APOLLO 15

CSM ENTRY CHECKLIST

PART NO.	S/N
SKB32100115-305	1001

UNIVERSAL SCIENCE NEWS, INC.

PRE-ENTRY ATTITUDE TIMELINE

SUPERCIRCULAR ENTRY

LUNAR ENTRY PAD

VEHICLE PREPARATION

HEY, NO QUARANTINE THIS TIME!
IS'NT THAT GREAT!

YOU'RE TELLING ME? !

VEHICLE PREPARATION

LUNAR ENTRY PAD

SUPERCIRCULAR ENTRY

PRE-ENTRY ATTITUDE TIMELINE

INC.

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DATE 3/22/71

LUNAR RETURN VEHICLE PREPARATION

1		INITIAL STOWAGE COMPLETED
2		CMC & IMU POWER UP pg G/2-1 & 2
3		SCS POWER UP pg G/2-4
4		P51 - IMU ORIENTATION pg G/6-1
5		LOAD DAP V48E 11102, 01111, PRO, PRO, PRO
6	-06:00h	LAST MCC DECISION
7	-05:35h	NO COMM - P52 & NAV SIGHTINGS
8		DON MAE WESTS & FOOT RESTRAINTS
9		ACTIVATE VHF FOR COMM CHECKS
10		VERIFY DSE POWERED cb S BD FM XMTR/DSE (2) - close (verify)
11		PERFORM UV PHOTOGRAPHY (Flight Plan)
12	-04:30h	P27 (SV,REFSMMAT), MNVR & ENTRY PAD UPDATES
13	-04:15h (__:__:___)	P52 - IMU REALIGN pg G/6-2 (OPTION 3, then OPTION 1)
14		P37 (NO COMM ONLY)
15		ECS CKS O2 SUPPLY REFILL pg S/1-7 PGA verification, (if suited)S/1-10 ECS Monitor Ck pg S/1-5 (382) EVAP H2O CONT PRI vlv - AUTO EVAP H2O CONT SEC vlv - AUTO SUIT HEAT EXCH SEC GLY - FLOW

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16 EPS CKS #1, 3, 4 (5 if req'd) pg S/1-2

17 SPS CK (If req'd) pg S/1-1

18 RCS CKS
SM RCS Monit Ck pg S/1-1
CM RCS Monit Ck pg S/1-1

19 C&W SYS CK pg S/1-17

20 CMC SELF CK pg G/2-3

21 ~~DSKY COND LT TEST pg G/1-23~~

22 -03:45h MIDCOURSE MANEUVER
P30 - EXT ΔV
-03:15h P40/41 - SPS/RCS THRUSTING
-03:00h MIDCOURSE (#7) BURN

23 -02:55h NO COMM NAV SIGHTINGS

24 -02:00h LOGIC SEQUENCE CK
(8) cb SECS LOGIC (2) - close (verify)
cb SECS ARM (2) - close
cb ELS/CM-SM SEP (2) - close
ELS LOGIC - on (up)
ELS - AUTO
Coordinate next 3 steps with MSFN
SECS LOGIC (2) - on (up)
MSFN confirm GO for PYRO ARM as req'd
SECS LOGIC (2) - OFF
cb SECS ARM (2) - open
ELS LOGIC - OFF
ELS - MAN
cb ELS/CM-SM SEP (2) - open

25 -01:35h P52 - IMU REALIGN pg G/6-2 (OPTION 3)
Record gyro torquing angles
R _____
P _____
Y _____
*If >1°, recycle P52 *
If confirmed, use SCS for EMS entry

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26(__:__:__) GDC ALIGN
If drift >10°/hr, change rate source

27 MNVR TO 0°, 265°, 0°
(Horizon Check at EI-17:00)
V49E

S-BD OMNI ANT - C

28 PERFORM BORESIGHT & SXT STAR CHECK
V41 N91E

Drive Optics to 90° shaft angle
OPTICS PWR - OFF

29 -01:15h EMS ENTRY CHECK
EMS FUNC - OFF
(8) cb EMS (2) - close
EMS MODE - STBY
EMS FUNC - EMS TEST 1 (wait 5 sec)
EMS MODE - NORMAL (wait 10 sec)
Check ind lts - off
RANGE ind - 0.0
Slew hairline over notch
in self-test pattern
EMS FUNC - EMS TEST 2 (wait 10 sec)
.05G lt - on (all others out)
EMS FUNC - EMS TEST 3
.05G lt - on
RSI lower lt - on (10 sec later)
Set RANGE counter to 58 nm±0.0
EMS FUNC - EMS TEST 4
.05G lt - on (all others out)
G-V trace within pattern to lwr rt
corner @9G
RANGE ind counts down to 0±0.2
EMS FUNC - EMS TEST 5
.05G lt - on
RSI upper lt - on (10 sec later)
RANGE ind - 0.0
Scribe traces vertical line 9g to
0.28±0.1

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ALIGN SCROLL TO ENTRY PATTERN (on
37K ft/sec line)
EMS FUNC - RNG SET
G-V scroll assy traces vert. line
0.28g to 0+0.1
EMS MODE - STBY

30 PRIMARY WATER EVAP ACTIVATION
GLY EVAP H2O FLOW - AUTO
GLY EVAP STM PRESS - AUTO
PRI ECS GLY PUMP - AC1 (verify)

31 SEC WATER EVAP ACTIVATION
ECS IND sel - SEC
SEC COOL LOOP PUMP - AC2
GLY DISCH SEC PRESS - 39-51 psig
SEC COOL LOOP EVAP - EVAP
SEC GLY EVAP OUT TEMP - 38-50.5°F
SUIT CKT HT EXCH - BYPASS 20 sec, OFF
ECS IND sel - PRIM

32 SET UP CAMERA
CM4/DAC/18/CIN - BRKT, MIR
(T16,250,7) 12 fps, MAG K

33 (-01:10h) CM RCS PREHEAT
Note: If sys test mtr 5c,d,6a,b,c,d
all read 3.9 vdc (28°F) or more,
omit preheat
(8) cb RCS LOGIC (2) - close
CM RCS LOGIC - on (up)
cb CM RCS HTRS (2) - close
(101) CM RCS HTRS - ON (LMP Confirm)
(20 min or til lowest rdg is
3.9 vdc) (Monitor Manf
press for press drop)

34 FINAL STOWAGE

Stow Optics
Install Optics Covers
Stow ORDEAL
(377) GLY TO RAD SEC vlv - BYPASS (verify)
Verify EVA COUCH STRUT disengaged
(382) Cool pnl installed
Y-Y struts (2) extended
Stow Data Box R-12
Attach both strut unlock lanyards
Check for water in tunnel area
Stow gas separator (A8)
Stow Cl injector (R6)
WASTE MGMT DRAIN vlv - OFF
Remove & stow URA, urine transfer hose and urine filter

35 (-00:50m) TERM. CM RCS PREHEAT

(101) CM RCS HTRS - OFF (LMP confirm)
CM RCS LOGIC - OFF
(8) cb CM RCS HTRS (2) - open

36 SYSTEMS TEST PANEL CONFIGURATION

SYS TEST METER - 5B (BAT RLY BUS 3.4-4.1 vdc)
(101) CM RCS HTRS - OFF (verify)
WASTE H2O DUMP HTR - OFF
URINE DUMP HTR - OFF
(100) LEB FLOOD & INTGL LIGHTING - OFF

37 PYRO BATT CK

(250) cb PYRO A SEQ A - close (verify)
cb PYRO B SEQ B - close (verify)
DC IND - PYRO BAT A(B)
*If PYRO BAT A(B) < 35 vdc *
*cb PYRO A(B) seq A(B) - open *
cb PYRO A(B)BAT BUS A(B)TO PYRO
* BUS TIE - close*
(275) cb MNA BAT C - close
cb MNB BAT C - close
DC IND - MNB

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38 CONFIGURE PNL 8

All cb's closed except:
- DIRECT ULLAGE (2) - open (verify)
- CM RCS HTRS (2) - open (verify)
- DOCKING PROBE (2) - open (verify)
- SPS P&Y (4) - open
- FLOAT BAG (3) - open (verify)
- SECS ARM (2) - open (verify)
- EDS BAT (3) - open (verify)
- ELS/CM-SM SEP (2) - open (verify)
- PL VENT - open (verify)
- SPS Pilot Vlvs A, B - OPEN

39 (__:__:__) FINAL GDC DRIFT CK (if req'd)

If drift >10°/hr, Suspect GDC, Do not use RSI & FDAI #2

40 CM RCS ACTIVATION

(8)
- cb ELS/CM-SM SEP (2) - close
- cb SECS ARM (2) - close
- Cue MSFN
- SECS LOGIC (2) - on(up)
- MSFN confirm GO for PYRO ARM
- SECS PYRO ARM (2) - ARM
- CM RCS PRPLNT 1&2 tb (2) - gray (verify)
- CM RCS PRESS - on (up)
- RCS IND sw - CM1, then 2
  - He PRESS stabilizes at 3300-3500 psia after 15 minutes
  - MANF PRESS 287-302 psia
- SECS PYRO ARM (2) - SAFE

41 -00:45m P27 & ENTRY PAD UPDATE

							AREA
	X	X	X				R 0.05 G
	X	X	X				P 0.05 G
	X	X	X				Y 0.05 G
							GET HOR
	X	X	X				P CK
		0					LAT N61
							LONG
	X	X	X				MAX G
	+						V_{400K} N60
	-	0	0				γ_{400K}
	+						RTGO EMS
	+						VIO
							RRT
	X	X					RET 0.05 G
	+	0	0				D_L MAX N69
	+	0	0				D_L MIN
	+						V_L MAX
	+						V_L MIN
	X	X	X				D_O
	X	X					RET V_{CIRC}
	X	X					RETBBO
	X	X					RETEBO
	X	X					RETDRO
	X	X	X	X			SXTS
	+					0	SFT
	+				0	0	TRN
	X	X	X				BSS
	X	X					SPA
	X	X	X				SXP
	X	X	X	X			LIFT VECTOR

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EARTH/POST LANDING

LUNAR ENTRY PAD

SUPERCIRCULAR ENTRY

PRE-ENTRY ATTITUDE TIMELINE

						AREA
X	X	X				R 0.05 G
X	X	X				P 0.05 G
X	X	X				Y 0.05 G
						GET HOR
X	X	X				P CK
	O					LAT N61
						LONG
X	X	X				MAX G
+						V_{400K} N60
-	O	O				γ_{400K}
+						RTGO EMS
+						VIO
						RRT
X	X					RET 0.05 G
+	O	O				D_L MAX N69
+	O	O				D_L MIN
+						V_L MAX
+						V_L MIN
X	X	X				D_O
X	X					RET V_{CIRC}
X	X					RETBBO
X	X					RETEBO
X	X					RETDRO
X	X	X	X			SXTS
+					0	SFT
+				O	O	TRN
X	X	X				BSS
X	X					SPA
X	X	X				SXP
X	X	X	X			LIFT VECTOR

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							AREA
X	X	X					R 0.05 G
X	X	X					P 0.05 G
X	X	X					Y 0.05 G
							GET HOR
X	X	X					P CK
	0						LAT N61
							LONG
X	X	X					MAX G
+							V_{400K} N60
-	0	0					γ_{400K}
+							RTGO EMS
+							VIO
							RRT
X	X						RET 0.05 G
+	0	0					D_L MAX N69
+	0	0					D_L MIN
+							V_L MAX
+							V_L MIN
X	X	X					D_O
X	X						RET V_{CIRC}
X	X						RETBBO
X	X						RETEBO
X	X						RETDRO
X	X	X	X				SXTS
+						0	SFT
+					0	0	TRN
X	X	X					BSS
X	X						SPA
X	X	X					SXP
X	X	X	X				LIFT VECTOR

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							AREA
	X	X	X				R 0.05 G
	X	X	X				P 0.05 G
	X	X	X				Y 0.05 G
							GET HOR
	X	X	X				P CK
		O					LAT N61
							LONG
	X	X	X				MAX G
	+						V_{400K} N60
	-	O	O				γ_{400K}
	+						RTGO EMS
	+						VIO
							RRT
	X	X					RET 0.05 G
	+	O	O				D_L MAX
	+	O	O				D_L MIN N69
	+						V_L MAX
	+						V_L MIN
	X	X	X				D_O
	X	X					RET V_{CIRC}
	X	X					RETBBO
	X	X					RETEBO
	X	X					RETDRO
	X	X	X	X			SXTS
	+					O	SFT
	+				O	O	TRN
	X	X	X				BSS
	X	X					SPA
	X	X	X				SXP
	X	X	X	X			LIFT VECTOR

DATE 6/11/71

SUPERCIRCULAR ENTRY

1 Set DET (up, to EI)

2 EMS INITIALIZATION

Scroll not on 37K:
*EMS FUNC - TEST 5 *
Slew scroll to 37K

EMS FUNC - RNG SET (verify)
SET RNG TO PAD DATA RNG
EMS FUNC - Vo SET
Slew Scroll to Pad Data VIO
EMS MODE - STBY (verify)
EMS FUNC - ENTRY

3 RSI ALIGNMENT

FDAI SOURCE - ATT SET
ATT SET - GDC
EMS ROLL - on (up)
GDC ALIGN pb - push & hold
YAW THUMBWHEEL - Position RSI thru 45° & back to LIFT UP
GDC ALIGN pb - release
EMS ROLL - OFF
Align GDC to IMU

4 CM RCS CHECK

AUTO RCS A/C ROLL (4) - OFF (verify)
cb RCS LOGIC (2)-close (verify)
SC CONT - SCS
MAN ATT (3) - MIN IMP
RCS TRNFR - CM
AUTO RCS SEL (RING 1) - OFF
AUTO RCS SEL (RING 2) - MNB
TEST RING 2 THRUSTERS
AUTO RCS SEL (RING 2) - OFF
AUTO RCS SEL (RING 1) - MNA
TEST RING 1 THRUSTERS
AUTO RCS SEL (RING 2) - MNB
RCS TRNFR - SM
MAN ATT (3) - RATE CMD
SC CONT - CMC/AUTO

5 30:00m (-30:00) MN BUS TIE (2) - ON
TAPE RCDR - REWIND

6 35:00m (-25:00) SEPARATION CK LIST

cb ELS/CM-SM SEP (2) - close (verify)
PRIM GLY TO RAD - BYPASS (pull)
REPRESS PKG vlv - FILL to 865-935, then ON
O2 SM SUPPLY vlv - OFF
SURGE TK - ON (verify)
CAB PRESS REL vlv (2) - NORM
ABORT SYS PRPLNT - RCS CMD (verify)
SM RCS SEC PRPLNT FUEL PRESS (4) - OPEN
VHF AM A&B - off (ctr)
HI GAIN ANT PWR - OFF
FC PUMPS (3) - OFF
FC 2 MNA - OFF
Verify Loads Balanced
(5) cb ECS RAD CONT/HTR (2) - open
cb RAD HTRS OVLD (2) - open
cb WASTE H2O/URINE DUMP HTR (2) - open
POT H2O HTR - OFF
GLY EVAP TEMP IN - MAN

7 VERIFY HORIZON CHECK ATT

R _____ (0°)
P _____ (265°)
Y _____ (0°)

P61 - ENTRY PREP

8 V37E 61E (AVE G ON)

05 09 01427 - ROLL REVERSED
*05 09 01426 - IMU UNSAT *

DATE 3/22/71

E/1-7

LUNAR ENTRY

							AREA
	X	X	X	0	0	6	R 0.05 G
	X	X	X	1	5	3	0.05 G
	X	X	X	0	0	0	Y 0.05 G
							GET HOR
	X	X	X	2	2	7	P CK
	+	0	2	6	1	2	LAT N61
	−	1	5	8	1	0	LONG
	X	X	X				MAX G
							γ400K N60
	−	0	0	6	5	0	γ400K
	+	1	0	8	4	8	RTGO EMS
	+	3	0	1	7	9	VIO
2	9	4	5	5	3	7	RRT
	X	X	0	0	2	9	RET 0.05 G
	+	0	0				DL MAX N69
	+	0	0				DL MIN
	+						VL MAX
	+						VL MIN
	X	X	X	4	0		DO
	X	X	0	2	1	3	RET VCIRC
	X	X	0	0	1	8	RETBBO
	X	X	0	3	3	8	RETEBO
	X	X	0	7			RETDRO
	X	X	X	X	0	4	SXTS
	+	1	4	0	3	0	SFT
	+	3	7	5	0	0	TRN
	X	X	X	2	1	3	BSS
	X	X	P	0	9	6	SPA
	X	X	X	R	4	7	SXP
	X	X	X	X	U	P	LIFT VECTOR

J NEB-EXIT FMIS
RET 400K 6+06
RET Moon 8+22
LANDING 13+29
CONST 6-ETE
MOON SET 294:56:20

DATE 6 APR 1971

EARTH/POST LANDING

LUNAR ENTRY

ECS, CRITICAL BURNS (OVER)

PRE-ENTRY ATTITUDE TIMELINE

SUPERCIRCULAR ENTRY | LUNAR ENTRY PAD | VEHICLE PREPARATION

5 E/1-3

6

7

NOW CAN OMS

REV 90 6+06

MAIN 8+32

WG. 13+27

CONS C. R. RIC

MOON SET

294+56+37

200 10

10 KC

3 FT

30.06 ΔH (-128)

OKINAWA

CRIM 2, 1,

RECOVERY

C-1305

HAWAII RESCUE

142

	MID	PAC				AREA
	X	X	X	0	0	0	R 0.05 G
	X	X	X	1	5	3	P 0.05 G
	X	X	X	0	0	0	Y 0.05 G
2	9	4	4	1	5	4	GET HOR
	X	X	X	2	6	1	P CK
	+	0	2	6	1	3	LAT N61
	−	1	5	8	1	3	LONG
	X	X	X	0	6	2	MAX G
	+	3	6	0	9	6	V_{400K} N60
	−	0	0	6	5	1	γ_{400K}
	+	1	0	8	4	9	RTGO EMS
	+	3	6	1	7	8	VIO
2	9	4	5	8	5	4	RRT
	X	X	0	0	2	9	RET 0.05 G
	+	0	0	NA			DL MAX N69
	+	0	0				DL MIN
	+						V_L MAX
	+						VL MIN
	X	X	X	4	0	0	DO
	X	X	0	2	1	2	RET V_{CIRC}
	X	X	0	0	1	8	RETBBO
	X	X	0	3	3	7	RETEBO
	X	X	0	7	4	4	RETDRO
	X	X	X	X	NA		SXTS
	+					0	SFT
	+				0	0	TRN
	X	X	X				BSS
	X	X					SPA
	X	X	X				SXP
	X	X	X	X	0	1	LIFT VECTOR

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9 F 06 61 IMPACT LAT, LONG, HDS UP/DN (+/-)
41:30m (.01°,.01°,±00001)
(-18:30) PRO

10 F 06 60 GMAX,V400K,GAMMA EI (.01G,fps,.01°)
Record
GMAX 6.36
V400K 36039
GAMMA EI -644
PRO

11 F 16 63 RTOGO (.1nm) 109444 PAD _____
VIO (fps) 36168 PAD _____
TFE(min-sec) _____
If NO COMM, Set RTOGO & VIO in EMS
& initialize
(ACCEPT) PRO
(RECYCLE) V32E to 10

P62 - CM/SM SEP & PRE-ENTRY MNVR

12 F 50 25 00041 REQUEST CM/SM SEP
43:00m COMPARE HORIZON with 31.7° line
(-17:00) If not ±5°, G&N NO GO
(265°P) MAN ATT (3) - RATE CMD (verify)
ATT DB - MIN
RATE - HIGH
SC CONT - SCS
YAW 45° OUT-OF-PLANE (LEFT)(315°)
BMAG MODE (3) - ATT1/RATE 2
MN BUS TIE (2) - ON (verify)
PRIM GLY TO RAD - BYPASS (verify)
EMS MODE - STBY (verify)
CM RCS LOGIC - on (up)
SECS LOGIC (2) - on(up)(verify)
SECS PYRO ARM (2) - ARM

45:00m CM/SM SEP (2) - on (up)
(-15:00) If docking ring still on:
CSM/LM FNL SEP (2) - on(up)(verify)

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MAN ATT (3) - MIN IMP
BMAG MODE (3) - RATE 2
C&W MODE - CM
RCS TRNFR - CM
CM RCS MANF PRESS - 287-302 psia
CM RCS LOGIC - OFF
SECS PYRO ARM (2) - SAFE
Monitor V MNA/B:
If <25 vdc, go to EMERG POWER DOWN
YAW back to 0°
PITCH TO ENTRY ATT
R _____ (0°)
P _____ (152°)
Y _____ (0°)

*If NO COMM Entry: *
* Track Horizon with 31.7° line*
* to .05G *
EMS DATA - Verify
EMS FUNC - ENTRY (verify)
EMS MODE - NORMAL
Verify .05G lt filter is down
PRO (Act ENTRY DAP Att Hold)

13 F 06 61 IMPACT LAT,LONG,HDS/DN (.01°,.01°,-00001)
PRO (CMC Guidance)

14 POSS 06 22 FINAL ATT DISP, RPY (.01°)
(Only if X-axis beyond 45° of Vel vector)

P63 - ENTRY INIT

15 06 64 G,VI,RTOGO (.01G,fps,.1nm)
FDAI SCALE - 5/5
ROT CONTR PWR DIR (2) - MNA/MNB
TAPE RCDR - HBR/RCD/FWD/CMD RESET
58:00m Pitch error needle goes toward
(-02:00) zero approaching .05G time

P64 - ENTRY POST .05G
(If no P64 at .05G ±5 sec & .05G lt - on,
GNCS NO GO)

16 06 74 BETA, VI, G (.01°,fps,.01G)

Start DAC

.05G time
(+0__:__)
(__:__:__)
(152°P at .05G)

RTOGO AT .05G AGREES WITH EMS-verify
HORIZ CHECK
.05G lt - on (EMS START)
* No EMS START within 3 sec: *
* EMS MODE - BACKUP/VHF RNG *

If CMC is GO:
MAN ATT (3) - RATE CMD
SC CONT - CMC
*If DAP NO GO: *
* SC CONT - SCS*
* FLY BETA *
*If CMC NO GO: *
* SC CONT - SCS*
* FLY EMS *

.05G sw - on (up)
EMS ROLL - on (up)

NOTE: To monitor N68, (BETA,VI,HDOT)
Key V16 N68E
Compare RSI & FDAI
If CMC or PAD cmds Lift DN,
* or NO COMM Entry: *
* MNVR Lift DN at .05G *
* (Lift up at 1.5G) *
EMS GO/NO GO
G-V Plot within limits
Monitor G-meter for
convergence with pad data (Do)
CMC is NO GO if commanding
>+90° when G >6.52
Go to 20 (P67) or continue

DATE 6/11/71

VEHICLE PREPARATION

LUNAR ENTRY PAD

SUPERCIRCULAR ENTRY

P65 - ENTRY - UP CONT (VL>18K fps)

17 F 16 69 BETA (.01°) _____
DL (.01G) _____ PAD _____
VL (fps) _____ PAD _____

-8
26.12
158.12

IF NO AGREEMENT:
*SC CONT - SCS *
*FLY EMS *

PRO

18 06 74 BETA,VI,G (.01°,fps,.01G)
(V<VL+500 fps & RDOT Neg) Go to 20

P66 - ENTRY - BALLISTIC (D<DL)

19 06 22 DESIRED GMBL ANGLES RPY
Monitor horiz ±12° of 31.7° mark

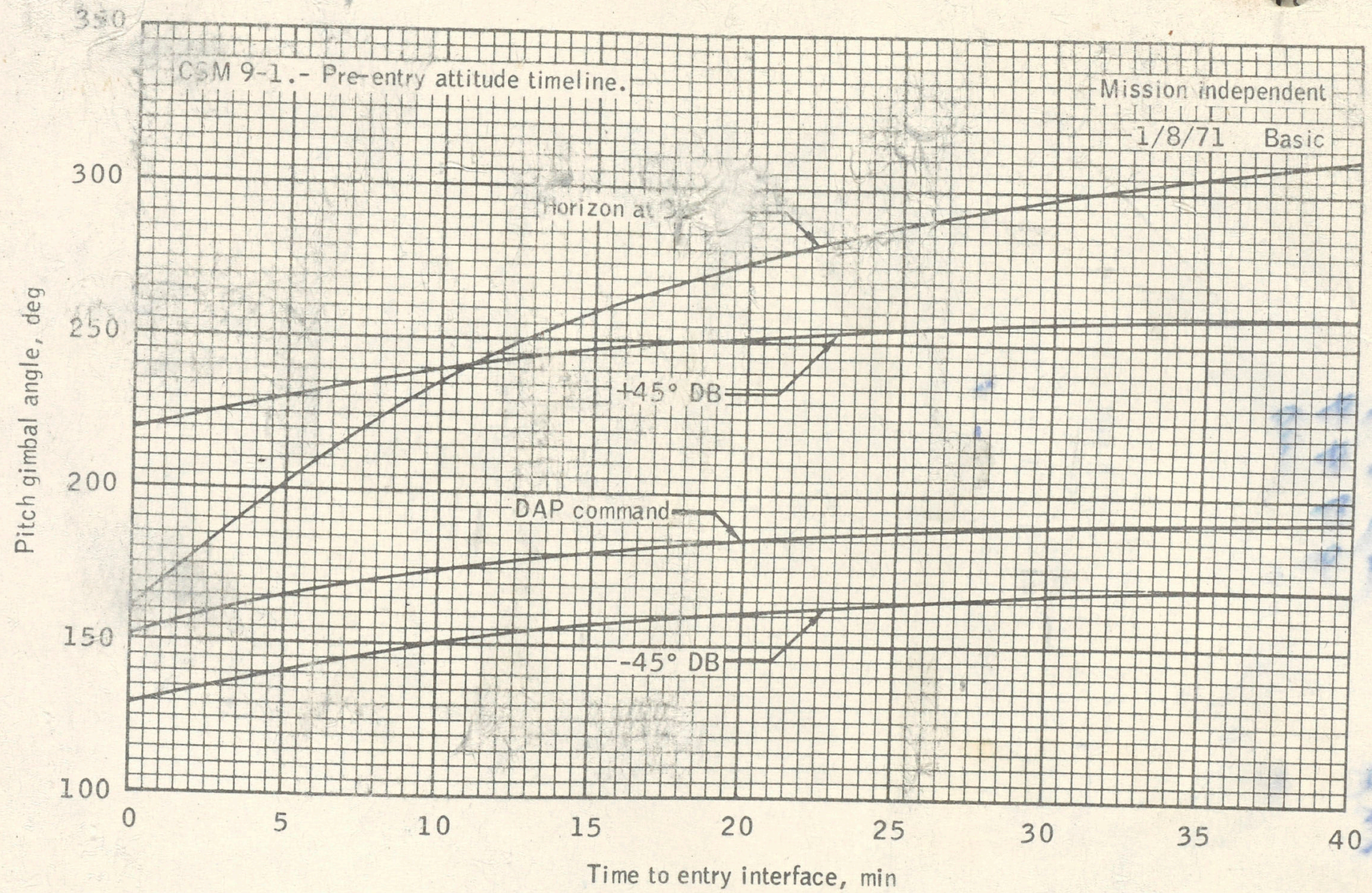
P67 - ENTRY - FINAL PHASE (AUTO AT .2G)

20 06 66 BETA,CRSRNG ERR,DNRNG ERR(.01°,.1nm,.1nm)
(+ is north & long)
BETA will be ±15° until R3 > ~-24nm
Monitor lift vector on RSI & FDAI
~~CM RCS: change rings when HE PRESS <1150 psia~~

21 F 16 67 RTOGO,LAT,LONG (Vrel=1000fps)
(.1nm, .01°,.01°)
SC CONT - SCS
RTOGO NEG - LIFT UP
RTOGO POS - LIFT DOWN
Monitor altimeter
Record LAT,LONG & VOICE TO RECY at 10K'
Record EMS RTGO
EMS MODE - STBY
EMS FUNC - OFF
Stop DAC
DAC - TTI

DATE ~~6/17/71~~ 7/13/71

DATE 6/11/71



Pre-entry attitude timeline.

E
2-7

PRE-ENTRY ATTITUDE TIMELINE | ECS, CRITICAL BURNS (OVER) | LV | EARTH/POST LANDING

SUPERCIRCULAR ENTRY

LUNAR ENTRY PAD

VEHICLE PREPARATION

E/1 1

DATE ~~6/11/71~~

EARTH/POST LANDING

RRT		Start Watch
90K'(06:08)	STEAM PRESS - pegged at ∿ 90K	(00:00)
~~60K'~~ 50K' (07:00)	CABIN PRESS REL vlv (2) - BOOST/ENTRY	(00:52)
	SECS PYRO ARM (2) - ARM	
	Check Altimeter	

40K'(07:14)
```
*          CM UNSTABLE                  *(01:06)
*RCS CMD - OFF                          *
* 40K' APEX COVER JETT PB-PUSH          *
*DROGUE DEPLOY PB - PUSH (2 sec*
*after apex cover jett)                 *
```

30K' ELS LOGIC - on (up) (01:24)
ELS - AUTO
Start DAC

24K'(07:45) RCS disable (auto) (01:37)
```
*RCS CMD - OFF*

Apex cover jett (auto)
*APEX COVER JETT PB - PUSH*
(WAIT 2 SECS)
Drogue parachutes deployed (auto)
*DROGUE DEPLOY PB - PUSH*

If Both Drogues Fail:
*ELS - MAN                              *
*Stabilize CM                           *
*5K' MAIN DPLY PB - PUSH*
*ELS - AUTO                             *
```

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23.5K' Cabin Pressure increasing
```
*If not increasing by 17K':             *
*CABIN PRESS REL vlv (RH) - DUMP*
```

10K'(~~08:41~~ 08:35) Main parachutes deployed (Drogues ~~+54s~~ +48s)(~~02:33~~ 02:27)
(Cab Press = 10 psia)
```
MAIN DEPLOY PB - PUSH (within 1 sec)
SURGE TK O2 vlv -OFF (if unsuited)
REPRESS PKG vlv -OFF (if unsuited)
DIRECT O2 vlv -OPEN
VHF ANT - RECY
VHF AM A - SIMPLEX
VHF BCN - ON
```

CABIN PRESS REL vlv (2) - CLOSE
CM RCS LOGIC - on (up)
If main or pyro bus lost,
* use RHC's for burn, *
* not DUMP sw *
CM PRPLNT - DUMP (burn audible)
Monitor CM RCS 1&2 for He press decrease
If no burn or press decrease,
* use both RHC's *
*DO NOT FIRE PITCH JETS *
CM PRPLNT - PURGE
*CM RCS He DUMP PB - PUSH *
RHC (2) - 30 secs, NO PITCH
Stow DAC
STRUT LOCKS (4) - UNLOCK
If night landing:
cb FLOAT BAG #3, FLT/PL (1 cb) - close
PL BCN LT - LOW
(275) cb FLT & PL BAT BUS A,B,&BAT C (3) - close
cb FLT & PL MNA & B (2) - open
(5) cb BAT RLY BUS (2) - open
cb RAD HTRS OVLD (2) - open (verify)
(8) cb SPS P&Y (4) - open (verify)

3K' CM RCS PRPLNT (2) - OFF (terminates purge)
CABIN PRESS REL vlv (RH) - DUMP
ELS AUTO (verify)
ELS LOGIC - ON (verify)
FLOOD Lts - POST LDG

800' CAB PRESS RELF vlv - CLOSE (latch off)
MN BUS TIE (2) - OFF

POSTLANDING

STABILIZATION, VENTILATION, COMMUNICATIONS

1 Stabilization after landing
(229) cb MAIN REL PYRO (2) - close
MAIN RELEASE - on (up)
SECS PYRO ARM (2) - SAFE
SECS LOGIC (2) - OFF
No contact with recovery forces
*VHF AM A&B - off (ctr) *
*VHF AM RCV ONLY - A *

EARTH/POST LANDING
SUPERCIRCULAR ENTRY PAD
LUNAR ENTRY
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(8) cb PL VENT - close
cb FLOAT BAG (3) - close
(278) cb UPRIGHT SYS COMPRESS (2) - close
If Stable II:
FLOAT BAG(3) - FILL till 2 min after upright, then - OFF
VHF AM A/B & BCN - OFF while inverted
If Stable I:
After 10 Min Cooling Period,
FLOAT BAG (3) - FILL 7 min, then OFF

2 Post Stabilization And Ventilation
PL BCN LT - BCN LT LOW (night landing)
PL VENT vlv - UNLOCK (Pull into detent)
Remove PL VENT Exh Cover
PL VENT - HIGH or LOW
If req'd:
PL DYE MARKER - ON
Release restraints
(275) cb MNA BAT BUS A & BAT C (2) - open
cb MNB BAT BUS B & BAT C (2) - open
cb FLT & PL BAT C - open
(250) cb PYRO A SEQ A - open
cb PYRO B SEQ B - open
Verify voltage $\geq$ 27.5 vdc
*If < 27.5 vdc: *
* cb FLT & PL-BAT BUS A&B (2) -open*
* cb FLT & PL BAT C (1) - close *
* GO TO LOW POWER CHECKLIST *
Unstow and install PLV DISTRIB DUCT
Deploy grappling hook and line if req'd

NOMINAL EGRESS & POWER DOWN
PL VENT - OFF
cb Pnl 250 (all) - open
Charge hatch counterbalance
Open side hatch (after collar installed)
ACTR HNDL SEL - N
GN2 vlv HNDL - VENT (pull)
GN2 vlv HNDL - PRESS (push)
Check Pressure Gauge (mid-white)
repeat vent/press to obtain mid-white

EARTH/POST LANDING
LUNAR ENTRY PAD
SUPERCIRCULAR ENTRY

UNAIDED EGRESS PROCEDURES

PREPARATION

Disconnect umbilicals
Neck dams on (if suited)
Configure couch(s) - 270°
Armrests stowed
Unstow survival kits
Connect lanyards, (green to S/C, white to crew)

STABLE I

PL VENT - OFF
cb Pnl 250 (all) - open
Charge hatch counterbalance
Open side hatch
ACTR HNDL SEL - N
GN2 vlv HNDL - VENT (pull)
GN2 vlv HNDL - PRESS (push)
Check Pressure Gauge (mid-white)
repeat vent/press to obtain mid-white
Remove raft from kit No. 2
Put raft overboard & pull inflation lanyard
Pass hardware kit to raft
Egress, inflate life vest, board raft
If no ventilation or CM O2 supply,
* initiate egress within 2-1/2 hrs*

STABLE II

PWR (3) - OFF
SUIT PWR (3) - OFF
PRESS EQUAL vlv - OPEN
Remove & stow hatch
Lower hardware rucksack down tunnel
Exit feet first; when clear of S/C inflate water wings
Remove life raft from kit No. 2 and inflate
If no ventilation or CM O2 supply,
* initiate egress within 2-1/2 hrs*

POST LANDING COMMUNICATIONS

VHF ANT - RECY (verify)
VHF BCN - ON (verify)
If no contact with recovery forces
perform VHF BEACON Check
MONITOR VHF BEACON transmission with
VHF AM B Rcvr and/or Survival Transceiver
*VHF Beacon not operating *
*connect Survival Transceiver to ant *
cable conn P112 behind VHF ant access pnl
*and place radio in BCN mode *

LOW POWER CHECKLIST

VHF BCN - OFF
VHF AM (3) - RCV
FLOOD LTS - OFF
VHF AM A&B - off (ctr)
VHF AM RCV ONLY - A (verify)
POSTLANDING VENT SYS: minimize use
SURV RADIO - plug into VHF BCN ANT cable
conn P112 behind VHF ant access pnl & turn
radio on in BCN mode

SUPERCIRCULAR ENTRY

LUNAR ENTRY PAD

EARTH/POST LANDING

DATE 3/15/71

EMERGENCY CSM/LV SEPARATION

IF POWERED FLT

TRANS CONTR - CCW (4 SEC)

MN BUS TIES - ON

TVC SERVO PWR 1 - AC1/MNA

TVC SERVO PWR 2 - AC2/MNB

BMAG MODE (3) - ATT 1/RATE 2

GMBL MTRS (4) - ON

ΔV THRUST A - NORMAL

DIR ULLAGE & THRUST ON PB - PUSH

SPS BURN (5 SEC) - THEN ΔV THRUST (2) - OFF

DATE 3/15/71

IF COASTING FLT

cb SECS ARM (2) (Pnl 8) - CLOSE

SECS LOGIC (2) - ON

SECS PYRO ARM (2) - ARM

ROT CONTR PWR DIR (2) - MNA/MNB

SC CONT - SCS

SEPARATE FROM LV AS APPLICABLE -

IF BEFORE DOCKING, THC CCW (4 SEC)

IF DOCKED, UMBIL NOT CONNECTED,
CSM/LM FINAL SEP (2) - ON

IF DOCKED, UMBIL CONNECTED, SIVB/LM SEP - ON

TRANSLATE AWAY FROM LV & MANEUVER TO BURN ATTITUDE

ΔVCG - CSM OR LM/CSM AS APPLICABLE

MN BUS TIE (2) - ON

TVC SERVO PWR 1 - AC1/MNA

TVC SERVO PWR 2 - AC2/MNB

BMAG MODE (3) - ATT1/RATE 2

GMBL MTRS (4) - ON

ΔV THRUST A - NORMAL

DIR ULLAGE & THRUST ON PB - PUSH

SPS BURN (5) SEC - THEN ΔV THRUST (2) - OFF

SUIT COMPRESSOR LITE - CLOSED SUIT LOOP

SWITCH TO OTHER COMPRESSOR ON OTHER BUS
SEE ECS 9

O2 FLOW HI + RAPID LOSS OF SURGE TK PRESS
+ CABIN PRESS <4.6 PSI

CABIN PRESS RELF vlvs (2) - CLOSE
✓TUNNEL EQUALIZATION vlv - CLOSED
REPRESS PKG vlv - ON (WHEN SURGE TK PRESS <150 PSI)
✓EMERG CABIN PRESS REGS - BOTH
DON SUITS

CONTAMINATION IN CM

DON O2 MASKS

CONTAMINATION IN CLOSED SUIT LOOP

CHANGE TO OTHER SUIT COMPR
DIRECT O2 vlv - FULL OPEN THEN ADJUST FOR SUIT
TO CABIN ΔP OF 2 IN OF H2O

IF CONDITION PERSISTS

SUIT COMPR (2) - OFF
DOFF HELMETS
DIRECT O2 vlv - CLOSE
DON O2 MASKS

FIRE/SMOKE IN CM

MONITOR DC FOR HI CURRENT - REMOVE POWER
FROM ASSOCIATED INVERTER
IF CURRENT REMAINS HI - REMOVE POWER FROM
ASSOCIATED DC BUS
IF CLOSED SUIT LOOP, SWITCH SUIT COMPR TO GOOD AC BUS
IF HELMET OFF, SUIT COMPR (2) - OFF
RECONFIGURE INVERTER 3 ON LOST AC BUS
VERIFY RCS CONTROL POWER CONFIGURATION

IF HELMETS OFF [DON O2 MASKS
USE FIRE EXTINGUISHER OR H2O GUN (OPTIONAL)

IF CLOSED SUIT LOOP [USE FIRE EXTINGUISHER OR H2O GUN (OPTIONAL)
✓ EMERG CABIN PRESS REGS - OFF
IF FIRE PERSISTS - DUMP CABIN

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G&N CRITICAL BURNS

IF NO START OR ISS LITE + PROG LITE
IF CMC LITE, PROG ALARM 1407 OR EARLY CUTOFF

SCS TVC (2) - AUTO
SC CONT - SCS
✓ ATTITUDE
SPS THRUST - DIRECT (MOMENTARY), IF REQ'd

IF ABNORMAL DYNAMICS

THC CW, control rates by MTVC
After SHUTDOWN, AUTO RCS (16) - OFF

SCS CRITICAL BURN

IF NO START OR EARLY CUTOFF

SPS THRUST - DIRECT (MOMENTARY)

IF RATE NEEDLE HARDOVER & FDAIs DIVERGE OPPOSITE

BMAG MODE (3) - RATE 1
THC - CW, use MTVC

IF ABNORMAL DYNAMICS IN AUTO MODE

THC - CW, use MTVC
BMAG MODE (3) - RATE 2

IF ABNORMAL DYNAMICS IN MTVC MODE

THC - CW
IF PROBLEM PERSISTS, SHUTDOWN
AUTO RCS (16) - OFF

SPS

IF NO CUTOFF AFTER ΔV THRUST (BOTH - OFF)

cb SPS PILOT VLVS - open

IF EMS & N40 (R3) STILL COUNTING AFTER SHUTDOWN

SC CONT - SCS
TRANS CONT PWR - OFF
cb DIR ULLAGE (2) - open
IF CONDITION PERSISTS, AUTO RCS SEL (16) - OFF
SM RCS PRPLNT (AFFECTED QUAD) - OFF

SPS PRESS LITE

CONTINUE CRITICAL BURN

IF FUEL & OX PRESS (BOTH) > 200 PSI

SPS HE vlvs (2) - OFF, THEN CONTROL MANUALLY BETWEEN 170-200 PSI

IF FUEL/OX ΔP > 20 PSI

SPS HE vlvs (2) - ON
IF CONDITION PERSISTS,SPS HE vlvs(2)-OFF(Until Pc <70)

G&C (COASTING, ENTRY)

CMC LITE

SC CONT - SCS
SEE G&N 5

ISS LITE + PROG ALARM LITE

SC CONT - SCS
SEE G&N 6

EMERGENCY POWER DOWN

CAUTION: USE BATTS ONLY WHEN MAIN BUS VOLTS < 24.5

CONFIGURE FOR USE OF AUX BATTERY
- FUEL CELL 2 MNA & MNB (2) - OFF
- cb CRYO O2 ISOL/AUX BAT - CLOSE (Pnl 226)
- SM PWR SOURCE - AUX BAT (mom) (Pnl 278)
- O2 TANK 3 ISOL - CLOSE (✓TB-bp) (Pnl 278)
- FUEL CELL 2 MN A(B) - as desired

	DC AMPS
INSURE DSE IS RECORDING	
IF UNSUITED, SUIT COMP (2) - OFF	4.0
FC PUMPS (3) - OFF (Until Tskin > 475°F)	8.7 TOTAL
cb G&N OPTICS MNA & MNB (2)- OPEN (Pnl 5)	3.1
G&N PWR (AC) - OFF (Pnl 5)	0.9
O2 HTRS (3) - OFF (CTR)	17.0
H2 HTRS (2) - OFF (CTR)	1.4 EA
H2 FANS (3) - OFF (CTR)	1.0
C/W NORMAL - ACK	
LM PWR - RESET - OFF	15.0 MAX
ECS RAD HTRS (2) - OFF	17.2 EA
POT H2O HTR - OFF	1.6 MAX
SM RCS HTRS (4) - OFF	3.3 MAX EA
HGA PWR - OFF	2.9
LIGHTS - Min Reqd	5.3 MAX
EXT LTS - OFF	4.6
NON ESS BUS - OFF (SPS Burn-Damage SIM CAM)	4 - 6
VHF RANGING - OFF	1.4
S BD AUX TV - OFF (CTR	5.3
SPS LINE HTR - OFF (CTR)	6.2 (A/B)
RNDZ XPNDR PWR - OFF or HEATER (Pnl 100)	3.0
SIG CONDR/DRIVER BIAS PWR (2) - OFF	
SECURE ONE BMAG	2.6
SELECT SINGLE JET CONTROL	
EMS FUNC - OFF	
RHC PWR DIRECT (2) - OFF	
THC PWR - OFF	
CONFIGURE FOR SINGLE INVERTER OPERATION	
TURN OTHER INVERTER OFF	4.0 MAX
BAT CHGR - OFF	
NOTE MISSION TIME	
cb TIMERS (2) - OPEN (Pnl 229)	
AC INVERTER (9) - OFF	
CM RCS HTRS - OFF	
ISOLATE FAILED FC's from MAIN BUSES	

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ECS POWER DOWN	3.7 TOTAL
ECS GLY PUMP sel - OFF (ISS LIMIT 2.5 HRS)	2.6
ECS RAD FLOW CONT PWR - off (CTR)	0.7
GLY EVAP TEMP IN - MAN	
ECS RAD HTRS (2) - OFF	
GLYCOL EVAP H2O FLOW - OFF	~0.1
GLYCOL EVAP STEAM PRESS - MAN	~0.2

COMM POWER DOWN	13.0 TOTAL
IF VOICE DESIRED	
UP TLM CMD RESET - RESET then OFF	
S-BD AUX TAPE - DN VOICE BU	
S-BD MODE PCM - OFF	
PCM BIT RATE - HIGH	
S-BD PWR AMP - OFF (CTR)	4.0
TAPE RCDR - OFF (CTR)	1.6
SCE PWR - OFF (CTR)	0.7
cb INSTR ESS MNA & MNB (2) - OPEN (Pnl 5)	4.9
TELCOM GRP 1 & 2 (2) - OFF	1.6

CMC/IMU POWER DOWN	6.0 IMU
COMPLETE ALIGNMENT TRANSFER	
CMC MODE - FREE PROVIDES CMC MIN IMP	
cb G&N IMU MNA & MNB (2) - OPEN (Pnl 5)	
V37E06E	3.0 CMC
F V50 N25, 00062, CMC PWR DN	
PRO, HOLD (~5 SEC) UNTIL STBY LT - ON	

SCS POWER DOWN	6.0
ACCEPTABLE S/C ATTITUDE	
BMAG PWR (2) - OFF	
FDAI/GPI PWR - OFF PROVIDES MIN IMP	
SCS ELECTRONICS PWR - ECA (REQUIRES AC1 & MNB)	
ORDEAL PWR & LIGHTING - OFF	
cb SCS LOGIC BUS (4) - OPEN (Pnl 8)	2.0
SCS ELECTRONICS PWR - OFF	
RHC PWR NORM (2) - OFF	

LAUNCH BUS LOSS

MN BUS A LOST - LAUNCH

EDS AUTO/OFF - OFF
TVC GMBL DR (P,Y) - 2
SCS TVC (P,Y) - RATE CMD
BMAG MODE (3) - RATE 2
FDAI SEL - 2
cb SPS PITCH 2 & YAW 2 (Pnl 8) - OPEN
(AFTER GIMBAL MOTORS ON)

AC INV 3 - MNB
AC INV 3 AC 1 - ON
AC INV 1 AC 1 - OFF
All F/C MNA - OFF
ALL F/C MNB - MNB (BEFORE CM/SM SEP)
cb MNA BAT BUS A (Pnl 275) - OPEN
cb MNB BAT C (Pnl 275) - CLOSED

MN BUS B LOST - LAUNCH

EDS AUTO/OFF - OFF
TVC GMBL DR (P,Y) - 1
SPS TVC (P,Y) - RATE CMD
✓BMAG MODE (3) - RATE 1
FDAI SEL - 1
cb SPS PITCH 1 & YAW 1 (Pnl 8) - OPEN
(AFTER GIMBAL MOTORS ON)

AC INV 3 - MNA
AC INV 3 AC 2 - ON
AC INV 2 AC 2 - OFF
All F/C MNB - OFF
All F/C MNA - MNA (BEFORE CM/SM SEP)
cb MNB BAT BUS B (Pnl 275) - OPEN
cb MNA BAT C (Pnl 275) - CLOSED

AC BUS 1 LOST - LAUNCH

BMAG MODE (3) - RATE 2
FDAI SEL - 2
TVC SERVO PWR 1 - AC2/MNB
SCS TVC PITCH, YAW - RATE CMD

AC INV 1 MNA - OFF
SUIT COMPR - AC 2
ECS GLY PUMP - AC 2
S BD NORM XPNDR - SEC
S BD NORM PWR AMP - SEC

AC BUS 2 LOST - LAUNCH

✓BMAG MODE (3) - RATE 1
FDAI SEL - 1
TVC SERVO PWR 2 - AC1/MNA
MTVC WITH THUMBWHEELS (MODE III OR IV)

AC INV 2 MNB - OFF
✓SUIT COMPR - AC 1
✓ECS GLY PUMP - AC 1

BAT BUS A LOST - LAUNCH

EDS AUTO/OFF - OFF
AUTO RCS SEL (RING 1) - OFF
IF BUS LOST BEFORE GMBL MTRS ON
TVC GMBL DR (P,Y) - 2
cb SPS P2 & Y2 (Pnl 8) - OPEN
(AFTER SEC GIMBAL MOTORS ON)

cb MNA BAT C (Pnl 275) - CLOSED

BAT BUS B LOST - LAUNCH

EDS AUTO/OFF - OFF
AUTO RCS SEL (RING 2) - OFF
IF BUS LOST BEFORE GMBL MTRS ON
TVC GMBL DR (P,Y) - 1
cb SPS P1 & Y1 (Pnl 8) - OPEN
(AFTER PRI GIMBAL MOTORS ON)

cb MNB BAT C (Pnl 275) - CLOSED

SPS BURN BUS LOSS

MN BUS A LOST - SPS BURN

TVC GMBL DR (P,Y) - 2
✓SCS TVC (P,Y) - RATE CMD
cb SPS P2 & Y2 (Pnl 8) - OPEN
(CRIT BURNS - AFTER GMBL MTRS ON)
FDAI SEL - 2
✓FDAI SOURCE - CMC
RHC PWR DIRECT 2 - MNB
BMAG MODE (3) - RATE 2
✓ΔV THRUST B - NORM
AUTO RCS SEL - MNB

AC INV 3 - MNB
AC INV 3 AC 1 - ON
AC INV 1 AC 1 - OFF
All F/C MNA - OFF
ALL F/C MNB - MNB
cb MNA BAT BUS A (Pnl 275) - OPEN

MN BUS B LOST - SPS BURNS

SCS TVC (P,Y) - RATE CMD
TVC GMBL DR (P,Y) - 1
cb SPS P1 & Y1 (Pnl 8) - OPEN
(CRIT BURNS - AFTER GMBL MTRS ON)
FDAI SEL - 1
✓FDAI SOURCE - CMC
RHC PWR DIRECT 1 - MNA
BMAG MODE (3) - RATE 1
ΔV THRUST A - NORM
AUTO RCS SEL - MNA

AC INV 3 - MNA
AC INV 3 AC 2 - ON
AC INV 2 AC 2 - OFF
All F/C MNB - OFF
All F/C MNA - MNA
cb MNB BAT BUS B (Pnl 275) - OPEN

AC BUS 1 LOST - SPS BURNS

TVC SERVO PWR 1 - AC2/MNB
SCS TVC (P&Y) - RATE CMD
BMAG MODE (3) - RATE 2
FDAI SEL - 2
✓FDAI SOURCE - CMC

AC INV 1 MNA - OFF
SUIT COMPR - AC 2
ECS GLY PUMP - AC 2
S BD NORM XPNDR - SEC
S BD NORM PWR AMP - SEC
SPS GAUGING - AC 2

AC BUS 2 LOST - SPS BURNS

TVC SERVO PWR 2 - AC1/MNA
BMAG MODE (3) - RATE 1
SCS TVC (P&Y) - AUTO
ΔVCG - LM/CSM
MTVC WITH TRIM THUMBWHEELS (SCS BURN ONLY)
FDAI SEL - 1
✓FDAI SOURCE - CMC

AC INV 2 MNB - OFF
✓SUIT COMPR - AC 1
✓ECS GLY PUMP - AC 1

BAT BUS A LOST - SPS BURNS

TVC GMBL DR (P,Y) - 2
(IF BUS LOST BEFORE GMBL MTRS ON)
cb SPS P2 & Y2 (Pnl 8) - OPEN
(CRIT BURNS - AFTER GMBL MTRS ON)

cb MNA BAT C (Pnl 275) - CLOSED

BAT BUS B LOST - SPS BURNS

TVC GMBL DR (P,Y) - 1
(IF BUS LOST BEFORE GMBL MTRS ON)
cb SPS P1 & Y1 (Pnl 8) - OPEN
(CRIT BURNS - AFTER GMBL MTRS ON)

cb MNB BAT C (Pnl 275) - CLOSED

ENTRY BUS LOSS

MN BUS A LOST - ENTRY

- BMAG MODE (3) - RATE 2
  FDAI SEL - 2
  ✓FDAI SOURCE - CMC
- AUTO RCS SEL (12) - MNB (ONLY IF BUS LOST AFTER SM SEP)

  AC INV 3 - MNB
  AC INV 3 AC 1 - ON
  AC INV 1 AC 1 - OFF
  All F/C MNA - OFF
  ALL F/C MNB - MNB (BEFORE CM/SM SEP)
  cb MNA BAT BUS A (Pnl 275) - OPEN
  cb MNB BAT C (Pnl 275) - CLOSED

MN BUS B LOST - ENTRY

- BMAG MODE (3) - RATE 1
  FDAI SEL - 1
  ✓FDAI SOURCE - CMC
- AUTO RCS SEL (12) - MNA (ONLY IF BUS LOST AFTER SM SEP)

  AC INV 3 - MNA
  AC INV 3 AC 2 - ON
  AC INV 2 AC 2 - OFF
  All F/C MNB - OFF
  All F/C MNA - MNA (BEFORE CM/SM SEP)
  cb MNB BAT BUS B (Pnl 275) - OPEN
  cb MNA BAT C (Pnl 275) - CLOSED

AC BUS 1 LOST - ENTRY

- BMAG MODE (3) - RATE 2
  FDAI SEL - 2
  ✓FDAI SOURCE - CMC

  AC INV 1 MNA - OFF
  SUIT COMPR - AC 2
  ECS GLY PUMP - AC 2
  S BD NORM XPNDR - SEC
  S BD NORM PWR AMP - SEC

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AC BUS 2 LOST - ENTRY

BMAG MODE (3) - RATE 1
FDAI SEL - 1
✓FDAI SOURCE - CMC

AC INV 2 MNB - OFF
✓SUIT COMPR - AC 1
✓ECS GLY PUMP - AC 1

BAT BUS A LOST - ENTRY

cb SCS B/D ROLL, P&Y (MNA) (3) (Pnl 8)
Before CM/SM SEP - OPEN
After RCS transfer to CM - CLOSE
cb SCS CONTR/AUTO (2) (Pnl 8) - OPEN
(AFTER APEX COVER JET)

cb MNA BAT C (Pnl 275) - CLOSED

BAT BUS B LOST - ENTRY

cb SCS B/D ROLL, P&Y (MNB) (3) (Pnl 8)
Before CM/SM SEP - OPEN
After RCS transfer to CM - CLOSE
cb SCS CONTR/AUTO (2) (Pnl 8) - OPEN
(AFTER APEX COVER JET)

cb MNB BAT C (Pnl 275) - CLOSED

ALL FC'S DISCONNECTED - POWERED FLT

ATTEMPT FC RECONNECT (ONE BUS AT A TIME)

IF RECONNECT NOT SUCCESSFUL

FC 1 - MN B
FC 2 - MN B
FC 3 - MN A

IF STILL NO SUCCESS

SCE PWR - AUX
EDS AUTO/OFF - OFF
cb MNA BAT C (Pnl 275) - CLOSED
cb MNB BAT C (Pnl 275) - CLOSED

AC BUS OVERLD + AC BUS + MN BUS UNDER V LITES

AFFECTED AC BUS - OFF (REASON - AC BUS SHORT)

FC 1 (2,3) LITE

VERIFY FC 1 (2,3) REAC tb - gray

IF tb BP

FC 1 (2,3) REAC vlv - OPEN (up)

IF tb STILL BP & REAC FLOW ~0

OPEN CIRCUIT FC 1 (2,3)

SM RCS THRUSTER FAILED ON

BMAG MODE (3) - RATE 2
CHG TO OTHER SC CONT MODE
ROT CONT PWR DIR (2) - MNA/MNB
STOP SPACECRAFT RATES WITH DIRECT RCS
AUTO RCS SEL (16) - OFF

IF CONDITION PERSISTS

AUTO RCS SEL (16) - ON (AS REQ'D)
MAN ATT (3) - ACCEL CMD
STOP SPACECRAFT RATES
cb SCS DIR ULL (2)(Pnl 8) - open
ROT CONT PWR DIR (2) - OFF

IF CONDITION PERSISTS

NEUTRALIZE RHC
SM RCS PRPLNT (AFFECTED QUAD) - OFF

SM RCS LITE

SM RCS HE (2) - CLOSE
SEE RCS 1

SM RCS QUAD SECURE

SM RCS He 1 & 2 (AFFECTED QUAD) (2) - CLOSE
SM RCS PRIM PRPLNT (AFFECTED QUAD) - CLOSE
Fire one jet in affected quad - 2 sec continuously
AUTO RCS SELECT (AFFECTED QUAD) (4) - OFF (except BOOST)

CM RCS FAILS TO PRESSURIZE OR FEED PRPLNT

IF NO PRESSURIZATION

✓cb EPS BAT BUS (2) (Pnl 229) - CLOSE
✓cb PYRO A/B SEQ A/B (2) (Pnl 250) - CLOSE
✓cb SECS ARM (2) (Pnl 8) - CLOSE
✓SECS PYRO ARM (2) - ARM
✓SECS LOGIC (2) - ON
CM RCS - PRESS

IF NO RCS PRPLNT FEED

✓cb EPS GRP 1 & 3 (Pnl 229) - CLOSE
✓cb SM RCS HTR A&B (Pnl 8) - CLOSE
✓cb RCS PRPLNT ISOL (2) (Pnl 8) - CLOSE
CM RCS PRPLNT - ON

IF STILL NO FEED

cb EPS GRP 5 (Pnl 229) - CLOSE
cb RCS LOGIC (2) (Pnl 8) - CLOSE
CM RCS LOGIC - ON
CM PRPLNT - DUMP MOMENTARILY, THEN OFF

V05 N09 ALARM CODES

00110 Mark reject has been entered but ignored
Continue

00113 No inbits (chan 16)
Continue: if alarm recurs use MDC DSKY.

00114 More marks made than desired
Continue

00115 V41 N91 keyed with OPTICS MODE not in CMC
OPTICS MODE - CMC and OPTICS ZERO - OFF

00116 Optics switch altered before 15 sec zero time elapsed
OPTICS ZERO - ZERO (15 sec).

00117 V41 N91 keyed but CMC has reserved OCDU (from start of gimbal test in P40 until termination of TVC functional allocation of the "optics" CDU Driving Output)
V41 N91 not yet available

00120 Optics torque has been requested but optics have not been zeroed since last FRESH START or RESTART
OPTICS ZERO - OFF then ZERO (15 sec).

00121 In 0.05 sec following mark, an ICDU changed by more than 0.033°
Repeat MK.

(m)00205 PIPA saturated
Use SCS control (G&N 12).

00206 The IMU zero routine has been entered with both the GMBL LOCK lt and NO ATT lt on
Coarse align to 0,0,0 Reselect V40E.

(m)00207 ISS turn-on request not present for 90 sec
Redo IMU turn on (G&N 12).

(m)00210 The IMU is not operating
Redo IMU turn on. If alarm recurs perform fresh start (V36E).
Consult MSFN. (G&N 12).

CM RCS

ALARM CODES

CRITICAL BURNS

(m)00211 Coarse align error
If P51(3)/52(4) in progress record gyro torquing angles and perform fine align check in P52(4)
Otherwise, see G/1-24. (G&N 12).

(m)00212 PIPA fail, but PIPA is not being used
PIPA BIAS check (G&N 6/8).

(m)00213 IMU not operating with turn-on request
See 00210

00214 Program using IMU when turned OFF
See 00210 or exit program.

(m)00217 IMU coarse align or pulse torque difficulty has occurred
If code 211 also, perform 211 cure only
Reinitiate current program.
If alarm recurs, terminate use of ISS (G&N 12).

00220 IMU orientation unknown
Align or if aligned set REFSMMAT flag

00401 Desired middle gimbal angle is excessive
Call N22 - maneuver if MGA < 85° or realign IMU.

00402 Second MINKEY pulse torque must be done.

00404 Target out of view (90 deg test)
(G/3-7,3-11,6-3,7-16)

00405 Acceptable star pair is not available
(G/6-3,6-6)

00406 Rend navigation not operating
Select P20 Opt. 0 or 4 or continue.

00421 W-matrix overflow
Notify MSFN but continue.
W-matrix automatically reinitialized at next mark.

00600 No solution on first iteration in P31 or P32/72
(G/4-6,4-8)

00601 Post CSI Perigee/lune alt <85nm/ 5.8nm
(G/4-6, 4-8)

00602 Post CDH Perigee/lune alt <85nm/ 5.8nm
(G/4-6, 4-8)

00603 Time from TIG (CSI) to TIG (CDH) <10 min
(G/4-6, 4-8)

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00604 Time from TIG (CDH) to TIG (TPI)
<10 min
(G/4-6,4-8)

00605 Number of iterations exceeds loop
maximum
(G/4-6,4-8,4-15,4-16)

00606 ΔV (CSI) has been >1000 fps for last
two iterations
(G/4-6,4-8)

00611 No TIG for given ELEV angle
(G/4-10,4-12)

00612 State vector in wrong sphere of influence
at TIG
(G/4-15)

00613 Reentry angle out of limits
(G/4-16)

(m)00777 ISS warning caused by PIPA fail
(G&N 6).

01102 CMC self test error
(G/2-3)

(m)01105 Downlink too fast
Rset. If alarm recurs DOWNLINK FAILURE.
(G&N 12).

(m)01106 Uplink too fast
Rset. If alarm recurs UPLINK FAILURE.
(G&N 12).

(m)01107 Phase table failure-assume erasable
memory is destroyed
If Comm: 1. V74 CMC DOWNLINK
2. P27 As Necessary.
3. V48 As Necessary (V46).
4. Reestablish REFSMMAT via
P51 As Necessary.
If FRESH START recurs,
CMC FAILURE (SSR-3).
If no Comm, pg G/9-1

01301 Arcsin or arccos input is greater than
one
Notify MSFN, continue.

(m)01407 VG increasing
(G&N 12).

01426 IMU unsatisfactory
Realign or use SCS.

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01427 IMU reversed
Note FDAI operation is inverted.
01520 V37 request not permitted at this time
Wait till COMP ACTY lt.
not on continuously - reselect V37 or if P62-67, select P00 and then desired program.
01600 Overflow in drift test
This is gnd test alarm only.
01601 Bad IMU torque abort
See 01600
01703 Insufficient time for integration.
TIG slipped
(G/5-3,5-18)
(m)03777 ISS warning caused by ICDU fail
(G&N 6)
(m)04777 ISS warning caused by ICDU & PIPA fail
(G&N 6)
(m)07777 ISS warning caused by IMU fail
(G&N 6)
(m)10777 ISS warning caused by IMU & PIPA fail (G&N 6)
(m)13777 ISS warning caused by IMU & ICDU fail
(G&N 6)
(m)14777 ISS warning caused by IMU,ICDU & PIPA fail
(G&N 6)
**20430 Orbital integration has been terminated to avoid possible infinite loop.
Notify MSFN.
Probable S.V. uplink required
**20607 No solution to conic subroutine
Reselect program.
**20610 Alt at specified TIG in P37 < 400K ft
Reselect P37 and decrease TIG.
**21204 Negative or zero time waitlist call.
If ave-g or ext. vb. on, continue.
Otherwise reselect program.
**21206 Second job attempts to go to sleep via keyboard and display program
See 21204.

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**21210 Second attempt is made to stall
Reselect program
Do not attempt use of IMU while CMC is using it.

**21302 SQRT called with negative argument
See 21204

**21501 Keyboard and display alarm during internal use
See 21204

**21502 Illegal flashing display
See 21204

**21521 P01 selected and P11 has already been performed
Select correct program

*31104 Delay routine busy
Reselect extended verb or continue with program.
Notify MSFN.

*31201 Executive overflow - no vac area
Reselect Extended Verb and/or Continue Program.

*31202 Executive overflow - no core sets
See 31201

*31203 Waitlist overflow - too many tasks
See 31201

*31211 Illegal interrupt of extended verb
Reselect extended verb after optics marking is completed.

(m) - Malf procedure indicated
**(2xxxx) - Generates restart (no lt), F37 (P00D00)
*(3xxxx) - Restart (no lt) and program continues (i.e. attempted recovery)(BAILOUT)

NOTE - All **alarms act as *type if they occur when Ave-g is on or display type extended verb is active.

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CRITICAL BURNS

ALARM CODES

CM RCS