatic ON (backup) and remove 28v to ullage rockets Disconnect integrator pitch rate pot. (remove 4.1°/min pitch rate) Command -40°/min yaw rate (180° yaw left)
483	468	Fire He and oxidizer vent valve squib
753	738	Start T/M calibrate
753	738	Apply 28v unreg. to SS/L power control box and switch beacon command channels
753	738	Command +3.86°/min pitch rate (yaw rate removed) Connect roll H/S signal to yaw gyro Switch-out 0.1% regulated 400-cycle power
753	738	Shutdown +28.3v IRP ascent power
763	748	Stop T/M calibrate Open eng. shutdown, switch antenna, open flight control gain change relays and switch roll and yaw gyro TLM gain
763	748	Shutdown integrator power
		ORBIT*
895	880	Open circuit to T/M over-ride SS/D Timer OFF, H/S to low gain Arm H/S OFF circuit
895	880	Fire fuel vent valve squib
		RECOVERY*
X	880	Restart SS/D Timer, H/S OFF*
X + 15	895	Command -45°/min pitch rate
X + 15	895	Arm capsule ejection squib
X + 92	972	Command + 3.86°/min pitch rate (stop -45°/min pitch rate) SS/L Transfer Circuit 1
X + 92	972	SS/L Transfer Circuit 2
X + 92+	972+	Fire capsule plug disconnect squib
X + 94.5	974.5	Fire capsule eject squibs Enable timer shutdown circuit Fire capsule eject squibs
X + 94.5	974.5	Lockout SS/H restart signal
X + 130	1010	Shutdown SS/D timer, H/S on.

*Notation for reference only.

***Integrator to be set at a dial reading of approximately 2150 representing a velocity to be gained of 17,200 ±40 fps.

Table A6-1
NOMINAL ORBIT SCHEDULE
(Based on a 93.0 Minute Period)

PHASE	EVENT	TIME FROM LAUNCH HRS	TIME FROM LAUNCH MIN	LOCATION DEG. N. LATITUDE
Launch	Launch	0	0	34.8
	Start Orbit		2	
	Orbit Injection		7.9	22.4
	Beacon, T/M off		14.9	6.3 (s)
Pass 1	Beacon, T/M on	1	27.5	75
	65° N latitude (ref)		30.2	65
	RM on		31.5	60
	Cross KTS latitude		32.2	57.6
	RM interruption (40)		32.2	57.6
	25° N Ref latitude		40.3	25
	Cross HTS latitude		41.1	21.6
	Beacon, T/M off		43.9	10
	End of Orbit 1	2	33.6	0
Pass 2	Beacon, T/M on	3	0.5	75
	RM on		4.5	60
	Cross KTS latitude		5.2	57.6
	RM interruption (60)		5.5	56.1
	Cross HTS latitude		14.1	21.6
	Beacon, T/M off		16.9	10
	End of Orbit 2	4	6.6	0
Pass 3	End of Orbit 3	5	39.6	0
Pass 4	End of Orbit 4	7	12.6	0
Pass 5	End of Orbit 5	8	45.6	0
Pass 6	Beacon, T/M on	8	52.3	25
	RM on		56.4	40
	RM interruption (20)		56.7	41.2
	Cross NHS latitude		57.2	42.9
	Beacon, T/M off	9	1.2	58
	End of Orbit 6	10	18.5	0
Pass 7	Beacon, T/M on	10	25.3	25
	RM on		29.4	40
	RM interruption (40)		30.1	42.4
	Cross NHS latitude		30.2	42.9
	Beacon, T/M off		34.2	58
	End of Orbit 7	11	51.5	0
Pass 8	Beacon, T/M on	11	56.2	17
	RM on	12	0.2	32
	Cross VTS latitude		1.0	34.8
	RM interruption (60)		1.2	35.5
	Beacon, T/M off		5.6	52
	End of Orbit 8	13	24.4	0

Table A6-1 (Continued)

PHASE	EVENT	TIME FROM LAUNCH HRS	MIN	LOCATION DEG. N. LATITUDE
Pass 9	Beacon, T/M on	13	29.2	17
	RM on		33.2	32
	Cross VTS latitude		34.0	34.8
	RM interruption (80)		34.5	36.9
	Beacon, T/M off		38.6	52
	End of Orbit 9	14	57.4	0
Pass 10	Beacon, T/M on	14	58.9	5
	RM on	15	2.9	20
	Cross HTS latitude		3.4	21.6
	RM interruption (100)		4.6	27.8
	Cross KTS latitude		13.1	57.6
	Beacon, T/M off		15.3	66
	End of Orbit 10	16	30.4	0
Pass 11	End of Orbit 11	18	3.4	0
Pass 12	End of Orbit 12	19	36.3	0
Pass 13	Beacon, T/M on	20	7.1	61
	RM on		11.1	45
	RM interruption (20)		11.4	43.7
	Cross NHS latitude		11.6	42.9
	Beacon, T/M off		13.8	34
	End of Orbit 13	21	9.3	0
Pass 14	End of Orbit 14	22	42.3	0
Pass 15	Beacon, T/M on	23	9.2	75
	RM on		13.3	60
	Cross KTS latitude		13.9	57.6
	RM interruption (40)		14.6	55.0
	Cross VTS latitude		19.6	34.8
	Beacon, T/M off		22.7	22
	End of Orbit 15	24	15.3	0
Pass 16	Beacon, T/M on	24	42.2	75
	RM on		46.2	60
	Cross KTS latitude		46.9	57.6
	RM interruption (60)		47.2	56.1
	Cross VTS latitude		52.5	34.8
	Beacon, T/M off		55.7	22
	End of Orbit 16	25	48.2	0
Pass 17	Beacon, T/M on	26	15.1	75
	RM on		19.1	60
	Cross KTS latitude		19.8	57.6
	RM interruption (80)		20.4	54.7
	Cross HTS latitude		28.7	21.6
	Beacon, T/M off		31.5	10
	End of Orbit 17	27	21.2	0

SECRET

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Table A6-1 (Continued)

PHASE	EVENT	TIME FROM LAUNCH HRS	MIN	LOCATION DEG. N. LATITUDE
Pass 18	End of Orbit 18	28	54.2	0
Pass 19	End of Orbit 19	30	27.1	0
Pass 20	End of Orbit 20	32	0.1	0
Pass 21	End of Orbit 21	33	33.1	0
Pass 22	Beacon, T/M on	33	39.9	25
	RM on		44.0	40
	RM interruption (20)		44.3	41.2
	Cross NHS latitude		44.8	42.9
	Beacon, T/M off		48.8	58
	End of Orbit 22	35	06.0	0
Pass 23	Beacon, T/M on	35	10.8	17
	RM on		14.8	32
	RM interruption (40)		15.5	34.5
	Cross VTS latitude		15.6	34.8
	Beacon, T/M off		20.2	52
	End of Orbit 23	36	39.0	0
Pass 24	Beacon, T/M on	36	43.7	15
	RM on		47.7	32
	Cross VTS latitude		48.5	34.8
	RM interruption (60)		48.7	35.5
	Beacon, T/M off		52.7	52
	End of Orbit 24	38	11.9	0
Pass 25	Beacon, T/M on	38	13.4	5
	RM on		17.4	20
	Cross HTS latitude		17.9	21.6
	RM interruption (80)		18.7	24.9
	Cross KTS latitude		27.6	57.6
	Beacon, T/M off		29.8	66
	End of Orbit 25	39	44.9	0
Pass 26	Beacon, T/M on	39	46.4	5
	RM on		50.4	20
	Cross HTS latitude		50.8	21.6
	RM interruption (100)		52.5	27.8
	Cross KTS latitude	40	0.5	57.6
	Beacon, T/M off		2.7	66
	End of Orbit 26	41	17.9	0
Pass 27	End of Orbit 27	42	50.8	0
Pass 28	Beacon, T/M on	43	21.6	61
	RM on		25.6	45
	RM interruption (20)		25.9	43.7
	Cross NHS latitude		26.1	42.9
	Beacon, T/M off		28.3	34
	End of Orbit 28	44	23.8	0

Table A6-1 (Continued)

PHASE	EVENT	TIME FROM LAUNCH HRS	TIME FROM LAUNCH MIN	LOCATION DEG. N. LATITUDE
Pass 29	Beacon, T/M on	44	54.4	61
	RM on		58.4	45
	Cross NHS latitude		59.0	42.9
	RM interruption (40)		59.1	42.5
	Beacon, T/M off	45	1.1	34
	End of Orbit 29		56.7	0
Pass 30	Beacon, T/M on	46	29.7	52
	RM on		33.7	36
	Cross VTS latitude		34.0	34.8
	RM interruption (60)		34.7	32
	Beacon, T/M off		37.1	22
	End of Orbit 30	47	29.7	0
Pass 31	Beacon, T/M on	47	56.6	75
	RM on	48	0.6	60
	Cross KTS latitude		1.3	57.6
	RM interruption (80)		1.9	54.8
	Cross VTS latitude		6.9	34.9
	Beacon, T/M off		10.1	22
	End of Orbit 31	49	2.6	0
Pass 32	Beacon, T/M on	49	29.5	75
	RM on		33.5	60
	Cross KTS latitude		34.2	57.6
	RM interruption (100)		35.2	53.4
	Cross HTS latitude		43.1	21.6
	Beacon, T/M off		45.9	10
	End of Orbit 32	50	35.6	0
Pass 33	Beacon, T/M on	51	2.5	75
	RM on		6.5	60
	Cross KTS latitude		7.2	57.6
	RM interruption (120)		8.2	53.4
	Cross HTS latitude		16.1	21.6
	Beacon, T/M off		18.9	10
	End of Orbit 33	52	8.5	0
Pass 34	End of Orbit 34	53	41.5	0
Pass 35	End of Orbit 35	55	14.4	0
Pass 36	End of Orbit 36	56	47.4	0
Pass 37	Beacon, T/M on	56	54.2	25
	RM on		58.3	40
	RM interruption (20)		58.6	41.2
	Cross NHS latitude		59.1	42.9
	Beacon, T/M off	57	3.1	58
	End of Orbit 37	58	20.3	0

Table A6-1 (Continued)

PHASE	EVENT	TIME FROM LAUNCH HRS	TIME FROM LAUNCH MIN	LOCATION DEG. N. LATITUDE
Pass 38	Beacon, T/M on	58	27.2	25
	RM on		31.3	40
	RM interruption (40)		32.0	42.4
	Cross NHS latitude		32.1	42.9
	Beacon, T/M off		36.1	58
	End of Orbit 38		53.3	0
Pass 39	Beacon, T/M on	59	58.0	17
	RM on	60	2.0	32
	Cross VTS latitude		2.8	34.8
	RM interruption (60)		3.0	35.5
	Beacon, T/M off		7.0	52
	End of Orbit 39	61	26.2	0
Pass 40	Beacon, T/M on	61	26.4	5
	RM on		30.4	20
	Cross HTS latitude		30.9	21.6
	RM interruption (80)		32.2	24.9
	Cross KTS latitude		40.6	57.6
	Beacon, T/M off		42.8	66
	End of Orbit 40	62	59.1	0
Pass 41	Beacon, T/M on	63	0.6	5
	RM on		4.6	20
	Cross HTS latitude		5.1	21.6
	RM interruption (100)		6.8	27.8
	Cross KTS latitude		14.8	57.6
	Beacon, T/M off		17.0	66
	End of Orbit 41	64	32.1	0
Pass 42	End of Orbit 42	66	5.0	0
Pass 43	End of Orbit 43	67	38.0	0
Pass 44	Beacon, T/M on	68	8.7	61
	RM on		12.7	45
	RM interruption (20)		13.0	43.7
	Cross NHS latitude		13.2	42.9
	Beacon, T/M off		15.4	34
	End of Orbit 44	69	10.9	0
Pass 45	End of Orbit 45	70	32.8	0
Pass 46	Beacon, T/M on	71	10.6	75
	RM on		14.7	60
	Cross KTS latitude		15.3	57.6
	RM interruption (40)		16.0	54.8
	Cross VTS latitude		21.0	34.8
	Beacon, T/M off		24.2	22
	End of Orbit 46	72	16.8	0

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Table A6-1 (Continued)

PHASE	EVENT	TIME FROM LAUNCH HRS	TIME FROM LAUNCH MIN	LOCATION DEG. N. LATITUDE
Pass 47	Beacon, T/M on	72	43.6	75
	RM on		47.6	60
	Cross KTS latitude		48.3	57.6
	RM interruption (60)		48.6	56.1
	Cross VTS latitude		53.9	34.8
	Beacon, T/M off		59.9	10
	End of Orbit 47	73	49.7	0
Pass 48	Beacon, T/M on	74	16.5	75
	RM on		20.5	60
	Cross KTS latitude		21.2	57.6
	RM interruption (80)		21.8	54.7
	Cross HTS latitude		30.1	21.6
	Beacon, T/M off		32.9	10
	End of Orbit 48	75	22.6	0
Pass 49	End of Orbit 49	76	52.6	0
Pass 50	End of Orbit 50	78	25.6	0
Pass 51	End of Orbit 51	79	58.6	0
Pass 52	Beacon, T/M on	79	5.5	25
	RM on		9.6	40
	RM interruption (20)		9.9	41.2
	Cross NHS latitude		10.4	42.9
	Beacon, T/M off		14.4	58
	End of Orbit 52	81	31.6	0
Pass 53	Beacon, T/M on	81	38.5	25
	RM on		42.6	40
	RM interruption (40)		44.3	42.4
	Cross NHS latitude		44.4	42.9
	Beacon, T/M off		48.4	58.0
	End of Orbit 53	83	4.6	0
Pass 54	Beacon, T/M on	83	9.4	17
	RM on		13.4	32
	Cross VTS latitude		14.2	34.8
	RM interruption (60)		14.4	35.5
	Beacon, T/M off		18.8	52
	End of Orbit 54	84	37.6	0
Pass 55	Beacon, T/M on	84	42.4	17
	RM on		46.4	32
	Cross VTS latitude		48.2	34.8
	RM interruption (80)		48.7	36.9
	Beacon, T/M off		52.8	52
	End of Orbit 55	86	10.6	0

Table A6-1 (Continued)

PHASE	EVENT	TIME FROM LAUNCH HRS	TIME FROM LAUNCH MIN	LOCATION DEG. N. LATITUDE
Pass 56	Beacon, T/M on	86	10.9	5
	RM on		14.9	20
	Cross HTS latitude		15.3	21.6
	RM interruption (100)		17.0	27.8
	Cross KTS latitude		25.0	57.6
	Beacon, T/M off		27.2	66
	End of Orbit 56	87	43.6	0
Pass 57	End of Orbit 57	89	16.6	0
Pass 58	End of Orbit 58	90	49.6	0
Pass 59	Beacon, T/M on	91	20.4	61
	RM on		24.4	45
	RM interruption (20)		24.7	43.7
	Cross NHS latitude		24.9	42.9
	Beacon, T/M off		27.1	34
	End of Orbit 59	92	22.6	0
Pass 60	End of Orbit 60	93	55.6	0
Pass 61	Beacon, T/M on	94	22.5	75
	RM on		26.6	60
	Cross KTS latitude		27.2	57.6
	RM interruption (40)		27.9	54.8
	Cross VTS latitude		32.9	34.8
	Beacon, T/M off		36.1	22
	End of Orbit 61	95	28.6	0
Pass 62	Beacon, T/M on	95	55.5	75
	RM on		59.5	60
	Cross KTS latitude	96	0.2	57.6
	RM interruption (60)		0.5	56.1
	Cross VTS latitude		5.8	34.8
	Beacon, T/M off		9.0	22
	End of Orbit 62	97	1.6	0
Pass 63	Beacon, T/M on	97	28.5	75
	RM on		32.5	60
	Cross KTS latitude		33.2	57.6
	RM interruption (80)		33.8	54.7
	Cross HTS latitude		42.1	21.6
	Beacon, T/M off		44.9	10
	End of Orbit 63	98	34.6	0
Pass 64	Beacon, T/M on	99	1.5	75
	RM on		5.5	60
	Cross KTS latitude		6.2	57.6
	RM interruption (100)		6.8	54.7
	Cross HTS latitude		15.1	21.6
	Beacon, T/M off		17.9	10
	End of Orbit 64	100	7.6	0

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Table A8-1

REAL-TIME DATA READOUT AND REPORTING REQUIREMENTS

	MEASUREMENT		CHANNEL	PRI-ORITY	TIME* READOUT REQUIRED	REPORT** TO STC BY VOICE	ORBITAL PROGRAMMER PASS	TRACKING STATION						T/M SHIP***	T/M AIRCRAFT***		NOTE
	NAME	NUMBER						VTS	MTS	NHS	KTS	HTS	TIS	PVT. JOE E. MANN	WV-2 137890	ELECTRA	
LAUNCH	Liftoff Signal	---	---	1	RT	X	Ascent	X	X								
	Thor Main Engine Cutoff	---	Thor 12	1	RT	X	Ascent	X	X								
	Booster Separation	A93	16-24	1	RT	X	Ascent	X	X								
	Agena Engine Ignition and Cutoff	B6	14	1	RT	X	Ascent	X	X					X			
	Tone Verifications A, B, C, D	H64, 65, 66, 67	16-2, -4, -6, -8	1	RT		Ascent	X	X								
	Programmer Step Readout (Console)	H108, 109	16-20, -22	1	RT	X	Ascent	X	X								
	11-Second Step Switch Position	H108	16-20	1	RT		Ascent	X	X					X			
	110-Second Step Switch Position	H109	16-22	1	RT		Ascent	X	X					X			
	Increase/Decrease Switch Position	H107	16-18	1	RT	X	Ascent	X	X					X			
	Yaw Gyro Torque	D84	17-54	2	PP1		Ascent							X			1
	Payload Function Selector Setting	AET 14/15, 17/18, 20/21, 23/24	13-18 thru 13-24 13-48 thru 13-54	1	RT	X	Ascent	X	X					X			
	Longitudinal Acceleration	A-10	11	2	See Note 2		Ascent	X	X					X			2
	SPI Pitch Angle (Upper)	D-138	16-52	2	See Note 2		Ascent	X	X								2
	SPI Yaw Angle (Upper)	D-139	16-50	2	See Note 2		Ascent	X	X								2
ORBIT	Tone Verifications A, B, C, D	H64, 65, 66, 67	16-2, -4, -6, -8	1	RT		1 thru 62	X	X	X	X	X					
	Command Verifications 1, 2, 3, 4	H112	11	1	RT	X	1 thru 62	X	X	X	X	X					
	Command Verifications 5, 6	H114	14	1	RT	X	1 thru 62	X	X	X	X	X					
	Programmer Period Readout (Console or Remote)	H110	1	2	RT		1 thru 62	X	X	X	X	X					
	Programmer Step Readout (Console)	H108, 109	16-20, -22	1	RT	X	1 thru 62	X	X	X	X	X					
	11-Second Step Switch Position	H108	16-20	1	RT		1 thru 62	X	X	X	X	X					
	110-Second Step Switch Position	H109	16-22	1	RT		1 thru 62	X	X	X	X	X					
	Increase/Decrease Switch Position	H107	16-18	1	RT	X	1 thru 62	X	X	X	X	X					
	Reset Monitor Signal	H70	16-10	1	RT	X	1 thru 62	X	X	X	X	X					

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Table A8-1 (Continued)

	MEASUREMENT		CHANNEL	PRIORITY	TIME* READOUT REQUIRED	REPORT** TO STC BY VOICE	ORBITAL PROGRAMMER PASS	TRACKING STATION						T/M SHIP***	T/M AIRCRAFT***		NOTE
	NAME	NUMBER						VTS	MTS	NHS	KTS	HTS	TIS	PVT. JOE E. MANN	WV-2 137890	ELECTRA	
ORBIT (Continued)	Programmer Pass Identification	H70	16-10	1	RT	X	1 thru 62	X	X	X	X	X					
	Re-entry Selector Switch Position	H117	16-45	1	RT	X	1 thru 62	X	X	X	X	X					3
	Payload Function Selector Setting	AET 14/15, 17/18, 20/21, 23/24	13-18 thru 13-24, 13-48 thru 13-54	1	RT	X	1 thru 62	X	X	X	X	X					
	Control Gas Supply Pressure - High Range	D95	16-33	1	PP1	X	1 thru 62	X	X	X	X	X					
	Control Gas Supply Pressure - Low Range	D140	16-27	1	PP1	X	1 thru 62	X	X	X	X	X					
	Battery Bus Voltage	C1	16-38	2	PP1		1 thru 62	X	X	X	X	X					
	Horizon Scanner - Pitch	D37	16-35	3	PP2		See Note 5	X		X	X	X					4
	Horizon Scanner - Roll	D39	16-37	3	PP2			X		X	X	X					4
	SPI Temperature	D130	15-43	3	PP2			X		X	X	X					5
	SPI Pitch Angle - Lower	D128	15-51	3	See Note 5			X		X	X	X					5
	SPI Yaw Angle - Lower	D127	15-49	3	See Note 5			X		X	X	X					5
	SPI Pitch Ref. Volt.-Lower	D136	15-2	3	See Note 5			X		X	X	X					5
	SPI Yaw Ref. Voltage - Lower	D137	15-4	3	See Note 5			X		X	X	X					5
	SPI Pitch Angle - Upper	D138	16-52	3	PP2			X		X	X	X					5
	SPI Yaw Angle - Upper	D139	16-50	3	PP2		See Note 5	X		X	X	X					5
	Wave Train	AET 50	8	2	PP1		See Note 2	X		X	X	X					14
	No Name Assigned	AET 40	12-9	2	PP1		See Note 11	X		X	X	X					11
	No Name Assigned	AET 48	12-13	2	PP1		See Note 11	X		X	X	X					11
RE-ENTRY	Programmer Period Readout (Console or Remote)	H110	1	3	RT		Recovery Pass				X	X					
	Programmer Step Readout (Console)	H108, 109	16-20, -22	2	RT	X					X	X					
	11-Second Step Switch Position	H108	16-20	3	PP2						X	X	X			X	
	110-Second Step Switch Position	H109	16-22	3	PP2						X	X	X			X	
	Reset Monitor Signal	H70	16-10	1	RT	X					X					X	
	Programmer Pass Identification	H70	16-10	2	RT		Recovery Pass				X					X	

Table A8-1 (Continued)

	MEASUREMENT		CHANNEL	PRI-ORITY	TIME* READOUT REQUIRED	REPORT** TO STC BY VOICE	ORBITAL PROGRAMMER PASS	TRACKING STATION						T/M SHIP***	T/M AIRCRAFT***		NOTE
	NAME	NUMBER						VTS	MTS	NHS	XTS	HTS	TIS	PVT. JOE E. MANN	WV-2 137890	ELECTRA	
RE-ENTRY (Continued)	Re-entry Selector Switch Position	H117	16-45	1	RT	X	Recovery Pass ↕				X	X	X			X	3
	Control Gas Supply Pressure - High Range	D95	16-33	1	PP1	X					X	X	X			X	
	Control Gas Supply Pressure - Low Range	D140	16-27	1	PP1	X					X	X	X			X	
	Battery Bus Voltage	C1	16-38	2	PP1						X	X	X			X	
	Horizon Scanner - Pitch	D37	16-35	1	PP2						X					X	4
	Horizon Scanner - Roll	D39	16-37	1	PP2						X					X	4
	SPI Pitch Angle - Lower	D128	15-51	2	See Note 6						X					X	6
	SPI Yaw Angle - Lower	D127	15-49	2	See Note 6						X					X	6
	SPI Pitch Ref. Voltage - Lower	D136	15-2	2	See Note 6						X					X	6
	SPI Yaw Ref. Voltage - Lower	D137	15-4	2	See Note 6						X					X	6
	SFI Pitch Angle - Upper	D138	16-52	1	PP2						X					X	6
	SPI Yaw Angle - Upper	D139	16-50	1	PP2						X					X	6
	Pitch Torque Signal	D41	17-38	2	PP1						X					X	7
	SS/D Timer Restart	D85	17-52	1	RT	X					X					X	
	Capsule Separation Event	AET 51	16-42	1	RT	X					X	X	X		X	X	8
	Payload Connector Disconnect	AET 26	12-2	2	RT						X	X	X			X	13
	Retro-Rocket Ignition, De-spin Valve Actuated, Thrust Cone Ejection	---	Capsule 7	1	RT, PP1	X					X				X	X	9
	Spin Valve Actuated, Thrust Cone Ejection	---	Capsule 9	1	RT, PP1	X					X				X	X	9
	Axial Acceleration	---	Capsule 11	1	PP1, PP2	X					X	X	X		X	X	10
	3 g Switch Close, 3 g Switch Open, Ablative Shell Off	---	Capsule 7	1	RT, PP1	X					X	X	X		X	X	9
	Parachute Cover Off	---	Capsule 9	1	RT, PP1	X					X	X	X		X	X	9
	Capsule T/M Signal Strength	---	Capsule 7, 9, 11	2	RT		Recovery Pass				X	X	X		X	X	12

Table A8-1 (Continued)

NOTES:

1. Report the system of reorientation, the voltage level prior to start of reorientation, and the average voltage level during reorientation.
2. Backup monitors for ascent events. SPI data is used as backup verification of separation.
3. Reads 1 volt for normal Pass 63 re-entry, 4 volts for alternate re-entry.
4. Read when sun position indicator data are required in Notes 5 and 6 (until turn-off at start of reorientation). KTS reads on the recovery pass to indicate SS/D restart event if measurement D 85 is invalid.
5. With the exception of D 130, Channel 15 SPI data will be read only if the SPI data on Channel 16 do not appear valid. Read 3 times at approximately 2-minute intervals correlated with system time on Pass 2 (KTS and HTS), on Pass 13 (NHS), on Pass 15 (VTS) if recovery is to be made on Day 3, on Pass 48 (KTS) if recovery is to be made on Day 4, on Pass 59 (NHS), and on Pass 61 (VTS). Readings at one system time only are required of VTS on Passes 9, 24, 39, and 55. All VTS and HTS readings are to be obtained as far north as possible. KTS transmits data on Channels 15 and 16 to Sunnyvale on 100-wpm/voice line after Pass 2; three 10-second data samples at 2-minute intervals required.
6. Read at 1-minute intervals before reorientation, 20-second intervals during reorientation, and immediately prior to separation; correlate with system time. Channel 15 SPI data will be read only if the SPI data on Channel 16 do not appear valid. KTS transmits data on Channels 15 and 16 to SV on 100-wpm/voice line after recovery pass; continuous transmission from acquisition to separation.
7. Read system time at start and finish of reorientation, voltage level prior to start of reorientation, and average voltage level during reorientation.
8. Reads 4.67 volts prior to separation, 1.33 volts after separation. Correlation within 2 seconds of exact system time is satisfactory for initial KTS and Electra report. HTS and TIS verify that event has occurred by voltage level check.
9. The RT readout will contain a verification that each event has occurred. The PP1 readout will contain the system time of each event. Use event numbers listed in Paragraph 7.4.5 for identification when reporting.
10. The KTS and Electra PP1 readout will contain the average value and duration. The PP2,readout will contain a complete time history of acceleration and will include the system time of each data dropout and the time duration of dropout. HTS and TIS read values 5 seconds prior to, at, and 5-seconds after parachute deployment.
11. Record voltage level at beginning, middle, and end of pass. Readout, accurate to at least 0.1 volt (2% bandwidth), required of VTS (Passes 8, 9, 15, 24, 31, 39, 55), NHS (Passes 6, 7, 13), KTS (Passes 1, 2, 16), and HTS (Pass 2). Readouts on Passes 1 and 2 are required 60 minutes after the pass; all other readouts required 10 minutes after the pass.
12. Provide a qualitative evaluation of signal reception.
13. Reads out of band after separation.
14. Refer to Table A8-2 for details of readout required.

** RT – Read in real time.*

PP1 – Read immediately after pass.

PP2 – Read immediately after RT and PP1 readouts.

*** All data are also to be reported to the STC by 60-wpm teletype as soon as possible.*

**** T/M ships and aircraft will transmit real-time data immediately after signal fade so no interference with the vehicle telemetry signal will be generated.*

Table A8-2

NOMINAL PAYLOAD FUNCTION WAVE TRAIN REAL-TIME READOUT AND REPORTING REQUIREMENTS

CHANNEL 8 (AET 50) READOUT AND REPORTING REQUIREMENTS

PASS NO	TRACKING STATION	MAXIMUM DATA REPORTING TIME ALLOWABLE (MINUTES)		
		READOUT (a)	READOUT (b)	READOUT (c)
1	KTS	10	60	90
2	KTS	--	--	90
2	HTS	30	60	90
6	NHS	15	60	90
8	VTS	--	--	90
9	VTS	15	60	30
13	NHS	15	60	90
15	VTS	15	60	90
16	KTS	15	--	--
24	VTS	15	60	30
31	VTS	15	--	--
39	VTS	15	60	30
55	VTS	15	60	30

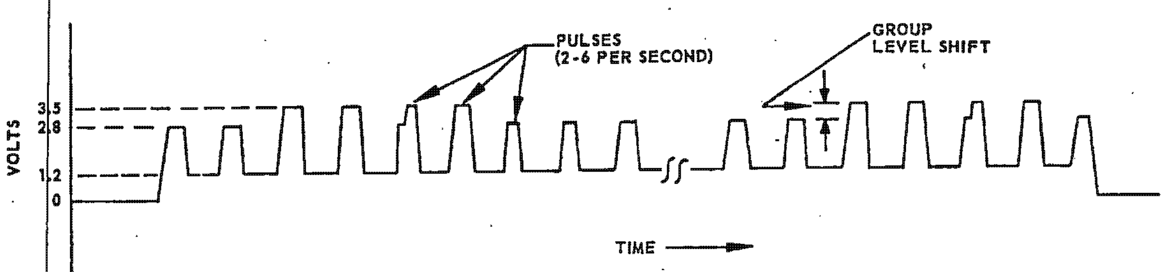
NOTE:

READOUT (a) – COMPARE CHANNEL 8 WAVE TRAIN WITH NOMINAL WAVE TRAIN BELOW. REPORT PRESENCE OR ABSENCE.

READOUT (b) – REPORT THE TIME (±0.5 SEC) OF THE START OF THE WAVE TRAIN AND THE DURATION (±5 SEC) OF THE WAVE TRAIN.

READOUT (c) – REPORT THE ELAPSED TIME (TO THE NEAREST 0.1 SECOND) REQUIRED FOR 100 PULSES COUNTED FROM LEADING EDGE TO LEADING EDGE AFTER AT LEAST 20 PULSES FROM THE WAVE TRAIN START. REPORT THE NUMBER OF GROUP LEVEL SHIFTS WITHIN THIS 100 PULSE PERIOD. DATA ON PASSES 9, 24, AND 39 IS TO BE MADE AVAILABLE AT THE EARLIEST POSSIBLE TIME AFTER ACQUISITION.

CHANNEL 8 (AET 50) WAVE TRAIN



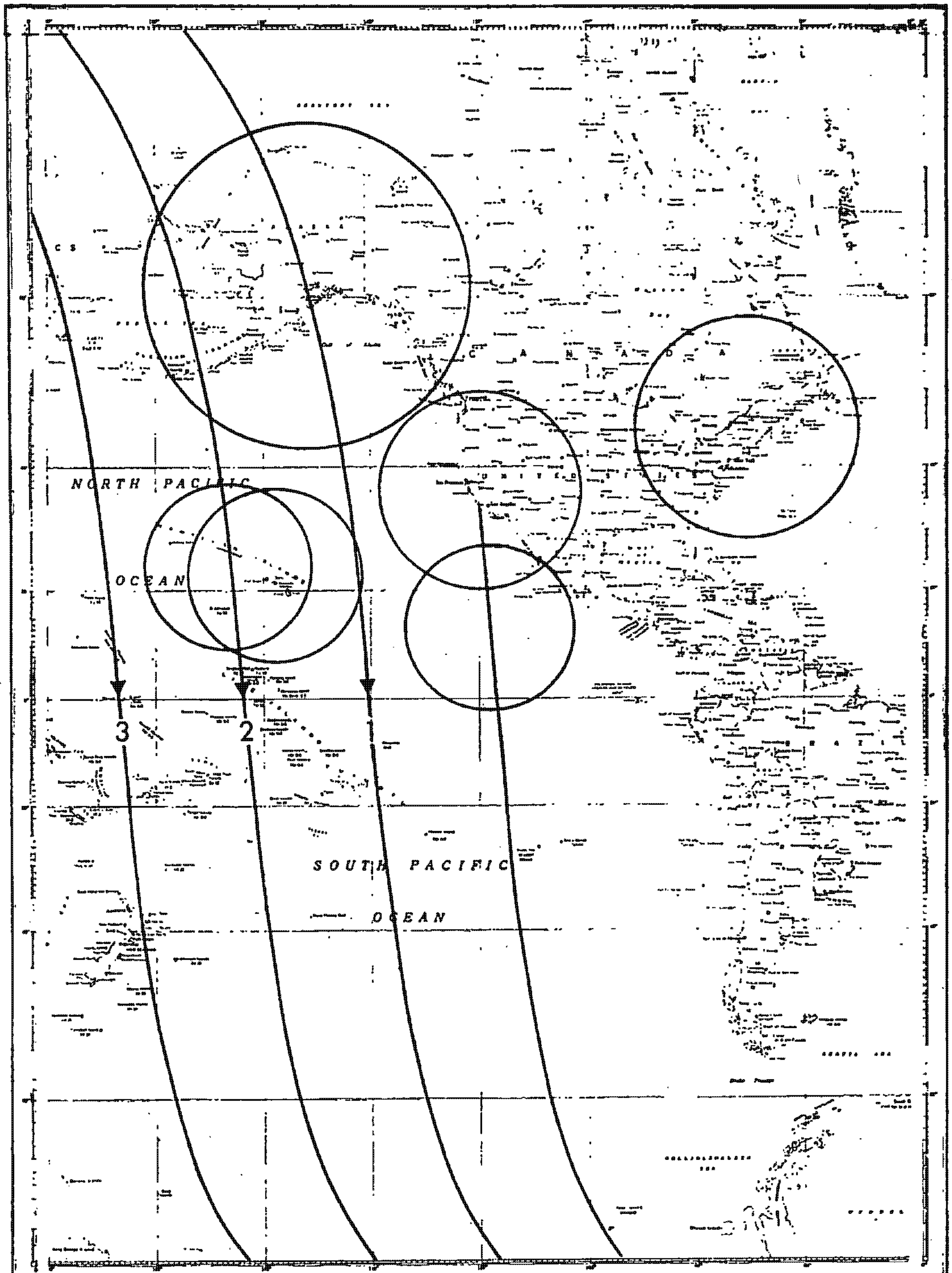


Figure A2-1(a) Nominal Orbit Traces – Passes 1 Through 3

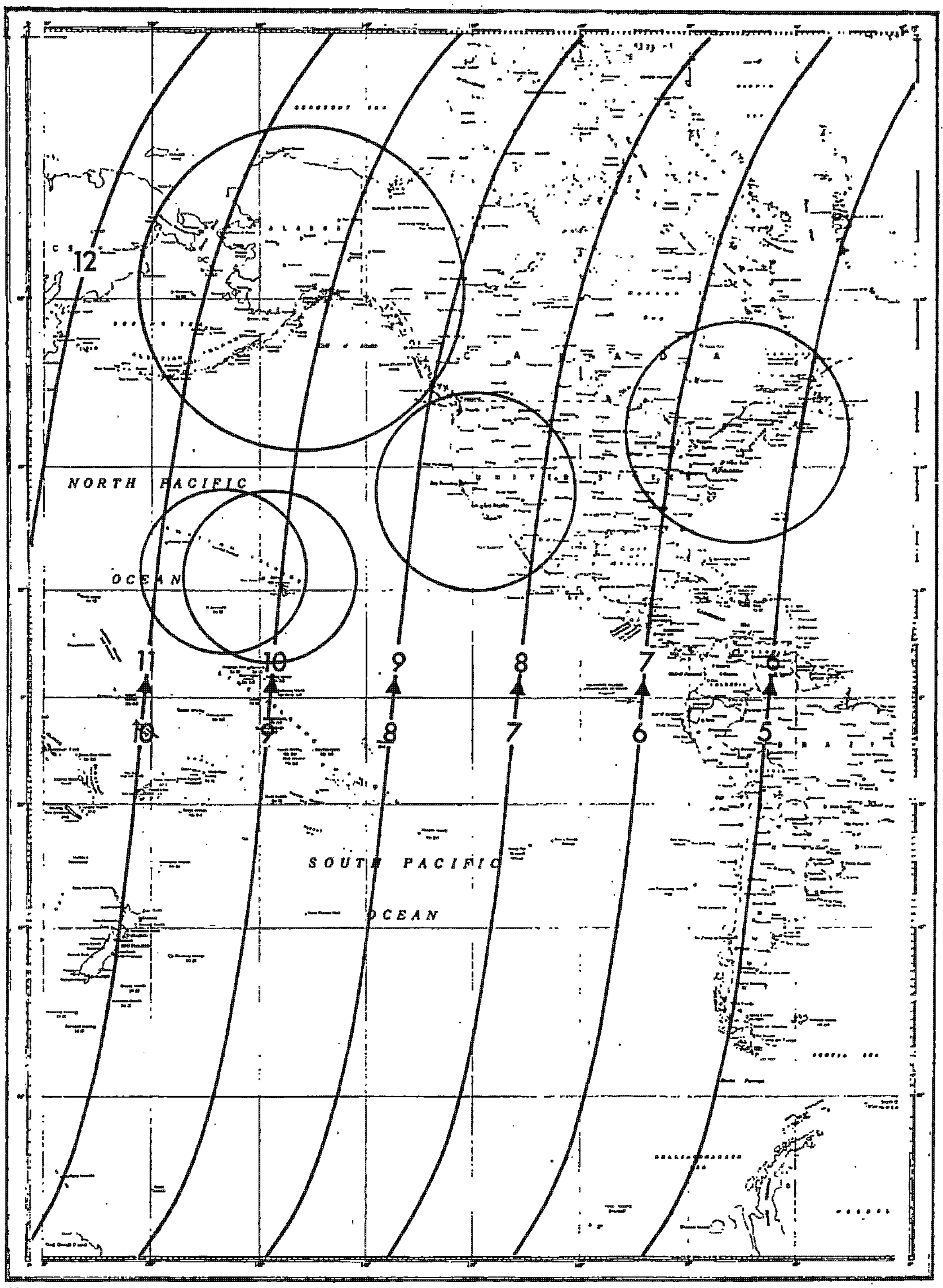


Figure A2-1(b) Nominal Orbit Traces – Passes 5 Through 12

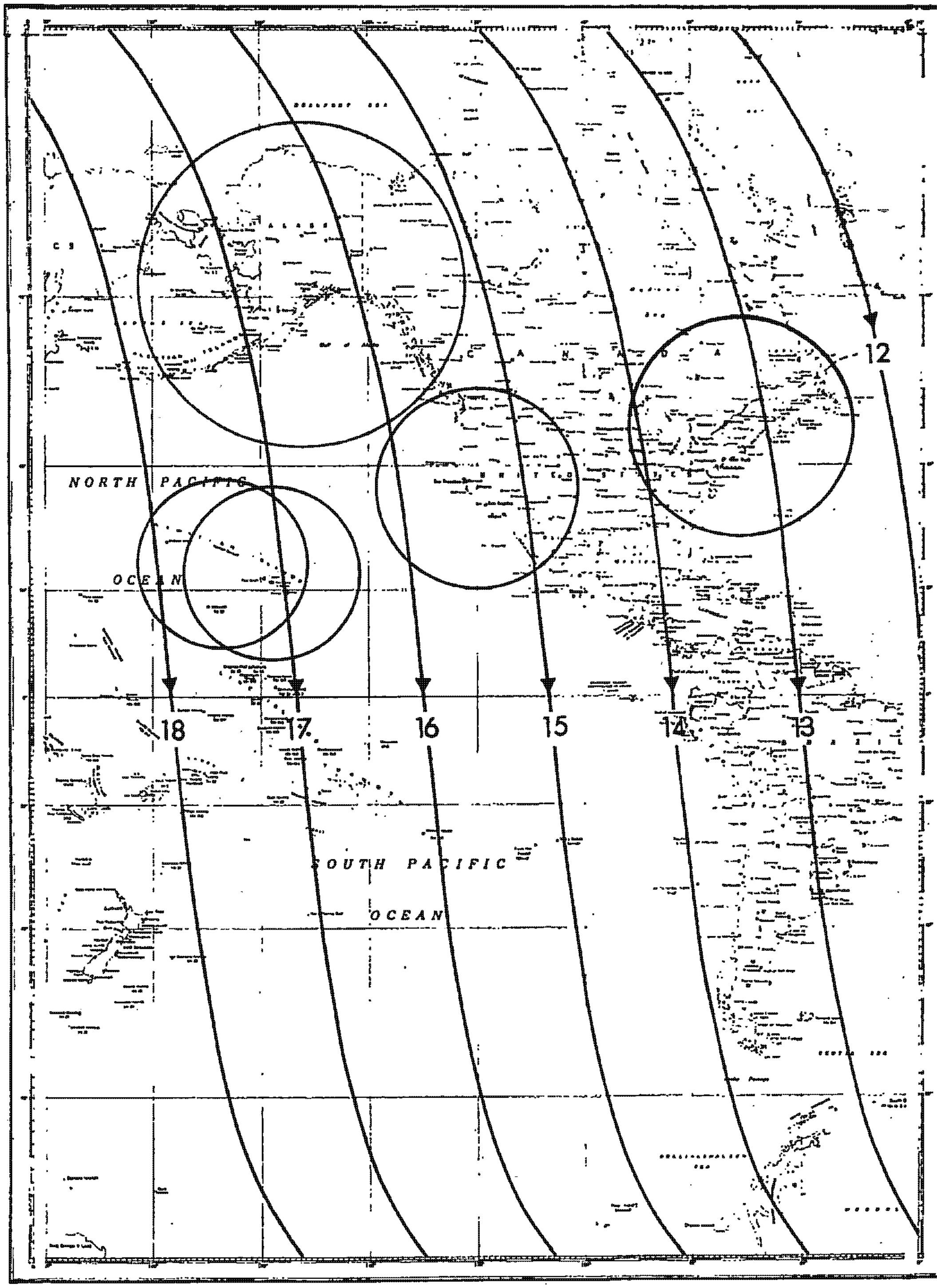


Figure A2-1(c) Nominal Orbit Traces – Passes 12 Through 18

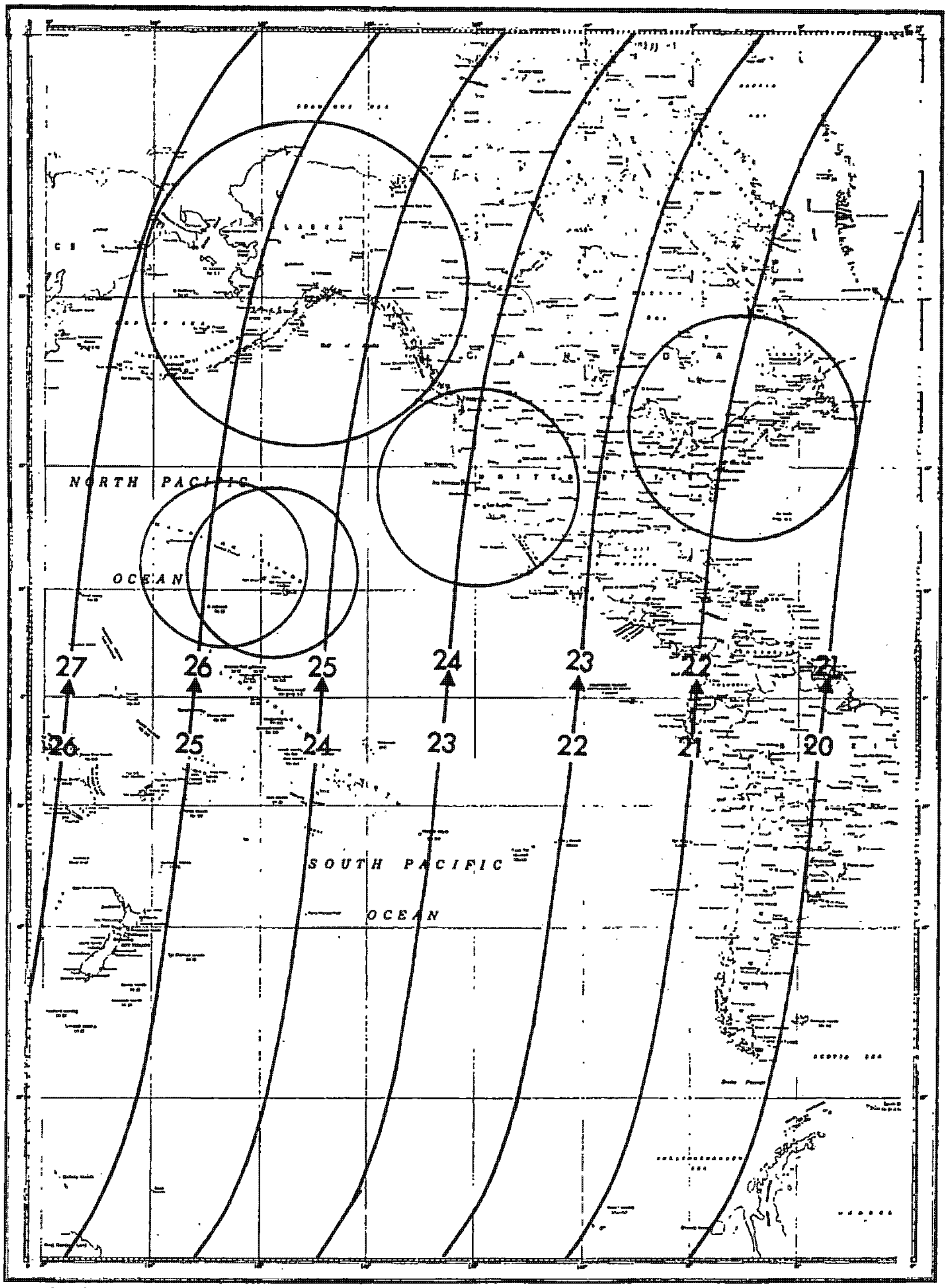


Figure A2-1(d) Nominal Orbit Traces — Passes 20 Through 27

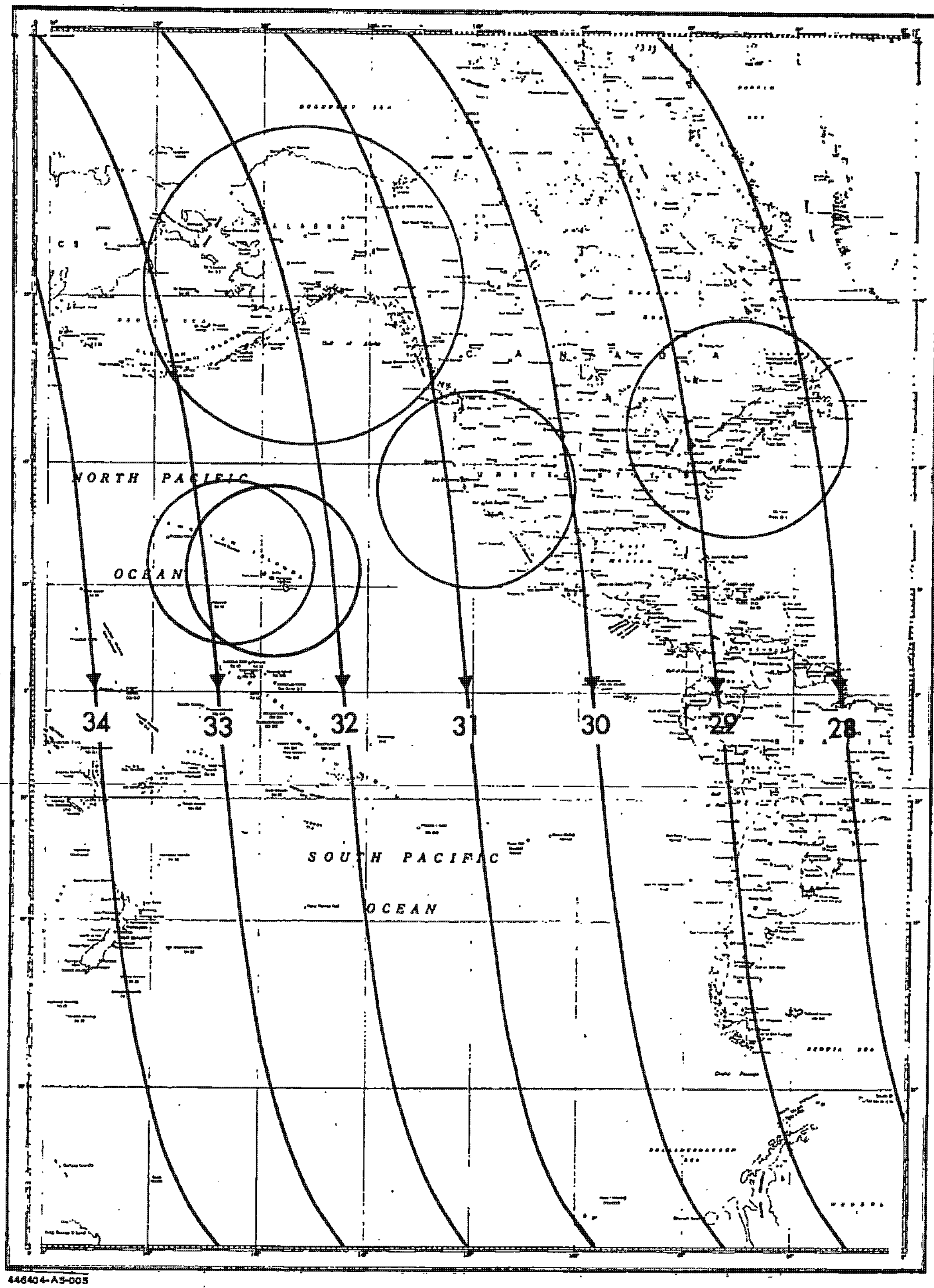


Figure A2-1(e) Nominal Orbit Traces – Passes 28 Through 34

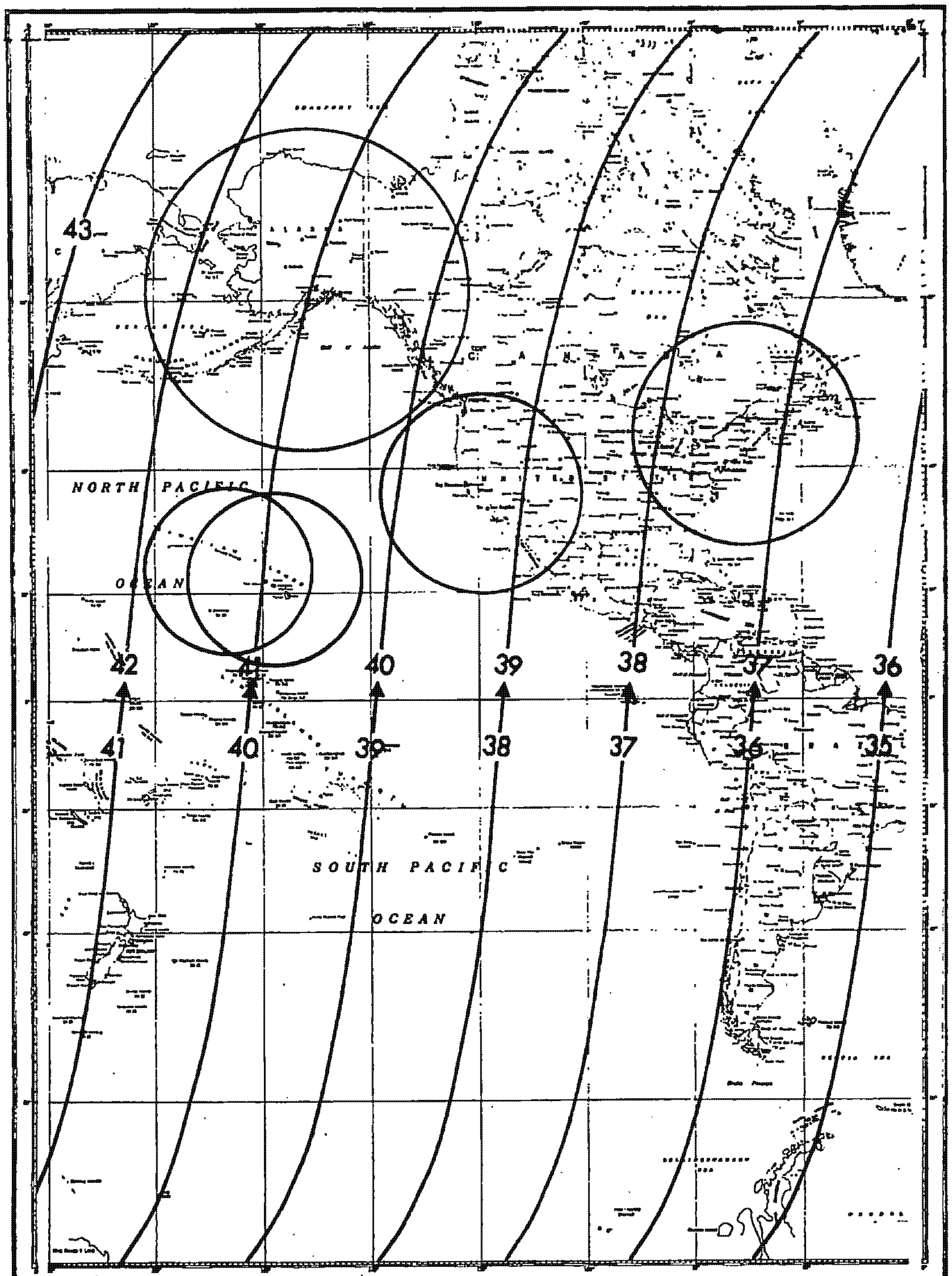


Figure A2-1(f) Nominal Orbit Traces – Passes 35 Through 43

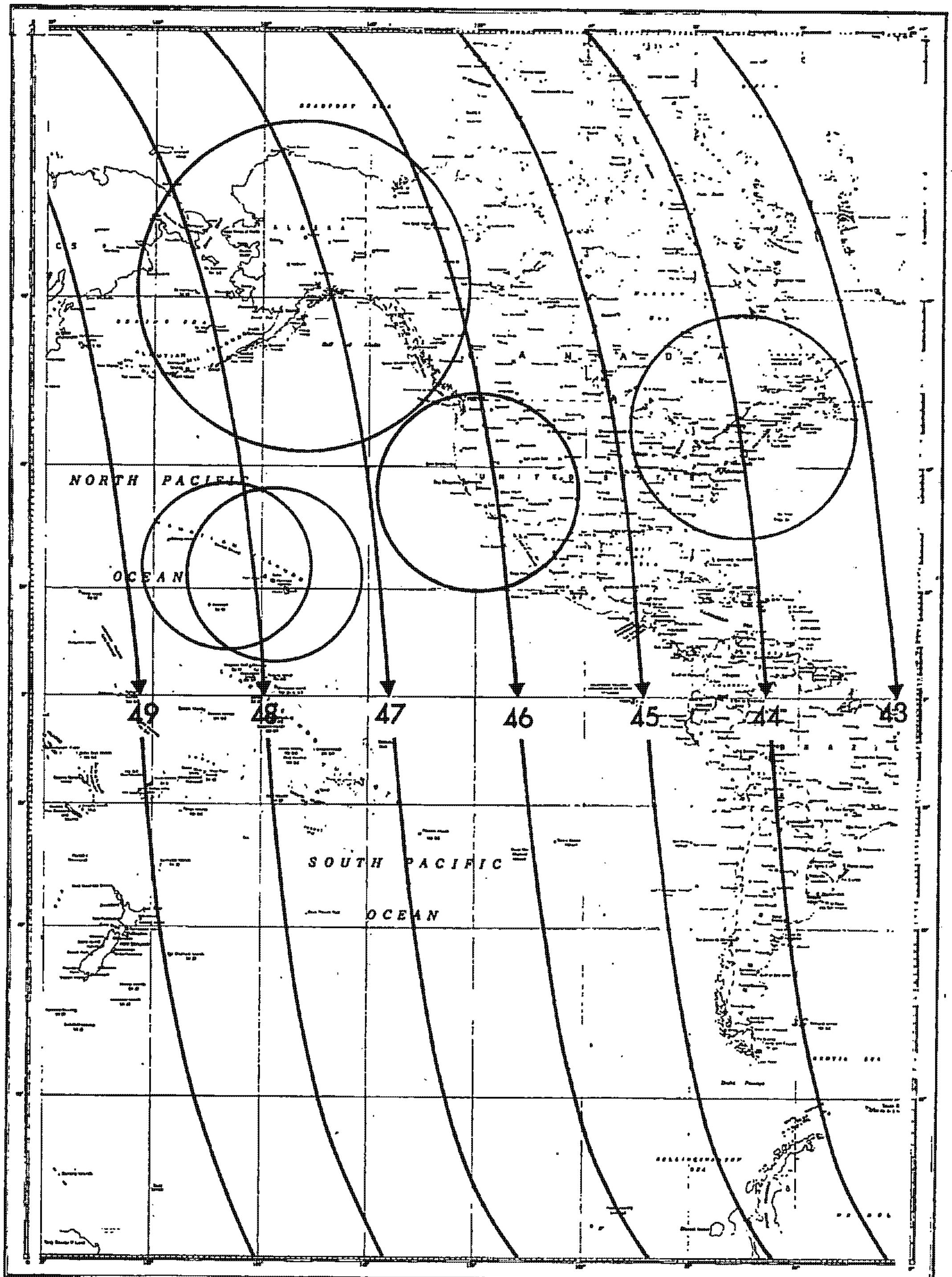


Figure A2-1(g) Nominal Orbit Traces — Passes 43 Through 49

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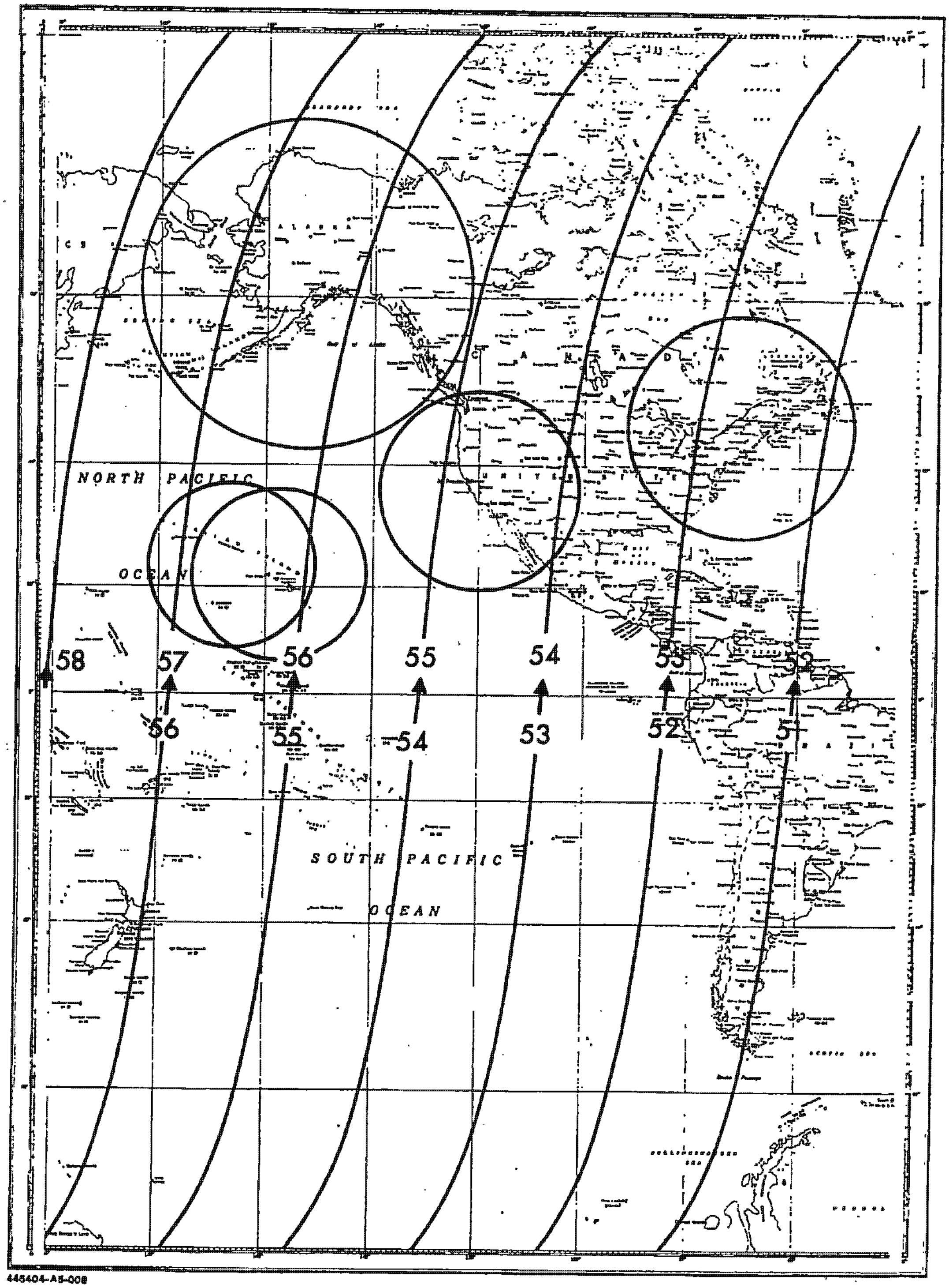

Figure A2-1(h) Nominal Orbit Traces — Passes 51 Through 58

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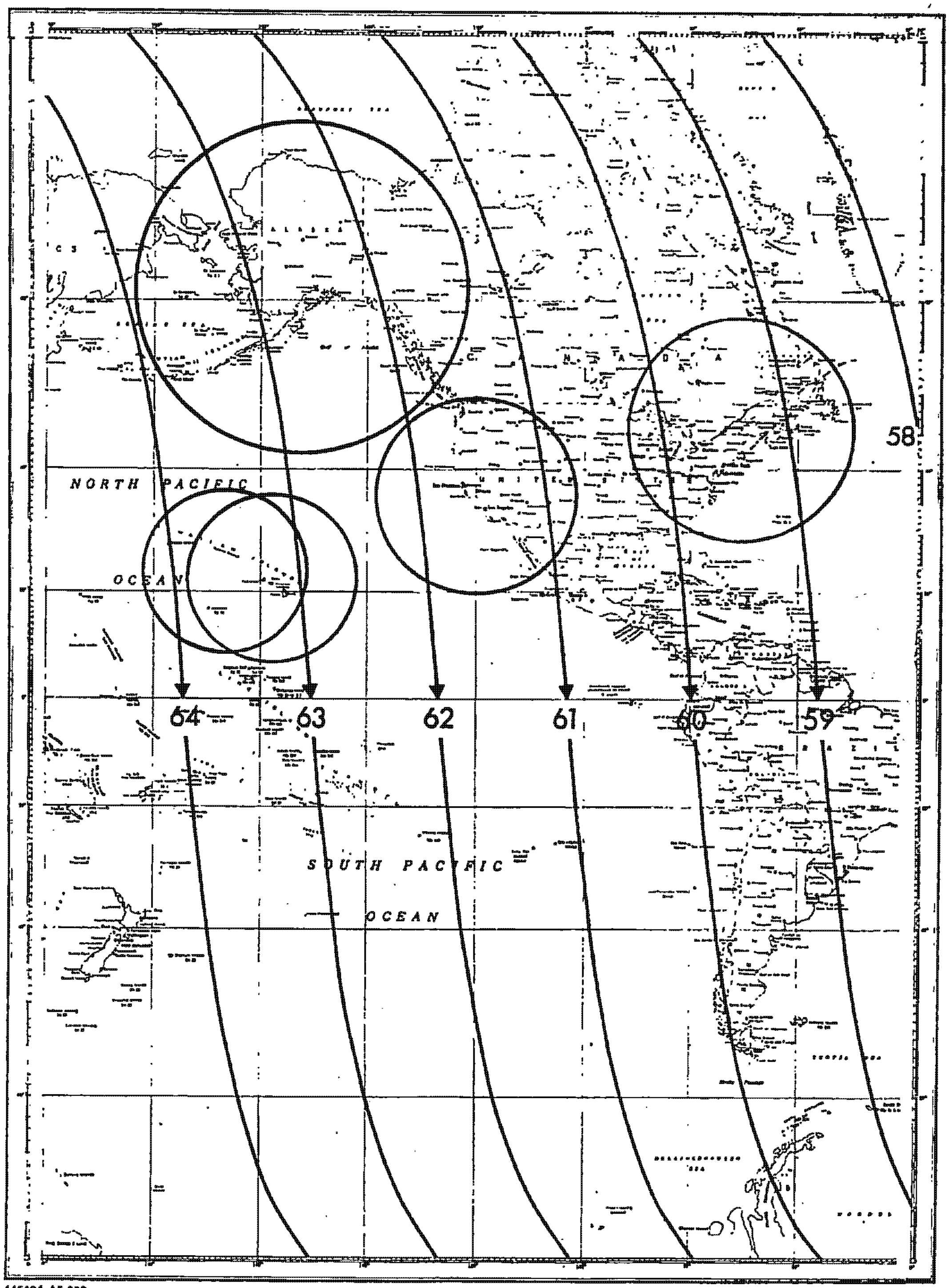

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Figure A2-1(i) Nominal Orbit Traces – Passes 59 Through 64

TYPE OF PASS						
A	B	C	D	E	F	G
STATION						
NHS	VTS	KTS-VTS	KTS-HTS	NHS	VTS	KTS-HTS
PROGRAMMER PASS NUMBER						
ASCENT(20)			1(40)			
			2(60)	6(20)		
				7(40)	8(60)	
					9(80)	10(100)
13(20)		15(40)*				
		16(60)	17(80)*	22(20)	23(40)	
					24(60)	25(80)
						26(100)
28(20)						
29(40)	30(60)	31(80)*	32(100)			
			33(120)*	37(20)		
				38(40)	39(60)	40(80)
						41(100)
44(20)		46(40)*	47(60)			
			48(80)*	52(20)		
				53(40)	54(60)	
					55(80)	56(100)
59(20)		61(40)*				
		62(60)	63(80)**			
			64(100)***	68(20)		
				69(40)	70(60)	71(80)
						72(100)
75(20)		77(40)	78(60)			
			79(80)	83(20)		
				84(40)	85(60)	
					86(80)	87(100)
90(20)	92(40)					

NOTE: NUMBER IN PARENTHESIS () SPECIFIES THE TIME IN SECONDS AFTER RESET MONITOR INITIATION AT WHICH THE PROGRAMMER IDENTIFICATION OCCURS.
* PASSES 15, 17, 31, 33, 46, 48, AND 61 PROGRAMMED FOR ALTERNATE RE-ENTRY SELECTION
** PASS 63 PROGRAMMED FOR NORMAL RE-ENTRY
*** PASS 64 PROGRAMMED FOR NORMAL RE-ENTRY AND ALTERNATE RE-ENTRY SELECTION

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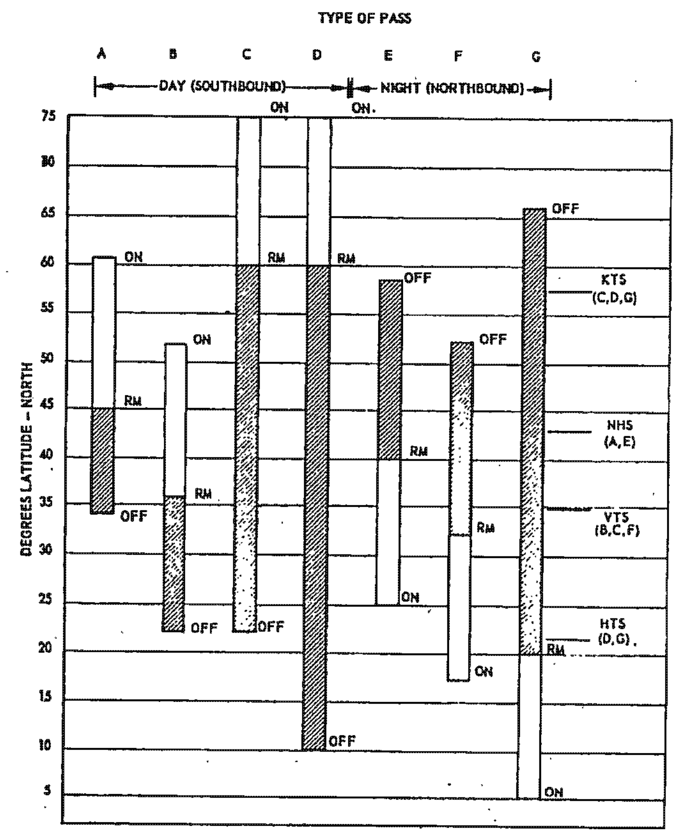

Figure A2-2 Readout and Reset Programming

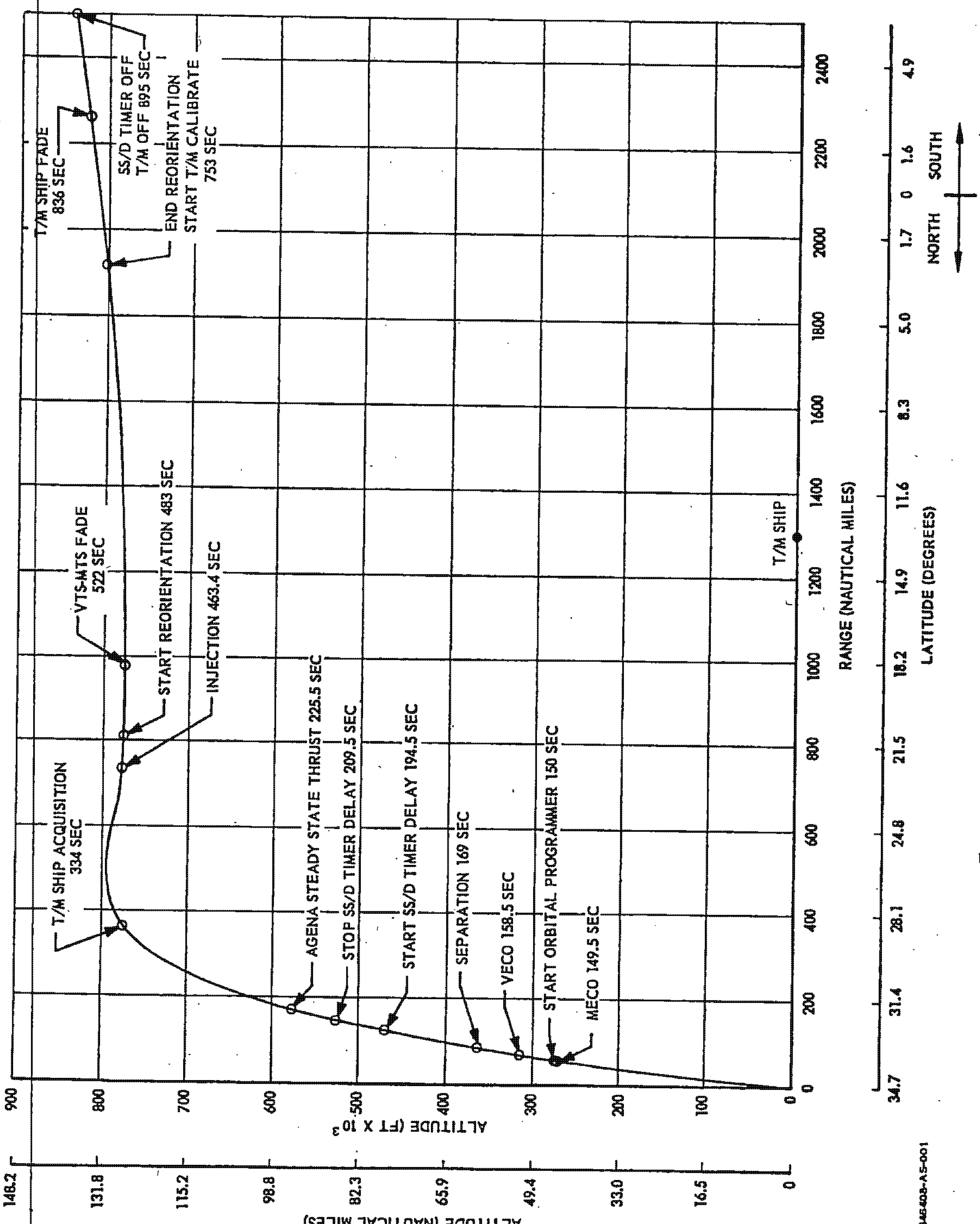

Figure A5-1 Launch Phase Nominal Trajectory

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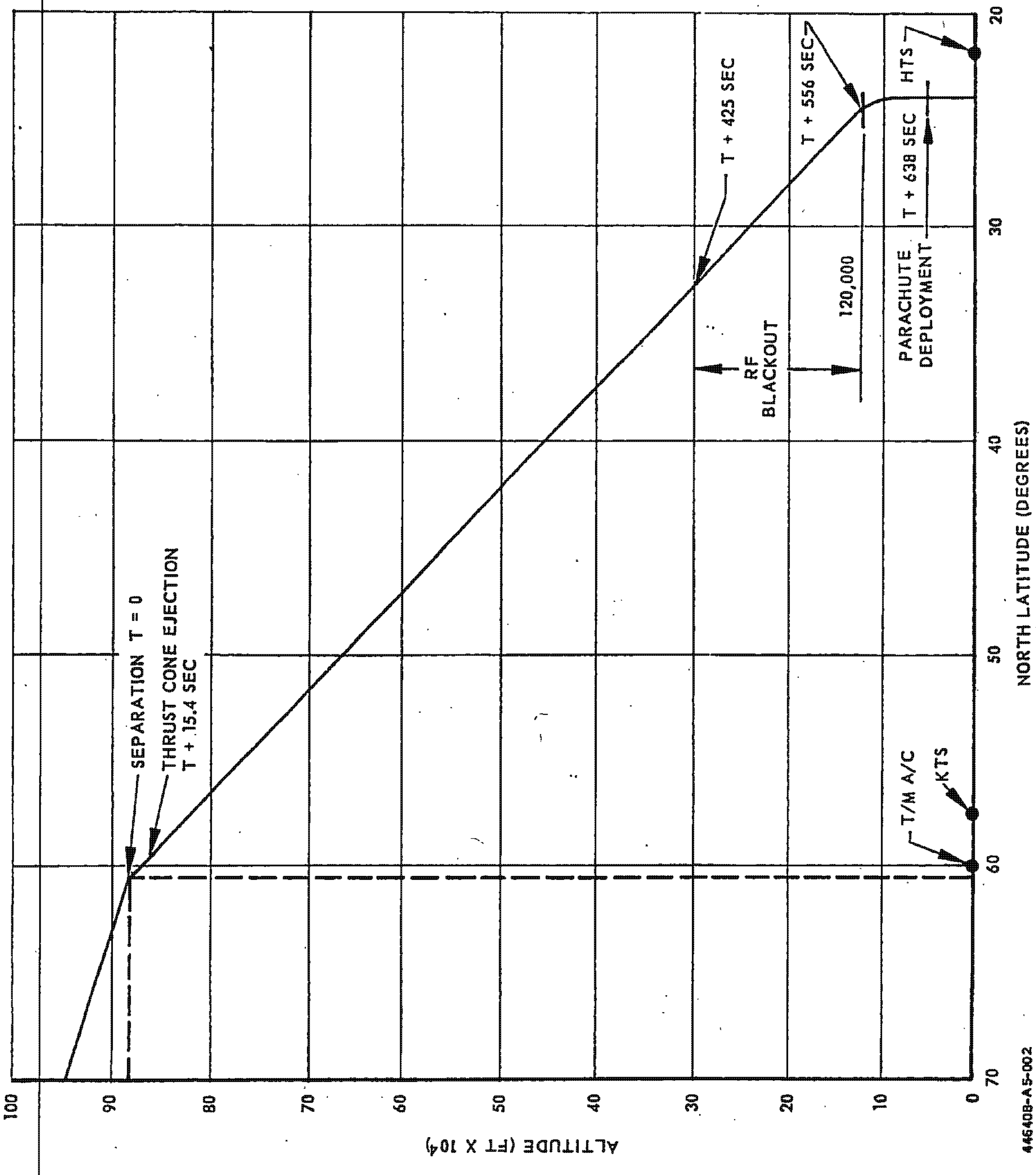

Figure A7-1 Capsule Re-entry Trajectory

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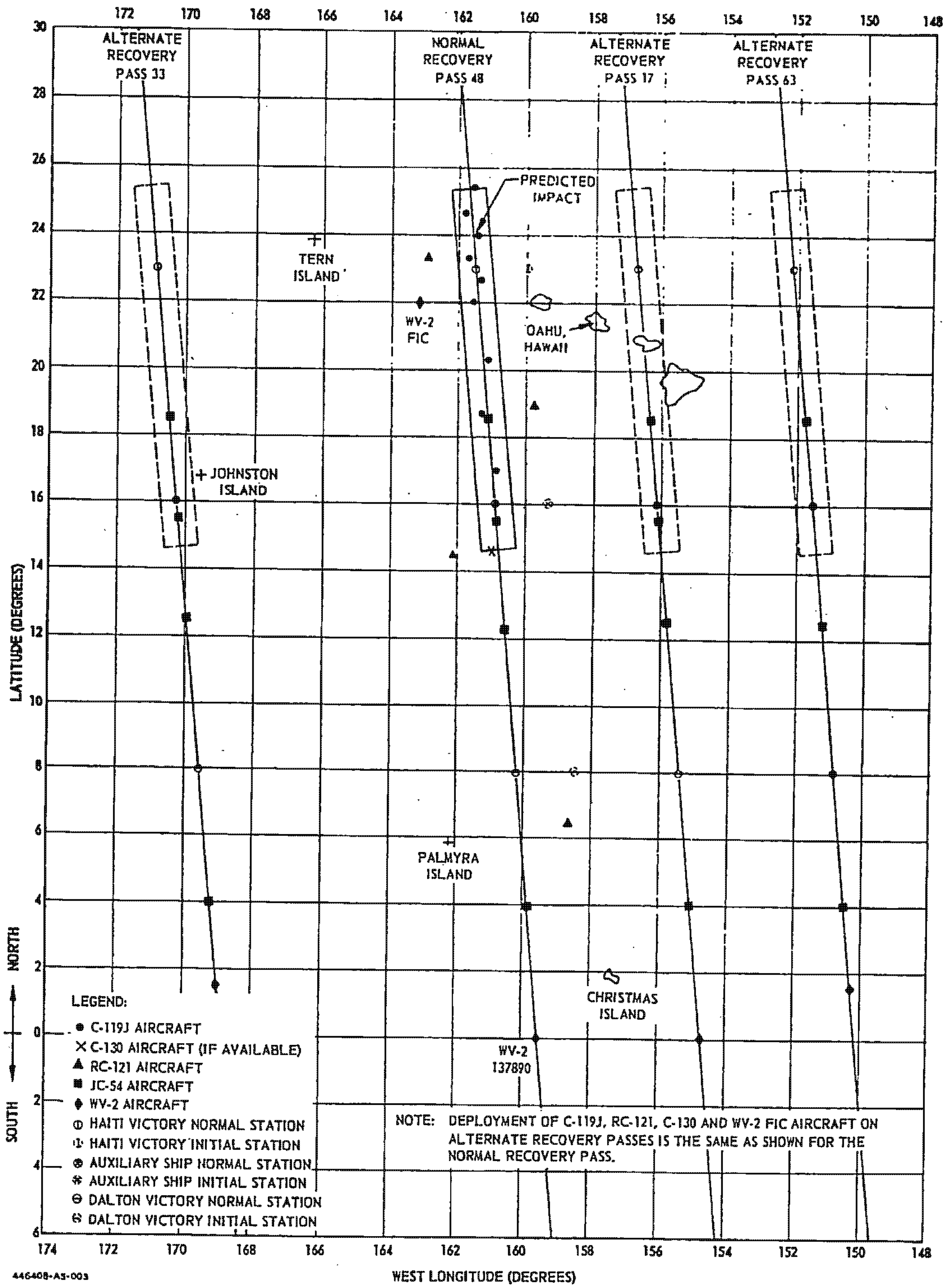

Figure A7-2 Recovery Force Deployment

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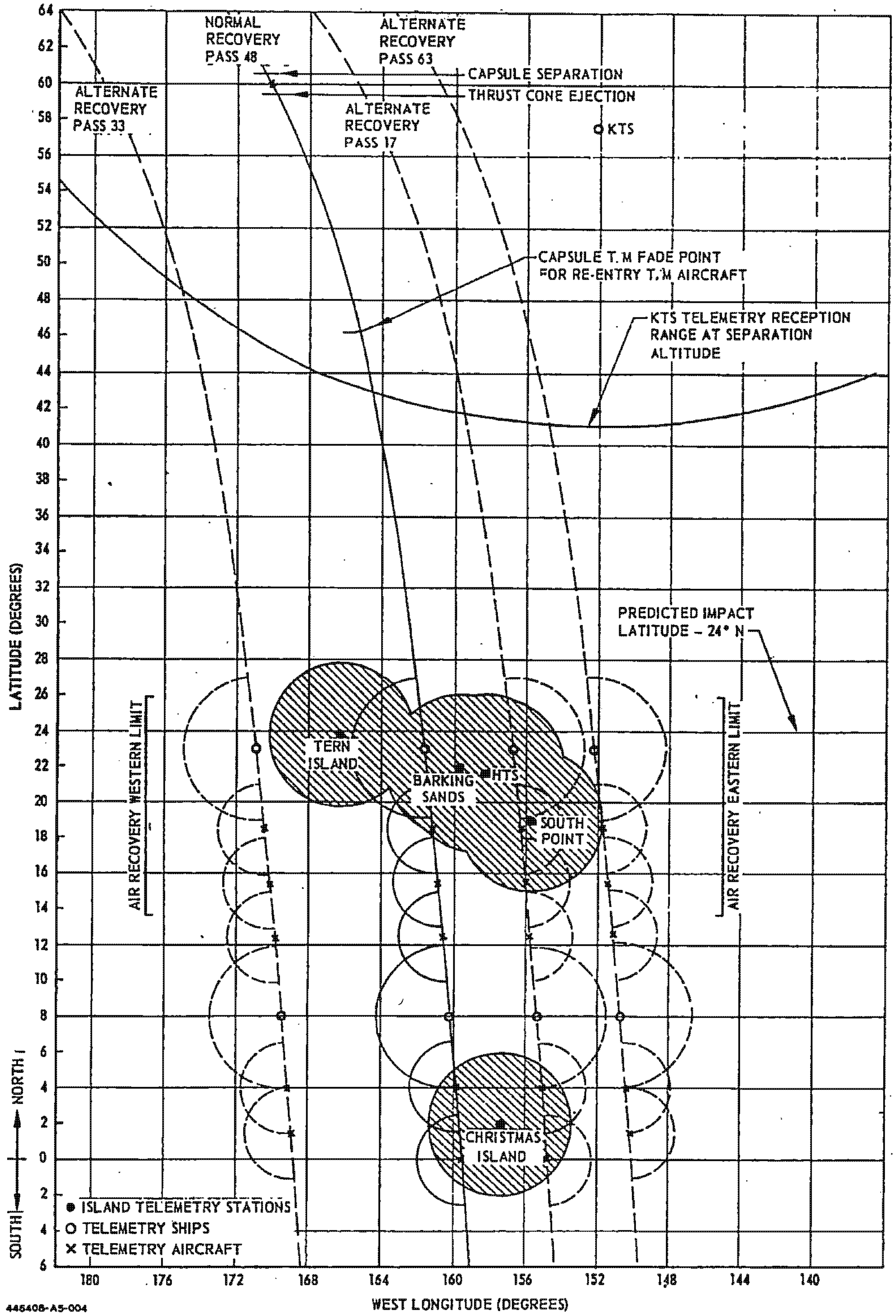

Figure A7-3 Normal and Alternate Re-entry Telemetry Coverage

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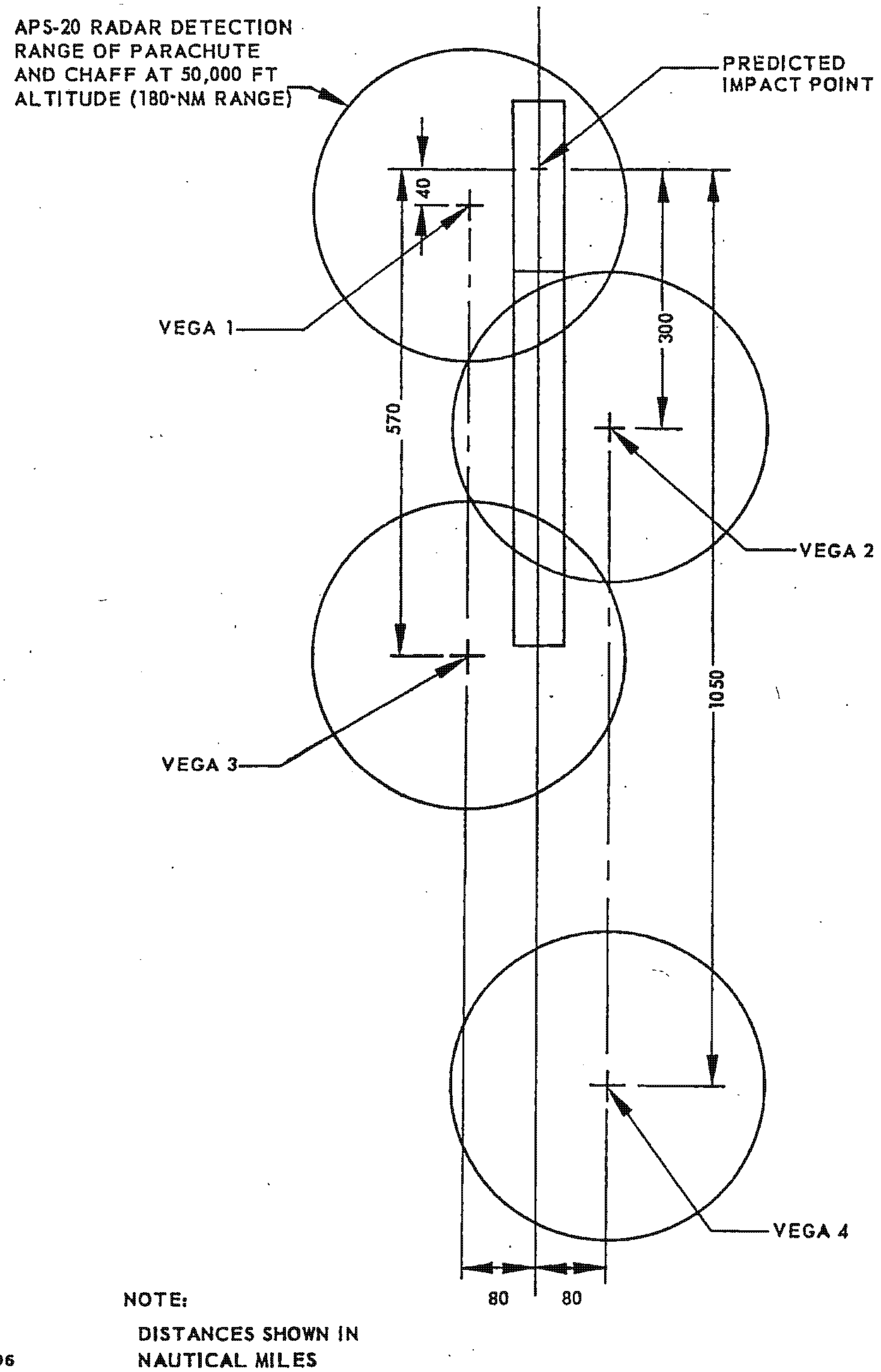

Figure A7-4 RC-121 Aircraft Deployment

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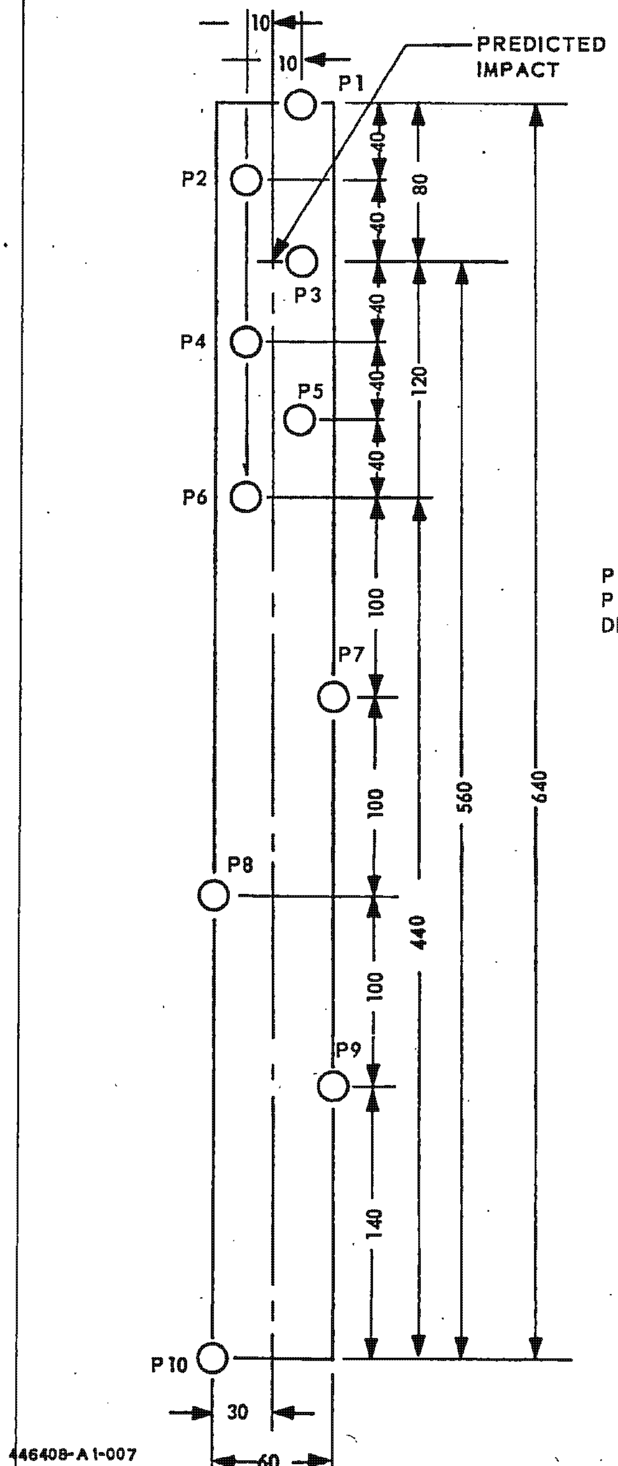


P1 THROUGH P9 ARE C-119 AIRCRAFT
P10 IS C-130 AIRCRAFT
DISTANCES SHOWN IN NAUTICAL MILES

Figure A7-5 Recovery Aircraft Deployment

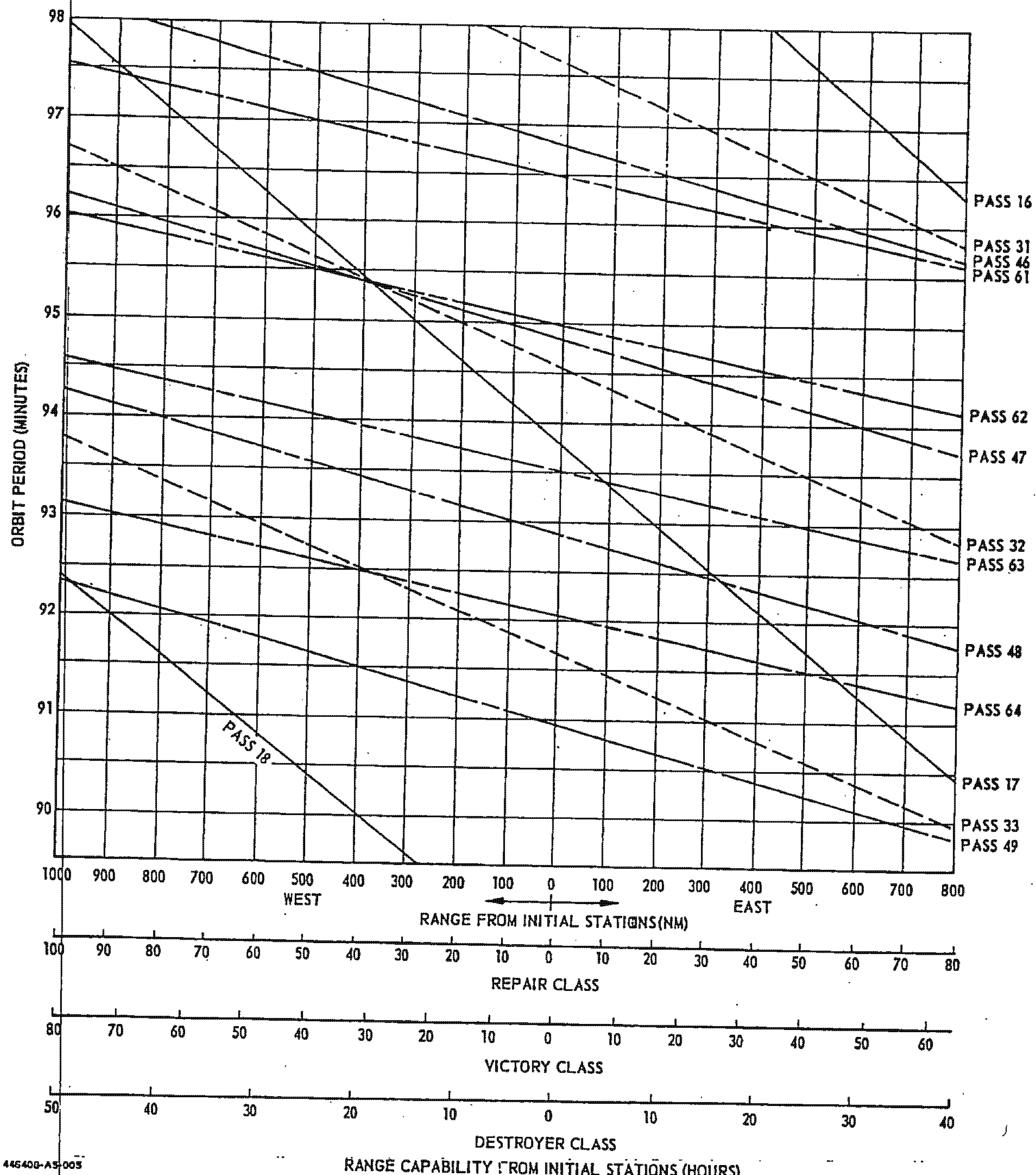


Figure A7-6 Surface Ship Deployment Capability

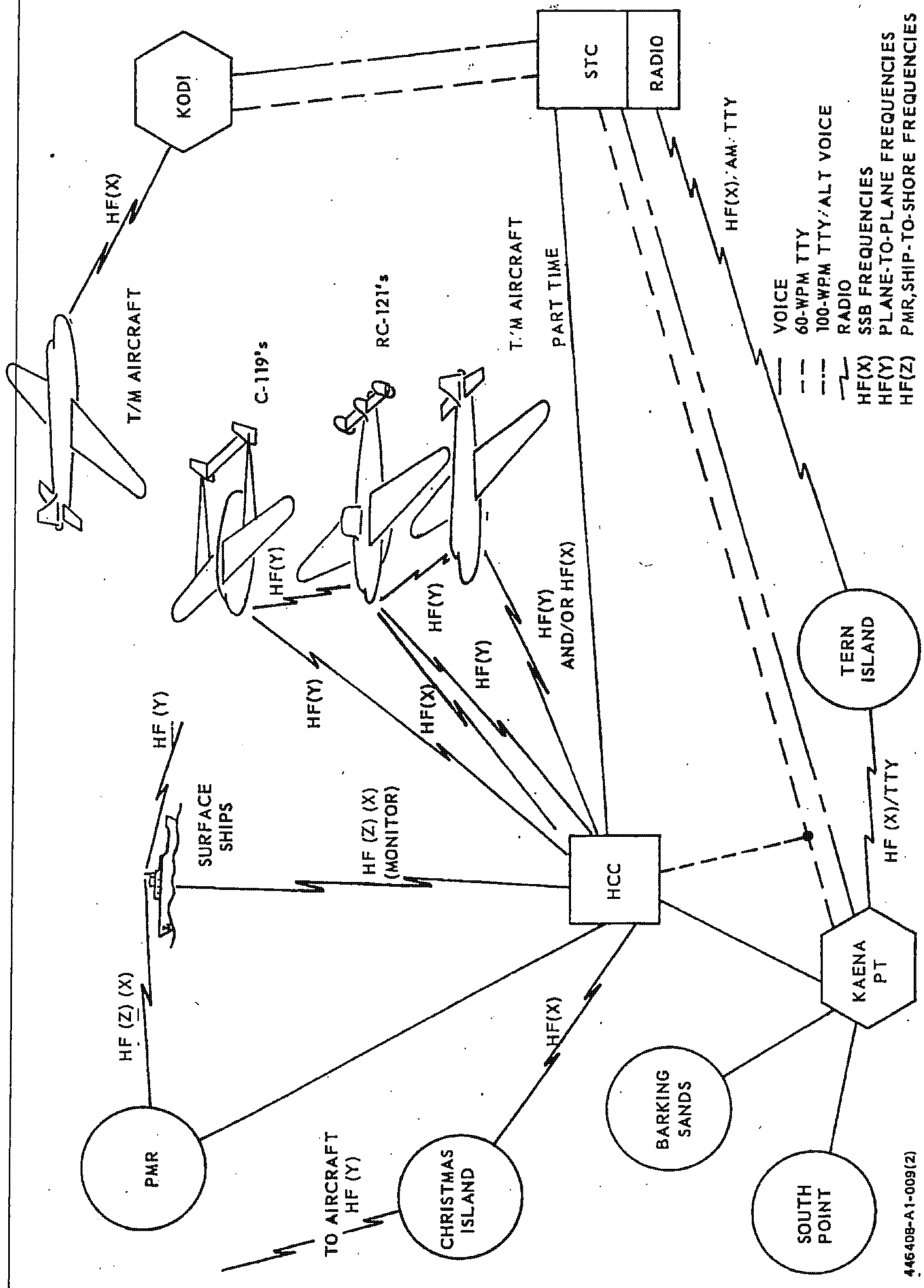


Figure A7-7 Recovery Operations Communications

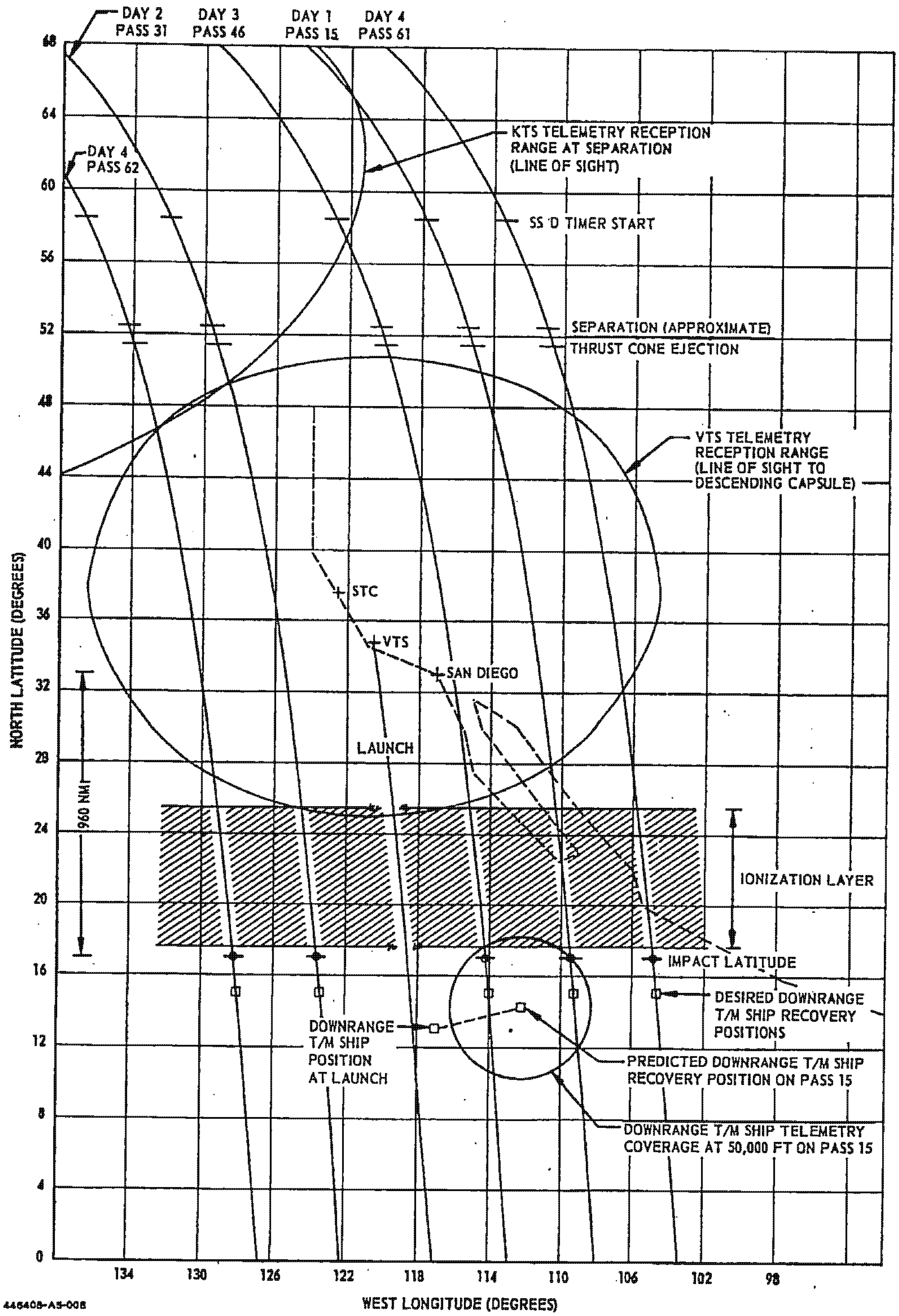


Figure A7-8 Emergency Alternate Re-entry Telemetry Coverage

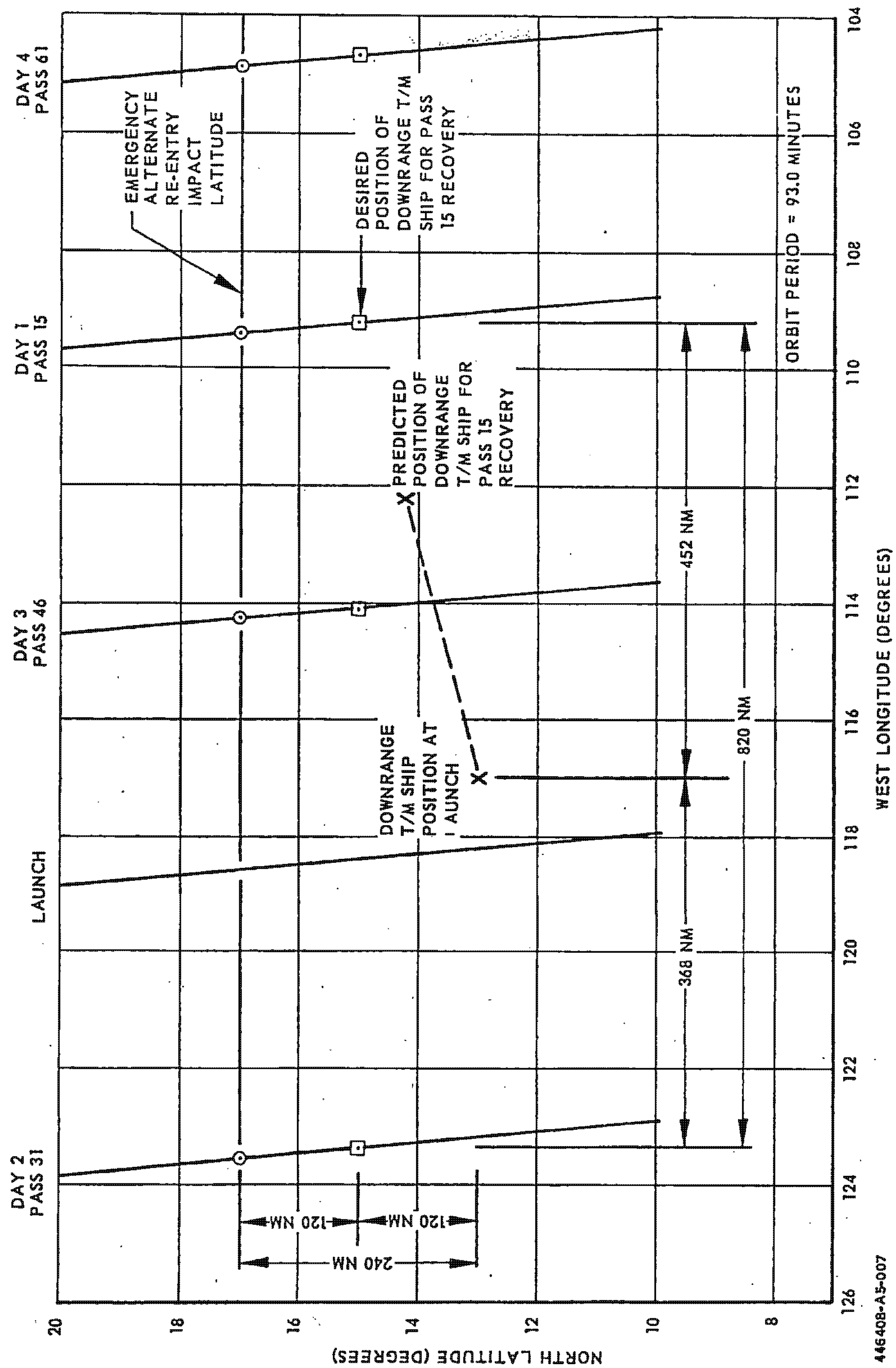


Figure A7-9 Emergency Alternate Re-entry Ship Deployment

LINE	DAY
———	1
— — —	2
—— — ——	3
— - — -	4

NOTES:

1. FOR USE IN EMERGENCY ALTERNATE RE-ENTRY SITUATIONS WHEN RE-ENTRY IS NOT POSSIBLE IN THE HAWAIIAN AREA
2. IMPACT EAST OF 106° WEST LONGITUDE IS NOT RECOMMENDED BECAUSE OF THE POSSIBILITY OF IMPACT IN MEXICO (SEE FIGURE A7-8)

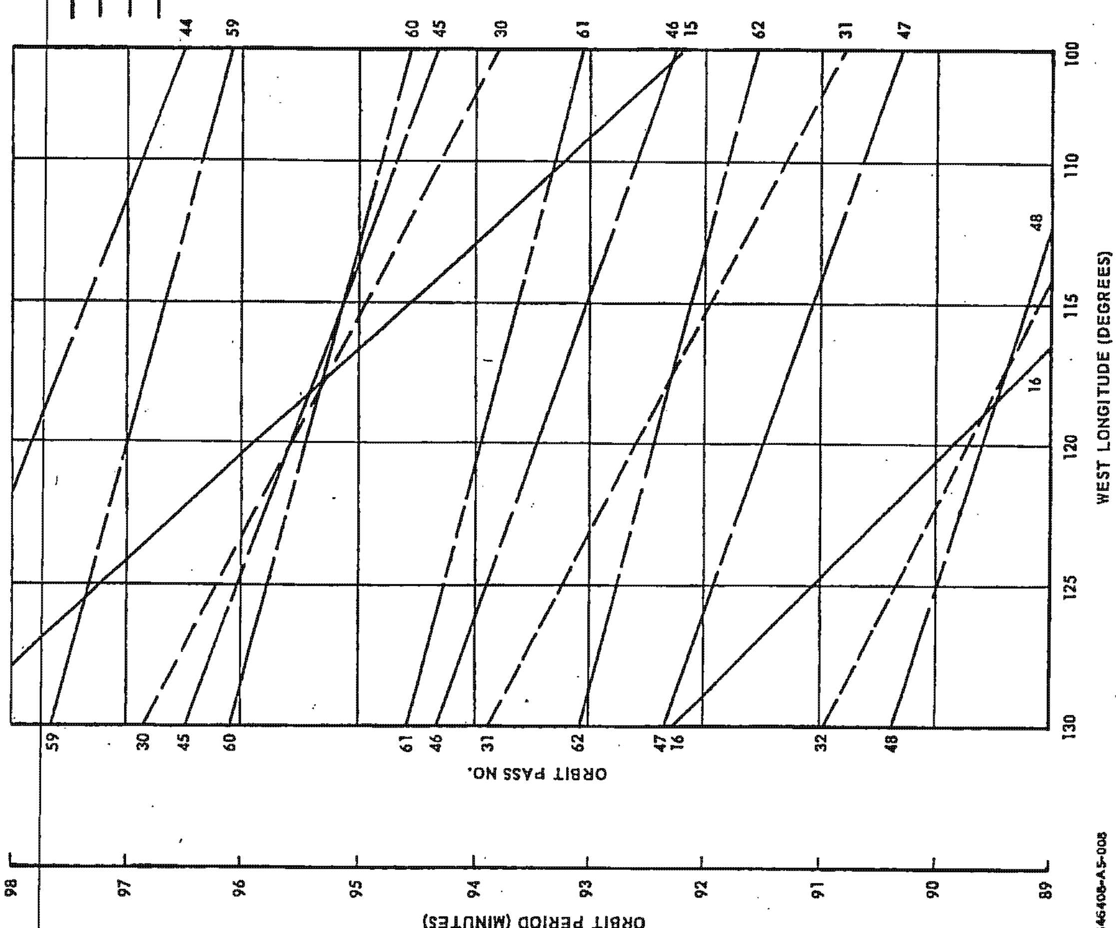
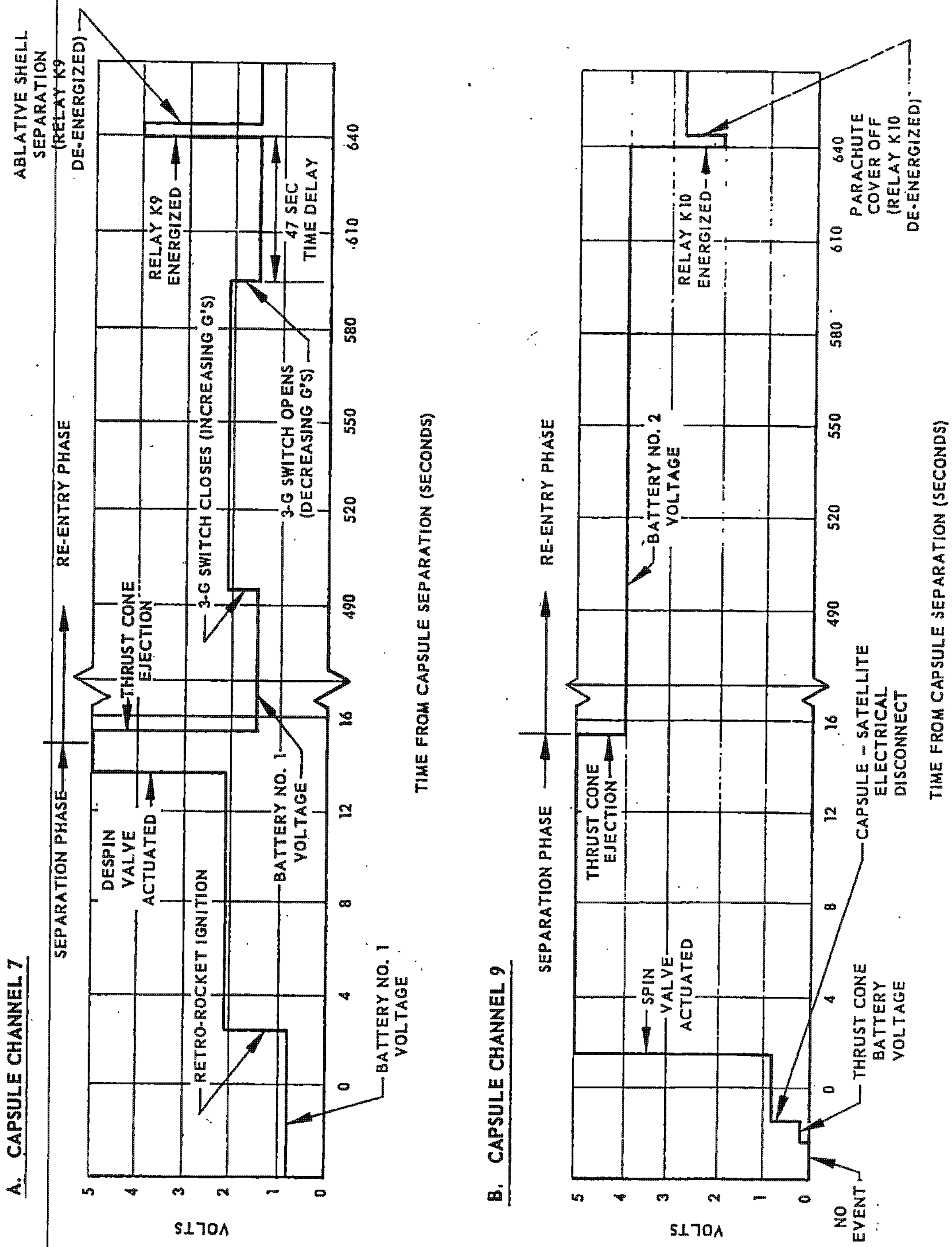


Figure A7-10 Recovery Longitude versus Orbit Period at 17°N Latitude



NOTE: VALUES SHOWN INDICATE NOMINAL SEQUENCE OF EVENTS. CONSULT T/M CALIBRATION DATA FOR VOLTAGE LEVELS WHICH WILL OCCUR IF SEQUENCE OF EVENTS IS NOT NORMAL. REFER TO SECTION 7.5 FOR SEQUENCE OF EVENTS DESCRIPTION

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Figure A8-1 Nominal Capsule Telemetry Voltage Levels