

CHANGE SHEET


FOR

MSC INTERNAL NOTE NO. 70-FM-19, DATED JANUARY 30, 1970


RTCC REQUIREMENTS FOR APOLLO 14 (S-3) MISSION:
MOON-CENTERED RETURN-TO-EARTH COMIC SUBPROCESSOR

By Frances M. Northcutt
TRW Systems Group

October 1, 1971



Ronald L. Berry, Chief
Planetary Mission Analysis Branch



John F. Mayer, Chief
Mission Planning and Analysis Division

NOTE: A black or dashed line indicates the area of change.
(See Change History)

After the attached pages, which are replacements, have been inserted, insert this change sheet between the cover and the title page and write on the cover "CHANGE 1 inserted".

1. Replace pp. A-69 and A-70, A-75 through A-84.

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Change Sheet to Internal

2. Identification

TO-PM-10 dated January 30, 1970

Page 1 of 1 Pages

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3. FROM:

Division Mission Planning and Analysis
Branch Planetary Mission Analysis
Section

4. Title or Subject

MPC REQUIREMENTS FOR APOLLO 14 (H-3)

Date of Paper

MISSION: MOON-CENTRED RETURN-TO-EARTH CORIC SUSPROCESSOR

October 1, 1971

5. Author(s)

Frances H. Northcut, TSN Systems Group

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REPLY TO
ATTN OF

FM54 (71-150)

September 20, 1971

MEMORANDUM

TO: Distribution

FROM: FM/Mission Planning and Analysis Division

SUBJECT: RTOC REQUIREMENTS: Modification to Moon-Centered Portion
of Return-to-Earth Abort Processor for Apollo 16

References:

1. MSC Internal Note 70-FM-19, "RTOC Requirements for Apollo 16 (R-3) Mission: Moon-Centered Return-to-Earth Conic Subprocessor," by F. M. Northcutt, dated January 30, 1970.
2. MSC Change Request No. 510-054, "Program Change Request," dated June 25, 1970.
3. TRW Letter No. 4913.8-71-38, "Return-to-Earth Program Update," by F. M. Northcutt, dated August 26, 1971.
4. MSC Memorandum No. FM54 (71-149), "RTOC Apollo 16 Mission Program Verification: Return-to-Earth Abort Processor Unit Test Case Definition," by R. S. Davis, dated September 20, 1971.

Introduction

As a result of a program discrepancy report on the moon-referenced portion of the Return-to-Earth Abort Processor (RTE), a change to the moon-centered fuel-critical unspecified area (FCUA) logic is requested. This change to the moon-centered conic logic is defined by the enclosure. The new logic will eliminate the observed non-optimum solution and further enhance the ability of the FCUA logic to produce the desired solution.

In addition the enclosure documents the previous changes to subroutine FCUA. These changes do not represent a change to the current program. With their incorporation, the original defining document (reference 1) will reflect the current program logic.

Discussion

Prior to the Apollo 15 flight a non-optimum moon-referenced PCUA solution was observed. The investigation of this case indicated that for some situations the ΔV function was not fully minimized. A minimal change to the logic produced the desired solution for this case. Because the change is small and affects only two portions of the logic and because a non-optimum solution is difficult to identify, this change is requested for Apollo 16.

Two classes of changes are reflected in the enclosure. The first class represented by the dotted lines in the right-hand margin documents corrections for typographical and logic errors to reference 1. Corrections defined by reference 2 are included.

The second class of change represented by the solid lines in the right-hand margin is the requested change to subroutine MQUA (PMQUA). Reference 3 presents this new logic.

To provide verification of the new logic, four unit test cases are defined by reference 4.

Summary

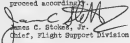
As a result of a non-optimum moon-referenced PCUA solution from the Return-to-Earth Abort processor, a change to the MQUA logic is requested for Apollo 16 and defined herein. Also included are the previous changes to subroutine MQUA in order to update the original program specifications.


Ronald L. Berry

APPROVED BY:


John P. Mayer
Chief, Mission Planning
and Analysis Division

The Flight Support Division concurs with the above and directs IBM to proceed accordingly.

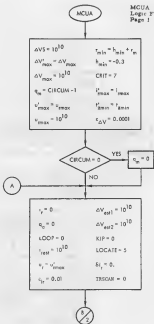

James C. Stokes, Jr.
Chief, Flight Support Division

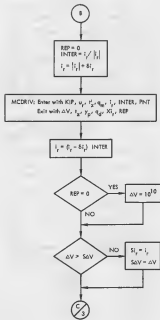
Enclosure

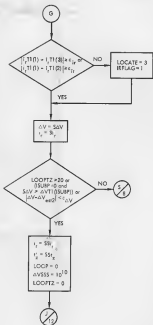
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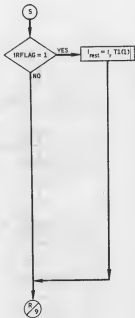
Change History for 70-FM-19

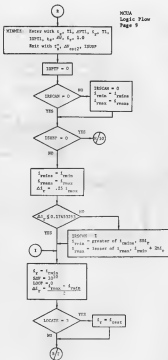
| Change no. | Date | Description |
|------------|---------|--|
| 1 | 10/1/71 | <p>A black line denotes new logic.</p> <p>A dashed line denotes change to documentation to reflect current logic.</p> <p><u>Page</u></p> <p>A-69 Initialization for flag IRSCAN added</p> <p>A-76 Logic deleted to always allow complete AV minimization with respect to T_R.</p> <p>A-77 a. (Dashed line) Same as page A-76. b. (Solid line) New logic added to define the initial T_R values for the generation of the solution with a landing time 1 hour less than the landing time bound.</p> <p>A-78 Same as A-76</p> <p>A-79 Same as A-76</p> <p>A-81 Supplies tolerances around the solution constraints</p> <p>A-82 Eliminates possible loop and allows generation of solution on both h_{po} and T_{zmax} constraint</p> <p>A-84 Same as A-81</p> |

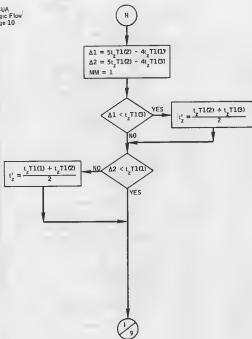












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