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LUMINARY Memo #177

TO: Distribution  
FROM: D. Eyles  
DATE: 22 October 1970  
SUBJECT: ZERLINA 56

The changes between ZERLINA 50 and ZERLINA 56 were all small, but since many of them involve displays they are documented here. I'm sorry this updated ZERLINA took so long to appear. "No-change" changes in LUMINARY, with which most of ZERLINA is common, had a delaying impact.

A. First, all the changes that have gone into LUMINARY up to revision 183 are incorporated.

B. The selection of P66 from P70 (or P71 or P12) – a sportive capability of ZERLINA 50 – is not allowed in ZERLINA 56.

C. The scaling of P64 LPD clicks was made  $1^\circ$  in both azimuth and elevation. Previously the scaling was  $1/2^\circ$  in elevation and  $2^\circ$  in azimuth. This is PCR 338, approved for LUMINARY too.

D. The polarity of the cross-pointer displays was changed back to what it always was, because the hardware change takes care of reversing the LATVEL display, even in the LGC case.

E. In ZERLINA 50, N63 was still being used during Ascent (P70, P71, P12) even though DELTAH, which appeared in R1, had no meaning in those phases. In ZERLINA 56, N63 is replaced by N94 during Ascent. This noun is as follows.

N94: R1 VGX (as in N85)  
R2 H  
R3 H

This change is approved for LUMINARY too.

F. The range displayed in N68 is no longer slant range, but instead is ground range, or, strictly speaking, SM Z-axis range. Although early in P63, when the LM is below the SM Z-axis, this display is somewhat less meaningful than the old one, during the final stages it more nearly represents ground range. LUMINARY too.

G. In N64, displayed during P64, forward velocity replaces TREDES in the left-hand half of R1. This makes N64 and N60 identical, but both nouns are retained, for the present. TREDES, everyone I talked to concurred, is of no use. Having forward velocity instead, even though it is truncated at 99 f/s, at least gives useful information near the end of P64. In particular, since P66 LPD operation is closely related to forward velocity (see Luminary Memo #171), this forward velocity display will assist the astronaut in deciding when to enter that mode. Of course this information is already available on the cross-pointers, in their high-mult mode, but to read them to the CDR the LMP must take his eyes off the DSKY. Additionally, having forward velocity on the DSKY may allow the cross-pointers to be kept in lo-mult throughout the Landing.

H. Finally, altitude-rate is updated every second in N60 during P66, instead of every 2 seconds as, anomalously, in ZERLINA 50.