

Erasable Memory Conflicts in Luminary 163

- References: (a) Revision 163 of AGC Program Luminary, dated 29 April 1970, received 18 May 1970.
- (b) "Erroneous N60 R1 Scaling in Luminary 163," dated 20 May 1970.
- (c) "Comments on Compatibility of Luminary 163 Program with MSC-approved PCRs 287 and 1038," dated 21 May 1970.
- (d) "Comments on Fix of Anomaly L-1C-01 in Luminary 163," dated 22 May 1970.

Continued review of reference (a) has revealed several erasable memory conflicts which prejudice the operational capability of the program, or at least make certain operational restrictions advisable. These difficulties are in addition to those with the program reported previously to MSC in references (b), (c), and (d).

One difficulty, for which no work-around seems available, makes the 1466_g alarm generation criterion somewhat variable. With the addition of TLOSS parameters on the downlink, the monitoring can be done by the ground, but no reliance should be placed on the 1466_g ("too many cycles dropped in P66") alarm itself. The difficulty arises because of the assignment of the "pad-load" cell TOOFW (see PCR 1013) to cell E7,1464. This cell is also used for the least significant half of the acceleration magnitude (program tag "/AFC/" and Official MSC equation notation "AFCMAG") which, of course, is loaded every second (for normal computations) in the P66 throttle-computation equations, lines 964 and 1009 on pages 802-3 of reference (a). The value of the least significant half of this equation quantity, of course, is not readily predicted before the flight. The difficulty only impacts the 1466_g alarm generation; it does not affect the decision as to whether the alarm "should" be created (i.e. the TLOSS "load shedding"). Attention was first directed to the erasable conflict of this constant due to its deliberate equivalencing to the cell QSAVED (by line 1913 on page 143 of reference (a)). QSAVED, in turn, is used by "VN1645", which among others is entered by P30, thus violating page 5.1-14 of Section 5 Rev. 8 Luminary GSOP which shows P30 together with P63 as part of "DOI and Coast Phase". An N01 loading could correct the "pad load" after P30, but naturally is not practical for the /AFC/ conflict.

A second difficulty is associated with the implementation of PCR 1028, which is supposed to provide "a separate erasable load...for LRWH in the programs following P63." There are two problems:

1. The separate quantity is made available only if P64 is entered (lines 01974-6 on page 784, "STARTP64", in reference (a)). According to Assumption #29 of P63 in Luminary Section 4 Rev. 7 GSOP, P63 allows "the selection of P66", a program "following P63" for which the original LRWH would remain loaded (i.e. P63 value).
2. The new cell for "following P63" values is LRWH1, cell E7,1756. It occupies the identical location to the most significant half of RM, the scaled radar range loaded in the "LRS22.1" routine (line 2889 on page 578 of reference (a)). This is entered from R22 even in the "no update mode", although P20 is supposed to be operable in this mode prior to descent (see Assumption 10 of P20 in Section 4 Rev. 7 GSOP). An N01 load could fix this problem.

A third conflict, of operational interest, is the fact that P20 and P22/P25 now load the N54 cells for ranges in excess of 400/566 miles (see reference (c)) without locking out extended verbs. Other displays (e.g. R36 or R30) could be garbled, and V47 (AGS update) should NOT be selected, nor should V67.

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