

Massachusetts Institute of Technology  
C. S. Draper Laboratory  
Cambridge, Massachusetts

LUMINARY Memo #184

To: Distribution  
From: D. Densmore  
Date: 15 December 1970  
Subject: Luminary Revisions 188-190

Luminary Revision 188 moved 57 words of Ascent Guidance (Routines ENGOFF, ENGOFF1, CUTOFF, CUTOFF1, and constant V16N63) were moved from bank 14 to bank 34.

Luminary Revision 189 fixed a keypunch error and an incorrect bank moving.

Luminary Revision 190 included the implementation of the following: PCR 333, Anomaly L-1D-14, ACB L-29, ACB L-30, and PCR 343; further implementation of PCR 339, PCR 1044, and ACB L-38; and cancellation of ACB L-40.

- 1) PCR 333 (Change recognition of ROD inputs). RODTRAP was coded in MARKRUPT instead of in LLGE, with an additional check of AVEGFLAG. ROD inputs are only recognized as valid during Average G. This makes it possible to use the ROD switch as a back-up MARKRUPT capability for Lunar Surface Mark procedures.
- 2) (L-38)
  - a) A s. p. constant (BITS9+7) was moved from Bank 42 to Bank 40 to make room for the implementation of ACB L-38. It is used only once, in interpretive.
  - b) A misspelled operand (RNDVZBIT) was changed to be spelled correctly (as defined, that is).

- 3) L-1D-14 (Set NOTHROTL flag for impulsive burns).  
At TIG -5, in S40.13 of P40, NOTHROTL, flagword 5 bit 12, is set before setting IMPULSW and going to ENDOFJOB in the impulsive burn case.
- 4) (ACB L-29) To improve the accuracy of the computation in DVTOTAL, the coding at MOONSPOT was changed to multiply KPIP1 times ABDELV with DMP rather than with SHORTMP.
- 5) (ACB L-30)  
The tag "MOONSPOT" in SERVICER was moved down eleven lines to after DVTOTAL is incremented. During the time interval from TIG -30 to TIG in P12, DVTOTAL was needlessly incremented by lunar gravity. This change makes DVTOTAL an accurate measure of the work done by the engine.
- 6) PCR 343 cancelled PCR 340 which changed the polarity of LATVEL to make it compatible with other X-pointer inputs. Since PCR 343 was implemented a hardware change was made to reverse the polarity. Four CA's that had been made CS, and two DCA's that had been made DCS, were changed back in L. A. D.
- 7) (PCR 339) Nine words were moved from bank 10 to bank 14 to make room for implementation of the V16N72 priority monitor display. Two unused routines in D. I. R. had been deleted, but then they were needed by PCR 1044 so they had to be replaced. (ACB L-40, Items 8f and 9.)
- 8) PCR 1044 (Redesign of R53-R57).
  - a) Correction to LUMINARY Memo 183 Item 3: (1) The two erasables formerly referenced to another unconnected erasable and now defined with their own names were put into Revision 190, not 187, and were XCOUNT and YCOUNT, not XMKNTR and YMKNTR. XCOUNT and YCOUNT

were formerly referenced relative to AOTCODE.

XMKCNTR and YMKCNTR share with P21TIME, +1.

(2) The incorrect erasable assignment flagged by CHECK= was put into Rev. 187 and corrected in Rev. 190. SPIRAL and CURSOR were defined as AOTCODE +3 and AOTCODE +5; however, they must be contiguous for downlink purposes.

- b) A keypunch error misspelling NOMKCNT was corrected, and the remarks for the erasables in this area were made more explicit and complete, including clear labelling of downlinked quantities.
  - c) The tags XCOUNT and YCOUNT were used in AOTMARK instead of AOTCODE +1 and AOTCODE +2. (clean-up.)
  - d) The star vector averaging counter MKDEX was formerly incremented even when a star is rejected in P57. The coding in AOTMARK to increment it was moved so that it would only increment when a star was accepted.
  - e) The accumulated average of the star vectors was unitized to improve accuracy in AVEIT in AOTMARK.
  - f) The implementation of PCR 1044 used routines GOMARK2 and GOMARK2R, which were deleted in the same revision to make room for PCR 339. They were replaced in this revision.
- 9) (L-40) L-40, to delete GOMARK2 and GOMARK2R, was cancelled and the routines (six words in bank 10) were replaced.
- 10) The erasable definitions for DB and DBVAL1 were corrected to have accurate and complete remarks fields and DBVAL1 was defined with "=" instead of "EQUALS" because it is another name for the same erasable (DB).

GSOP Impact:

The following items should be examined for impact on the various GSOP sections:

section 2	items 1, 3, 6
section 4	items 1, 3, 5, 8
section 5	items 1, 5