Bendix
Aerospace Systems Division

HANDLING, PACKAGING, TRANSPORTATION AND STORAGE OF ALSEP ARRAY E FLIGHT HARDWARE AND SUPPORT EQUIPMENT

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This document outlines the general methods utilized to achieve the ALSEP Array E requirements related to preservation, packaging, handling, storing and shipping.

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FIGURES

TABLES

1.0 PURPOSE

The purpose of this report is to outline and document the general methods utilized to achieve the ALSEP Array E requirements related to preservation, packaging, handling, storing, and shipping (PPHSS).

2.0 SCOPE

This report covers packaging, handling, shipping and storage of the various ALSEP components including subpackage no. 1, subpackage no. 2, fuel transport module, system test set, LSP E&SA test set, and major level "A" spares. The report defines how these requirements are achieved during in-house manufacturing and test, preparation of equipment for shipment to KSC, and receipt and handling of ALSEP hardware at KSC. The basic approach in satisfying the requirements has been to hand carry flight hardware in specially designed containers which are packaged in accordance with the applicable preservation, packaging, handling, shipping and storage procedures. The details as they pertain to each hardware item are included herein.

3.0 MANUFACTURING AND IN-HOUSE TESTING

All flight hardware is subjected to special handling requirements during manufacture and test. These requirements are specified in each applicable Work Order Operation Sheet (WOOS) or test procedure (TP). In addition, packaging, transportation, and handling requirements have been established for special subcontracted assemblies used in various experiments and central electronics; Table 3-1 lists test procedures prepared specifically to achieve these ALSEP requirements. Figures 3.1, 3.2, and 3.3 show the flow of subcontracted assemblies that are used on ALSEP Array E; these illustrations describe origin and destination of hardware, packaging method, and mode of transportation.

3.1 Lunar Ejecta and Meteorite Experiment (LEAM)

The LEAM contains three subcontracted items of hardware, namely, central electronics, three sensor assemblies, and parylene film; all items are commercially packed and hand carried to BxA. The central electronics and sensor assemblies are purchased from Time Zero, and the parylene film is obtained from Union Carbide. The LEAM Parylene Film Handling Procedure (TP 2347064) covers the handling of this film prior to LEAM assembly; subsequently during manufacture and test the LEAM Handling Procedure (TP 2365349) covers the handling of the instrument.

PRESERVATION, PACKAGING, HANDLING, STORING AND SHIPPING (PPHSS) PROCEDURES AND HANDLING PROCEDURES

TABLE 3-1

TP 2337169	Pressurizing Procedure for ALSEP Flight Hardware Shipping Container
TP 2337170	Installation into Shipping Container and Preparation of Recording Thermometer
TP 2337171	Installation into Shipping Container and Preparation of Impact-O-Graph
TP 2337174	PPHSS Instructions for ALSEP Flight Fuel Cask Mounting Structure
TP 2337175	PPHSS Instructions for the Diplexer Filter, Diplexer Switch and RF Cable (Level "A" Spares)
TP 2337176	PPHSS Instructions for the Command Receiver and RF Cable (Level "A" Spare)
TP 2337177	PPHSS Instructions for the Transmitter and RF Cable (Level "A" Spare)
TP 2337178	PPHSS Instructions for the Aiming Mechanism and Helical Antenna (Level "A" Spare)
TP 2337185	PPHSS Instructions for the Central Station Timer (Level "A" Spare)
TP 2337193	PPHSS Instructions for the Heat Flow Experiment Subsystem (Level "A" Spare)
TP 2338187	ALSEP Heat Flow Experiment Handling Procedure

Table 3-1 (Cont'd)

TP 2365349	ALSEP Program LEAM Handling Procedure
TP 2365374	LSP Central Electronics Handling Procedure
TP 2365375	LSP Explosive Package and LSP Explosive Package Transport Module Handling Procedure
TP 2365376	LSP Geophone Module Package Handling Procedure
TP 2365508	ALSEP Program LMS Handling Procedure
TP 2365529	LSG Handling Procedure
TP 2368913	PPHSS Instructions for the Lunar Surface Gravimeter
TP 2368914	PPHSS for Equipment to Build the LEAM and the LEAM Flight System Hardware
TP 2368915	PPHSS Instructions for the Explosive Package Transport Module Flight Hardware
TP 2368916	PPHSS Procedure for the Lunar Mass Spectrometer (LMS)
TP 2368924	PPHSS Instructions for Data Processor (Level "A" Spare)
TP 2368926	PPHSS Instructions for ALSEP Flight System Hardware
TP 2368945	LSP Transmitter and Cable Reel Handling Procedure
TP 2368962	PPHSS Instructions for the Command Decoder (Level "A" Spare) Array E
TP 2368963	PPHSS Instructions for the PCU/PDU Assembly (Level "A" Spare) Array E

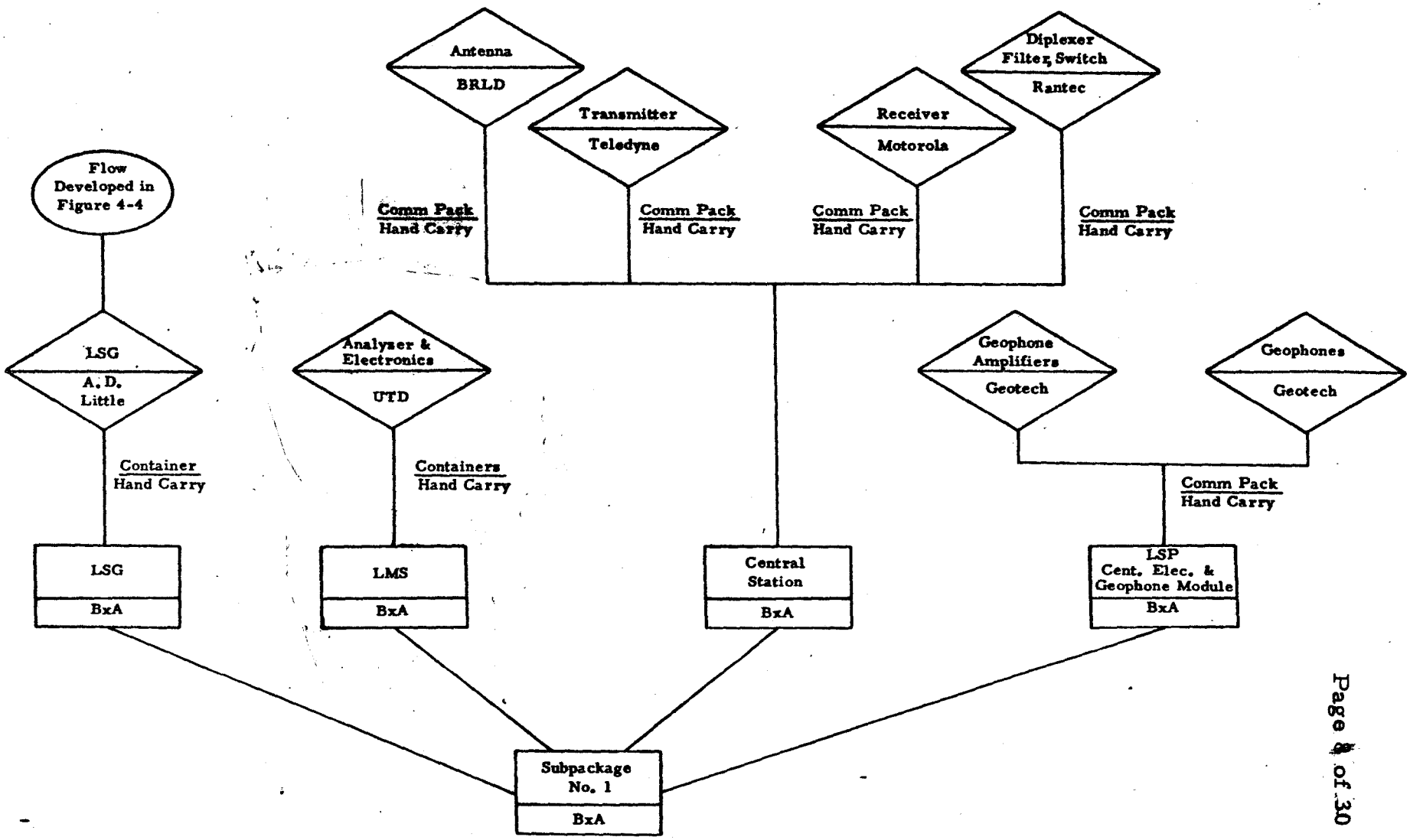

FIGURE 3-1 TRANSPORTATION FLOW OF ARRAY E SUBPACKAGE NO. 1 ASSEMBLIES

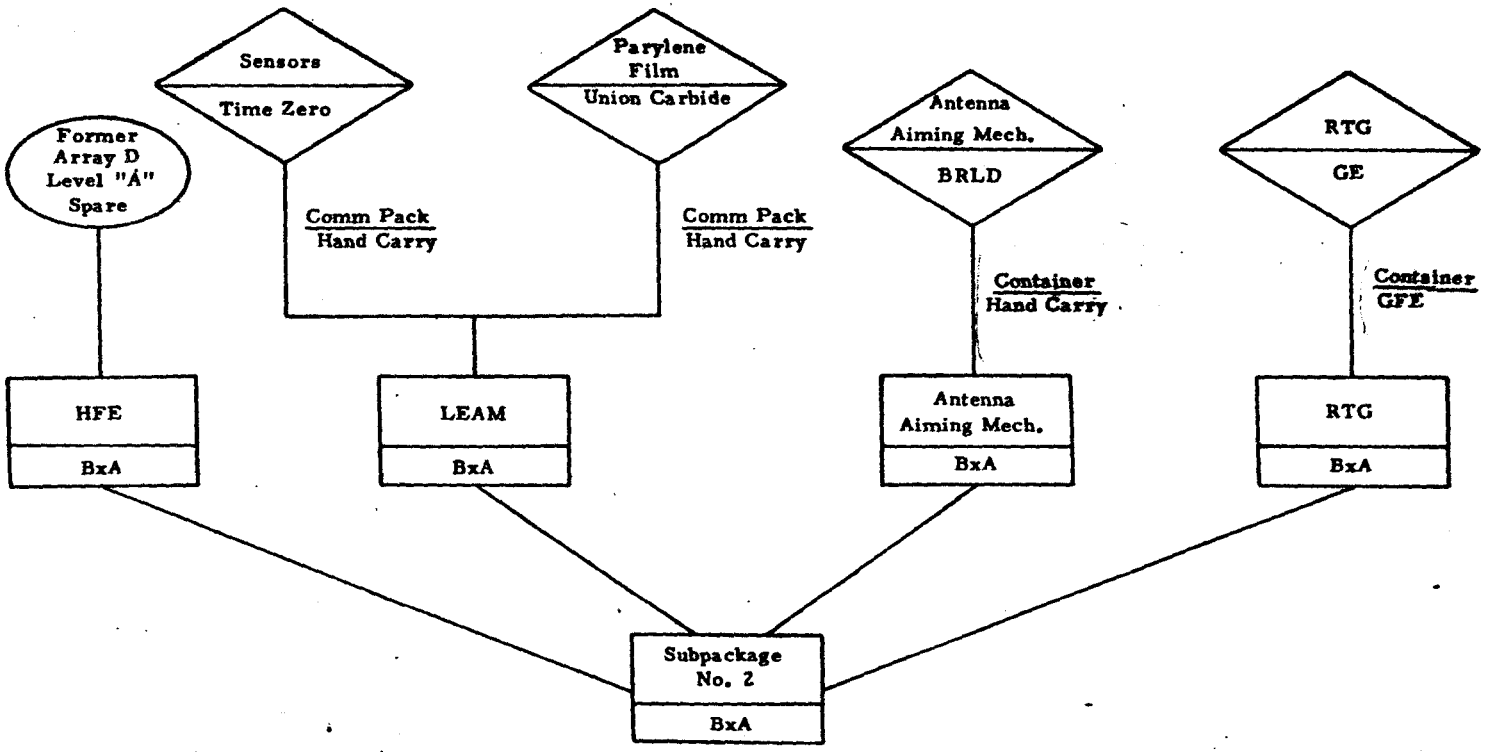

FIGURE 3-2 TRANSPORTATION FLOW OF ARRAY E SUBPACKAGE NO. 2 ASSEMBLIES

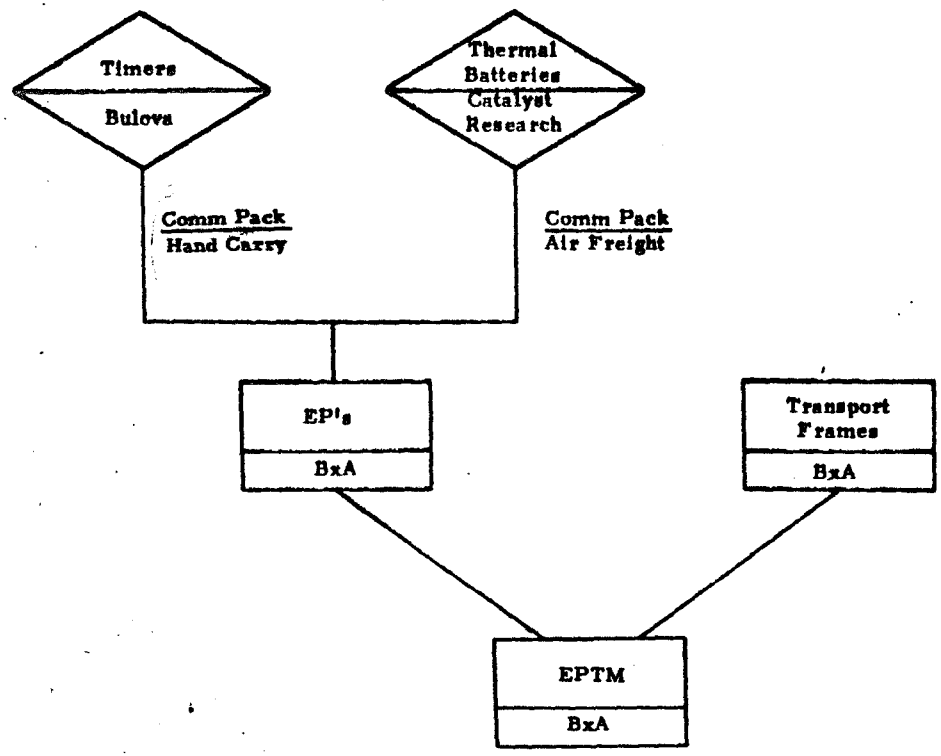

FIGURE 3-3 TRANSPORTATION FLOW OF ARRAY E EPTM ASSEMBLIES

3.2 Lunar Surface Gravimeter (LSG)

The LSG is built to various stages by two subcontractors, namely, La Coste & Romberg and Arthur D. Little and by BxA. Figure 3.4 depicts the flow during manufacture and test. This process is as follows:

a) A.D. Little ships the Heater Box subassembly (1) to Bendix and also ships two thermistors to La Coste & Romberg (2) through Bendix, to be assembled on the sensor.

b) Bendix assembles the temperature controller/monitor assembly and the fixed gain preamp to the Heater Box Subassembly and then ships this subassembly to La Coste & Romberg (3).

c) La Coste & Romberg installs their sensor into the Heater Box/ Electronics Subassembly. It is tested and calibrated prior to shipping to Bendix (4).

d) On receipt of the Heater Box assembly from La Coste & Romberg, Bendix assembles the encoder electronics and assembles this to the instrument housing cover received from A.D. Little (5). Testing is then performed prior to shipping to A.D. Little (6).

e) A.D. Little assembles the sensor package and tests. They receive the Electronics Package from Bendix (7) and perform a test on the combined assembly. Subsequently, A.D. Little completes the LSG assembly (including the Bendix supplied Bubble Level (8)) and performs tests on the LSG prior to shipping to Bendix (9).

f) Bendix then prepares the LSG for installation on Subpackage No. 1 for shipment to KSC.

After shipment to BxA, the flight experiment is handled in accordance with TP 2365529, LSG Handling Procedure.

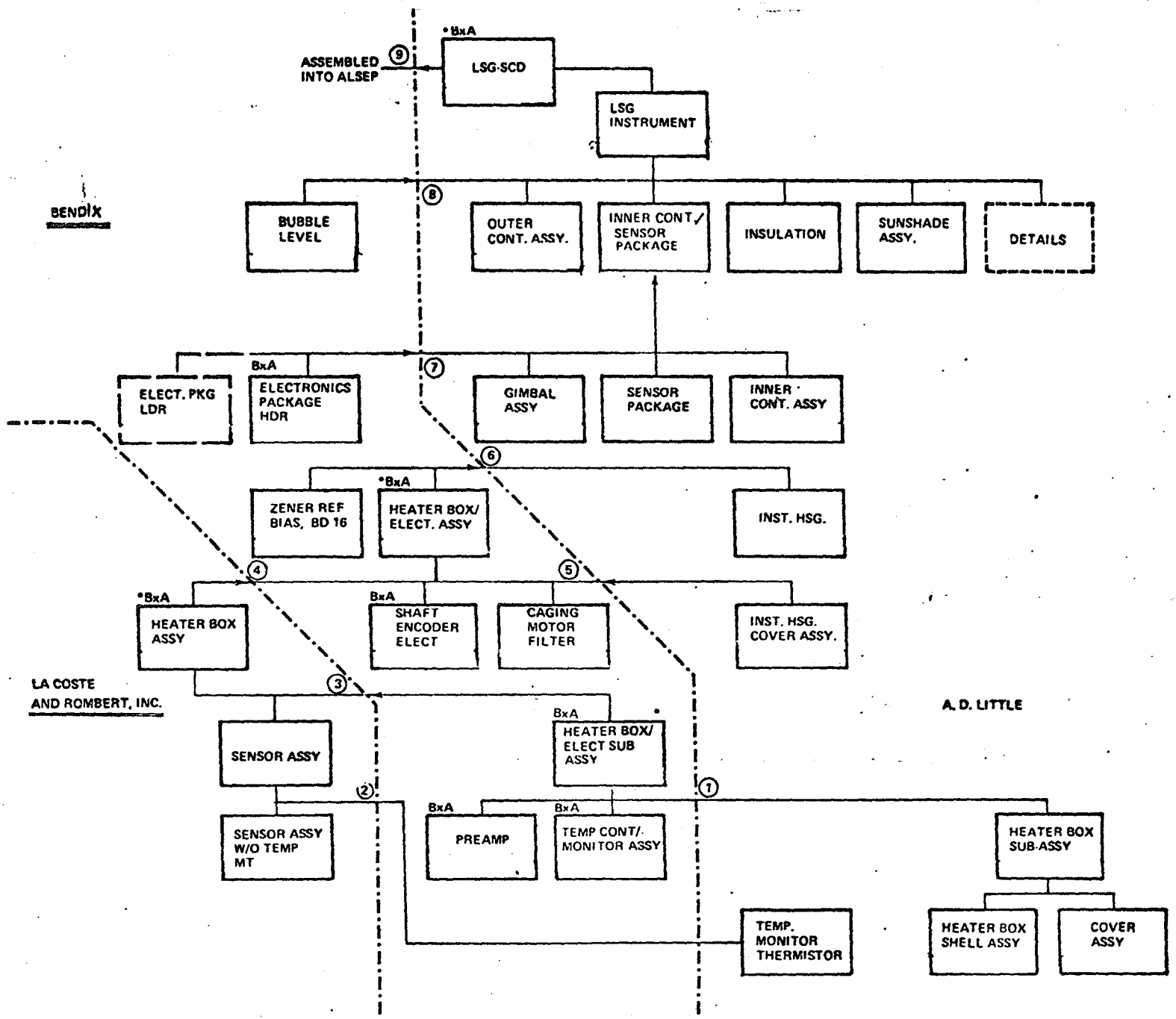
ASSEMBLED INTO ALSEP
9
*BxA
LSG-SCD
LSG INSTRUMENT
BENDIX
8
BUBBLE LEVEL
OUTER CONT. ASSY.
INNER CONT./ SENSOR PACKAGE
INSULATION
SUNSHADE ASSY.
DETAILS
BxA
7
ELECT. PKG LDR
ELECTRONICS PACKAGE HDR
GIMBAL ASSY
SENSOR PACKAGE
INNER CONT. ASSY
6
*BxA
ZENER REF BIAS, BD 16
HEATER BOX/ ELECT. ASSY
INST. HSG.
4
5
*BxA
HEATER BOX ASSY
BxA
SHAFT ENCODER ELECT
CAGING MOTOR FILTER
INST. HSG. COVER ASSY.
LA COSTE AND ROMBERT, INC.
3
A. D. LITTLE
BxA
SENSOR ASSY
HEATER BOX/ ELECT SUB ASSY
2
1
BxA
BxA
SENSOR ASSY W/O TEMP MT
PREAMP
TEMP CONT/ MONITOR ASSY
HEATER BOX SUB-ASSY
TEMP. MONITOR THERMISTOR
HEATER BOX SHELL ASSY
COVER ASSY

FIGURE 3-4

3.3 Lunar Mass Spectrometer (LMS)

Three subassemblies of the LMS are manufactured at the University of Texas at Dallas and hand carried to BxA in two special shipping containers provided by UTD. The Multi-mode Analyzer is packaged in one container and the Multi-mode Analyzer Control Electronics Assembly and the Preamplifier Discriminator Electronics are packaged in the other container in accordance with UTD document 151-797, Marking, Packing, Handling and Unpacking of LMS Analyzer Subsystem. During manufacturing and test of the LMS, it will be handled in accordance with TP 2365508, ALSEP Program LMS Handling Procedure.

3.4 Lunar Seismic Profiling Experiment (LSP)

The LSP consists of four major assemblies which are the Geophone Module Package, LSP Central Electronics, LSP Remote Antenna and Explosive Package Transport Module.

3.4.1 Geophone Module Package

Geophone and Cable for the Geophone Module Package are packaged to best commercial practice and hand carried from Geotech to BxA. The Geophone Module Package is handled during manufacture and test in accordance with TP 2365376, LSP Geophone Module Package Handling Procedure.

3.4.2 LSP Central Electronics

The LSP Central Electronics is manufactured at BxA and contains amplifiers from Geotech. The amplifiers are packaged to best commercial practice and hand carried to BxA. The LSP Central Electronics is handled during manufacture and test in accordance with TP 2365374, LSP Central Electronics Handling Procedure.

3.4.3 LSP Remote Antenna

The LSP Remote Antenna is manufactured from piece parts at BxA and is handled in accordance with TP 2368945, LSP Transmitter Antenna and Cable Reel Handling Test Procedure.

3.4.4 Explosive Package Transport Module (EPTM)

The flight explosive package transport module is built up at Cape Kennedy approximately 30 days prior to flight. BxA manufactures the transport frames, the Electronic and Safe Arm Assemblies, and inert housing and charge assemblies. The live housing and charge assemblies are supplied GFE from Naval Ordnance Laboratory mated with structural E&SA assemblies and mounted on transport frames for shipment directly to KSC.

The eight electronic and safe arm assemblies each contain two timers manufactured by Bulova Watch Company and a thermal battery manufactured by Catylst Research. The timers are commercially packaged at Bulova and hand carried to BxA. The thermal batteries are commerical packaged and transported by air freight.

The EPTM during manufacture and test is handled in accordance with LSP Explosive Package and LSP Explosive Package Transport Module Handling Procedure (TP 2365375).

3.5 Heat Flow Experiment (HFE)

The Heat Flow Experiment for ALSEP Array E was manufactured as an Array D spare. No transportation is necessary to change the spare to flight status. The HFE is handled in accordance with ALSEP Heat Flow Experiment Handling Procedure (TP 2338187).

3.6 Central Station (CS)

Central Station consists of the following components: Power Distribution Unit, Command Decoder, Data Processor, Command Receiver, Transmitter (2), Diplexer Switch, Diplexer Filter, Antenna and Antenna Aiming Mechanism. The Command Receiver is purchased from Motorola, commercially packaged and hand carried to BxA. The Transmitters are manufactured by Teledyne Telemetry, commercially packaged and hand carried to BxA. Both the Diplexer Switch and Filter are manufactured by Rantec, commercially packaged and shipped by air carrier to BxA. The Antenna and Antenna Aiming Mechanism are manufactured by Bendix Research Labs Division (BRLD). Both assemblies are hand carried to BxA.

4.0 SPECIAL TESTING AND CALIBRATION

Special facilities external to BxA, for testing and calibration of the LSG, LMS and LEAM are required. ALSEP designed GSE Containers have been provided to insure safe transport of the experiments. Procedures on preservation, packaging, handling, storing, and shipping instructions have been written, detailing the equipment, participants and operations required. The general instructions applicable to all these experiments are as follows:

1. All equipment and attaching hardware for packaging is delivered to the packaging area.

2. The inside of the container is inspected for cleanliness before installing equipment.

3. All personnel in the clean atmosphere working area are prohibited from eating, drinking and smoking.

4. All personnel handling flight equipment wear clean, nylon gloves and clean lab coat or jacket.

5. No items are worn or displayed that can drop onto the surface of the assembly while working.

6. Participating personnel have been trained for extreme care in handling so as not to drop, bump or scrape the flight hardware against the container or other objects.

The following paragraphs provide specific information on packaging for each of the three experiments to be tested or calibrated is described below.

4.1 LSG

The LSG experiment is shipped to the University of Maryland for noise test prior to the completion of ALSEP acceptance tests. The experiment will be transported in the LSG Shipping Container, built by Arthur D. Little, Inc., ADL Part No. 4017 and packaged in accordance with Preservation, Packaging, Handling, Storing, and Shipping Instructions for the Lunar Surface Gravimeter (TP 2368913). The container has provisions for desiccant and a relief valve to prevent pressure buildup inside the container. At the time of packing the container will be purged and slightly pressurized with dry nitrogen gas for preservation purposes. Since the container does not have provisions for shock recording instruments, the LSG will be hand carried to and from the University of Maryland to protect it from severe shock loads. Prior to return of the LSG to BxA the experiment is functionally tested and Magnetic Flux Recorders (MFR's) are attached to the experiment. The LSG must be protected from magnetic fields greater than 5 gauss in order to prevent magnetizing the sensor. Upon return the MFR's will be checked to ensure that the sensor has not been subjected to a strong field. These recorders will remain attached to the LSG until integration with subpack no. 1 at BxA.

4.2 LEAM

The LEAM experiment is transported to Goddard Space Flight Center for calibration prior to shipment to KSC. The LEAM is packaged in the LEAM shipping container, Part No. 2347911. The container is designed with provisions for a recording thermometer, Impact-O-Graph, humidity indicator and desiccant bags. The experiment is packaged in accordance with Preservation, Packaging, Handling, Storing and Shipping for Equipment to Build the LEAM and the LEAM Flight System Hardware (TP 2368914). The experiment will be hand carried to and from Goddard.

4.3 LMS

Prior to completion of the ALSEP acceptance test, it is necessary to ship the LMS to Langley Research Center for absolute calibration. Shipment is accomplished by installing the LMS in its shipping and storage container (PN 2347595) in accordance with the Preservation, Packaging, Handling, Storing, and Shipping procedure (TP 2368916). The container includes a pressure relief valve, is hand carried on an aircraft, and includes provisions for monitoring temperature, humidity, and shock during shipment.

5.0 PREPARATION OF FLIGHT HARDWARE FOR SHIPMENT TO KSC

BxA flight hardware includes subpackage No. 1, subpackage No. 2, EPTM's, and the fuel cask structure assembly. Each item is separately packaged in its own ALSEP designed GSE metal shipping container in accordance with its applicable PPHSS procedure; Table 3-1 lists all the ALSEP PPHSS procedures, and Appendix A includes the data pertinent to shipping containers.

General instructions for the packaging, preservation, shipment, and storage of flight hardware to KSC is described below.

5.1 Packaging

Packaging of subpackage 1, subpackage 2, and the EPTM's consists of installing the hardware (previously installed on handling frames) on a shock-mounted mounting plate. Shock and temperature recorders are also installed to provide continuous monitoring of these parameters up to eight days. In addition, the container for subpackage 1 will include three magnetic flux recorders for recording magnetic fields during shipment to KSC.

The containers for subpackage 2 and the EPTM's will include the appropriate pyrotechnic lot verification devices. In addition desiccant bags and a humidity indicator are installed prior to closing and sealing of the container. The fuel cask structure assembly is packaged using best commerical practice and installed in a wooden crate.

5.2 Preservation

Preservation of subpackage No. 1, subpackage No. 2, and the EPTM is provided by using desiccant material, purging, and the pressurizing subpack containers with argon gas and the EPTM container with dry nitrogen gas.

Preservation of the fuel cask and structure assembly is provided by the use of desiccant material.

5.3 Shipment

Transportation of all four assemblies between BxA and KSC is by air carrier. The air carrier, government or commerical, is selected at the time of delivery. The hardware will be escorted by BxA and MSC personnel couriers during shipment.

5.4 Storage

The ALSEP storage requirements are 50 to 80°F and 50% maximum for relative humidity. Although storage of ALSEP is not expected, this would be accomplished by keeping the hardware in the containers designed to achieve these requirements during this period.

5.5 Contingency Plan

Should it become necessary to ship subpackage 1 or subpackage 2 without an experiment or should it become necessary to replace or return an experiment to BxA, containers are available for shipping individual experiments. Even though these containers include provisions for monitoring temperature, shock, and relative humidity, the experiments will be hand carried in the container to facilitate transport and reduce the possibility of damage. Table 5-1 lists the containers available for the experiments and the associated PPHSS.

TABLE 5-1
FLIGHT EXPERIMENT SHIPPING CONTAINER

Experiment	PPHSS No.	Container Part No.
LMS	TP 2368916	2347599
LSG	TP 2368913	E-4017
LEAM	TP 2368914	2347911
HFE	TP 2337193	2333356

6.0 PACKAGING, HANDLING AND TRANSPORTATION OF GROUND SUPPORT EQUIPMENT (GSE) FROM BXA TO KSC

6.1 System Test Set

The System Test Set and accessory equipment will be transported to KSC via Air Ride Van provided by NASA. Packaging of the test set is outlined in TP 2337182, PPHSS for System Test Set. Packaging will consist of securing components subject to vibration, providing desiccant bags to absorb moisture

covering test set with polyethylene and padding with furniture blankets after placing in vehicle. Accessory items will be placed in containers with padding and dunnage. Containers will be wrapped with polyethylene.

6.2 E&SA Test Set

The LSP E&SA Test Set will be packaged to best commerical practice and installed in a wooden crate. Transportation to KSC will be by government or commercial air carrier.

6.3 Miscellaneous Items

Miscellaneous items of support equipment requiring separate shipment to KSC will be shipped air freight, air express or hand carried on commercial aircraft and packaged to best commercial practice.

7.0 RECEIPT AND HANDLING OF FLIGHT HARDWARE AND GSE AT KSC

ALSEP Flight Hardware flow at KSC is shown in Figures 7.1 and 7.2. The flow covers only events performed by BxA personnel at KSC. The applicable procedure to perform each of the major events is given in Appendix B. In addition to the hardware shipped from BxA, Ann Arbor, BxA receives the fuel cask assembly from GE for installation on the LM and the live housing and charge assembly for mating with the LSP E&SA Assemblies to form the Flight Explosive Packages. BxA also assists in the installation of the live fuel capsule into the fuel cask on the LM. All three of these assemblies are supplied to BxA as GFE.

7.1 General Handling

Handling of the hardware at KSC is performed in accordance with TCP 2337086. The subpackages are stored outside of containers only in clean room areas. Personnel handling the flight hardware wear clean, white, lint free nylon gloves. Movement of packages is accomplished with either a special ALSEP handling cart or ALSEP hoist device. The BxA KSC resident team is trained and experienced in the handling of the ALSEP hardware to avoid shock loading or inadvertent contact with foreign objects. Because of the susceptibility of the LSG sensor to magnetic fields, magnets and electrical equipment which produce large magnetic fields will be avoided at all times.

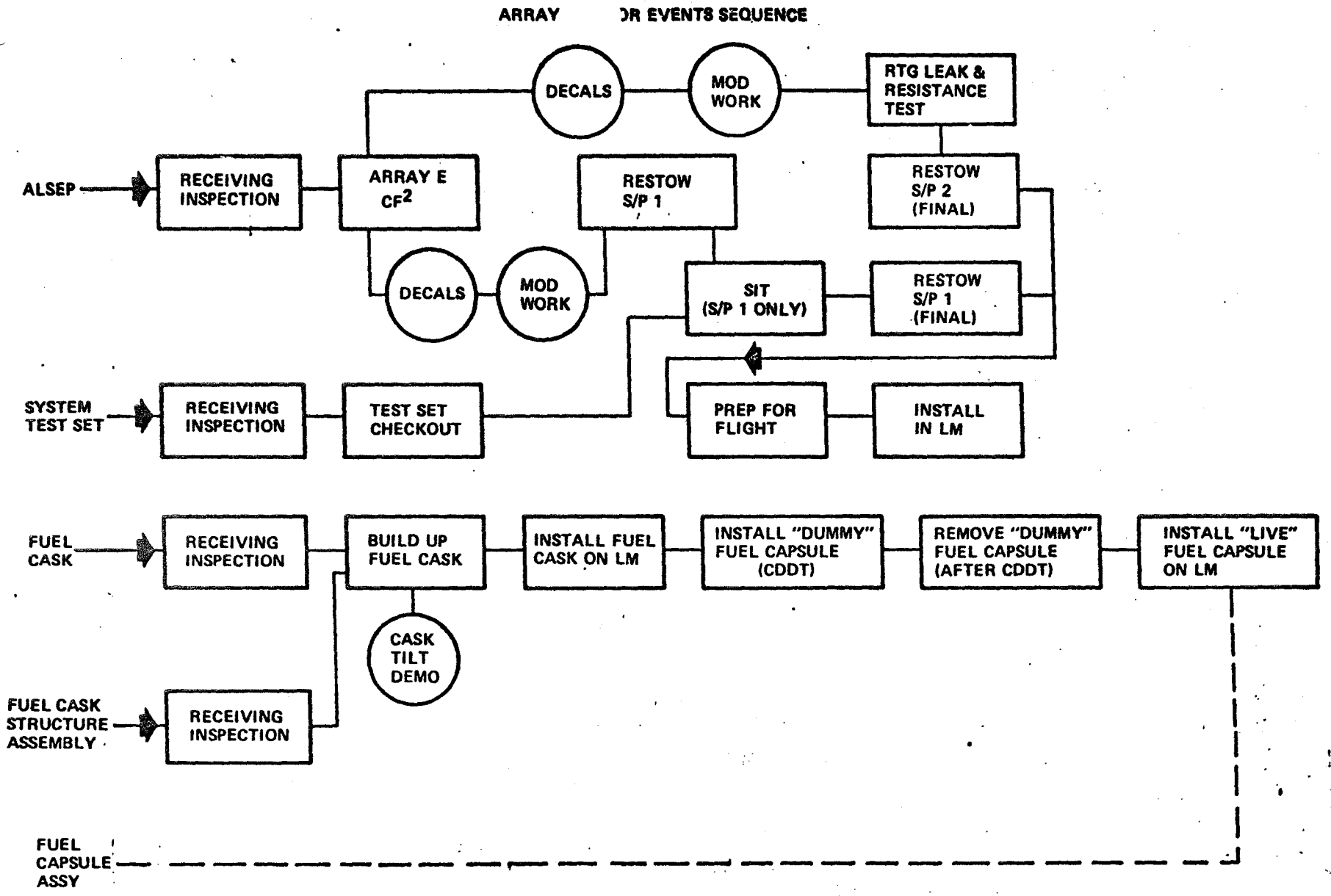
ARRAY OR EVENTS SEQUENCE
DECALS
MOD WORK
RTG LEAK & RESISTANCE TEST
ALSEP
RECEIVING INSPECTION
ARRAY E CF2
RESTOW S/P 1
RESTOW S/P 2 (FINAL)
DECALS
MOD WORK
SIT (S/P 1 ONLY)
RESTOW S/P 1 (FINAL)
SYSTEM TEST SET
RECEIVING INSPECTION
TEST SET CHECKOUT
PREP FOR FLIGHT
INSTALL IN LM
FUEL CASK
RECEIVING INSPECTION
BUILD UP FUEL CASK
INSTALL FUEL CASK ON LM
INSTALL "DUMMY" FUEL CAPSULE (CDDT)
REMOVE "DUMMY" FUEL CAPSULE (AFTER CDDT)
INSTALL "LIVE" FUEL CAPSULE ON LM
CASK TILT DEMO
FUEL CASK STRUCTURE ASSEMBLY
RECEIVING INSPECTION
FUEL CAPSULE ASSY

FIGURE 7-1

ALSEP ARRAY E - LSP FLOW - KSC

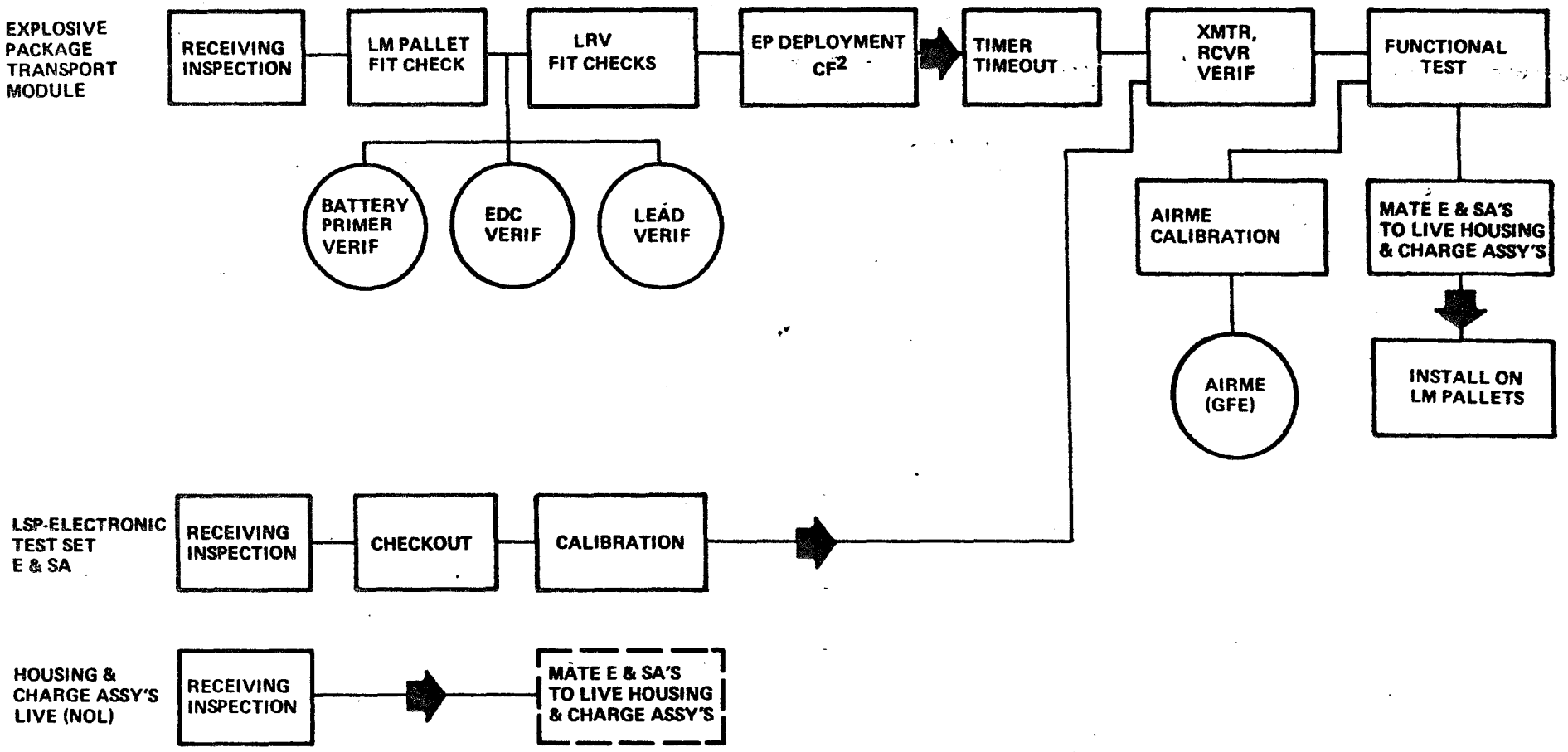

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FIGURE 7-2

7.2 Safety

Handling of the flight hardware at KSC, will be accomplished in accordance with the Array E Flight System Ground Safety Plan, ALSEP-TM-840. This document provides the plan for assuring the safety of personnel, flight hardware, and facilities during the handling of the ALSEP Array E hardware. Detailed safety requirements and emergency procedures have been included in all KSC procedures classified as containing hazardous sequences. When hazardous procedures are scheduled to be accomplished, the KSC Systems Safety Support Department is notified to ensure their participation and support should any hazard develop.

Specific hardware items that are potentially hazardous include the LSP Explosive packages which each contain from 1/8 to 6 lb of explosive material roughly equivalent to TNT, the LEAM which contains 4 explosively activated reefing line cutters, and the Fuel Capsule Assembly which is both a thermal and radioactive hazard.

7.3 KSC Repair Plan

In the event that flight hardware is damaged or fails during any of the testing and handling operations at KSC or during transport to KSC a basic reapir flow has been developed to streamline repair operations and minimize turn around time. This repair flow is depicted in Figure 7-3. Basically upon detection of any non-conformance condition a Discrepancy Record will be initiated. KSC Material Review Board (MRB) will review the discrepant condition and recommend action. Material undergoing MRB action shall be tagged with a withhold tag. Normally only minor repair (paint touch up, replacement of boyd bolt receptacles) will be accomplished at KSC. For major repair actions the hardware will be returned to BxA. It will be packaged in accordance with the PPHSS procedure and escorted via air carrier. BxA MRB will then review the discrepant condition and recommend repair action. Level A spares are maintained at BxA to make removal/replacement repair actions. A list of current Major Level "A" spares is given in Table 7-1. Once the repair action is made, it will be verified, and additional acceptance testing, as directed by BxA MRB, will be accomplished. After all MRB directed actions have been completed and no other discrepant conditions have arisen the DR will be closed and the hardware returned to KSC.

8.0 LEVEL "A" SPARES

A list of level "A" spares is given in Table 7-1, and a list of containers in which they are packaged along with the capabilities of the containers for environmental devices is shown in Appendix A of the document. The level "A" spares are packaged such that they can be stored for a period of two years.

BASIC REPAIR FLOW AT BENDIX

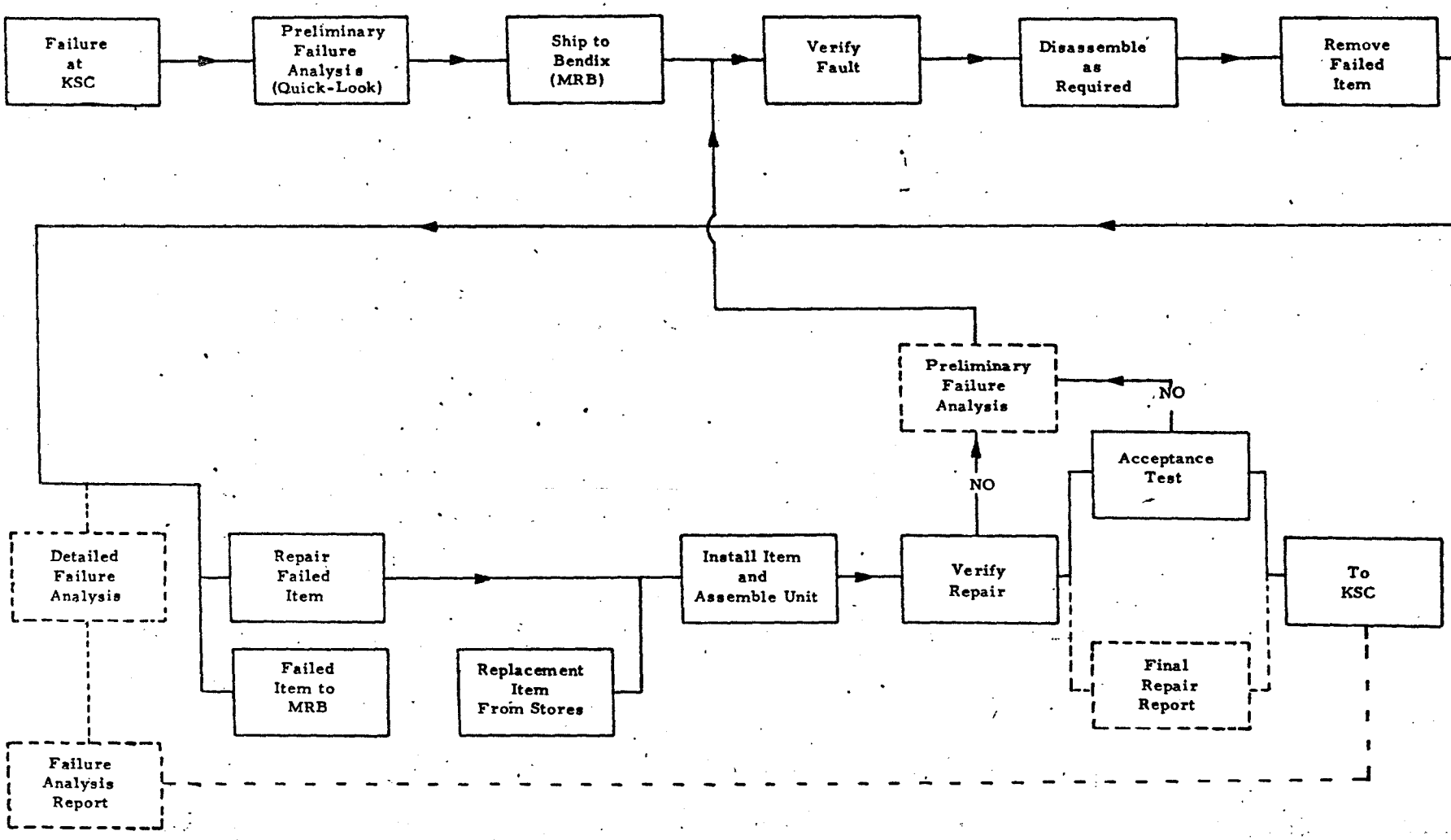

FIGURE 7-3

TABLE 7-1

MAJOR LEVEL "A" SPARES FOR ARRAY E

Nomenclature	Part No.	Quantity
Helical Antenna	2330307	1
Diplexer Filter	2330525	1
Diplexer Switch	2330526	1
Command Receiver	2345147	1
Command Decoder	2367600	1
Data Processor/Mux/ A/D Conv.	2349400	1
Transmitter	2362877	1
PDU	2362200	1
PCU	2368101	1
Shorting Plug	2364057	1

Appendix A

ALSEP ARRAY E

STORAGE/SHIPPING CONTAINER

REQUIREMENTS AND STATUS

AL P ARRAY E

STORAGE/SHIPPING CONTAINER REQUIREMENTS AND STATUS

12-21-71

ITEM	CONTAINER PART NO.	STATUS	SHOCK RECORDER	TEMP RECORDER	HUMIDITY INDICATOR	REMARKS
Subpack No. 1	2332914	Avail	X	X	X	Standard ALSEP
Subpack No. 2	2332915	Avail	X	X	X	Standard ALSEP
Fuel Cask	47E301176G1	Avail	N/A	N/A	N/A	Provided by G. E.
Fuel Capsule Assy.	47D300613P5	Avail	(Shipped direct from G. E. to KSC)			Provided by G. E.
EPTM (LSP)	2364750	Avail	X	X	X	Standard ALSEP
LMS	2347595	Avail	X	X	X	Standard ALSEP
HFE	2333356	Avail	X	X	X	Standard ALSEP
LSG	E-4017	Avail	N/A	N/A	X	Provided by A. D. Little
LEAM	2347911	Avail	X	X	X	BxA Design
Transit (SLA/GSE)	2345410	Avail	Environmental Recorders not required			

ITEM	CONTAINER PART NO.	STATUS	SHOCK RECORDER	TEMP RECORDER	HUMIDITY INDICATOR	REMARKS
High Explosives (LSP)	2364750	At N.O.L.	X	X	X	Provided to N.O.L.
LEVEL A SPARES						
Helical Antenna	2333386	In GFE Stores			X	Standard ALSEP (Sold Off)
Antenna Aiming Mech.	2333386	Not applicable to Array E				
Antenna Cable Assy.	N/A	In GFE Stores				Commercial Pack (Sold Off)
Diplexer Filter	2333380	In GFE Stores			X	Standard ALSEP (Sold Off)
Diplexer Switch	2333380	In GFE Stores			X	Standard ALSEP (Sold Off)
Command Receiver	2333185	In GFE Stores			X	Standard ALSEP (Sold Off)
Command Decoder	2360142	Avail. Storage			X	Standard ALSEP

ITEM	CONTAINER PART NO.	STATUS	SHOCK RECORDER	TEMP RECORDER	HUMIDITY INDICATOR	REMARKS
Data Processor/MUX	2360143	Avail (Storage)			X	Standard ALSEP
Transmitter	2333186	Avail (Storage)			X	Standard ALSEP
Power Dist. Unit	2360144	Avail (Storage)			X	Standard ALSEP
Power Cond. Unit	2360144	Avail (Storage			X	Standard ALSEP

APPENDIX B

LIST OF KSC PROCEDURES FOR ARRAY E

TCP 2334384	General ALSEP Handling Procedure
TCP 2337001	System Test Set Receiving Inspection Procedure
TCP 2337056	ALSEP Subpackages Fitcheck to LM
TCP 2337075	ALSEP Cask Assembly Installation on the Lunar Module
TCP 2337076	ALSEP Cask Assembly Removal from the Lunar Module
TCP 2337086	ALSEP Subpackages Handling Procedure KSC
TCP 2337090	Flight Cask to Bond Assembly and ACA Fit Check to CG Fixture
TCP 2341443	Cask Tilt Demonstration at KSC
TCP 2345113	ALSEP Subpackages Installation in GSE and Movement to Launch Pad (KSC)
TCP 2345116	ALSEP Subpackages Installation in LM (Launch Pad) KSC
TCP 2365344	Array E CF^2 Test
TCP 2365345	ALSEP Generator Assy., (RTG) Leak Test & Resistance Check (KSC)
TCP 2368906	ALSEP/MFSN Turn On & Verify (Array E) (SIT)
TCP 2368907	GMIL/ALSEP Interface Test (Array E) (SIT)

TCP 2368908	ALSEP & STS Turn OFF (Array E) (SIT)
TCP 2368909	Array E Subpackage No. 1 Receiving Inspection (KSC)
TCP 2368910	Apollo 17 ALSEP (Array E) Subpackage No. 2 Receiving Inspection (KSC)
TCP 2368920	LSP E&SA Test Set Receiving Inspection (KSC)
TCP 2368930	Array E GSE Receiving Inspection
TCP 2368931	LSPE Ordnance (H&C) Receiving Inspection (KSC)
TCP 2368932	E&SA Test Set Checkout (KSC)
TCP 2368933	E&SA Test Set Calibration
TCP 2368934	EPTM Receiving Inspection (KSC)
TCP 2368935	LSP Electronics and Safe/Arm Assembly (E&SA) Functional Test (KSC)
TCP 2368936	EPTM/LRV Pallet Fitcheck (KSC)
TCP 2368937	Array E Preparation for Flight
TCP 2368938	Assembly of Operational EP's and Installation in LM-12 (KSC)
TCP 2368939	EPTM/LM Pallet Fitcheck (KSC)
TCP 2368958	Array E Restowage after CF^2 Test
TCP 2368959	Calibration of Data Unit Console for Array E STS
TCP 2368975	ALSEP Program Array E System Test Set Operational Procedure (KSC)
TCP 2368983	Winding and Setting of LSP Timers