Mission Planning and Analysis Division
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS 77058

IN REPLY REFER TO 70-FM54-113

MAY 25 1970

MEMORANDUM TO: See attached list

FROM : FM5/Chief, Lunar Mission Analysis Branch

SUBJECT : Corrections to the flyby options of the RTCC Midcourse Correction Processor as specified in Internal Note No. 70-FM-11

The three flyby options use similar logic for the first five steps of each option. Option 8, the SPS lunar flyby, will be used as an example; but the changes indicated apply to each option. These changes have been coordinated with Flight Software Branch and IBM.

Ronald L. Berry

Ronald L. Berry

APPROVED BY:

John P. Mayer
Chief, Mission Planning
and Analysis Division

The Flight Software Branch concurs with the above recommendation.

James C. Stokes, Jr., Chief
Flight Software Branch

Enclosure

Addressees:
(See attached list)

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1. Type of Document: Change sheet to Internal Note

2. Identification: TO-FM-11 dated February 6, 1970

Page 1 of 1 Pages

TO:

3. FROM:
Division: Mission Planning and Analysis
Branch: Lunar Mission Analysis
Section:

4. Title or Subject: RTCC REQUIREMENTS FOR APOLLO 14: LUNAR FLYBY MODES OF THE TRANSLUNAR MIDCOURSE CORRECTION PROCESSOR

Date of Paper: May 25, 1970

5. Author(s): Kenneth T. Zeiler and Quentin A. Holmes

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MSC Form 199 (Rev Dec 63)

CHANGE HISTORY FOR 70-FM-11

Change no.	Date	Description
1	5/25/70	Page 7: pen-and-ink change to correct typographical error. Pages 8 and 9, 14 and 15, 21 and 22: changed steps because of misordering. a. Delete the call to integrated TLMC immediately preceding step 3. b. Step 3 should be a conic instead of an integrated flyby. c. First-guess values come from step 1 instead of TLMC in step 3. d. Delete integrated maneuver storage immediately after step 3. e. Insert a call to integrated TLMC immediately before step 4. f. Step 4 should be an integrated instead of a conic flyby. g. First-guess values in step 4 come from TLMC instead of step 2. h. Store the integrated maneuver (deleted on pages 8, 14, and 21) immediately after step 4. i. Step 5 executes a conic flyby to the same inclination of free return and height as step 4. j. First guess values for step 5 come from step 3 not step 4. k. Converged value of INCL OF FREE RETURN should read "CONV. VALUE FROM STEP 4 ± .01°". Page 17: pen-and-ink change to correct error in step 6. Page 18: pen-and-ink change to show program modification to step 8. Pages 13 and 20: HEIGHT of PERILUNE in block that reads SCALE WEIGHT OF PERILUNE FOR TLMC.

CHANGE SHEET

FOR

MSC INTERNAL NOTE 70-FM-11 DATED FEBRUARY 6, 1970

RTCC REQUIREMENTS FOR APOLLO 14: LUNAR FLYBY MODES

OF THE TRANSLUNAR MIDCOURSE CORRECTION PROCESSOR

By Kenneth T. Zeiler and Quentin A. Holmes

Change 1

May 25, 1970

Ronald L. Berry, Chief
Lunar Mission Analysis Branch

for John P. Mayer, Chief
Mission Planning and Analysis Division

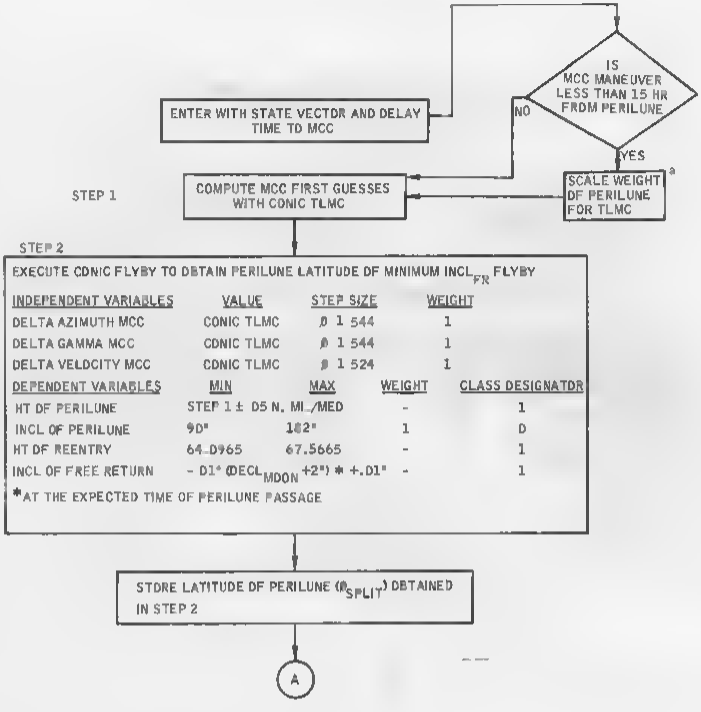
NOTE: A black bar in the margin indicates the area of change.

After the attached enclosures, which are replacement pages, have been inserted and after the following pen-and-ink changes have been made, insert this CHANGE SHEET between the cover and the title page and write on the cover, "CHANGE 1 inserted".

1. Page 7: change WEIGHT to HEIGHT in the block that reads "SCALE WEIGHT OF PERILUNE FOR TLMC".

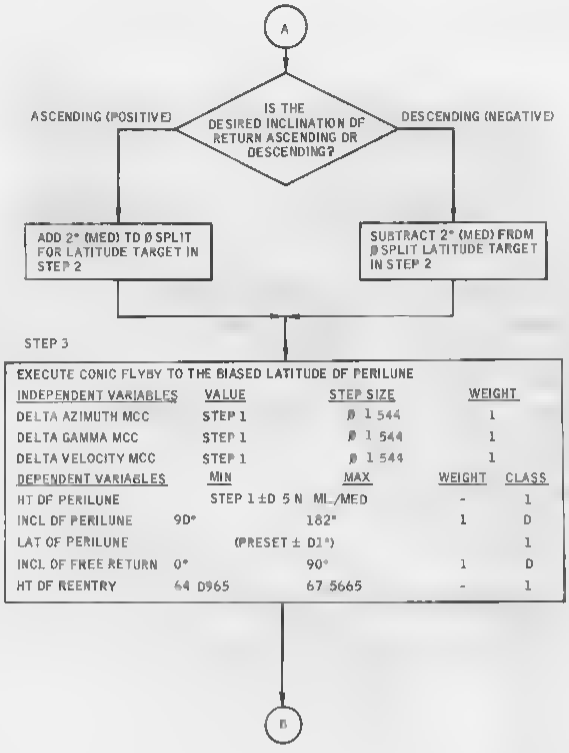
2. Page 17: Step 6 - The dependent variable HT OF PERILUNE has no weight and is class 1.

3. Page 18: Step 8 - The dependent variable INCL OF FREE RETURN should have a MIN of -1° and a MAX of +1° instead of ±.01°.

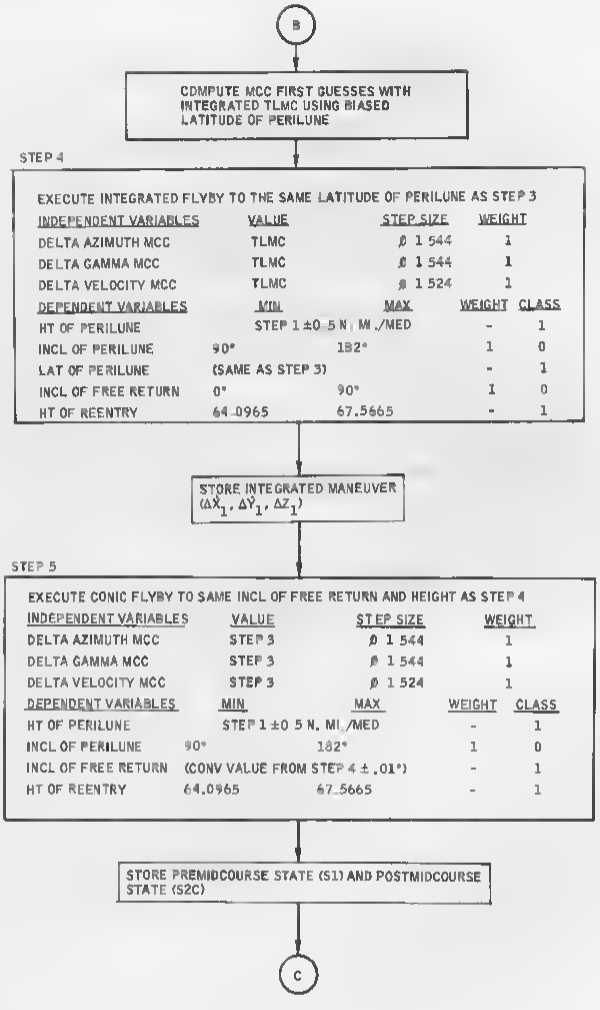


[a]For midcourse maneuvers performed from perilune minus 15 hr to perilune arrival, the input height of perilune for TLMC and the first three steps of each flyby option are scaled according to the time of the maneuver. Between TLI and perilune minus 15 hr, the height of the nominal TLI perilune is entered to TLMC. From perilune minus 15 hr to perilune arrival, the input height drops linearly from the TLI target value to 60 n. mi

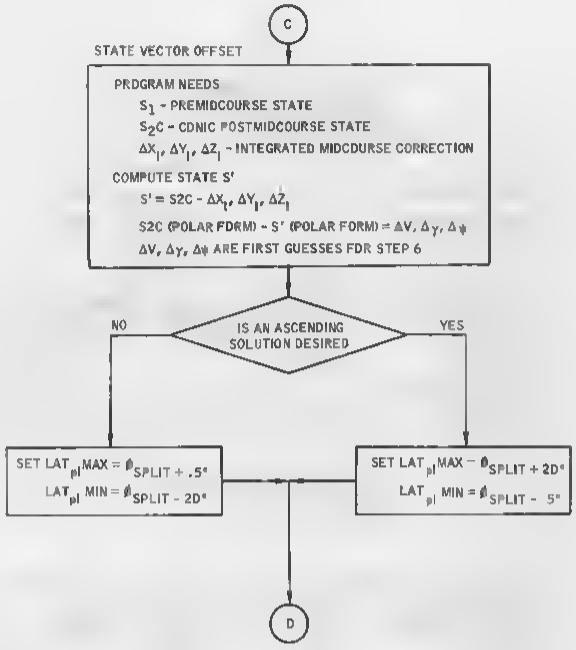
Flow chart 1.- SPS lunar flyby.



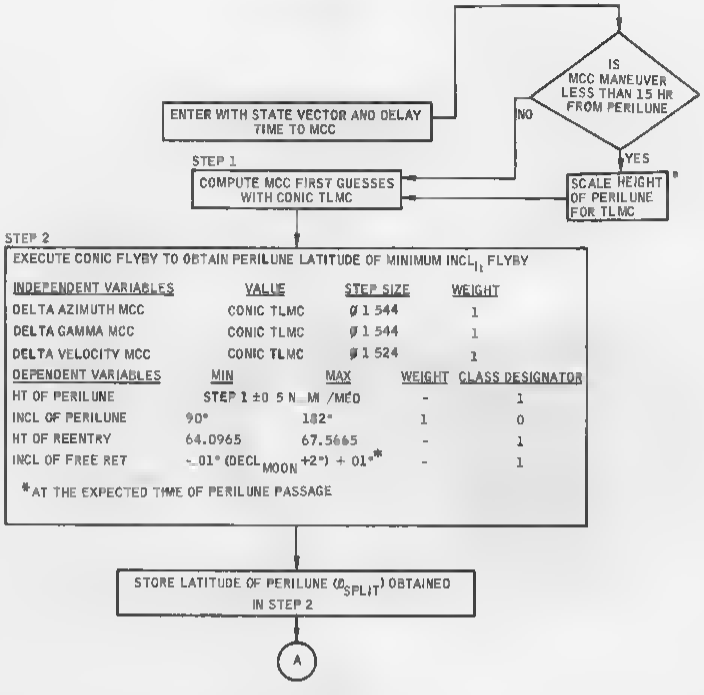
Flow chart 1 - SPS lunar flyby-Continued



Flow chart 1,- SPS lunar flyby-Continued.

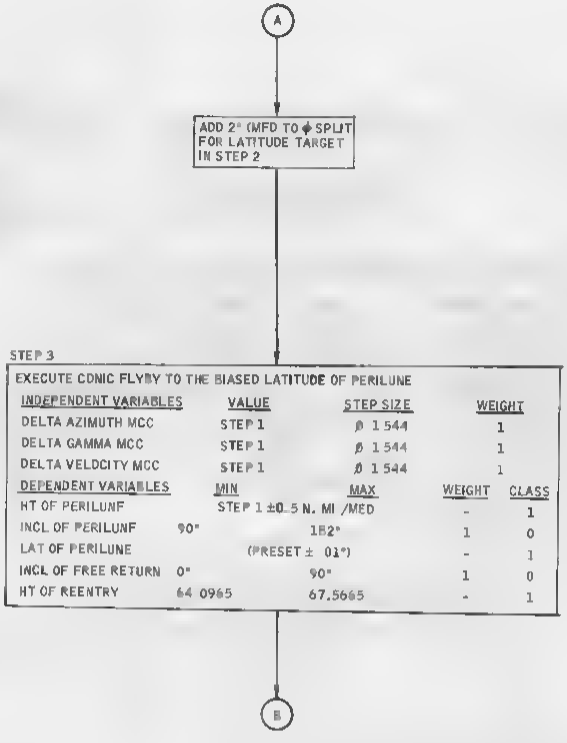


Flow chart 1.- SPS lunar flyby - Continued.

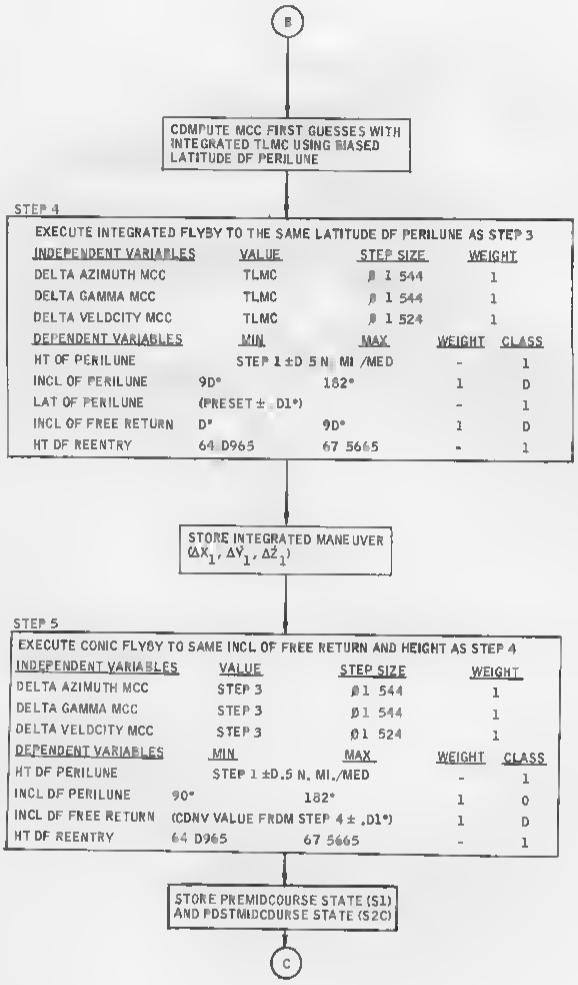


*For midcourse maneuvers performed from perilune minus 15 hr to perilune arrival, the input height of perilune for TLMC and the first three steps of each flyby option are scaled according to the time of the maneuver. Between TLI and perilune minus 15 hr, the height of the nominal TLI perilune is entered to TLMC. From perilune minus 15 hr to perilune arrival the input height drops linearly from the TLI target value to 60 n. mi.

Flow chart 2.- Optimized lunar flyby.

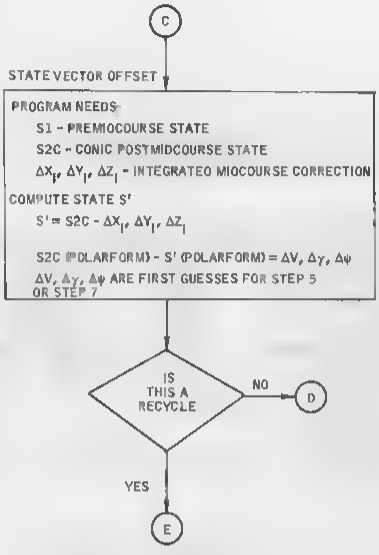


Flow chart 2 - Optimized lunar flyby - Continued.

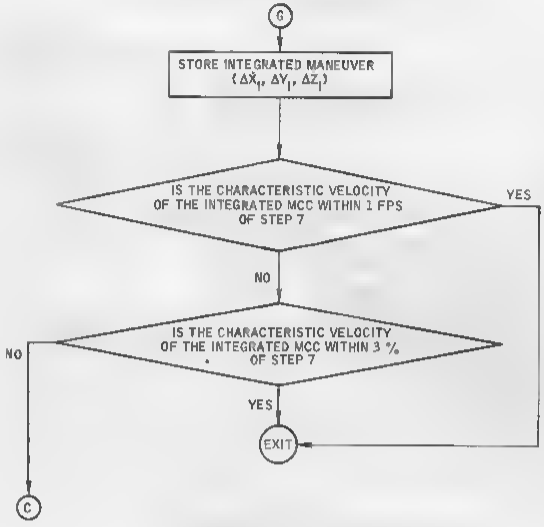


Flow chart 2.- Optimized lunar flyby - Continued.

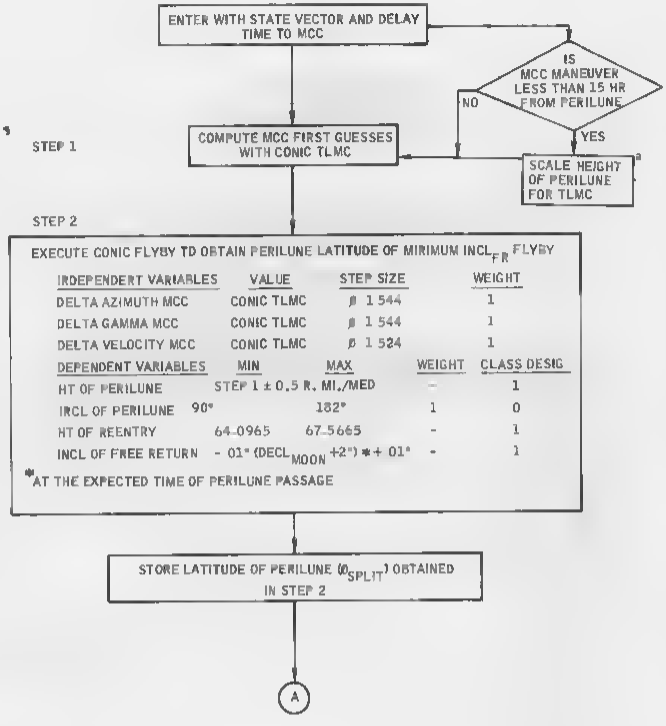
Change 1 May 25, 1970



Flow chart 2 - Optimized lunar flyby - Continued.

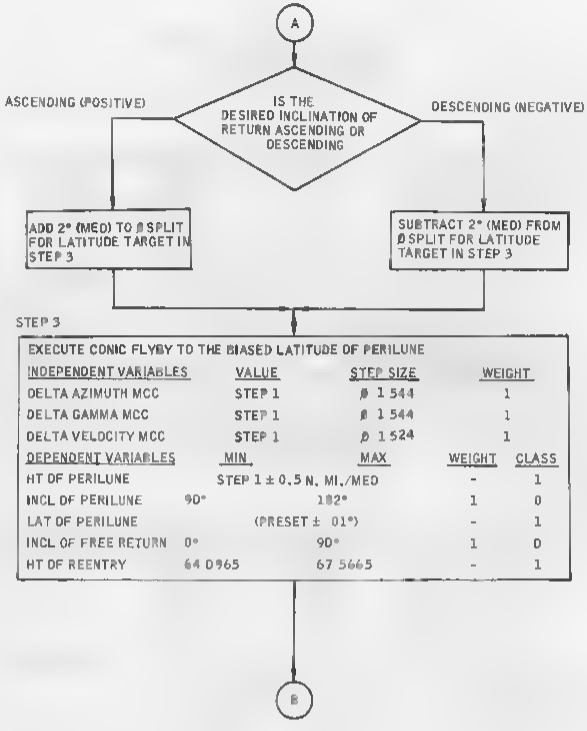


Flow chart 2 - Optimized lunar flyby - Concluded.

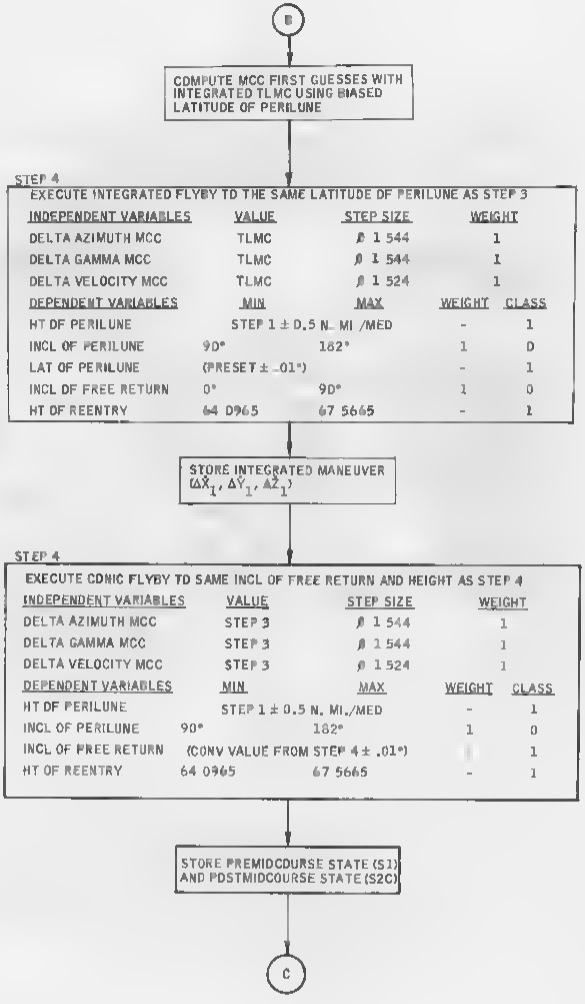


[a] For midcourse maneuvers performed from perilune minus 15 hr to perilune arrival, the input height of perilune for TLMC and the first three steps of each flyby option are scaled according to the time of the maneuver. Between TLI and perilune minus 15 hr, the height of the nominal TLI perilune is entered to TLMC. From perilune minus 15 hr to perilune arrival, the input height drops linearly from the TLI target value to 60 n. mi.

Flow chart 3.- Optimized RCS flyby to a desired inclination of free return.



Flow chart 3.- Optimized RCS flyby to a desired inclination of free return - Continued.



Flow chart 3.1 - Optimized RCS flyby to a desired inclination of free return - Continued.