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UNITED STATES GOVERNMENT

Memorandum

TO : See list attached

DATE: September 1, 1967

In reply refer to:
PD-AC/M39

FROM : Chairman, Guidance Software Control Panel

SUBJECT: Review of Command Module Computer (CMC) and Lunar Guidance Computer (LGC) fixed memory storage requirements

1. On August 28, 1967, a meeting was held at MIT/IL to review the CMC and LGC fixed memory storage requirements. MIT/IL presented an estimate of the present fixed memory required to code the CMC and the LGC programs as defined in the preliminary Guidance System Operations Plan (GSOP) and as modified at the MSC GSOP review. It was estimated that the programs to be coded exceeded the available fixed memory by 1,695 words in the CMC and 2,170 words in the LGC. This estimate included a pad of 1,100 words in the CMC and 1,615 words in the LGC based on their previous experience and the amount of coding yet to be done.

2. The enclosure presents a summary of the programs which were considered for deletion. This list was derived from the questionable programs which survived the previous "black Friday" meetings, additions to the programs since the last "black Friday" meeting and a reevaluation of the MSC requirements. The following list in a summary of the programs deleted and the fixed memory acquired as a result of the deletions.

Description of Program	CMC	LGC
TPI Search	0	470
"Pulse Check" portion of "Self Check"	687	687
Lunar Orbit Plane Change Targeting	370	
Predicted Lunar Landing Time	330	330
Docked IMU Coarse Alignment		100
Lunar Surface Checkout		200
Safe Perilune	200	
Descent Orbit Injection		295
Lunar Orbit Insertion	200	
Lunar Surface Lat. Long		50
Total Deletions	1787	2132
Deletion Objective	1695	2170

3. In addition to the above deletions, two other candidates were discussed at length but no resolution was reached. Action items were assigned to investigate the potential deletion of the following candidates.

a. Remove the gyro compassing program (400 words) from the CMC assuming that the function can be performed elsewhere.

(1) MIT/IL to investigate relocating the program into erasable memory.

(2) MSC/ASPO to investigate relocating the program into ACE computer.

b. Reduce the predicted launch time program (850 words) in the LGC assuming a simplified program can be defined to provide the function.

MSC/CB/MPAD to investigate the acceptability of determining the launch time using a "canned" ascent and rendezvous trajectory.

4. All programs that were deleted were done so under the assumption that it did not compromise crew safety or mission success. If further analysis proves this not to be true, it is requested that it be brought to the attention of the Guidance Software Control Panel.

Aaron Cohen

Enclosure

Potential Deletion List
Colossus-Sundance
August 29, 1967

		Fixed Memory Words	
		Colossus (CMC)	Sundance (LGC)
I	Jan. 13, 1967 List (Category B & C)		
1.	P-21 Ground Track Det.	50	50
2.	P-17, P-77 TPI Search Prog.	480	470
3.	Self Check	687	687
4.	P-33 Lunar Orbit Plane Change Targeting Prog.	370	-
5.	P-22 Lunar Surface Navigation	-	120
6.	R-24 RR Search Routine	-	215
7.	P-25 CMC, P-60 LGC Predicted Lunar Landing Time Prog.	330	330
		1917	1872
II	Jan. 13, 1967 Possible Additions Incorporated (Category D)		
1.	R-05 S-Band Antenna Prog.	85	105
2.	P-50 Docked IMU Coarse Align't	-	100
3.	COAS Backup Marking (IMU Algn't)	50	50
4.	R-24 Backup Rendezvous Tracking (COAS)	100	-
5.	Erasable Memory on Downlink	20	20
		255	275

III MSC-MIT Additions or Direction to MIT Since Jan. 13, 1967

	CMC	LGC
1. R-34 Rendezvous Parameter Display (R, $\dot{R}$ and θ_{SXT})	20	-
2. R-63 Rendezvous Final Attitude Display (X axis along LOS)	30	30
3. P-38, P-78 Stable Orbit Rendezvous Pre-thrust	100	100
4. P-39, P-79 Stable Orbit Rendezvous Midcourse		
5. P-27 LGC Update Prog.	-	320
6. R-XX Rendezvous Out-of-Plane Display (Y, $\dot{Y}$ and ω)	120	120
	270	570

IV MIT Additions Since Jan. 13, 1967

1. R-35 Lunar Landmark Selection Routine	190	-
2. P-04 Lunar Surface Checkout	-	200
3. P-46 LM / CSM Separation Monitor Prog.	-	50
	190	250

V MSC Additional Suggestions (GSOP Review 8-16-67)

1. P-70 Safe Perilune	200	-
2. P-61 Descent Orbit Injection (DOI)	-	415
3. P-32 Lunar Orbit Insertion (LOI)	200	-
4. P-10, P-11 Predicted Launch Time Prog's.	-	850
5. Kayton Lunar Surface Lat. Long. Prog.	-	50
	400	1315
Grand Total	3032	4282