MIT/DL PROGRAM CHANGE ROUTING SLIP

☐ COLOSSUS 2D ☐ LUMINARY 1C
☑ COLOSSUS 2E ☐ LUMINARY 1D
☐ COLOSSUS 3 ☐ LUMINARY 1E
☐ COLOSSUS ☐ LUMINARY

☐ MIT Approved PCN ☐ NASA Approved PCR
☑ NASA Approved PCN ☐ NASA Approved Software Anomaly
☐ NASA Approved Software Anomaly

A. Coding
☑ Begin coding immediately

ACTION: (Signature)
Program Supervisor's Approval: (Signature)

☐ Do not code until new GSOP material has been approved by the Mission Design Review Board (MDRB) and distributed.

B. GSOP Preparation
☑ Prepare GSOP revisions for MDRB consideration

ACTION: (Signature)

Technical Committee Meeting not required

Technical Committee Meeting(s) held on
Attendees:

C. KSC Testing and Checkout
☐ Review for possible impact on KSC testing and checkout

ACTION: (Signature)

D. Other Programs Affected
☐ Review for corresponding changes in

ACTION: (Signature)

Special Instructions

Project Manager: (Signature)  Date: (Date)

PCN # 1041
ANOMALY # ____________
Add AVEGFLAG check in implementation of PCR 984.

No need to bypass in coast

Add AVEGFLAG check in implementation of PCR 984 - Avoid coarse align during SATURN, if AVEG is running.

4.0 SOFTWARE CONTROL BOARD ACTION

X IMPLEMENT AND PROVIDE DETAILED CHANGE EVAL.  

DATE 3/14/70

5.0 MIT DETAILED PROGRAM CHANGE EVALUATION

6.0 SOFTWARE CONTROL BOARD DECISION ON MIT DETAILED PROGRAM CHANGE EVALUATION
3.5.2 Manual Mode

The Manual (Stick) Mode of CMC – SATURN IU takeover provides the crew with a capability of issuing RHIC commands, through the CMC, to the SATURN IU autopilot. To initiate the SATURN manual function, the crew must first set to "3" the CONFIG octal window of Nov 46 RI. This is done by means of Verb 48 (R03). The crew then executes Verb 46. The routine is disabled by setting the CONFIG window to "0" and repeating Verb 46.

Keying VERB 46 ENTR (with CONFIG = 3) during P11 terminates the attitude-error subroutine (automatic mode) and leaves only the RHIC for issuing control signals to the IU. The RHIC out of detent provides constant maneuver rates based upon stored erasable parameters.

The manual takeover mode is entered once each 100 ms by means of the TIMES5 clock and interrupt mechanism. During each cycle, the RHIC bits are sampled, and rate commands are generated that remain in force until updated by the next cycle. The commands are communicated to the SATURN IU autopilot by means of the IMU error-counter digital-to-analog converters.

Since the IMU error counters also drive the FDAQ attitude-error needles, these needles will be driven by stick commands. Because the stick commands are implied rate commands, and the needles are designed to indicate attitude errors, the magnitude of the needle deflection is not meaningful; the sign of the needle deflection will be the opposite sense of the stick deflection.

3.5.3 Coarse Align Avoidance during SATURN Steering

Coarse aligning during SATURN steering is detected (CDUZ > 85° magnitude, either real or due to CDUZ transients) during SATURN steering (section 3.5.2 above). If gimbald lock is detected (CDUZ > 85° magnitude, either real or due to CDUZ transients), coarse aligning of the IMU is bypassed in order to preserve the integrity of the CMC/SATURN IU interface for possible use by the manual SATSTICK mode discussed in section 3.5.2 above. Coarse align CDU mode uses the same error counters and digital-to-analog converters used by SATSTICK, so it is necessary to avoid this conflict. Stick capability is mandatory; therefore, coarse aligning must be avoided.

3.5.4 Restarts

Restarts in either Automatic or Manual Mode will

1. Disable SATURN TAKEOVER relay,
2. Return command values to zero,
3. Re-enable SATURN TAKEOVER relay.

In the Automatic Mode, the computation of attitude error resumes and a new attitude-error bias is stored at each restart.