



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS 77058

IN REPLY REFER TO: 70-FA-T-12

February 10, 1970

MEMORANDUM TO: See list attached.

FROM : FA/Chairman, Apollo Spacecraft Software
Configuration Control Board

SUBJECT : Status report on the "P66" fix

There were some things about the terminal descent on the last mission that kind of spooked a lot of people. One of the things suggested as a result of this was to add a capability to the LM guidance and control system which would assist the crew during the last 100 feet or so of the descent. Specifically, fix the PGNCs so that it will provide an automatic nulling of the horizontal velocity while the crew controls the descent rate with the ROD switch.

This suggestion was made in mid-December after the Apollo 13 LM computer flight ropes modules had been manufactured. Therefore it was desirable to constrain this change to a single module and, of course the formulation, coding and verification had to be carried out very quickly. Actually the program release was accomplished in early January for Raytheon to make a new module No. 5. The plan was to finish all necessary testing and analysis after that release and, if anything were found making it non-flight worthy, we would fall back and use the original module which essentially provides the Apollo 11 and 12 capability.

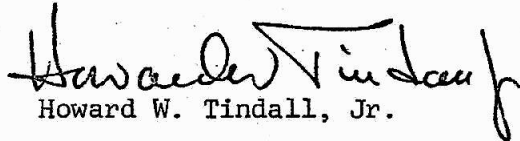
Since that time the crew has really fallen for the horizontal velocity nulling feature but, unfortunately, MIT has discovered problems in the formulation which make the program unacceptable for flight. Specifically the computer cycle time is exceeded, or nearly so; the consequence of which is violent throttle commands either up or down completely without warning.

MIT has reworked the program to avoid this unacceptable feature and claims to have thoroughly tested it. Eyeball examination by other experts (MSC and TRW) and FMES testing at Grumman have revealed nothing questionable about it. MIT strongly advised making a new revised module 5.

The question resolves to which is the greater risk - a new "immature" program which may contain undiscovered deficiencies vs. a flight without automatic horizontal nulling. A toss-up.

Mr. Kraft broke (shattered?) the tie by voting for making the new module and the tape was released to Raytheon the morning of February 5. Rope delivery to KSC is now scheduled for March 10, 1970, which means the original module must be used during the FRT now planned on February 18, 1970. However, the module will be instilled prior to CDDT, which is currently scheduled for March 19, 1970.

And, of course we'll use it unless something is discovered between now and then to prevent it. Testing, of course, continues at a rapid pace; the crew, on the other hand, is training to get along without it if they must.


Howard W. Tindall, Jr.

FA:HWT:js