APOLLO SPACECRAFT SOFTWARE CONFIGURATION CONTROL BOARD PROGRAM CHANGE REQUEST

NUMBER (Completed by FSB): 737

1.0 COMPLETED BY ORIGINATOR

1.1 ORIGINATOR	DATE	1.2 ORGANIZATION	APPROVAL	DATE
George W. Cherry	2/17/69	MIT/IL	G. W. Cherry	2/17/69

1.3 EFFECTIVITY: LUMINARYIA

1.4 TITLE OF CHANGE: Permit ATT HOLD Mode In P63, 64, 65

1.5 REASON(S) FOR CHANGE: See data amplification sheet

1.6 DESCRIPTION OF CHANGE: See data amplification sheet

2.0 SOFTWARE CONTROL BOARD OR FLIGHT SOFTWARE BRANCH DECISION FOR VISIBILITY IMPACT ESTIMATE BY MIT

2.1 ☐ APPROVED ☐ DISAPPROVED

2.2 REMARKS:

2.3 SOFTWARE CONTROL BOARD OR FLIGHT SOFTWARE BRANCH SIGN OFF

DATE

3.0 MIT VISIBILITY IMPACT EVALUATION:

3.1 SCHEDULE IMPACT: 1 day

3.2 IMPACT OF PROVIDING DETAILED EVALUATION

3.3 STORAGE IMPACT

3.4 REMARKS:

3.5 MIT ORIGINATOR: G. W. Cherry

DATE: 2/17/69

4.0 SOFTWARE CONTROL BOARD ACTION

4.1 ☐ IMPLEMENT AND PROVIDE DETAILED CHANGE EVAL. ☐ PROVIDE DETAILED CHANGE EVALUATION ☐ DISAPPROVED

4.2 REMARKS

4.3 SOFTWARE CONTROL BOARD SIGN OFF

DATE

5.0 MIT DETAILED PROGRAM CHANGE EVALUATION

5.1 MIT COORDINATOR

DATE

5.2 MIT EVALUATION

6.0 SOFTWARE CONTROL BOARD DECISION ON MIT DETAILED PROGRAM CHANGE EVALUATION

6.1 ☐ START OR CONTINUE IMPLEMENTATION ☐ DISAPPROVED OR STOP IMPLEMENTATION

6.2 REMARKS:

6.3 SOFTWARE CONTROL BOARD SIGN OFF

DATE

APOLLO SPACECRAFT SOFTWARE CONFIGURATION CONTROL BOARD

-DATA AMPLIFICATION SHEET -

PROGRAM CHANGE REQUEST NO. 737	PREPARED BY: George W. Cherry DATE: 2/17/69	ORGANIZATION: M. I. T.

CONTINUATION SECTION (REFER TO BLOCK NUMBER AND TITLE ON PROGRAM CHANGE REQUEST FORM)

REASON FOR CHANGE

The present landing program logic does not permit the astronaut to switch to the ATT HOLD mode in order to assess the manual handling qualities of the LM while the PGNCS maintains the P63, P64, or P65 computations, throttle control, DSKY displays and FDAI attitude error displays. If the LM commander merely wants to "get the feel of the vehicle" at 500 feet altitude in preparation for the manually controlled terminal touchdown maneuvers, the landing program changes to major mode P66, the rate-of-descent mode. But, at 500 feet altitude there are still 53 seconds in the "visibility phase" and 33 seconds remaining time in which the LPD and site re-designation capability can be exercised. If the astronaut could enter the ATT HOLD mode without leaving P6[illegible] he could fly the FDAI error needles at any point in P64 and assess the handling qualities of the LM. He could then switch the mode control back to AUTO and use the ACA to re-designate the landing site.

DESCRIPTION OF CHANGE

Modify the program so that it performs as follows:

1. The auto discretes monitor routine automatically selects P66 only if the PGNCS mode control switch is in ATT HOLD and the LM crew commands a net change in the rate of descent. If the mode is ATT HOLD but the rod switch has not been operated since the change to the ATT HOLD mode, the present PGNCS major mode, P63, P64, or P65, is maintained and the astronaut has manual control of the LM's attitude. The PGNCS continues to command the DPS throttle and display the

REMARKS

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guidance equations computed attitude errors on the FDAI error needles. If the astronaut commands a net change in descent rate while the control mode is ATT HOLD, the auto discretes monitor routine selects P66 and the ROD switch inputs which caused the selection of P66 as well as all subsequent ROD switch inputs are used to compute and command the new desired descent rate. Note that nothing is lost in speed of response in going to the ROD mode by this method.

2. If the major mode is P64, the ACA redesignates the landing site or controls the rate of the L[illegible] through the DAP depending on the position of the mode control switch. In AUTO, the ACA redesignates the landing site. In ATT HOLD it is the rate command/attitude hold stick. The astronaut can go back and forth between the two uses of the stick in P64 as long as he does not operate the ROD switch while the mode is ATT HOLD.

3. But as soon as he operates the ROD switch while in the rate command mode in P64, the major mode changes to P66 and return to P64 is impossible.

4. The astronaut can select manual control by the mode control switch in P63 also and rate of descent by the mode control switch and one input from the ROD switch.

REMARKS