PRELIMINARY

LSPE INTEGRATED TEST PLAN

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1.0 INTRODUCTION

The purpose of this document is to define tests to be accomplished on the various models of the Lunar Seismic Profile Experiment (LSPE) hardware for Array E. The following test models will be considered in this test plan.

A. Engineering Model

B. Crew Engineering Model

C. Structural/Mechanical/Thermal Simulator (SMTS)

D. Prototype

E. Qualification

F. Flight

2.0 TEST OBJECTIVES

The objectives of the tests outlined in this document are to demonstrate and verify that the design meets the experiment operational performance requirements through each stage of development in accordance with the LSPE Performance & Interface Control Specifications, and Component Design Requirements. Testing will be accomplished from subassembly through integration of LSP experiment in the ALSEP system.

3.0 APPLICABLE DOCUMENTS

The following documents are referenced in this document and are the source for detailed design specifications and control

BxA (a) IC314131 Interface Control Specification for LSPE

(b) AL900131 Performance Specification for LSPE

(c) AL770000 EMI

(d) MIL-STD-810A Environmental Test Methods for Aerospace and Ground Equipment

4.0 LSP EXPERIMENT DESCRIPTION

The LSP experiment consists of the following major assemblies; Central Electronics, Geophones Module Package and Explosive Package Transport Modules (two per array each containing four Explosive Packages.

4.1 Central Electronics - The central electronics is composed of a transmitter to command detonate the explosive packages, a multiplexer and A/D Converter, control and data formating logic, DC/DC Converter and Geophone amplifier assembly.

4.1.1 Transmitter Antenna Assembly - The antenna assembly will be mounted to the ALSEP Central Station and is used in conjunction with the transmitter for the RF link to explosive packages.

4.2 Explosive Package - The explosive package is comprised of two major assemblies, the Electronics and Safe/Arm Assembly and the HE Block Assembly.

4.2.1 Electronic and Safe/Arm Assembly - The Electronics and Safe/Arm assembly is comprised of the receiver and associated antenna (deployable

from outside the explosive package), logic module for triggering firing circuit, the firing circuit, End Detonating Cartridge (EDC), two (2) timers, a safe/arm slide plate assembly and a thermal battery.

4.2.2 HE Block Assembly - This section of the explosive package contains the explosive material and housing. It is attached to the electronics and safe/arm assembly mechanically.

4.3 Geophones Module Package - The Geophones Module Package is comprised of four (4) geophones and their deployable interconnection cables, and a central structure for stowage of the geophones and cables. The structure is configured to be used in deployment of the geophones. The interconnection cables will be hard wired to the Central Electronics. The initial ≈ 35 feet of cables will be stowed on a reel at the base of the geophones transport case. This ≈ 35 feet of the cable will consist of the four geophone cables tied together and will be deployed as a single cable. Upon deployment of this cable the structure will serve as a stand from which the geophones will be deployed.

5.0 ENGINEERING MODEL

5.1 Engineering Model Tests - Engineering Models of the following components will be fabricated and tested: transmitter, transmitter antenna assembly, receiver, receiver antenna, DC/DC converter, control and data

formating logic, safe/arm and firing circuits for explosive package. Eight engineering model HE Blocks will be fabricated and detonated with EDC's by NOL.

5.2 Engineering Model Test Philosophy - Engineering model units may be built with parts which have not been qualified. Testing will be performed to verify design and functional operation of the components in accordance with design requirements. Tests will be conducted under ambient conditions and selected environmental simulations commensurate with level of development. Test procedures, test methods and test equipment requirements will be developed during this phase of testing. Integration of the assemblies will be accomplished to highest level practicable at this stage of hardware development for interface compatibility verification.

5.2.1 Transmitter Tests - Tests will be performed to verify design and performance of the transmitter. Tests shall demonstrate transmitter performance with respect to response to external command, frequency stability, pulsed output characteristics (i.e., rise/fall time, pulse width, repetition rate), average power, spectrum characteristics harmonics and noise.

5.2.2 Control and Data Formating Logic - Tests shall verify design philosophy and demonstrate logic operation. This will be in a brass board configuration. Testing shall verify parameters such as, proper control of

multiplexer, verify logic control of data format with respect to sampling rate of seismic data and/or engineering data, verify operation of miscellaneous circuitry such as calibration signals and transmitter sampling. Test logic levels and establish driving capabilities of the logic circuits.

5.2.3 DC/DC Converter - Tests shall verify design and functional performance of the assembly. Tests will verify proper performance wi th minimum to maximum input voltages, transients due to turn on and/or changes in loading. Tests shall determine that noise and ripple are in tolerance. Determine, if any, the resultant effect on the central station of a short in the LSP power distribution, verify voltage and current outputs.

5.2.4 Transmitter Antenna Assembly - Tests shall verify design and functional performance of the assembly. Tests will determine input impedance, radiation patterns, gain characteristics, mechanical interface and deployment characteristics.

5.2.5 Explosive Package

5.2.5.1 Electronic and Safe/Arm Assembly

5.2.5.1.1 Receiver - Tests shall verify receiver design and performance. Testing shall determine receiver bandwidth, receiver minimum detectable signal and noise figure, dynamic range output logic levels and switching times over input power range using a representative pulsed input. Verify receiver performance through antenna system.

5.2.5.1.2 Safe/Arm Assembly - Tests will be performed to verify operation of subcontractor supplied timers with respect to actuating the safe/arm slide plate assembly and activation of thermal battery and EDC's. Headers will be substituted for EDC's. Tests shall verify mechanical interface tolerances with the HE Block and EDC assemblies. Perform tests integrating the electronics with the safe/arm assembly for sequential operation of total assembly.

5.2.5.2 HE Block - Tests of a set (8) HE Blocks in conjunction with EDC and BxA supplied safe/arm assembly will be conducted concurrently by NOL White Oak, Maryland. BxA firing circuitry will be used to provide the EDC firing signal for some of these (approximately 5) with high speed photography used to measure detonation time delay.

5.4 Facilities and Special Equipment Requirements - Standard laboratory equipment will be used to perform these tests. A thermal controlled vacuum chamber and vibration facility will be required for selected tests. Data collection may require magnetic recorder, analog strip chart recorder in conjunction with hand tabulated data sheets.

6.0 CREW ENGINEERING MOCKUP

A mechanical mockup approximating the conficulation of flight units will be fabricated for crew training and human factors considerations. The following LSP components will be fabricated, an LSPE Transmit Antenna

Assy., Geophone Module Assembly mounting bracketry, a Geophone Module Package with one Geophone Reel Assembly, Transport Frame Assembly and one Explosive Package structural assembly excluding Electronics and Safe/Arm internal components, and HE material.

6.1 Test Purpose and Sequence - The tests are performed to establish deployment procedures and contingency procedures. Tests will verify that deployable packages are compatible with physical movement limitations of the astronaut and other human factor design criteria. The test sequence and environments are as follows:

A. Shirt sleeve in one g environment in the Crew Engineering lab Bendix Aerospace Systems Division.

B. Space suited in a one g environment in the Crew Engineering lab Bendix Aerospace Systems Division.

C. Space suited in a 1/6 g environment in the Crew Engineering lab Bendix Aerospace Systems Division.

D. Space suited in an Airforce KC 135 aircraft to obtain zero g environment. (conducted as a part of System Test)

7.0 STRUCTURAL/MECHANICAL/THERMAL SIMULATOR

A thermal simulator of the explosive package will be fabricated. This unit will simulate flight hardware with respect to thermal capacity, conductivity, absorption properties to permit evaluation and refinement by Solar Simulation test.

Mechanical Model of a Geophones Reel will be fabricated for function and fit checks to aid in specification of manufacturing processes for prototype design.

8.0 LSP DESIGN VERIFICATION TEST (PROTOTYPE)

This unit is to be manufactured with the same tooling, processes, quality control and design as flight hardware. High reliability burnt-in components are not required for this unit. The completed unit will conform to description in Section 3.0.

8.1 Purpose of test - The purpose of this unit and associated test program is to verify design and manufacturing methods. The test program will verify electronic circuit performance, electrical interconnect harnesses and mechanical fit and structural integrity of LSP hardware from module level to the integrated experiment level. The test program will subject the unit to a series of functional tests and design limit environments, culminating in field test of the experiment. Acceptance test procedures will be developed and finalized for the Qualification Test program.

8.2 Test Sequence - In-house and field tests will be accomplished on this unit. In-house testing will include in-process testing at sub-assembly level, functional testing at assembly level and experiment component level; functional, environmental and field testing at the experiment level.

In-process testing and assembly level testing will be accomplished to Type II test procedures. Functional, environmental and field test at experiment component and integrated experiment level will be accomplished to Type II procedures.

Receiving Inspection test may be accomplished on sub-contractor furnished components. These tests may vary from visual inspection to application of power and basic functional checks.

In-process testing will be accomplished at module level to verify manufacturing techniques and circuit performance prior to final assembly. In-process testing will include mechanical fit checks of structures and enclosures. Selected environments may be required at this level.

Functional and environmental tests will be performed at component and integrated experiment level to verify system performance. Functional tests will be accomplished before and after design limit environmental testing. Typical flow of hardware and test sequence is depicted in Figure 8-O.

Concurrent with BxA in-house testing NOL, White Oak, Maryland will be conducting a series of tests on the HE Blocks at Dahlgren, Virginia. Structural models of the Electronic and Safe/Arm assemblies and Transport Frame Assembly will be furnished by BxA. These tests

will consist of acceptance and design limit environments with X-ray tests performed after each environment to verify HE Block integrity. Flow of hardware and test sequence is depicted in Figure 8-1.

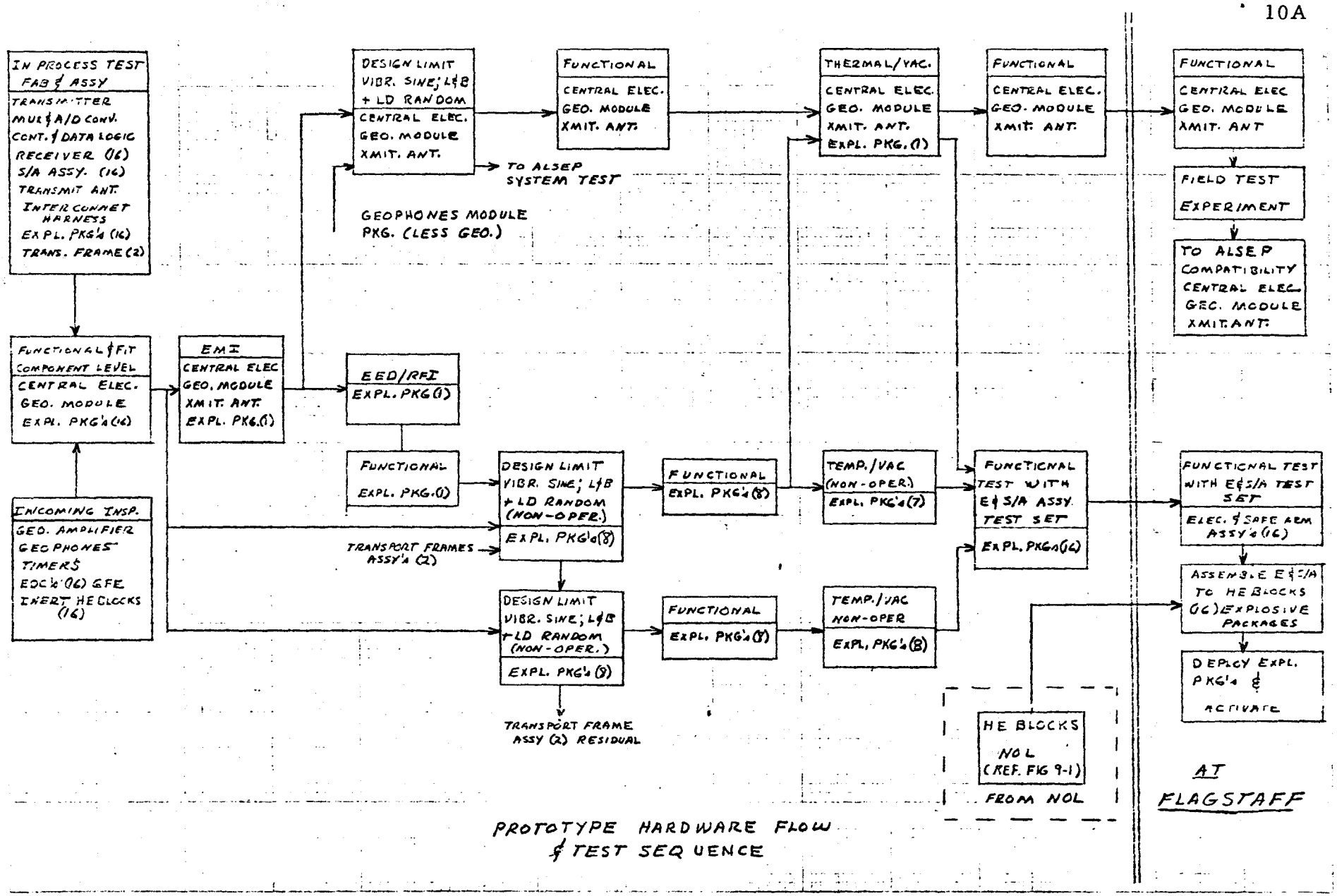
At the completion of In-house testing at BxA and NOL testing at Dahlgren, Va. hardware will be field tested at a remote site at Flagstaff, Arizona. The field test will be conducted by BxA with support of NOL personnel. Functional test will be accomplished on the hardware utilizing the Experiment Test Set and the Electronics & Safe/Arm Assembly Test Set prior to the field test of the experiment. This test will include deployment of experiment and remote detonation of Explosive Packages.

8.3 Place of Tests - Testing will be accomplished at Bendix Aerospace Systems Division and at a remote field test site. A parallel test effort will be conducted by NOL, White Oak, Maryland on the HE Blocks (REF. TIR727-8-0125)

In-house testing at Bendix Systems Division will include in-process testing at subassembly level, component level test and integrated experiment level testing.

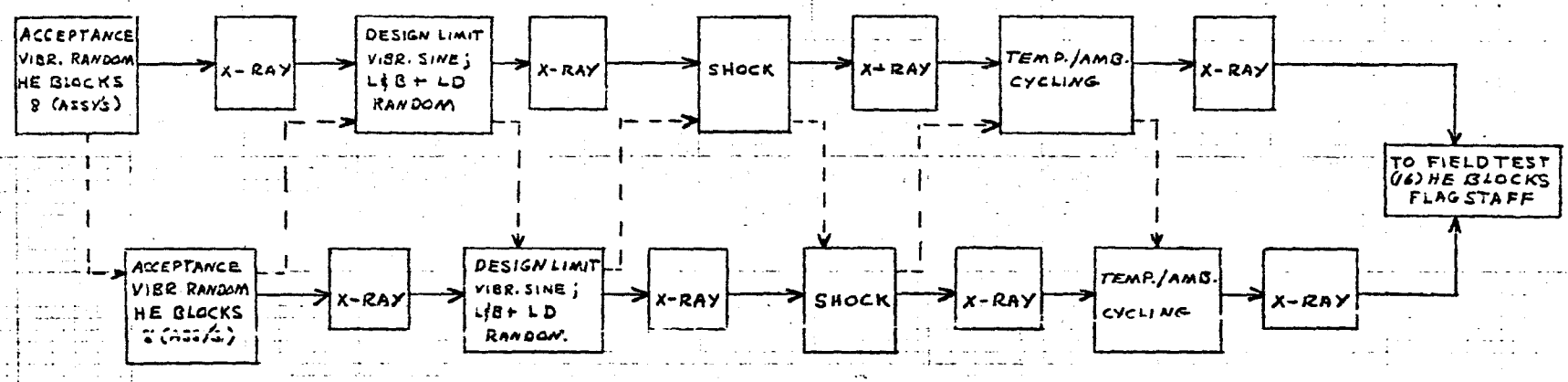
The NOL testing with live ordnance will be conducted at test facility at Dahlgren, Virginia.

Field testing will be accomplished at test site at Flagstaff, Arizona. Testing will be accomplished by BxA with support of NOL personnel.



PROTOTYPE HARDWARE FLOW & TEST SEQUENCE

FIGURE 8-0



1. HE BLOCK ASSY'S ATTACHED TO STRUCTURAL E/S/A ASSY'S (8) & MOUNTED IN TRANSPORT FRAMES (2)
2. STRUCTURAL E/S/A ASSYS (8) & TRANSPORT FRAMES FURNISHED BY B&A
3. ---- INDICATES E/S/A ASSY'S AND TRANSPORT FRAMES SHARED USE

PROTOTYPE TEST FLOW
AT DAHLGREN, VA.

FIG. 8-1

8.4 Facilities and Special Equipment Requirements - In-process test sets will be required to accomplish testing during fabrication and assembly of the transmitter, receiver, firing circuit, DC/DC converter and control and data formating logic. These test sets will consist of fixtures and adaptors to obtain access to printed circuit board paths and/or terminals to facilitate inserting and switching of input stimulus and monitoring outputs signals in conjunction with standard laboratory equipment and BxA designed test equipment. The Experiment Test Set and Electronics & Safe/Arm Assy Test Set will be required for component level and experiment level tests performed in-house, at NOL and in the field.

A thermal controlled vacuum chamber, vibration facility and EMI chamber will be required for environmental testing.

9.0 LSP QUALIFICATION UNIT TESTS

The qualification unit will consist of one complete experiment plus an additional quantity of four (4) explosive packages manufactured with the same tooling, processes, quality control and design as flight hardware. Each of the four (4) additional explosive packages will have timers of different operating times to represent the four different operating time s of a complete set of eight; and will contain inert HE Blocks & EDC's.

9.1 Purpose of Test - The purpose of the qualification test program is to demonstrate the LSPE manufacturing processes and

fabrication methods comply with performance requirements, are compatible with ALSEP system and capable of performance through acceptance level test followed by design limit induced environments required for flight units.

9.2 Test Sequence - Qualification hardware must satisfactorily complete tests defined in the acceptance test procedures developed in the prototype test program. In-process testing will be accomplished during the manufacturing process at module and assembly level prior to acceptance testing.

Qualification testing of the LSP will be accomplished in two parts:

A. Environmental conditioning of eight (8) explosive packages (with inert HE Blocks) by temperature cycling in vacuum at BxA and design limit vibration and shock test by NOL at Dahlgren, Va. facility followed by field test of the complete experiment at a remote site to verify the complete LSP including active HE Blocks. Eight explosive packages will be expended during this test. Test sequence and flow of hardware is shown in Figure. 9-0 and Figure 9-1.

B. Functional and environmental testing as a part of the ALSEP System using LSP hardware remaining from the above field test plus four explosive packages (with inert EDC and HE Blocks). One explosive package will undergo solar simulation

thermal vacuum with ALSEP and will be activated by command from ALSEP. Three explosive packages will under go temperature cycling over operating limits in vacuum and will be activated by command from ALSEP which will be at ambient. One explosive package will be field tested locally at BxA to assure immunity from ALSEP Central Station radiation. Test sequence and flow of hardware is depicted in Figure 9-0.

9.2.1 Qualification Tests - The following tests shall be performed on qualification hardware:

A. Acceptance Tests

1. Experiment Functional (PIA)
2. Mass Properties
3. Acceptance Vibration, 3 axes, random (operate for central electronics, non-operate for explosive packages, and geophones)
4. Experiment Functional (PIA)

B. Explosive Package Environmental Conditioning and Experiment Field Test (8 Explosive Packages)

1. Temperature cycling over operating design limits in vacuum, 8 explosive packages.
2. Explosive Package Functional (PIA)

3. Explosive Package Functional at Dahlgren, Va. (by BxA).

4. Design Limit Vibration and Shock, pre and post test X-ray inspection at Dahlgren Facility.

5. Explosive Package Functional (PIA) at Dahlgren, Va. (by BxA).

6. Field Test experiment (8 explosive packages expended).

C. Testing as a Part of ALSEP System

Complete sequence of ALSEP Array E Qualification tests for the LSPE Central Electronics, Geophone Module Assembly, and Transmit Antenna, plus one (1) explosive package (with inert detonator and HE Block) will undergo solar simulation test and be activated by ALSEP thermal vacuum test.

The following tests, unique to LSP, will be performed upon LSP/ALSEP as a part of the ALSEP Array E Qualification Test Sequence:

1. Explosive Package Temperature cycling and Activation in Vacuum by ALSEP Command - Three explosive packages, temperature cycled over operating limits in vacuum and activated by ALSEP command with the ALSEP Central Station in ambient.

2. Explosive Package Immunity to ALSEP Radiation, plus Activation by ALSEP Command - Local (BxA) field test with Explosive Package at a distance from ALSEP Central Station equal to-minimum lunar deployment distance.

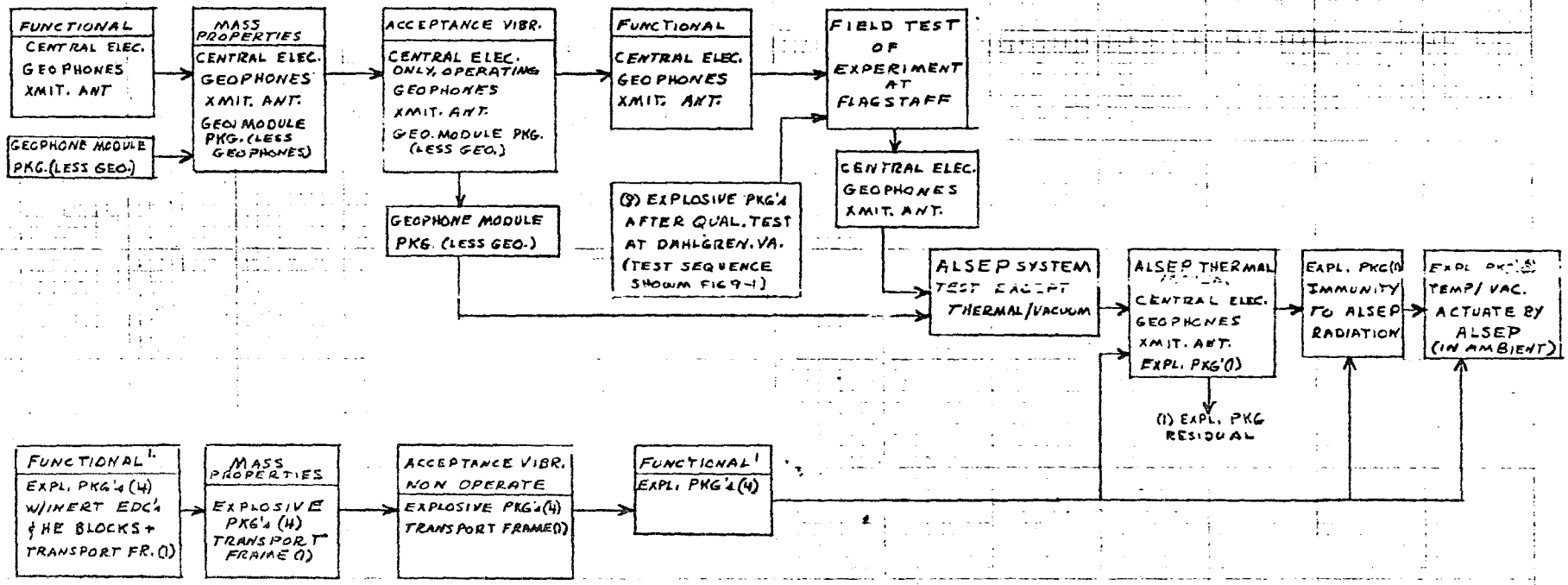
3. One Explosive Package in thermal vacuum chamber during Design Limit testing.

9.3 Place of Tests - Functional, environmental acceptance, environmental condition tests and qualification tests with ALSEP will be conducted at Bendix Aerospace Systems Division. Field test of LSP experiment will be conducted at a remote test site at Flagstaff, Arizona. NOL will conduct qualification on live explosive packages at Dahlgren, Va. facility.

9.4 Facilities and special equipment requirements - In-process testing will be accomplished with Standard laboratory equipment augmented with adaptors and breakout boxes as required.

Experiment Test Set and Electronic and Safe/Arm Test Set will be required for acceptance tests at component and experiment test level through environments and field test.

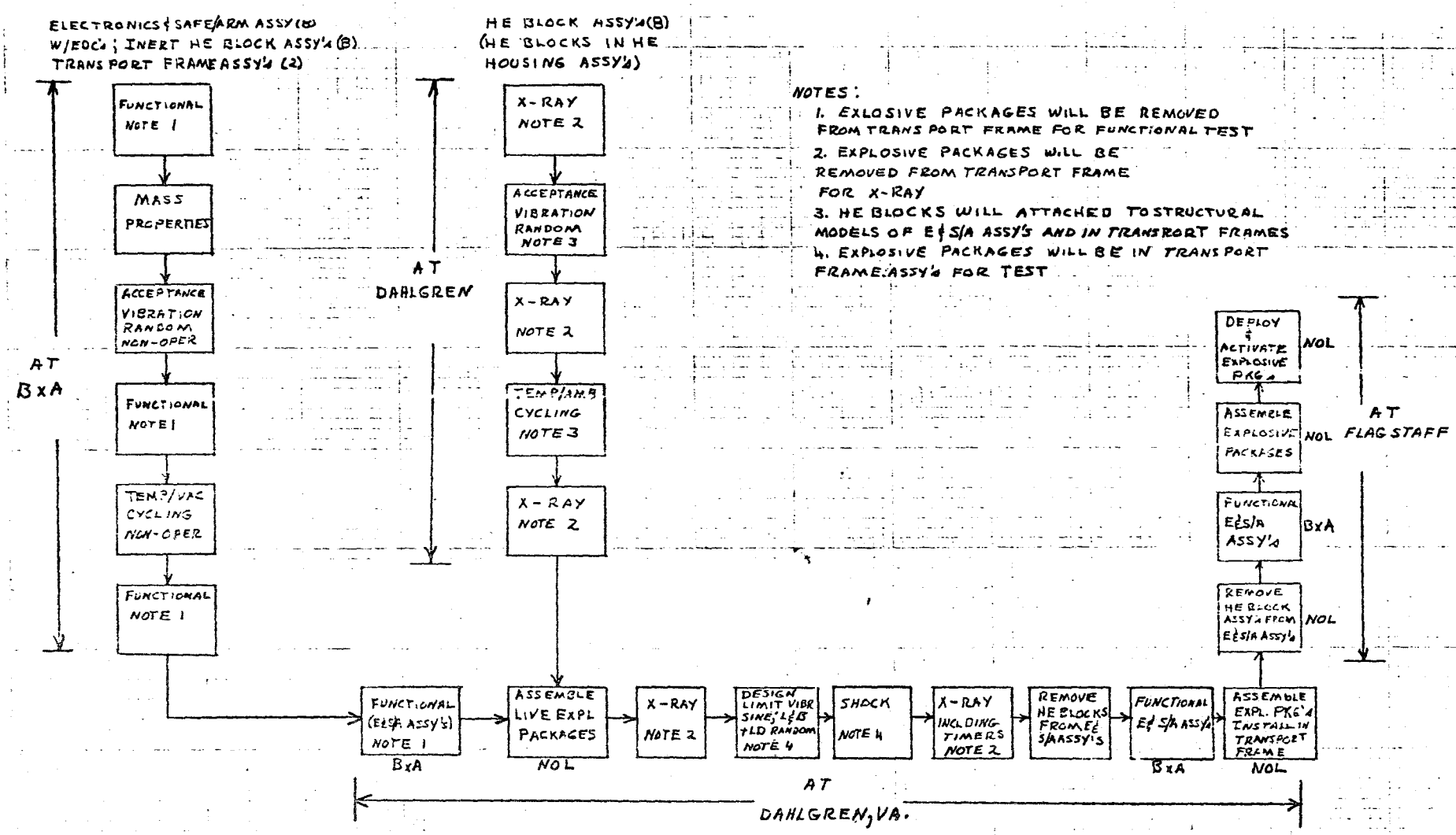
Thermal vacuum chamber and vibration facilities will be required for acceptance tests and environmental conditioning tests. Field test of the experiment will be at a remote field test site.



1. EXPLOSIVE PACKAGES REMOVED FROM TRANSPORT FRAME FOR TEST

QUALIFICATION HARDWARE FLOW AND TEST SEQUENCE

FIG. 9.0



QUALIFICATION HARDWARE FLOW AND TEST SEQUENCE FOR EIGHT EXPLOSIVE PACKAGES FOR FIELD TEST

FIG 9-1

10.0 LSP FLIGHT UNIT ACCEPTANCE TEST

Subsequent to in-process testing and prior to the integration into an ALSEP Array the LSPE shall be subjected to the following tests to demonstrate that the flight units meet performance requirements.

10.1 Acceptance Tests

A. Acceptance Tests at BxA

1. Experiment Functional (PIA)
2. Mass Properties
3. Acceptance Vibration, 3 axes, random (operating for central electronics, non-operating for explosive packages and geophones)
4. Experiment Functional (PIA)

B. Acceptance tests by NOL at Dahlgren Facility

1. Acceptance Vibration, 3 axes, random HE Blocks attached to structural models of Electronic and Safe/Arm Assembly (8 assemblies required) mounted in a Transport Frame Assemblies (2 required)
2. X-ray inspection, post vibration.

C. Testing at KSC

1. Functional test of eight (8) Electronic and Safe/Arm Assemblies prior to assembling to HE Block Assemblies, using the Electronic and Safe/Arm Test set.

10.2 Facilities and special equipment requirements - In-process testing will be accomplished with standard laboratory equipment augmented with adaptors and breakout boxes as required.

Experiment Test Set and Electronic and Safe/Arm Test Set will be shipped to KSC and will be required for Functional acceptance testing.

Vibration facilities will be required for acceptance environmental tests.

11.0 TEST DOCUMENTATION

11.1 Test Procedures

11.1.1 Prototype Test Procedures - The following test procedures will be required:

1. Experiment Functional, 2 procedures
   (1) CE/Geophone Module/Transmit Antenna
   (2) Explosive Package
2. Experiment EMI (one Explosive Package with inert HE Block)
3. Design Limit Vibration 3 procedures, Central Electronics/ Geophones Module/Transmit Antenna Assembly

(1) Design limit sine, L&B random, LD random - all non-operating.

(2) Design limit random, operating (CE only)

Eight Electronic and Safe arm assemblies with inert HE Blocks in Transport Frame Assemblies (2)

(1) Design limit sine, L&B random, LD random - all non-operating.

4. Thermal Vacuum Environmental - 2 Procedures

(1) CE/Geophones Module/Transmit Antenna Assy.

(2) One Explosive Package consisting of Electronics and Safe Arm Assy, with inert HE Block.

5. Central Electronics Functional

6. Transmitter Functional (In Process)

7. Temperature/Vacuum Environmental, non-operating - 1 Procedure (Partial set of 7, and set of 8 Electronics and Safe/arm Assemblies

8. SDS Amplifier Functional (In Process)

9. Central Electronics P. C. Boards In-Process Functional

10. DC/DC Power Converter Functional (In Process)

11. Geophones Module, Mechanical and Electrical

12. Geophone and Cable Assy. Functional (In Process)

13. Electronics & Safe/Arm Assy. Functional (In Process)

14. Electronics and Safe/Arm Assembly Bridgewire Resistance Measurement
15. Electronics & Safe/Arm Assy Capacitor Circuits In-Process Functional
16. Receiver Functional (In-Process
17. Central Electronics Handling Procedure
18. Geophone Module Handling Procedure
19. Explosives Package Handling Procedure
20. Components Handling Procedure
21. EED/RFI, Explosive Package only
22. Experiment Integration (with ALSEP) - LSP portion of procedure.

11.1.2 Qualification Model Test Procedures - The following test procedures will be required:

New Test Procedure:

1. Mass Properties, 3 procedures: Central Electronics, Geophone Module Assy, Explosive Package and Transport Frame Assy.
2. Acceptance Level Vibration (Random only), 3 procedures: central Electronics (operating), Geophones Module Assy./Transmit Antenna (non-operating), Explosive Package and Transport Frame Assy. (non-operating)

Revised and updated as required, the following Prototype Test Procedures

1. Experiment Functional, 2 Procedures: Central Electronics/ Geophones Module Assy/Transmit Antenna; Explosive Package.
2. Design Limit Vibration, non-operating - 1 procedure (8 Electronics and Safe/Arm Assy's in Transport Case)
3. Temperature/Vacuum Environmental, non-operating - 1 procedure (8 Electronics and Safe/Arm Assy's)
4. Central Electronics Functional
5. Transmitter Functional (In Process)
6. SDS Amplifier Functional (In Process)
7. Central Electronics P. C. Boards In-Process Functional
8. DC/DC Power Converter Functional (In Process)
9. Geophones Module, Mechanical and Electrical
10. Geophone and Cable Assy Functional (In Process)
11. Electronics & Safe/Arm Assy Functional
12. Electronics & Safe/Arm Assy Bridgewire Resistance Measurement
13. Electronics & Safe/Arm Assy Capacitor Circuits In-Process Functional

14. Receiver Functional (In Process)

15. Central Electronics Handling Procedure

16. Geophone Module Handling Procedure

17. Explosives Package Handling Procedure

18. Components Handling Procedure

Generate the LSP unique sections of the following procedures for LSP test with the ALSEP Qual Model

1. Experiment Integration (update of Prototype)

2. IST with IPU

3. System EMI

4. Acceptance Vibration, S/P 1 (Operating, 3 axes random)

5. Design Limit Vibration, S/P 1 (3 axes operating 7 non-operating)

6. Modified IST

7. Thermal Vacuum - Functional and Environmental

   (2 procedures)

   a. Chamber Setup

   b. Chamber Verification

   c. ALSEP deployment

   d. Open Door IST

   e. Lunar Morning IST

   f. Lunar Noon IST

g. Crosstalk

h. Lunar Night IST

i. Open Door IST

j. Removal from Chamber

8. Design Limit Thermal Vacuum - Functional & Environmental (2 procedures) a. through j. as above.

9. LSP Explosive Package Temperature Cycling & Actuation in Vacuum by ALSEP Command

10. LSP Explosive Package Immunity to ALSEP Radiation plus Actuation by ALSEP Command

11.1.3 Flight Model Test Procedures - Revise and update as required the following Test Procedures for the Flight Model (LSP W/O ALSEP)

1. Experimental Function, 2 Procedures (CE/Geophones Module/ Transmit Ant., Explosive Pkg.)
2. Central Electronics Functional (In Process)
3. Transmitter Functional (In Process)
4. (Multiplexer and A/D Converter Functional - Deleted)
5. SDS Amplifier Functional (In Process)
6. Central Electronics Logic Boards In-Process Functional
7. DC/DC Power Converter Functional (In Process)

8. Geophones Module, Mechanical and Electrical
9. Geophone and Cable Assy. Functional (In Process)
10. Electronics & Safe/Arm Assy. Functional (In Process)
11. Electronics and Safe/Arm Assembly Bridgewire Resistance Measurement
12. Electronics & Safe/Arm Assy. Capacitor Circuits In-Process Functional
13. Receiver Functional (In Process)
14. Central Electronics Handling Procedure
15. Geophone Module Handling Procedure
16. Explosive Package Handling Procedure
17. Components Handling Procedure
18. Mass Properties, 3 Procedures: Central Electronics, Geophone Module/Transmit Antenna, Explosive Package and Transport Case
19. Acceptance Level Vibration (random only), 3 Procedures: Central Electronics, Geophones Module, Transmit Ant., Explosives Package and Transport Case (CE operating, rest non-operating)

Generate (or update as specified) the LSP unique sections of the following procedures for LSP test with the ALSEP flight model:

A. New Procedures

1. Experiment Fit Check
2. MSFN Turn-on & Verification
3. MSFN SIT

B. Update of Qual Procedures

4. Experiment Integration
5. IST with IFU
6. System EMI
7. Acceptance Vibration, S/P 1 (3 axes operating & non-operating)
8. Modified IST
9. Acceptance Thermal Vacuum - Functional & Environmental (2 Procedures)

11.1.4 Field Test Procedures - Generate the following four Test Procedures for Prototype Model Field Tests:

1. Support Equipment/Facilities Checkout at Test Site
2. Pre-Test Functional of Test Article
3. Deployment of Test Article and Support Equipment
4. Test Conduct

Update above 4 Procedures for Qualification Model Field Test

11.1.5 Structural/Mechanical/Thermal Simulator Test Procedures

Prepare the following test procedure for the Explosive Package Simulator;

1. Thermal Vacuum

11.1.6 Experiment Test Set Procedures - Generate the following test Procedure for the Test Set:

1. Experiment Test Set verification (acceptance)
2. Experiment Test Set calibration

11.1.7 Electronic and Safe/Arm Test Procedures:

1. Electronic and Safe/Arm Test Set Acceptance Test Procedure
2. Electronic and Safe/Arm Test Set Calibration

11.1.8 Crew Training Model Procedures:

1. Crew Training Model Acceptance Test Procedure.

11.2 Test Results Reports - Test Results reports will be prepared and submitted for acceptance tests on Qualification and Flight hardware, and for the qualification tests specified in para. 9.2.1B.

Reports shall consist of:

A. Pre-test meeting minutes

B. As-run procedure including Discrepancy Reports (DR), Test Discrepancy Reports (TDR) and variation sheets.

C. Post-test meeting minutes

D. Documentation of closing action items and test results.

E. Qualification Test Reports shall include preliminary engineering analysis of test results.