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TO: Distribution

FROM: P. Rye

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SUBJECT: Revisions 46 through 51 of ARTEMIS

Revision 51 was GOOD.

Major changes incorporated into Revisions 46 through 51:

1) The unused RTB routine NORMUNIT was deleted (ACB A-9)

2) Bit names were defined for setting of IMODES30, IMODES33, and OPTMODES. Setting of these registers was changed to use the new bit names. Flagword settings were also changed to use appropriate bit names.(ACB A-10)

3) A call to ZROATER was added in the SATURN DAP when switching from CMC to IU so that attitude errors are zeroed at that switchover point.(PCR 1050)

4) A number of constants were moved into fixed-fixed because room was needed in the switched banks.

5) Coding in V46 was changed to clear both DAP configuration bits at once for DAP idle. A missing INHINT was added.(PCR 1050)

6) The superfluous setting of Bit 1 of OPTMODES in T4RUPT was deleted.(PCN 994)

7) A check for R67 was added in GOPROG to bypass STOPRATE if R67 is in progress.(PCR 1051)

8) The following changes were incorporated for MINKEY Rendezvous (PCR 1049):

   a) New flags defined:

      AUTOSEQ (Bit 7 Flag 10) - on state indicates automatic sequence operating

BURNFLAG (Bit 10 Flag 10) - on state indicates that the CSM performed a burn

CSISFLAG (Bit 6 Flag 11) - on state indicates multiple CSI targetting

FULTKFLG (Bit 2 Flag 10) - on state indicates only one type of marking (optics or VHF) is being performed for targetting

HAFLAG (Bit 7 Flag 11) - on state indicates P31 Height Adjustment targetting

MANEUFLG (Bit 5 Flag 10) - on state indicates no mark has been processed since the last final comp cycle of a targetting program.

PCFLAG (Bit 1 Flag 10) - on state indicates P36 plane change targetting

PCMANFLG (Bit 15 Flag 10) - on state indicates P20 to exit after plane change maneuver and P79 maneuver.

PTV93FLG (Bit 4 Flag 10) - on state indicates W-matrix initialization to be performed after the next burn

RANGFLAG (Bit 9 Flag 10) - on state indicates range <328 N.M.

REJCTFLG (Bit 12 Flag 10) - on state indicates R22 to ignore optics mark currently being processed.

TPIMNFLG (Bit 3 Flag 10) - on state indicates TPI targetting has been completed

P35FLAG (Bit 8 Flag 10) - on state indicates MCC targetting has been completed

HDSUPFLG (Bit 11 Flag 10) - on state indicates 'heads-up' tracking attitude. This flag is not altered by a Fresh Start.

b) New erasables defined:

TEMPMM, AUTPOINT, RRATE2, VPASS36, UNP36, UNA36, ANEXIT, AUTOY, CMYDOT, LMYDOT, BURNTMP1, 2, 3, and 4, OLDMKTME, AGEOFW, COUNT3MK, THAM, TCSI2, AUTTEMP, N90RET, CNT3TEMP.

c) The MINKEY controller program was incorporated into the V37 section. If the auto sequence is in effect, the controller program sets the erasable cell AUTPOINT to return to the next program in the sequence after the current program is completed.

Thus once the automatic sequence has been selected, the nominal progression of programs is automatic without further V37 requests from the astronaut. Upon the initial selection of P31, P32, P33, P34, P35, or P36, the controller program flashes V50N25, checklist code 17. A PROCEED response will initiate the MINKEY Rendezvous sequence; an ENTER response will return to the normal mode. P20 is automatically called in both MINKEY and non-MINKEY, when any of the above targetting programs is selected.

d) New entries to accommodate the MINKEY programs were added to the V37 selection tables. The tables were reorganized so that program priority is no longer specified for each program--all programs are started with a priority of 13; a PRIOCHNG call to change to priority 20 was added in P01, the only program which was not previously called with PRI013. This change allows downlist selection to be included in the PREMM1 table, eliminating the need for the DNLADMM1 table, which was deleted.

e) Mark processing was changed to use only one mark buffer. The erasables reserved for MRKBUF2 and obsolete references to MRKBUF2 were deleted. Mark reject code, which used MRKBUF2 as a temporary, was changed to use RUPTREG1.

f) Mark reject logic was added to set REJCTFLG if the rejected mark is currently being processed by R22. This flag is checked in R22 before incorporation. R23 backup mark reject coding was added to do the same.

g) R21, rendezvous marking routine, was deleted. Optics marking is accepted (no flashing V51 is displayed) whenever P20 rendezvous is running.

h) A new V57 routine was added which displays the current setting of FULTKFLG in R2 via V04N12FL (R1 = 4); the desired setting of the flag may be accomplished by loading 0 or 1 into R2 and keying ENTER.

i) Clearing of AUTOSEQ and R21MARK flags was added to V56 code.

j) A new noun 31 was defined to display time of the last W-matrix initialization. Noun 82 was changed to display DELVOV rather than DELVLVC. Noun 90 was changed to display Y CM, YDOT and YDOT LM rather than Y, YDOT, and PSI.

k) During a MINKEY rendezvous, P20's use of R60 was changed to bypass the final V50N18FL display. Restart code for R60 was added to reestablish R21MARK flag if rendezvous P20 is active.

l) Coding was added in the rendezvous targetting programs to bypass unwanted displays during MINKEY rendezvous.

m) TPIMNFLG is set on the final pass P34 and P35. P35FLAG is set on the final pass of P35. MANEUFLG is set on the final pass of all rendezvous targetting programs except P36. W-matrix initialization values are updated to 2000 ft and 2 f.p.s. on the final pass of all rendezvous targetting programs if MINKEY rendezvous is in progress.

n) All state vector extrapolation by targetting programs was changed to use conic integration. Precision integration for target offsets is still available in P34 and P35.

o) R36 was rewritten to calculate the new N90 components for a specified TIG using conic integration.

p) R31 and R34 were modified to use conic integration for all state vector extrapolation except when AVERAGEG is running. Code was added so that R41 is callable by P79.

q) TIMEOPT subroutine, commonly used by R30 and R36, was modified to display updated TIG for R36 on the recycle option.

r) P76 was modified to use NOMTIG (targetted burn time) rather than TIG, which would have been updated since the burn.

s) P20 control logic was modified for the automatic sequence. Option 4 (3-axis rendezvous) is automatically selected and HEADSUP flag is examined to determine azimuth angle if auto sequence is operating. R21MARK, allowing optics marks, is set for rendezvous P20 whether or not MINKEY rendezvous is operating. Logic which interfaces with the controller program was incorporated to maintain program flow in the automatic sequence.

t) An automatic W-matrix initialization procedure was incorporated into R22.

u) Clearing of RENDWFLG by V67 was deleted.

v) R61 was modified to set RANGFLAG if range is < 328 N.M. R22 bypasses the VHF read unless this flag is set.

w) Coding was added in R22 to set R22CAFLAG during mark processing; this flag is referenced by the mark reject logic.

x) The subroutine ADVANCE was changed to use the contents of MPAC rather than TIG. User calls to ADVANCE were modified appropriately.

y) Two new targetting programs were added--P31 Height Adjustment Targetting and P36 Plane Change Targetting.

z) Extended verbs are locked out during the display of V06N90FL in the targetting programs. This display now appears in P31, P32, P33, P36, P72, and P73 as well as in R36.

aa) P32 code was modified to interface with P31 and to count down NN for subsequent CSI calls.

bb) Code was added in P33 to clear PCFLAG.

cc) Code was added in P40/P41 to set BURNFLAG if the CSM did the burn.

dd) P52 was modified for the auto sequence to compute and perform the platform realignments required before and after a P40 plane change maneuver. A new alarm code, 402, is generated in P52 if coarse align torquing as attempted during automatic rendezvous.

ee) The RCS DAP was modified to set STIKFLAG and zero HOLDFLAG if the middle gimbal angle exceeds 75 degrees.

ff) Code was added in POODOO to clear AUTOSEQ flag.

9) Coding in P27 was rearranged so that a block of code could be moved from Bank 27 to Bank 42. A new entrance in MR. KLEAN was defined for use by P27. (ACB A-11)

10) An error in the implementation of ACB 117 was corrected by specifying a transfer to IMUBAD after zeroing LGYRO and waking a possible sleeping job.

11) A new entrance was defined for UPACTOFF for use by V37, R61, and P27. Code was changed accordingly in those routines. (ACB A-12)

12) The exit from SXTMARK at ENTANSWR was changed to call ENDEXT before returning to the user in order to allow a possible sleeping display to come up and thus avoid conflict with subsequent displays called by the user. (ART-2D-03)

13) MKRELEAS coding was modified to zero MARKINDX and to omit clearing Bit 2 of Channel 12 (T4RUPT clears this bit when OPTIND is found to be negative). (ART-2D-07)

14) A restart bug in UPDATEVG was corrected by saving the return in R61CNTR rather than returning via QPRET. (ART-2D-05)

15) Code to clear SWTOVER flag was added in TVCINIT. (ART-2D-04)

16) Computation of time to call TIGBLNK (TIG-35) in P40/P41 was changed from interpretive to basic to insure no delay in the ignition sequence. (ART-2D-06)

17) The unused flag CPHIFLAG was deleted, as were two obsolete references to it.(ACB A-7)

18) The constant OCT77000 was deleted; code in T4RUPT was changed to use LOW9 instead of the complement of OCT77000. (ACB A-8)

19) Code was added in R30 to initialize LUNAFLAG before calling the LAT-LONG subroutine. (ART-2E-02)

20) A constant used by Universal Pointing, UT166, was equated to the existing constant .166...; excess code setting GLOKFAIL was deleted. (PCR 1051)

21) A call to KLEENEX was inserted in the terminate logic of R52. (ART-2E-05)

22) The return from SXTMARK in R53 was modified to call MKRELEAS and CLEANDSP for all users. (ART-2D-08, ART-2D-09)

23) ACB 83, which has been incorrectly (but benignly) implemented in ARTEMIS, was corrected.

Known problems existing in Revision 51 of ARTEMIS:

ART-2E-01, ART-2E-03, ART-2E-04, ART-2E-06.