



The Charles Stark Draper Laboratory

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LUMINARY PROJECT MEMO # 27

TO: Distribution
FROM: R. Larson
DATE: March 2, 1972
SUBJECT: Minutes of LEP Meeting Held at MSC on 2/23/72 (LM)

MIT Attendees: R. Larson, P. Rye, D. Eyles, P. Weissman,
P. Volante, S. Drake, R. Sheridan, K. Greene

On February 23, 1972 a meeting was held at MSC to review all Erasable Memory Programs (EMP's) and Luminary Erasable Procedures (LEP's) (LM) that have been written by MIT. The following is a summary of the Disposition of these LEP's from the review and the assigned action items.

LEP 001 Cause a software restart via V31
SOURCE: PCR 1154.2, EMP 102.

This EMP was given SCB sign off.

LEP 002 EMP to backup failed
DSKY key
SOURCE: PCR 1155, EMP 100

OPEN

1. The Display Inertial Data Request discrete (SW channel 30 bit 6) should be checked to see if this discrete can also be used (as a backup to Gimbal Disable (SW channel 32, bit 9) and if so to include it in the EMP.

ACTION: P. Rye

2. Include in Recovery/Termination how you disengage this EMP VIA V21 N01?

ACTION: P. Rye

LEP 003 EMP for N79 overwrite
SOURCE: PCR 1177, EMP 106; Checklist, Apollo 16,
G&N Dictionary, 12/1/72, p. 1-41.

OPEN

Research what happens in response other than PRO
after the EMP is loaded (e.g. V32E, V34E, restarts,
etc). Are there restrictions in response to the above?

ACTION: D. Millard

LEP 004 State vector readout for transfer to CMC.
SOURCE: Checklist, Apollo 16, G&N Dictionary,
12/1/71, p. 1-76.

OPEN

1. Add to Restriction 1, p. 70 & 71.

ACTION: R. Larson

2. Add a 4th restriction stating that the SV loading
steps are for lunar sphere only.

ACTION: R. Larson, P. Volante

LEP 005 V36 recovery
SOURCE: Checklist, Apollo 16, G&N Dictionary
12/1/71, p. 1-15.

OPEN

Make statement about loading HIASCENT & CH 5,
CH 6, MASK and any others?

ACTION: R. Larson

LEP 006 General Systems Checkout
SOURCE: Checklist, Apollo 16, G&N Dictionary,
12/1/72, p. 1-15.

OPEN

1. The Explanatory Data, 5th paragraph, change
V36 to Fresh start and add step 1d to 1c.
2. In Restrictions indicate that 1 is for 1c and 1d
of Procedure
3. In Restrictions 1 also refer to LEP 007.

ACTION: R. Larson

LEP 007 LGC thruster inhibit/re-enable
SOURCE: Checklist, Apollo 16, G&N Dictionary,
12/1/71, p. 1-66.

T IS DONE

LEP 008 Crew defined docked deadband.
SOURCE: Checklist, Apollo 16, G&N Dictionary,
12/1/71, p. 1-66.

OPEN

1. In Explanatory data change "dead zone" to "dead band" and change " 2.8^0 to 10^0 " to " $\pm 1.4^0$ to $\pm 5^0$ ".
2. In reference delete "Sec 3, Rev 6" and change p. 3.4 - 24 to 3.4 - 23.
3. Add Restriction: V36 or Freshstart overwrites docked deadband with approx. $\pm 1.4^0$ (see LEP 005)

ACTION: R. Larson

LEP 009 LPD bias load/alternate bias load.
SOURCE: Checklist, Apollo 16, G&N Dictionary,
12/1/71, p. 1-66.

OPEN

This LEP was somehow left in Cambridge. It has not been completely reviewed by 23D.

ACTION: S. Drake, R. Larson

LEP 010 R MAX/V MAX loading to force all N 49' s.
SOURCE: Checklist, Apollo 16, G&N Dictionary,
12/1/71, p. 1-66.

OPEN

This LEP was also left in Cambridge. It has been reviewed but not submitted to SFSB.

ACTION: R. Larson

LEP 011 DSKY TIMER - D. Millard

LEP 101 LGC operation with the IMU cage discrete failed on.

OPEN

This LEP is in the process of development by MIT.

ACTION: R. Larson, R. Sheridan, S. Drake, D. Millard
Mtg. Friday 3/3, 9:00 am, Room 215A.

LEP 102 LGC operation with 1SS turn-on discrete failure.

OPEN

This will be taken up with LEP 101.

LEP 103 LGC operation with the IMU operate discrete failed
OFF

OPEN

This also will be taken up with LEP 101.

LEP 104 EMP for inhibiting T4RUPT course alignment of the
IMU
SOURCE: PCR 1165.2; EMP 108.

OPEN

1. 31201 alarm should be mentioned vice 31202.
2. Restriction 5 needs clarification - Operation with DAP has not been verified.
3. Add changes for other CDU's.

ACTION: R. Larson, N. Barnett, P. Weissman

4. Restriction 7A needs clarification, make like EMP 100.

LEP 105 Rapid IMU realign
SOURCE: Checklist, Apollo 16, G&N Dictionary,
12/1/71, p. 3-1.

OPEN

Research and/or add Explanatory Data for maintaining pitch axis other than Zero.

ACTION: D. Millard

LEP 106 EMP for P20 operation with IMU OFF
SOURCE: PCR 1175; EMP 104

OPEN

Preliminary copy submitted to SFSB for review.

ACTION: P. Volante standby for comments, comments received 2/29/72.

LEP 107 Ascent with failed CDU.
SOURCE: PCR 355 (MIT has not received this PCR)

OPEN

LEP 107 will be dealt with in conjunction with LEP 108, 109, and 110.
Preliminary proposal for these LEP's submitted 2/23/72 to SFSB.

ACTION: R. Larson, D. Millard, S. Drake, R. Sheridan
Mtg: Tuesday, 2/29, 9:00 am 215A.

LEP 108 EMP for performing descent with failed CDU's
SOURCE: PCR 1158; EMP 103.

OPEN

EMP 103 was submitted to SFSB on 2/23/72.

Luminary Memo #235 Rev 1 submitted to SFSB on 2/23/72 as alternate method.

1. Research needs to be done in the area of (a) widening DB, (b) disabling jets, and (c) elimination DAP alarm.
2. Research is also required to determine PGNS throttle control during AGS attitude control.

3. Research is required on procedures by R. Thorson (MSC) relating to descent with static failure in Y or Z.

ACTION: D. Eyles

LEP 109 EMP for IMU orientation determination (P51, P57)
 with a failed CDU
 SOURCE: PCR 1167.2

OPEN

See LEP 107.

LEP 110 EMP for IMU realignment (P52, P57) with a failed CDU
 SOURCE: PCR 1166.2

OPEN

See LEP 107.

LEP 111 P 40, P 41, P 42 with failed CDU

OPEN

MIT is not working on this LEP at the present time

LEP 112 PIPA bias measurement and loading.
 SOURCE: Checklist, Apollo 16, G&N Dictionary,
 12/1/71, p. 1-60.

OPEN

Add Explanatory Note that covers computer scaling
and derivation of equations and all that stuff.

ACTION: R. Sheridan

LEP 113 Enable V 40 N 20 E in apparent gimbal lock.

OPEN

1. Clarify MGA $\leq 70^\circ$ in step 1.

2. Add N 20 to step 3 of LEP

3. Delete word "STATUS"

ACTION: R. Larson

LEP 114 Onboard computation of NBD XYZ
SOURCE: Checklist, Apollo 16, LM DATA CARD BOOK,
 12/16/71, p. 2.

OPEN

I do not feel that this procedure has been fully
verified by MIT (23S and 23D)

ACTION: R. Sheridan, S. Drake

LEP 201 EMP for displaying raw LR H and H dot on the DSKY
SOURCE: PCR 1178, EMP 107

OPEN

EMP 107 and Luminary Memo (unnumbered) were
distributed to SFSB for review on 2/23/72.

ACTION: D. Eyles standby for comments.

LEP 202 Radar bias determination/initialization
SOURCE: Checklist, Apollo 16, G&N Dictionary
 12/1/71, p. 1-65.

OPEN

1. Add boresight determination procedure.
2. Verify signs and add in explanatory data if not in
checklist.

ACTION: R. Larson, S. Drake, P. Volante.

LEP 203 RR CDU Failure Work arounds

SOURCE

OPEN

This LEP is in Limbo

1. MIT should review the Apollo 15 Notes of Interest relative to this LEP.

2. MIT should review the B. Cockerell, R. Savely memo relative to this LEP

ACTION: P. Volante, E. Mueller

LEP 301 EMP for guided RCS translational maneuvers (P 99)
SOURCE: PCR 1156, EMP 99

OPEN

1. Change Switch nomenclature
2. Add change for 2 jet to Restrictions
3. Include deadband centering changes whenever they occur and specify values (R03 value or 1^0 , etc).
4. Add termination procedure
5. Change Prior 2 people title to GND
6. Prior 3c Note should read . . . for maneuvers and burn.

ACTION: P. Weissman, P. Volante

LEP 302 EMP for P 47 with DPS/GTS (gimbal trim system)
SOURCE: PCR 1174, EMP 101

This EMP was given SCB sign off with conditions that Norton's comments be incorporated.