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COLOSSUS Memo #65  
Digital Simulation Memo #8-68

To: Distribution  
From: Sid David  
Date: 18 June 1968  
Subject: Revision of COLOSSUS Digital Environment

On June 18, the COLOSSUS digital environment changed in response to the NASA decision to employ COLOSSUS on the "D" mission (CSM103/LM3) and to incorporate new and significantly different SPS engine data. To implement these changes, the controlled digital simulation subroutine COLOSSUS, CSMBLK2 was revised, and two new data files were created: FLCSM103, COLOSSUS and FLLVC103. COLOSSUS.

The mass properties of the dry CSM103/LM3 vehicle are not very much different from the CSM106/LM5 vehicle. However, the propellant loading differences of the SPS and the Ascent LM stage are significant. These loadings are summarized below:

	CSM103/LM3 (lbs)	CSM106/LM5 (lbs)
SPS PROPELLANT	35268	39754
ASCENT LM PROPELLANT	4294	5044

The SPS engine steady state and minimum impulse thrust models have been revised. The new value of steady state nominal engine thrust is 20,500 lbs. Previously, 20,000 lbs. was the accepted value. The engine on and off delays (as modeled in the simulation) have been changed from 0.42 and 0.57 seconds respectively, to 0.52 and 0.49 seconds respectively. The turn-off transient (time from electrical shut down to 1% thrust) has been increased from 1.5 to 2.2 sec.

For minimum impulse burns (less than 1 sec duration) a second order curve fit is employed to model the total impulse. For burn durations less than 400 milliseconds, a zero impulse model is employed.

Simulation users who are testing COLOSSUS should continue to use the controlled subroutines and begin to use the above files immediately. In addition, two revisions to current run decks will be necessary.



- 1) Field three of the first INPUTPROG input card should read 503.
- 2) An additional COLOSSUS, CSMBLK2 input card is required to obtain a nominal vehicle for the docked LM configurations to off-load the Ascent stage propellant. The additional card when required should read as follows:

CSM4      290, 7, 0.8484, 1, 0, 0

To facilitate these changes, control cards have been reproduced and given to Margaret Hamilton for distribution.

The list below contains the names of all controlled subroutines and files to be used for checkout and verification of COLOSSUS.

Controlled Name Subroutine

COLOSSUS. ENVCNTRL  
COLOSSUS. PRELUNCH  
COLOSSUS. SATURN  
COLOSSUS. ATTITUDE  
COLOSSUS. CSMBLK2  
COLOSSUS. LVCBLK2  
COLOSSUS. IMUBLK2  
COLOSSUS. UNIVERSE  
COLOSSUS. ASTRNAUT  
COLOSSUS. OPTICSB2  
COLOSSUS. INPUTPRG  
COLOSSUS. DISCONT  
COLOSSUS. RRADAR  
COLOSSUS. TARGET

Controlled File

FLSATV. COLOSSUS	
FLCSM103. COLOSSUS	(This is a new file.)
FLLVC103. COLOSSUS	(This is a new file.)