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OCT 30 1969

UNITED STATES GOVERNMENT

Memorandum

NASA Manned Spacecraft Center

TO : See list attached

DATE: October 21, 1969

69-PA-T-132A

FROM : PA/Chief, Apollo Data Priority Coordination

SUBJECT: Apollo 12 Newsletter

So many things have changed - some subtly, some considerably - that I thought a newsletter might be useful. It is written particularly for those of you who have not been directly involved in preparation for Apollo 12.

LM IMU Drift Check

Based on providing a safe (not point) landing with abortability, MPAD has established the LM IMU drift rate tolerances to be .35°/hr. about the pitch axis (Y) and 1.5°/hr. about the roll and yaw axes (X, Z). Using the new docked alignment technique followed by the pre-DOI/PDI AOT alignment (P52) about 2 3/4 hours later, the allowable differences in the actual torquing angles from those predicted by the MCC are 0.8° around Y and 3.6° around X and Z. These are nice and wide, making a NO/GO improbable. However, if they are exceeded, DOI must be delayed one rev and the crew will repeat the P52 about two hours after the first. Based on these torquing angles, the crew will compute and update the IMU compensation parameters in the LGC using standard techniques and a decimal-to-octal conversion chart they have been supplied. If the P52 repeat confirms a changing drift rate greater than 1.5°/hr. in any axis, the IMU is broken and DOI is NO/GO for the mission. Otherwise, there is no further check and the mission is continued. (Note: it is necessary for the crew to update their own IMU compensation since the P52 occurs shortly after LOS and it is important that the new compensation be in operation ASAP after the P52 to avoid a misalignment build-up before PDI.)

DOI

A change in the Mission Rules has been agreed to which clarifies action in the event of large DOI residuals. As noted previously, we're willing to accept PDI altitude dispersions resulting from DOI residuals less than 5 fps. There are failures which could cause larger residuals than that, though, that do not preclude descent. For example, failure of the PGNCS to shut off the DPS. Manual backup for this could result in about 8 fps overspeed with perfect PGNCS, AGS, and DPS still available. RCS (-X) plume impingement prevents trimming more than about 5 fps so the rule says:

a. If PGNCS residual is greater than 10 fps - abort

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b. If PGNCS residual is greater than 5 fps but less than 10 fps - trim to 5 fps and continue if the PGNCS is working okay.

c. If PGNCS residual is less than 5 fps - continue if the PGNCS is okay.

DOI Aborts

FCD has determined that the X-axis RCS plume impingement is marginal to support LM Z-axis braking from a DOI abort rendezvous, so the procedure is to jettison the DPS at TPI.

Landing Radar

Since our September 15/16 Apollo Mission Techniques meeting we have had second thoughts on how we should handle a 523 alarm, which indicates that the landing radar antenna has failed to reposition correctly after high gate. At the time of our meeting, consensus of those present was that processing landing radar after high gate was a desirable thing to do even when it was actually near Position 1. Since that time independent analysis by MIT and MPAD has indicated that, although we wouldn't be in bad trouble allowing the landing radar to come in, we are better off to inhibit it in some cases, provided we have had good landing radar data until high gate. It is true that with the recent spacecraft computer program changes there are some occasions when we would be slightly better off to process the data but the operational complexity of sorting out which situation we have in real time is not warranted. We also preferred, if possible, to keep the crew procedure the same, regardless of whether communication with the control center was available or not. Therefore, in the event of a 523 alarm, the precise crew procedure is V58 (to inhibit the landing radar) and "Proceed" (to clear the alarm) and then an "Error Reset."

Lunar Surface

Everyone must know by now that the CCB decided the PGNCS should be powered down on the lunar surface. Before powering down, though, the crew has agreed to do two (rather than one) AOT alignments (Technique 2) to provide data which gives the MCC a substantially better chance of determining LM position on the moon.

MSFN Orbit Determination

It has been found that by adding one more term in the RTCC lunar potential model, we are able to improve the orbit determination and descent targeting significantly. It even permits high-quality, single-pass solutions! There was some concern that the incompatibility of the RTCC with the spacecraft computers might present some problem but as of now we can't think of any so - it's in the RTCC, but won't be in the spacecraft for either Apollo 12 or 13.

Howard W. Tindall, Jr.

Howard W. Tindall, Jr.

PA:HWT:js