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MEMO

To: Russ Larson  
From: D. Eyles  
Date: 9 March 1970  
Subject: What To Do About TLOSS For Apollo 14

We are in a quandary over what to do about TLOSS for Apollo 14. The possibilities so far considered are these:

(1) Do nothing. Be content with the Apollo 13 solution for the one most time-consuming phase, P66 Auto. Time for the terrain model is provided by Covelli's synchronization of the LR read, so that the Apollo 14 rope is no less safe than the one for 13. This plan diverts little effort away from the variable guidance period being prepared for 15.

(2) Generalize the scheme devised by Klumpp for P66 Auto to all powered flight. That is (a) raise Servicer's priority after it starts so a new Servicer cannot break in, and (b) check time at the end of Servicer and if it is too late (criterion in erasable) drop guidance for that pass. This would require fairly massive testing of the 14 rope, since every phase would have to be tested with enough TLOSS to drop off guidance. This is PCR 1012 as written.

(3) Implement only part (a) of (2). This prevents the worst of the TLOSS manifestations - wild maneuvering - and nothing untoward happens before an eventual 1201 or 1202 alarm, except (here's the rub) some delta-V would be lost and the navigation thus degraded. So this version of PCR 1012, the one approved at the last SCB, does not seem too attractive. It could be improved by putting some alarm logic in a strategic place to warn if the duty cycle is being exceeded before any bad manifestations at all. But what would be the response to this alarm? Terminate the landing or continue and loose navigation?

Up to now I have preferred solution (1). Thanks to Covelli the 14 rope would be better by a percent TLOSS or two even with the terrain model. But this memo is to point out another solution, a little bolder but possible and on

the whole safer and easier.

I suggest we offer the Variable Guidance Period Servicer - running at a minimum of 2 seconds to make it like current programs in the absence of TLOSS - for Apollo 14 with two to four weeks further slip, to mid-May or late May. It could be done on roughly this schedule:

now - 1C SFRR (mid-March)	Develop Variable Servicer in version Zerlina, minimizing computer usage.
SFRR - next SCB (early April)	Test in Zerlina, concentrating on landing.
SCB - end of April	Test all phases at 0 and some high value TLOSS (20% or 30%).
end of April - release	Freeze assembly, run pseudo level 6 tests.

The work done so far is consistent with this plan. The Variable Servicer is written and running in landings. The attractions of this plan are

- (1) The variable Servicer - which as most here now agree, is the necessary ultimate solution to TLOSS worries - gets in one flight sooner.
- (2) Duplication of effort is avoided. The Apollo 14 effort does not detract from the more thorough plan for 15.
- (3) Minimization of total testing by eliminating the major difference there would be between the ropes for 14 and 15. Or, for a given amount of testing of these ropes, greater confidence would be gained. It seems silly to test another kluge for 14 when you expect to put in a non-kluge solution soon anyway.

This suggestion is motivated by my discouragement with all the three initial suggestions and confidence in the variable Servicer now running in ZERLINA.