

GM 32
19/3 R+M

NOV 30 1964

EG32-64-312

THROUGH: NASA Resident Apollo Spacecraft Program Office
Massachusetts Institute of Technology
Instrumentation Laboratory
Cambridge, Massachusetts 02142

TO : Massachusetts Institute of Technology
Instrumentation Laboratory
Cambridge, Massachusetts 02142
Attention: M. B. Trageser, Director, Apollo G&N Program

FROM : Manager, Apollo Spacecraft Program Office

SUBJECT: Contract NAS 9-153, LEM Guidance and Control configuration

This transmittal serves to define the integrated guidance and control system desired by the MSC. The selected configuration is based on the results of the joint effort undertaken by G&N, MIT, and MSC during the recent program definition phase to optimize the design and operational flexibility of the LEM guidance and control system.

The configuration selected is defined herein in terms of basic features and of changes desired to the pre-definition phase mechanization. The other details of the system and its peripheral functions and interfaces remain as defined in the minutes of the implementation meetings.

A primary control path and an independent abort control path, both having manual control capability, are to be provided.

The basic functions and mechanization of the two paths are as follows:

a. Primary Control Path. The primary navigation and guidance subsystem and the components of the stabilization and control subsystem required to actuate the reaction control and propulsion subsystems shall compose the primary control path. Interfaces are desired between the PNCB and the jet drivers and gimbal drive power switching of the SCS. Vehicle control through these functional interfaces shall be termed the digital autopilot control mode.

In accordance with the full mission capability required of this control mode, interfaces are desired between the manual attitude and translation controllers and the PNCB.

DC	OPR	#	T	FCM	SUBJ	SIGNATURE	LOC
11-30-64	MSC	17	LM	(A6000)		SHER	004-64

The digital autopilot control mode and the SCS are to be isolated in that a single power failure in the SCS shall not result in loss of digital autopilot control.

b. Abort Control Path. The stabilization and control subsystem and the abort guidance section shall compose the abort control path. The SCS shall operate entirely in conjunction with the AGS for automatic control except for the interfaces specified for the digital autopilot control mode. Attitude errors presently provided the SCS from the PNCS shall be used exclusively for display.

The existing manual control capability through the SCS is to be retained. One rate gyro package shall be provided for stabilization. The AGS shall not be required to compute vehicle angular rates or to drive the gimbal drive actuators directly.

The contractor is urged to consider hardware schedule maintenance the prime consideration in the implementation of the integrated guidance and control system and to assert maximum effort in minimizing schedule effect. Any necessary adjustments in contractual requirements will be forthcoming in accordance with established procedures.

The effort expended by MIT during the program definition phase is recognized and appreciated by the MSC.

Original Signed By:
Joseph F. Shea
Joseph F. Shea

cc:

NASA Hqs., MA

EG151/P. E. Ebersole

EG5/P. McGathey

PP7

EG

EG/C. W. Frasier

D. C. Cheatham

EG3

EG32

EG32/P. Kurten

EG32:PKurten:pj 11-27-64

CONCURRENCES:

MSC Form 192 (Mar 64) OFFICIAL FILE COPY

	EG151/Ebersole	EG/Frasier	EG/Cheatham	EG3/Gardiner	EG
OFFICE CODE ▶	EG151/Ebersole	EG/Frasier	EG/Cheatham	EG3/Gardiner	EG
SIGNATURE ▶	<i>P. E. Ebersole</i>	<i>C. W. Frasier</i>	<i>D. C. Cheatham</i>	<i>P. McGathey</i>	<i>P. E. Ebersole</i>
DATE ▶	11/27/64	11/27/64			11/27/64