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COLOSSUS Memo #213

LUMINARY Memo #110

TO: Distribution
FROM: W. F. Ostanek
DATE: 10 September 1969
SUBJECT: Bad Other Vehicle State Vector

This memo describes a method of replacing a bad state vector for the other vehicle without ground update. The bad state vector probably results from erroneous use of P76.

This method involves use of V71 state vector update and a program or routine which leaves available in erasable a rectified state vector scaled appropriately for earth or lunar orbit. Rectified this and other state vectors are available in both spacecraft (RN, VN, PIPTIME; R-OTHER, V-OTHER, T-OTHER) but cannot be loaded directly via V71 because of incorrect scaling when lunar centered.

However, routines R31 (V83), R34 (V85) and program P21 with other vehicle option integrate the state vector to some base time and save the rectified state vector in the proper scaling for that base time.

Procedure:

In the Command Module

When it recognizes it has a bad IM state vector, the CM asks the LM for his state vector. In the LM, with rendezvous navigation programs, V83 is entered and following the N54 the following registers are readout via V1N1:

\bar{R}	BASETHP	E4,1567	2167-2174	
\bar{V}	BASETHV	E4,1504	2104-2111	(LUMINARY 116)
T	BASETIME	E4,1513	2113-2114	

If rendezvous navigation is not being done, P21 may be used with this vehicle option and readout of the following registers after N43:

\bar{R}	P21BASER	E7,1675	3675-3702	
\bar{V}	P21BASEV	E7,1703	3703-3710	(LUMINARY 116)
T	P21TIME	E7,1762	3762-2763	

The 14 registers comprising \bar{R} , \bar{V} , T are voiced in that order to the CM. The CM copies the registers, then selects P00 and enters V71E, 21E, 1501E, 77775 (77776 for earth orbit) and then \bar{R} , \bar{V} , T. Proceed on FLV21 NO2 causes the state vector to be loaded. Since the state vector was obtained from the LM and the LM burn has already taken place, the CM does not use P76 again until the next LM burn.

The W matrix and state vectors will not be synchronized following this procedure. The W-matrix is invalidated by the state vector update. P00 should be reselected so that P00 will immediately synchronize the state vectors.

In the Lunar Module

If the LM has a bad CM state vector, the procedure above is used except the CM calls up V83 or P21 with this vehicle option. The CMC locations for the V83 state vector is:

\bar{R}	BASETHP	E4,1624	2254-2261	
\bar{V}	BASETHV	E4,1640	2262-2267	(COMANCHE 67)
T	BASETIME	E4,1742	2342-2343	

For P21:

\bar{R}	P21BASER	E7,1604	3604-3611	
\bar{V}	P21BASEV	E7,1612	3612-3617	(COMANCHE 67)
T	P21TIME	E4,1715	2315-2316	

The LM uses the same P27 block update procedure except the third entry after V71E is 2 (1 for earth orbit).