Bendix

Aerospace Systems Division

October System Safety Progress Report

ALSEP ARRAY E

ATM 1067

DATE 5 November 1971

This ATM documents the progress of the System Safety Program for ALSEP Array E through October 1971.

J. P. Jones, Supervisor
ALSEP Support Engineering

B. J. Rusky, Manager
ALSEP System Support

1.0 IDENTIFIED HAZARDS

1.1 LSG/Subpack No. 1 Interface

1.1.1 Description

The method of LSG attachment to Subpack No. 1 is through the use of four (4) boyd bolts. These boyd bolts deflect the sunshield to create the possibility of "throwing" boyd bolts with sufficient force to strike an astronaut EMU or to transmit sufficient force through the UHT to throw an astronaut off balance.

1.1.2 Status

Evaluation tests were conducted with the LSG at A. D. Little, Inc. on 19 July through 21 July 1971. These tests were conducted by BxA and A. D. Little personnel. An analysis of the test results has been documented in ATM 1057, LSP Boyd Bolt Release Tests Report, released 27 October 1971.

1.1.3 Disposition

The hazards involved in normal deployment of the LSG Experiment have been reduced to negligible as a result of the analysis. A residual hazard has been defined to MSC System Safety. The effect of a boyd bolt shearing failure at a time when an astronaut is over the LSG cannot be determined until the capability of the EMU to sustain a low energy impact has been investigated by MSC.

2.0 DESIGN CHANGES

Array E design changes are reviewed from the safety viewpoint prior to initiating the change. During this report period one design change required safety consideration. The change involved the LSP Experiment.

2.1 Description

ECN 66630 on Assembly 2348593 dispositions the improved design qualification and flight safe/arm slides for use in prototype hardware; new identical qualification and flight slides will be manufactured. The improved design qual/flight slides have a radius on the counter bore in the safe and resafe position which improves the ability of the slide to contain an accidental EDC detonation.

2.2 Status

The changes have been incorporated and the Safe/Arm Slides will be verified as capable of withstanding EDC detonation in the safe and resafe positions by NOL.

3.0 IDENTIFIED SAFETY DISCREPANCIES

No safety discrepancies have been identified during this report period.

4.0 TESTS AND OPERATIONAL PROCEDURES

A total of 29 procedures have been reviewed and four of these procedures contained hazardous sequences. No new hazardous sequences have been identified since the last report.

5.0 SYSTEM SAFETY DOCUMENTS

5.1 LS-11 - LSP Field Test Safety Plan was released on 7 October 1971 with MSC approval. The plan provides detailed information to assure controlled conditions during the hazardous field test sequences for the protection of test personnel and to establish criteria for responding to emergency situations which may arise during the tests. An update of this document will be released in November to reflect changes that will be made in field test planning and procedures.

5.2 ATM 1057 - LSG Boyd Bolt Release Test Report was released on October 1971. This report documents a "worst case" analysis of LSG/Boyd Bolt interface using the data recorded at the test performed at Arthur D. Little Incorporated on 15 July through 21 July 1971 to determine the inherent safety of the design.

5.3 ATM 1056 - LSP Ground Operations and Safety Plan is being updated to incorporate NASA MSC comments and the latest available information.

6.0 RESIDUAL HAZARD LIST

A residual hazard has been identified on the LSP Experiment. Specifically, in the unlikely event of shearing an LSG Boyd Bolt at a time when the astronaut EMU could be hit by the bolt the effect on the astronaut EMU cannot be determined. The hazard exists as a residual hazard pending an MSC investigation of the capability of the suit to withstand impact from the bolt.

7.0 NARRATIVE

7.1 LSP Manufacturing

An LSP Safety briefing was conducted for LSP Manufacturing, Test and Inspection personnel as well as DCAS inspection. This presentation was conducted at two different times so that all currently assigned personnel could attend. The briefing will be presented again at an appropriate time for the benefit of personnel handling E&SA Assemblies during environmental testing.

7.2 LSP Field Test

7.2.1 A safety analysis was performed on the heaters to be used with the explosive packages during field testing. The heater circuitry was found to be inherently safe and the brief analysis is documented in letter no. 975-2327.

7.2.2 The NOL procedures for standard charge detonation and disposition of LSP Explosive Package Duds were received from MSC for review. BxA comments for incorporation into these procedures were forwarded to MSC.