APOLLO 11

LM TIMELINE BOOK

June 21, 1969

FLIGHT PLAN

CSM		LM		MCC-H
CMP	0930 EDT	CDR	LMP	
	96:00	DON LCG AND PGA W/O HELMET AND GLOVES		
V64 ACQUIRE MSFN CREW STATUS REPORT REPORT DOCKING TUNNEL INDEX ANGLE TO MSFN P27 UPDATE LOAD DAP R1 = 21112 R2 = 11111	96:22	CSM POWER TO LM-OFF (AT LMP REQUEST)	LM POWER-ON	DUMP DSE
	96:30	DISCONNECT AND STOW LM POWER UMBILICAL	EPS ACTIVATION MISSION TIMER ACTIVATION PRIMARY GLYCOL LOOP ACT	UPLINK CMC CSM STATE VECTOR DESIRED ORIENT (LS REFSMMAT)
RECORD LMK 130 PAD DATA (SEE GET 98:35) TEI 28 BLOCK DATA AND CSM DAP DATA			CAUTION/WARNING CHECKOUT CB ACTIVATION TB VERIFICATION	UPDATE CSM LMK 130 PAD BLOCK DATA CSM DAP DATA
	96:51	IVT TO LM TRANSFER HELMET & GLOVES	PGNCS TURN - ON AND SELF TEST	
UNSTOW OPTICS	96:58	ECS ACTIVATION AND C/O CONNECT TO LM ECS	BIO MED SWITCH - LEFT	
	97:00			

MSFN

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	FINAL	JULY 1, 1969	96:00 - 97:00	5/1	3-63

MSC Form 2189 (OT) (Nov 68)

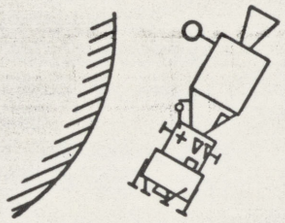
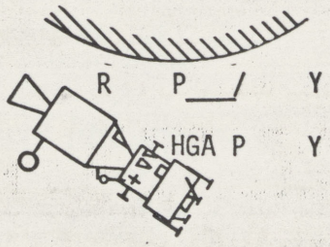
FLIGHT PLANNING BRANCH

FLIGHT PLAN

CSM		LM		MCC-H
REPORT: CMP	1030 EDT 97:00	CDR	LMP	
P52 (LDG SITE REFSMMAT) N71: __ __,__ __ N05: __ __ __.__ __ N93: X __ __.__ __ __ Y __ __.__ __ __ Z __ __.__ __ __ GET __ __ __:__ __:__ __	MSFN	SUIT FAN/H20 SEP CHECK	SEC S-BAND T/R AND POWER AMPLIFIER CHECK	UPDATE LM STEERABLE ANTENNA ANGLES (GET :97:10)
		GLYCOL PUMP CHECK	S-BAND STEERABLE ANTENNA ACTIVATION	
		VHF-B ACTIVATION		
		E MEMORY DUMP	IVT TO CSM	
VHF CHECKOUT CSM TIME MARK TO LM STOW OPTICS		VHF CHECKOUT (COMM CHECK WITH CSM)		
		LGC/CMC CLOCK SYNC T EPHEM UPDATE	DON PGA	
VO6N20E (ON MARK FROM CDR)	97:30 97:34	DOCKED IMU COARSE ALIGN REPORT GIMBAL ANGLES TO MSFN		COPY GIMBAL ANGLES UPDATE LM
		SLEW STEERABLE ANTENNA	IVT TO LM TRANSFER HELMET & GLOVES	STEERABLE ANTENNA ANGLES (GET: 98:21)
DON HELMET AND GLOVES PGA PRESSURE INTEGRITY CHECK INSTALL DROGUE & PROBE, PRELOAD PROBE INHIBIT ROLL COMMANDS UNTIL LM/CM ΔP>3.5psia	97:44 97:49	VERIFY DROGUE AND PROBE INSTALLATION CLOSE AND SECURE HATCH	CONNECT TO LM ECS AND COMM	
COCK LATCHES (12) VENT TUNNEL HATCH INTEGRITY CHECK INSTALL AND ALIGN DOCKING TARGET	98:00		ASCENT BATTERY ACTIVATION AND CHECKOUT RECORD ED BAT VOLTS	

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	FINAL	JULY 1, 1969	97:00 - 98:00	5/11-12	3-64

FLIGHT PLAN

CSM	1130 EDT	LM CDR	LM LMP	MCC-H
CMP  MANEUVER TO TRACKING ATTITUDE R P___/ Y	98:00	DON HELMET & GLOVES	DON HELMET & GLOVES	
		ARS/PGA PRESSURE INTEGRITY CHECK	ARS/PGA PRESSURE INTEGRITY CHECK	
		CABIN REGULATOR CHECK	CABIN REGULATOR CHECK	
SELECT OMNI B	98:21	DOFF HELMET & GLOVES COPY DAP DATA COPY GYRO TORQUE ANGLES AND FINE ALIGN IMU X ___, Y ___, Z ___ DRIFT CHECK	DOFF HELMET & GLOVES SELECT OMNI FWD BIO MED SWITCH - RIGHT	UPDATE LM DAP DATA GYRO TORQUE ANGLES
GO INERTIAL UNSTOW OPTICS P22 ORBITAL NAVIGATION	98:30			P22 AUTO OPTICS LMK ID 130 T1 __ __ __:__ __:__ __ (HOR) T2 __ __ __:__ __:__ __ (35°) __ __ NM (N OR S) N 89 LAT __ __.__ __ __ LONG/2 __ __.__ __ __ ALTITUDE- __ __ __.__ __ NM
TRACK LDG SITE LANDMARK (5 MARKS ON LDMK 130) PITCH DOWN DO NOT INCORPORATE MARKS	MSFN	RATE GYRO CHECK	AGS ACT & SELF TEST	
PITCH DOWN, 0.5°/SEC	98:50	 R P___/ Y HGA P Y		
STOP PITCH AND GO INERTIAL REACQUIRE MSFN	98:56 99:00		REACQUIRE MSFN ANT P Y	DUMP DSE

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	FINAL	JULY 1, 1969	98:00 - 99:00	5/12	3-65

FLIGHT PLAN

CSM		LM		MCC-H
CMP	1230 EDT 99:00	CDR	LMP	UPLINK LGC LS REFSMMAT LM & CSM STATE VECTORS LGC/CMC CLOCK SYNC PIPA BIAS LGC ABORT CONSTANT UPDATE LM AGS ABORT CONSTANT AGS K FACTOR UPLINK CMC LM & CSM STATE VECTORS UPDATE CSM P30 MNVR PAD (SEPARATION) GO/NO-GO UPDATE LM STEERABLE ANTENNA ANGLES(GET:100:25)
STOW FLIGHT PLAN UNSTOW SOLO BOOK COPY PADS		DEPLOY LANDING GEAR ORDEAL INITIALIZATION	P27 UPDATE	
P27 UPDATE SC CONT - SCS MIN/MAX DB, LOW/HIGH RATE (AT REQUEST OF CDR) GO/NO-GO FOR UNDOCKING DISABLE ROLL JETS FOR RCS HOT FIRE	MSFN	DAP DATA LOAD DPS GIMBAL DRIVE & THROTTLE TEST	V47 INITIALIZE AGS COPY AGS ABORT CONSTANT AND K FACTOR	
		RCS PRESSURIZATION	RCS PRESSURIZATION	
		RCS CHECKOUT	GO/NO-GO FOR UNDOCKING RCS CHECKOUT	
	99:30 99:32	RR ACT & SELF TEST	SLEW STEERABLE ANTENNA ANT P Y	
RR XPONDER- HEATER MANEUVER TO AGS CALIBRATION ATTITUDE	99:43	R P___/ Y		
RATES <0.1°/SEC DISABLE THRUSTERS FOR 32 SEC (AT REQUEST OF LMP) MANEUVER TO UNDOCKING ATTITUDE R P___/ Y	99:49 REV 13		AGS ACCEL & GYRO CALIBRATION	
	100:00	DPS PRESS & CHECKOUT		

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	FINAL	JULY 1, 1969	99:00 - 100:00	5/12-13	3-66

FLIGHT PLAN

CSM

CMP

RR TRANSPONDER
ACT & SELF TEST

LOAD DAP R1 = 11102
R2 = 11111
SC CONT - SCS

UNDOCK

ENABLE B3 & C4 RCS JETS
V64 ACQUIRE MSFN
LM INPECTION, PHOTO

COPY PADS
SC CONT - CMC
P30 EXT ΔV
P41 RCS THRUST

CSM SEPARATION
GET: 100:39:59
BT: 8.0 SEC
ΔV_T: 2.3 FPS
-X THRUSTERS
ORBIT: 63.1 X 55.6

P20 AUTO MANEUVER
SXT & VHF TRACKING

MSFN

100:00
100:19
100:30
100:48
100:54
101:00

MSFN

LM

CDR

DAP DATA LOAD

YAW LEFT 60°, PITCH UP 110°
SET ORDEAL
YAW 360°, LM INSPECTION

R P___/ Y

LR ACT AND SELF TEST

P30 EXT ΔV
RR MAN LOCK - ON

VHF RANGING
RR - OFF

LMP

V47 AGS ALIGN
R P___/ Y

DON HELMETS AND GLOVES
PREPARE FOR UNDOCKING

UNDOCK

ACQUIRE MSFN
ANT P Y
P27 UPDATE

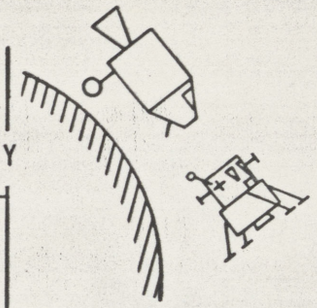
COPY PADS

SEPARATION

P27 UPDATE
V47 AGS UPDATE
AGS ALIGN

COPY PAD

MCC-H



UPLINK LGC
- LM STATE VECTOR (DOI - 10)
- DOI TARGET LOAD
- PIPA BIAS

UPDATE CSM
- DOI P76 PAD
- PDI, +12 ABORT P76 PAD

UPDATE LM
- DOI MNVR PAD
- PDI PAD
- PDI +12 PAD

UPDATE LGC
- CSM STATE VECTOR (PDI + 25)

UPDATE LM
- LUNAR SURFACE PAD

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	FINAL	JULY 1, 1969	100:00 - 101:00	5/13	3-67

UNDOCKED TO SEP

+30 USE ACTIVATION & C.O.
C/L TO 5 MIN BEFORE UNDOCK
V77E
V62E
V48 21102

+35 UNDOCK (100:15)
YAW LT 60° (ATT CONT P&R - MODE CONT)
PITCH UP 110° (ATT CONT R&Y - MODE CONT)
AOS 100 +19 FDAI (0,305,0)
V83 SET ORDEAL
VERIFY TRACKING LT-ON, THEN OFF
✓ S BD P ~~143~~ 133 Y ~~-29~~ -40
VERIFY COMM, AUTO TRACK

+40 PCM-HI
YAW 360° FOR INSPECTION ATT CONT P&R - MODE CONT

V76E
GUID CONT - PGNS
+45 LM ACTIVE STATION KEEP (CAMERAS)
HELMETS & GLOVES - OFF (OPT)

+50

+50 POO, UPDATA LINK - DATA
(S.V., TARGETING, PIPA BIAS, & PADS FOR DOI, PDI, PDI +12)
UPDATA LINK - OFF

+55

232+00600,233+00250	224+(+60271)
464+00500,465+00195	225+(+58148)
616+0	226+(+83884)
623+0	227+(-50457)
	231+(+56936)

240 +56936
262 -00150
254 +0767.2

+0 CSM SEP (100:40)

+0 SEP (100:39:59) TTCA (CDR)-DISABLE
CB LR-CLOSE, CK TEMP (50°-70°)
RATE ERR MON-LDG RDR/CMPTR
X-PNTRS-HI MULT, TM SW-H/H
LDG ANT-DES, MODE SEL-LR
RDR TEST - LDG
TEST MON-ALT/VEL EXTR (2.1-5.0),AGC
RECORD TM H/H
V63E, N12 OPT CODE, V22E, 2E, PRO
N66 SLANT RANGE, ANT POSIT, PRO
+5 N67 V_x V_y V_z
V34E, LDG ANT - AUTO, V60E
V63E, N12 OPT CODE, V22E, 2E,PRO
LDG ANT-DES (√522 ALARM), THEN AUTO
V34E, RDR TEST OFF
V63E, V34E, CB LR - OPEN
UPDATA LINK-DATA (CSM S.V.), OFF
V47E, 414+1, 414R+0, 400+3, 400R+0
V83, SET ORDEAL, 317R,440R,277R
+10 DEADBAND - MIN,400+2,507+0
SS AGS-AUTO, √ERROR NEEDLE, ATT HOLD
100 P-30 TARGET PGNS FOR DOI, N33 TIG,
+54 N81 ΔVX, ΔVY, ΔVZ: N42 HA, HP, ΔVT:
N45 M, TFI, MGA: RESET ET UP
PRO, P00
V76
CB RR(2) CLOSE, CHECK TEMP (10°-50)
V63, RR TEST
RR-SLEW. MANUAL LOCK-ON
RR-LGC
+15 VHF A XMTR - VOICE/RNG
B XMTR - OFF
COMPARE LGC, TM, CSM VHF, CMC-RECORD

V34E, 400+0
V41N72E (+00000 TRUN, +28300 SHFT)
CB RR (2) - OPEN, V44
+20

+20 P52 OPT3
CB(11) AC BUS A-AOT LAMP CLOSE
AOT - DETENT F/0.0°
1st STAR_____
2nd STAR_____
N05 ANG DIFF_____
PRO
N93 TORQUING ANG
X_____
Y_____
Z_____
+25 PRO
N25
PRO TO PICAPAIR N15
3rd STAR_____

+30 DETENT CL (5)
CB(11) AC BUS A-AOT LAMP-OPEN LOS
V34E 101
INSTALL AOT SUN FILTER +30
PGNS MODE CONT - ATT HOLD
P00, V77

+35 CHECK DPS, APS, RCS, EPS,
CYCLE CWEA CB
THROT CONT-MAN/CDR
TTCA(BOTH) - THROTTLE (MIN)
DEADBAND - MIN
PRPLNT QTY - DES 1
DON HELMETS & GLOVES
+40

+40

+45 P40,N18(0,285,0),N86 AUTO MNVR

CB (11) EPS: INV 1-CLOSE
+50 TM SW-R/RDOT, MODE SEL-PGNS
V47, 414+1, 414R+0
S-BD 90,0. THEN P+213 Y +27
OMNI-AFT,PCM-LO
VHF A XMTR-VOICE
+53 B XMTR-DATA
V83,317R, 440R

+54 N20E, V40E, 400+3, 400R+0, 277R
400+1
+55 PRO
410+5, LOAD ΔV
411R+0, 407R+0

-4:00 √DPS CONFIG CARD
V77E
-1:00 MASTER ARM-ON
-:35 ENG ARM - DES
500R
-0:00 DOI (101:38:48) +15s THROTTLE UP 40%
ENG ARM, MASTER ARM - OFF
TTCA (CDR) - ENABL/JETS, NULL VGX

DOI TO PDI

SR 101 +41

+0 DOI(101:38:48) +15s THROTTLE UP 40%
ENG ARM. MASTER ARM - OFF
TTCA (CDR)-JETS & ENABLE,NULL VGX
P00 MODE CONT (PGNS)-ATT HOLD
PITCHDOWN,P=195, POINT AT CSM
410+0,407+0
V82E
PRPLNT QTY MON - OFF
IF AGS ΔVGX >2.0:
CB RR(2) - CLOSE, RR MODE - LGC
V95, TTCA(CDR) - DISABLE
+5 MAN LOCK-ON, P20
400+2
MODE CONT (PGNS) - ATT HOLD
V76,AGS AUTO,✓ERROR NEEDLES,ATT HOLD
P00, V63
VHF A XMTR - VOICE/RNG
B XMTR - OFF
COMPARE RANGE WITH CSM

+10 V34, CB RR(2) - OPEN

+15 P30 TGT PGNS FOR PDI+12 ABORT:
N33 TIG
N81 ΔVX, ΔVY, ΔVZ
N42, HA, HP, ΔVT
N45 M, TFI, MGA
PRO
PITCH DWN TO 125° (P52 PITCH)

V48 21112

+20

SET CAMERA

+20 YAW LEFT 180°, FACE RETRO
V77E
V83E SET ORDEAL

COAS TO OVHD WINDOW

P52 OPT 3
F 50 25, E
F 01 70, V21E, 00546E
PRO, F 50 18, PRO (AUTO MNVR)
V76E
+25 V06N20E, ENTER ON MARK
RECORD R_2
N22E, RECORD R_2
V34E PITCH TO FDAI 180, 285, 0
+30 SELECT INV 1, ✓INV 1
CB AELD(2) - CLOSE
CB ABORT STAGE (2) - CLOSE
CYCLE CWEA CB
RESET ENG STOP PB
SET WINDOW BARS
THROT CONT-AUTO
ACA/4 JET (CDR) - ENABLE
TTCA (CDR)-ENABLE
BOTH TTCA-THROTTLE, MIN

+35 BATS 5&6 NORM FEED - ON
CB RR(2) - CLOSE
CHECK DPS, APS, RCS, ECS, EPS
P20 MODE II LOCK-ON
N18, R,P,Y, ENTR,✓MAIN LOBE
RR-AUTO TRACK, V56E
P63
N61 TGO, TFI, CR
N33 TIG
RESET ET UP
N25 00014 FINE ALIGN
ENTR-BYPASS ALIGN
N18 R, P, Y
+40 PRPLNT QTY MON - DES 1

+40 S-BD OMNI-AFT,ACQUIRE MSFN
✓SB P +213 Y +27
AOS 102 +19 VERIFY COMM, AUTO TRACK
PCM - HI
UPDATA LINK - VOICE BU
BIOMED LEFT
DOI POST BURN REPORT
HELMETS AND GLOVES ON
SUIT GAS DIVERTER - EGRESS
CABIN REGS A&B - EGRESS

+45 MODE CONT (PGNS) - AUTO
AUTO MNVR
ALT, ATT, POS CHECKS

+50 V47, 414+1, 414R+0
V83E, 317R, 440R
+52 OHW ≠34°

+54 N20E,V40E,400+3,400R+0
CONFIRM NO CDU TRANSIENTS
400+1, 433R VI

240=231
262=-00150
254+07672

+55 CB LR - CLOSE
+56 PRO-FINAL TRIM
ENTR, N62 VI, TFI, ΔVM, ✓DET
✓DPS CONFIG CARD,
GO/NO GO

+57 ALT, ATT CHECK
SEQ CAMR - ON
V77E
-:35 ENG ARM - DES:
-:07.5 ULLAGE

-0:00 PDI (102:35:13)
+0:05 DES ENG CMD OVRD - ON

N 25 N07 E
77E
10000E 1E

(DES $O_2 \approx 91$

	(OHW) Θ	TFI	VI	-HDOT	(ΔH) H	DPS
ENG ARM - DES	(7)	-0:35				
IGNITION	286	0:00	5560.0	4.3	48800	95
DES ENG CMD OVRD-ON		0:05				
TTCA - UP @ 26 SEC	285	0:30	5500.0	4.8	48700	95
V21 N01 E	(10)					
H 252 E						
D 2462 E	279	1:00	5200.0	14.0	48400	89
WAIT 3 SEC	275	1:30	4900.0	21.0	47900	84
TTCA - 10%	(16)					
LPD ALT CHK	271	2:00	4600.0	30.0	47100	79
TM - H/H DOT	268	2:30	4300.0	40.0	46100	74
	(19)					
	267	3:00	4000.0	53.0	44700	68
LPD POS CHK	264	3:30	3600.0	67.0	42900	63
YAW RT 174°					(17500)	
SBD P -14 Y +12	82	4:00	3300.0	80.0	40700	58
✓ED BATTS	80	4:30	2900.0	95.0	38000	53
V16 N68 E					(17500)	
V57E - ENABLE LR	78	5:00	2600.0	109.0	34800	47
	76	5:30	2200.0	122.0	31200	42
					(17500)	
	72	6:00	1800.0	123.0	27500	37
					(14000)	
THROTTLE DOWN	68	6:30	1400.0	114.0	24300	32
					(10500)	
EVAL MAN CONT	63	7:00	1200.0	143.0	20200	29
					(8750)	
	60	7:30	1000.0	157.0	16200	25

PDI THRU TD +3 MIN

V16 N68 E

P64

LDG ANT - HOVER

SBD P +17 Y -14

223+00020 @ 2K

PGNS MODE CONT-
ATT HOLD

P65

P66

X-PNTR-LO MULT

TOUCHDOWN

ENG STOP - PUSH
ACA - OUT OF DETENT
MODE CONTROL (BOTH) - AUTO
DES ENG CMD OVRD - OFF
ENG ARM - OFF
ASC FEED 2 (2) - CLOSE
413+1
223+00001

Θ	TFI	VI		(HMAX) -HDOT	H	HOR	DPS
57	8:00	700.0		157.0	11500	60	22
47	8:30	500.0		139.0	7000	49	19
		TR-LPD		(186.0)			
43	8:44	99	60	112.0	5000	45	
				(163.0)			
40	8:54	99	56	95.0	4000	42	
				(136.0)			
36	9:06	98	52	76.0	3000	38	16
				(104.0)			
31	9:22	82	47	55.0	2000	33	
				(63.0)			
24	9:44	61	39	32.0	1000	25	
				(35.0)			
18	10:06	40	33	16.0	500	18	12
				(29.0)			
16	10:14	32	31	12.0	400	16	
				(21.0)			
13	10:26	20	31	7.0	300	13	10
				(12.0)			
9	10:48	0	43	3.0	200	9	
2	11:26			3.0	100	2	
2	11:42			3.0	50	2	6

NO STAY

ABORT STAGE - PUSH
ENG ARM - ASC
ENG STOP - RESET
ENG START - PUSH
MODE CONTROL (2) - AUTO

TOP

RIGHT-HAND PAGE

THRU TD +3MIN

June 21, 1969

(DES $O_2 \approx 91$)

TFI	VI	HDOT	(Δ H) H	(SHE) DPS	(OHW) RCS	
-0:35					(5)	ENG ARM SW – DES
0:00	5550.0	-7.6	50000	(1300) 95	89	ENG IGNITION DES ENG CMD OVRD – ON
0:05 0:30	5500.0	-8.0	49800	95		
1:00	5200.0	-17.0	49400	(1400) 91	(12) 88	
1:30	4900.0	-25.0	48800	86		
2:00	4600.0	-34.0	47900	(1400) 80	(17) 88	LPD ALT CHECK TM - H/HDOT
2:30	4300.0	-44.0	46800	76		
3:00	4000.0	-55.0	(17,500) 45300	(1340) 69	(21) 88	
3:30	3600.0	-68.0	43400	69		YAW RT 180° S-BD P = -11 Y = +14
4:00	3300.0	-82.0	41200	(1230) 58	88	√ED BATTS
4:30	3000.0	-98.0	38500	53		V16 N68E
5:00	2600.0	-113.0	(17,500) 35300	(1090) 47	88	V57- ENABLE LR UPDATE
5:30	2200.0	-130.0	31600	42		
6:00	1800.0	-132.0	(17,500) 27600	(920) 36	88	
6:30	1400.0	-115.0	(14,000) 23900	31		THROTTLE DOWN EVALUATE MAN CONT
7:00	1200.0	-149.0	(10,000) 19900	(810) 28	88	

V16N68E

P64

LDG ANT – HOVER

SBD P 15 Y -10

223+ 00020 @ 2000FT

PGNCS MODE CONT– ATT HOLD

P65

P66

X-POINTER- LO MULT

TOUCHDOWN

ENG STOP – PUSH
ACA – OUT OF DETENT
MODE CONTROL (BOTH)-AUTO
DES ENG CMD OVRD – OFF
ENG ARM – OFF
ASC FEED 2(2) – CLOSE
223+00001
413+1

NO STAY

TFI	VI		(HMAX) HDOT	H	HOR	(SHE) DPS	RCS
7:30	900.0		-160.0	15200	59	25	
8:00	700.0		-154.0	10500	56	(740) 22	87
8:30	500.0		-128.0	6200	48	18	
	TG-LPD		(-186)				
8:40	99	61	-110.0	5000	44		
8:50	99	57	-94.0	4000	41		
			(-136)			(660)	
9:02	99	53	-76.0	3000	37	16	86
9:16	99	48	-57.0	2000	33		
			(-63)				
9:38	98	40	-33.5	1000	26		
			(-35)			(620)	
9:58	79	33	-17.7	500	20	12	85
10:06	71	31	-12.9	400	18		
			(-21)				
10:14	63	29	-8.9	300	16		
10:32	47		-3.0	200	12	9	84
11:22	12		-2.9	100	2.5		
11:40			-2.9	50	1		
11:53			-2.9	10		5	83

ABORT STAGE – PUSH
ENG ARM – ASC
ENG STOP – RESET
ENG START – PUSH
MODE CONTROL(2)-AUTO

14:00 MASTER ARM - ON
DES VENT - FIRE
MASTER ARM - OFF
OXID VENT - OPEN
ENG STOP - RESET

15:00 NOMINAL T 1, ABORT TIME
CB(11) PGNS: LDG RDR - OPEN
AOT - FWD
SLEW RR TO +X AXIS
AOT - CL
CB(11) PGNS: RNDZ RDR - OPEN
AC BUS A: RNDZ RDR - OPEN

V37E68E
N43 LAT, LONG , ALT
PRO

16:00 V37E12E
N33 TIG (PDI + 23 MIN)
N76 V HOR, V VERT, CROSS RNG
N74 TFI, YAW, PITCH

V47E, 414+1, 414R+0, 400+3, 400R+0
414+2
400 + 1
225 + (TBD) α_L LOWER
226 + (TBD) α_L UPPER
410 + 0
411 + 1

MODE SEL - PGNS

PRPLNT QTY MON - OFF
PRPLNT TEMP PRESS MON - ASC
ASC HE MON - CYCLE
O_2/H_2O QTY MON - ASC 1, 2

STAY/NO STAY

19:30 NO STAY

-2:00 BAT 1,3 - OFF
DES H_2O - OFF
SELECT ASC H_2O TANK
DES O_2 - CLOSE
ASC 1 O_2 - OPEN
MASTER ARM - ON
CABIN REPRESS - CLOSE
ASC H_E SEL - BOTH
ASC H_E PRESS - FIRE
ASC H_E REGS 1,2 - OPEN
ASC FEED 2 (2) - OPEN
CRSFD - OPEN
CB RR (2) - CLOSE, RR-LGC

-1:00 BAT 2,4 - OFF
DES BAT - DEADFACE
VOLTMETER - 5,6 LMP, CDR

- :30 ENG ARM - ASC
- :05 ABORT STAGE - PUSH
PRO
+ :01 ENG START - PUSH

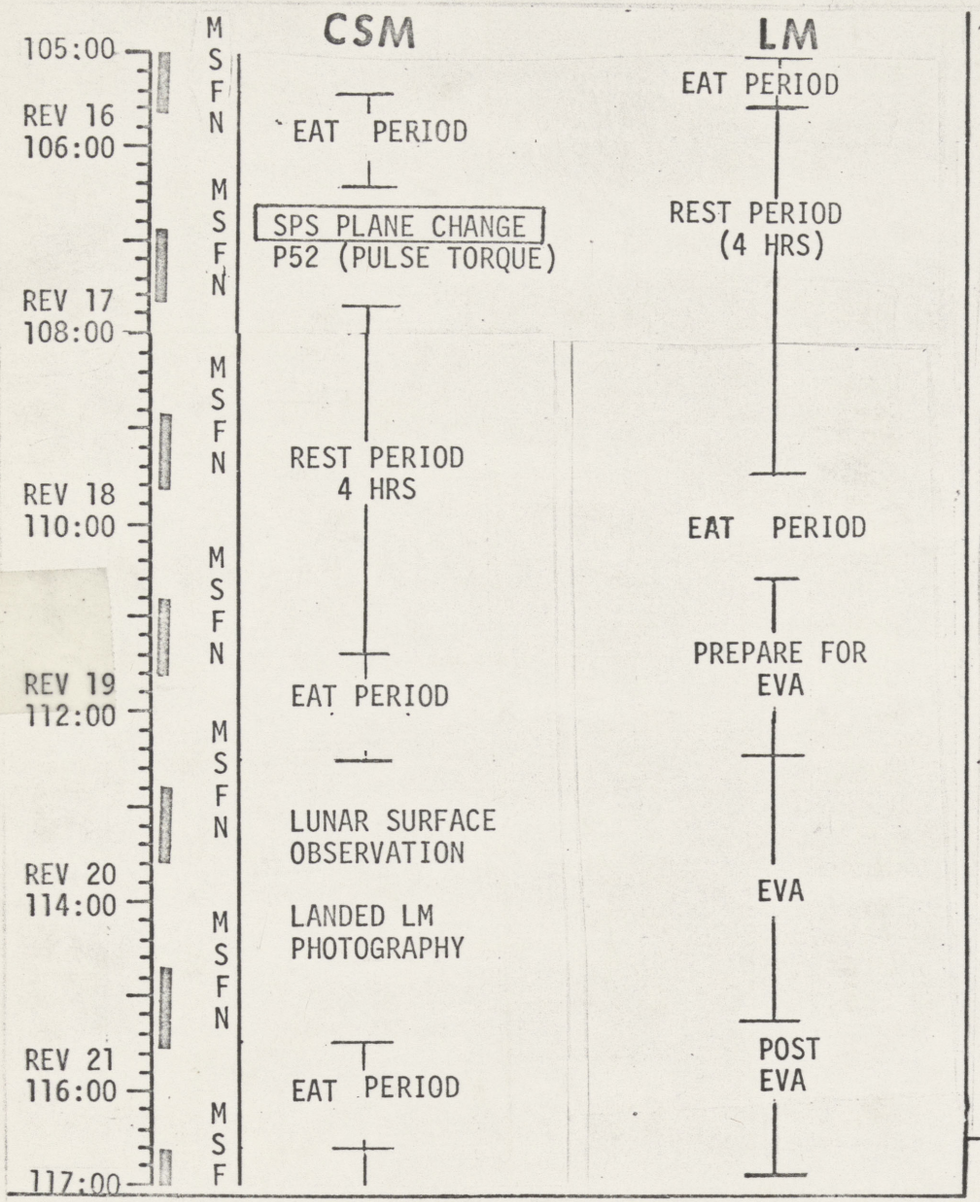
STAY V37E00E GO TO LUNAR SURFACE C/L

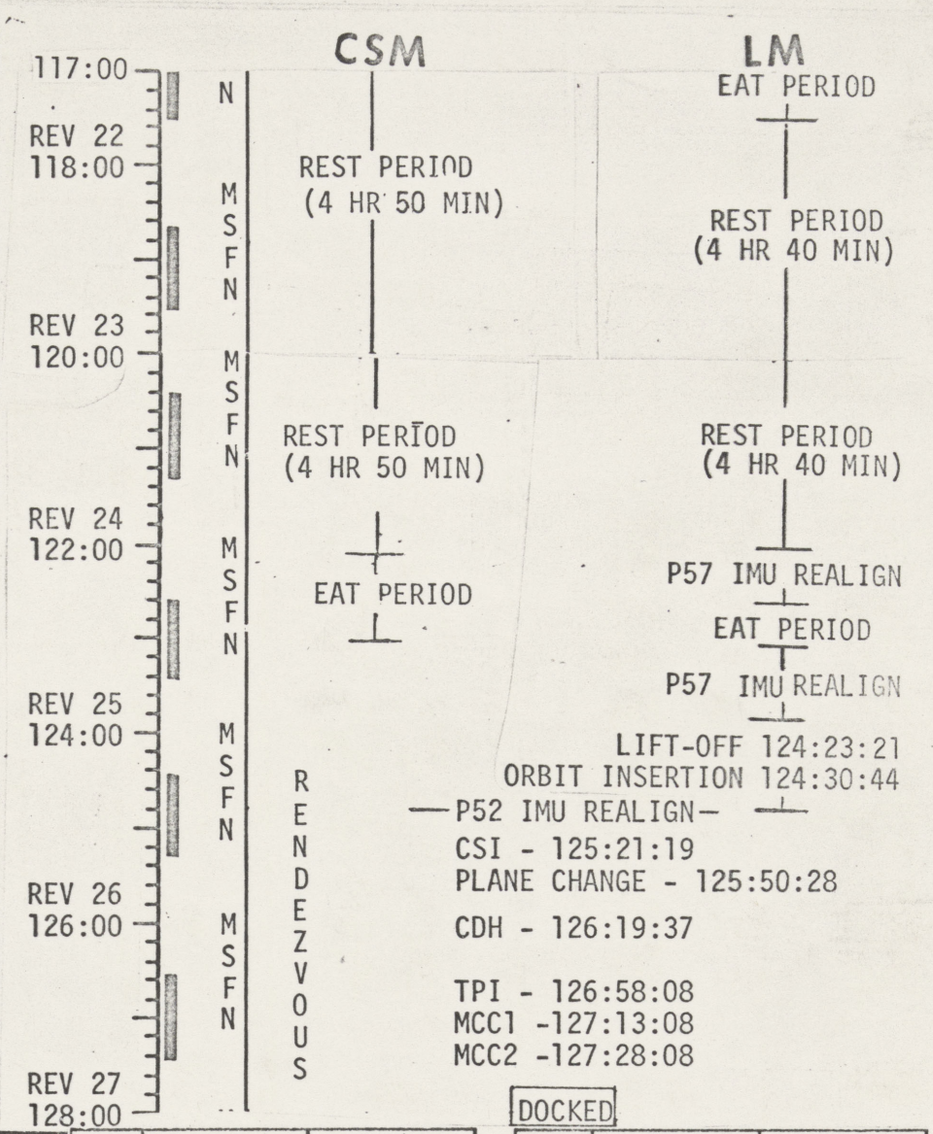
	CDR	LMP
CSM	TOUCHDOWN	102:47:11
102:53	PERFORM LUNAR CONTACT CHECKLIST STAY/NO STAY FOR PDI+13 MINUTES PDI + 13 MINUTES CHECKLIST STAY/NO STAY FOR PDI + 23 MINUTES	
1630 EDT 103:00	INITIATE DPS VENTING V76 RCS MIN IMPULSE RR TO STANDBY MAKE ESTIMATE OF LANDED LOCATION CLOSE SHADES, DOFF HELMET AND GLOVES	ASCENT BATTERIES OFF REPORT 047, 053 AGS LUNAR SURFACE GYRO CALIBRATION LOAD AGS ASCENT TARGET H=6000 FT, H DOT=32 FPS CLOSE SHADES, DOFF HELMET AND GLOVES
MSFN	BEGIN SIMULATED COUNTDOWN	P57-IMU ALIGN (REFSMMAT) GRAVITY MEASUREMENT N04: __ __ __ __ __ __
	REPORT ESTIMATE OF LANDED LOCATION	AGS LUNAR ALIGNMENT
103:29 103:30		P57-IMU ALIGN (REFSMMAT) 2 CELESTIAL BODIES N04: __ __ __.__ __ N05: __ __ __.__ __
103:39 103:45	PHOTOGRAPH LUNAR SURFACE	N71: __ __,__ __ N93: X __ __.__ __ __ Y __ __.__ __ __ Z __ __.__ __ __ N89: LAT __ __.__ __ __ LONG/2 __ __.__ __ __ ALT __ __.__ __ __ GET __ __ __:__ __:__ __
REV 15		ALIGN AGS TO PGNCS REPORT 057, 053 COPY AND LOAD ASCENT PAD DATA VERIFY AGS ASCENT PROGRAM
104:00		

CSM	1730 EDT	CDR	REPORT: LMP
	104:00		P57 - GRAVITY AND ONE CELESTIAL BODY (T-ALIGN) N04: __ __ __.__ __ N71: __ __ N93: X __ __.__ __ __ Y __ __.__ __ __ Z __ __.__ __ __ GET __ __ __:__ __:__ __
	104:15	STAY/NO STAY FOR LUNAR SURFACE OPERATIONS	
MSFN	104:30	P12 - ASCENT PROGRAM	AGS LUNAR ALIGN BIOMED SWITCH-RIGHT
			V47 - INITIALIZE AGS AGS GUIDANCE STEERING
		END SIMULATED COUNTDOWN AT TIG -1 MINUTE	AGS POWER DOWN (AGS STATUS SW - OFF)
	104:45	1st REV LO:104:42:05	
	104:51	DOFF HELMET & GLOVES EAT PERIOD (40 MIN)	DOFF HELMET & GLOVES EAT PERIOD (40 MIN)
	105:00		

MISSION	EDITION	DATE
APOLLO 11	FINAL	JULY 1, 1969

TIME	DAY/REV
103:00 - 105:00	5/14-15





105:00 --- 128:00

CSM REV	EST TIG	NEW TIG
16	106:40:13	
17	108:38:20	
18	110:36:28	
19	112:34:35	
20	114:32:43	

CSM REV	EST TIG	NEW TIG
21	116:30:51	
22	118:28:58	
23	120:27:06	
24	122:25:14	
25	124:23:21	

APOLLO ASCENT

R 12.0 44 +1.4

June 21, 1969

RCS ≈ 78 PERCENT	TIME FROM L/O	VI	HDOT	H	PITCH	/OHW	He
ENG ARM-ASC PRO ABORT STAGE-PUSH ENG START-PUSH	-0:05 0:00	15	0	0	01.5		3000
N63 MONITOR YAW MNVR PITCH INITIATE BAL CPL-OFF	+0:10	55	53	263	351.5		2950
MODE SEL-AGS	+0:30	165	90	1,815	308	39	2800
	+1:00	430	125	5,050	305	37	2600
	+1:30	710	150	9,200	302	35	2400
	+2:00	1020	170	14,000	299	33	2200
	+2:30	1350	185	19,300	296	31	2050
S-BD P = 134 Y = -32	+3:00	1690	190	24,950	293	29	1900
	+3:30	2060	190	30,600	289	27	1700
	+4:00	2440	185	36,300	285	24	1550
	+4:30	2850	175	41,650	282	22	1400
N76E, V_H V_V ΔR	+5:00	3280	155	46,700	278	19	1300
V16 N77E N85E 500R RNG/ALT MON-RNG/RNG RT	+5:30 +6:00 +6:30	3740 4220 4730	135 110 80	50,950 54,750 57,450	278 273 265	16 13 10	1150 1000 900
200 FPS MAIN SOV(2)-OPEN ↑ ASC FEED (4)-CLOSE ↓ 50 FPS ENG ARM-OFF 0 FPS ABORT STAGE-RESET STOP-RESET MODE CONT(2)-ATT HOLD BAL CPL-ON ΔVX NULL, KEY REL VI, HDOT, H PRO, ΔV'S V82E, 315R, 403R, 313R PRO, PRO OOE, RR-AUTO TRACK DAP 1(2) 2002	+7:00 +7:14	5260 5540	50 30	59,550 60,150	260 257	7	750 700

MONITOR

PGNS	AGS
06 63 V_I, $\dot{H}$, H	500 VG 367 HDOT
16 77 T_{GO}, V_Y	433 V_I 357 T_{GO}
16 85 VGX, VGY, VGZ	

A05-10415

INSERTION THRU CSI

08220
01033

60

55

INSERTION (124:30:39)

50 P00, RECORD RDOT/R
V48, 1 (2) 2002, RR-LGC,V63,V34
ATT TRANSL-2JETS (4JETS)
V41N72 (+00000,+28300)
CB RR(2)-OPEN, V44
TTCA (BOTH)-OFF

47 ACA 4JET (BOTH)-OFF 417+1 — RDOT
INV 2, CB INV 1-OPEN
EXT LTG-TRACK
P52 OPT3
CB AOT LAMP CLOSE

45 AOT-DETENT F/0.0°,V76 — RDOT ⊱R
SS 124 +37 1st STAR_____
2nd STAR_____

410+1 TGT CSI
373 TIG CSI
275 TIG TPI

42 605 COTAN Θ + 00777 — RDOT
416+1 1/2 PERIOD
623+0 ZERO YAW
451+0 Y DOT

40 — RDOT ⊱R

40 N05 ANG DIFF — RDOT ⊱R
PRO
N93 TORQUING ANG
X_____
Y_____
Z_____
PRO, GET

37 N25 — RDOT
PRO TO PICAPAIR N15
3rd STAR_____
DETENT CL

35 CB AOT LAMP-OPEN — RDOT ⊱R
V34E
V48 1(2) 1012
CB RR (2)-CLOSE
V95
V67 (+10000,+00100,+00015)
P20, AUTO MNVR

32 V80, M=1, V67 — RDOT
P32, TARGET CSI
~~400+2~~ 257

30 CHART RDOT — RDOT ⊱R
V47, 414+1, 414R+0
400+3, 400R+0
V83, SET ORDEAL, 317R
440R, 277R

27 310 ΔT CSI — RDOT
SET ET
400+2

25 — RDOT ⊱R

22 M=10, V32 — RDOT

20 CHART RDOT — RDOT ⊱R

144

20 CHART RDOT — RDOT ⊱R

17 CHECK SYSTEMS — RDOT

15 V90 OBTAIN CSM YDOT — RDOT ⊱R

12 PRO-FINAL COMP — RDOT
N81-LOAD CSM YDOT
S BD 90, 0;
THEN P-13 Y +17
OMNI-FWD

267 VG CSI
402R ΔH
372R ΔT CSI-CD
371R ΔVG CDH
263R Y DOT

LOS 125 +10

10 CHART RDOT/R — RDOT ⊱R

PCM-HI
V47,414+1,414R+0
400+3,400R+0
V83, SET ORDEAL, 317R
400R, 277R
PCM-LO
P41, N86

5 410+5, LOAD ΔV
407+0
ΔV'S TO CSM
502R
TTCA (CDR)-ENABLE

DB MIN
DEFLECT ACA
MODE CONT(AGS)-ATT HOLD
ATT CONT(3)-MODE CONT
400+0

:30 V77, MODE CONT-ATT HOLD
:05 407+1, 502R
:00 CSI (125:21:20)
NULL RESIDUALS
TTCA (CDR)-DISABLE

CSI THRU CDH

60 CSI (125:21:20)
NULL RESIDUALS
TTCA (CDR)-DISABLE
V76, MODE CONT-AUTO
400+2

SR 125 +26
P33 TARGET CDH
V82E

DB MAX
ATT CONT-PULSE
MODE CONT(AGS)-AUTO
400+2
310R SET ET

55 CDH TIME TO CSM — RDOT ⟩R
410+2 TGT CDH

52 M=4 — RDOT
V67 (+02000,+00020,+00005)
417+1

50 — RDOT ⟩R
M=3, V32

47 V90, LOAD CDH-30 — RDOT
OBTAIN CSM YDOT

45 — RDOT ⟩R

42 M=10, V32 — RDOT

40 — RDOT ⟩R

40 — RDOT ⟩R
V34
P30

36 CHART RDOT — RDOT
V90 LOAD CDH-30
35 OBTAIN CSM YDOT — ⟩R
P41
410+5 LOAD ΔV
407+0

DB MIN
DEFLECT ACA
MODE CONT(AGS)-ATT HOLD
ATT CONT(3)-MODE CONT
400+0

32 TTCA (CDR)-ENABLE
:30 V77, MODE CONT-ATT HOLD
:05 407+1, 501R

30 PLANE CHANGE (125:49:40)
TTCA(CDR)-DISABLE
V76,MODE CONT-AUTO
P33 TARGET CDH

DB MAX
ATT CONT-PULSE
MODE CONT(AGS)-AUTO
400+2, 410+2
373R, 310R
477R, 402R
450R 452R

417+1
27 — RDOT

25 — RDOT ⟩R
M=4, V93

23 CHART RDOT — RDOT
AOS 125 +57
√S BD P-13 Y +17
VERIFY COMM, AUTO TRACK
PCM-HI
BIOMED-RT

20 M=5, V32 — RDOT ⟩R

20 M=5, V32 — RDOT ⟩R

17 CHECK SYSTEMS — RDOT

15 V90 OBTAIN CSM YDOT — RDOT ⟩R

12 PRO FINAL COMP — RDOT
N81 LOAD CSM YDOT

10 CHART RDOT — RDOT ⟩R
V47, 414+1, 414R+0
400+3, 400R+0
V83, SET ORDEAL, 317R
440R, 277R

P41 N86
5 410+5
407+0 LOAD ΔV's
502R
TTCA (CDR)-ENABLE

DB MIN
DEFLECT ACA
MODE CONT(AGS)
ATT HOLD
ATT CONT(3)-MODE CONT
400+0

:30 V77, MODE CONT-ATT HOLD
:05 407+1, 502R

0 CDH (126:19:40)
NULL RESIDUALS,
TTCA (CDR)-DISABLE

CDH THRU TPI

40			
	CDH (126:19:40) NULL RESIDUALS TTCA(CDR)-DISABLE V76, MODE CONT-AUTO 400+2, 417+1 P34 TGT CDH	DB MAX ATT CONT-PULSE MODE CONT(AGS) AUTO 400+2	
35	CHART RDOT V82E	RDOT ⋮R	
32	M=4, V93	RDOT	
30	M=3, V32	RDOT ⋮R	
27	410+3 TPI SRCH 307+04300 ΔT TRNFR 310+02600 TFI TPI	RDOT	
25	CHART RDOT 303 θ TPI 267R ΔV TPI 371R ΔV TPI+ΔV TPF	RDOT ⋮R	
SS 126 +35	M=10, V32		
22		RDOT	
20		RDOT ⋮R	
20		RDOT ⋮R	
17	CHECK SYSTEMS	RDOT	
15	CHART RDOT ,RANGE COPY ET	RDOT ⋮R	
	310+01300 303R θ TPI		
12	PRO-FINAL COMP TIG TO CSM N81, LOAD CSM-YDOT, √ET V47, 414+1, 414+0	RDOT	
10	400+3, 400R+0	RDOT ⋮R	
	MODE CONT-ATT HOLD		
9	CHART θ 277R 404+0, 405+0, 406+0 310+00800, 303R θ 410+4 TPI TRNFR 267R ΔV TPI 371R ΔV TPI + TPF, 373R TIG TPI P41 N86		
5	CHART θ (277R), TM R/RDOT 410+5 LOAD V's 407+0, 502R TTCA (CDR)-ENABLE	DB MIN DEFLECT ACA MODE CONT(AGS) ATT HOLD ATT CONT(3)- MODE CONT 400+0	
:30	V77, MODE CONT-ATT HOLD		
:05	407+1, 472R		
:00	TPI (126:58:27)		
:00	TPI (126:58:27) NULL RESIDUALS TTCA (CDR)-DISABLE		

TPI THRU DOCKING

0 TPI (126:58:27)
NULL RESIDUALS
TTCA (CDR)-DISABLE
P35
V76, MODE CONT-AUTO
M=0, V93
404+0,405+0,406+0
400+2
V82E

DB MAX
ATT CONT-PULSE
MODE CONT(AGS)-
AUTO
400+2

5

S BD 90, 0
LOS 127 +06
OMNI-FWD
MODE CONT-AUTO
PCM-LO
9 CHART θ (277R)

DB MIN
DEFLECT ACA
MODE CONT(AGS)-
ATT HOLD
ATT CONT(3)-
MODE CONT
400+0

10

12 PRO-FINAL COMP

13 CHART θ (277R), TM R/RDOT
P41
TTCA (CDR)-ENABLE
V77, MODE CONT-ATT HOLD
:05 407+1, 472R

15 MCC1
V76, MODE CONT-AUTO
TTCA (CDR)-DISABLE
P35
M=0, V93
404+0, 405+0, 406+0

DB MAX
ATT CONT(3)-
PULSE
MODE CONT(AGS)-
AUTO

20

20

SR 127 +21
24 CHART θ (277R)
25

DB MIN
MODE CONT(AGS)-
ATT HOLD
ATT CONT (3)-
MODE CONT

27 PRO-FINAL COMP

28 CHART θ (277R), TM R/RDOT
P41
TTCA (CDR)-ENABLE
V77, MODE CONT-ATT HOLD
:05 407+1, 472R

30 MCC2

P00
V48,11002 (22002)
P47
V63
404+0, 405+0, 406+0
BAL CPL - ON

DB MAX
ATT CONT(3)-
PULSE

35

40

40

BRAKING:
30 FPS - 6000 FT
20 FPS - 3000 FT
10 FPS - 1500 FT
5 FPS - 600 FT

45

50

AOS 127 +53
OMNI-AFT
VERIFY COMM, AUTO TRACK
PCM HI
BIOMED LEFT

55 DOCKING
TTCA (CDR) - DISABLE
COAS SW-FWD
EXT LTG-DOCK
SHFT/TRUN-±50
V41N72 (+00000,+32000)
PITCH 90°, YAW 120°

60

CONFIGURE PGNS And AGS

1 MODE CONT: AGS - ATT HOLD
ATTITUDE CONTROL (3) - PULSE
GUID CONT - AGS
DEADBAND - MAX
BAL CPL - ON

2 Verify FWD DUMP VLV - AUTO

3 V48E
N46 11011
PRO
N47 _____ LM WT

_____ CSM WT
PRO

4 V37E00E
V76E

EQUIP PREP FOR TRANSFER

1 Stow The Following In ISA:
Rndz charts
16 mm Film
Flight Data
P.P.K. (2)
DSEA
Flag Kit

2 Install Crash Bars
Install Window Shades (3)

PREP FOR TRANSFER

1 Verify Tunnel Pressurized from CSM
PRESS REGS A&B - EGRESS
OVHD DUMP VLV - OPEN

2 Doff Helmets

3 Doff Gloves,
Move HSB's Aft From ASC Eng Cover
Unstow CSRC Pocket And Place In TSB

4 When Pressures Equal, OVHD DUMP VLV - AUTO

5 Open Hatch
Stow: Probe On Left Hand Side Using
Outboard (Double) Restraint Cable
: Drogue Over Probe Using Inboard
(Single) Restraint Cables Through
Drogue Handles

6 Receive Bags And Vacuum Brush
From CSM, Place Behind ISA

7 Verify: CABIN GAS RETURN VLV - EGRESS
SUIT GAS DIVERTER VLV - EGRESS
SUIT CKT RELIEF VLV - CLOSE
CDR's SUIT ISOL - SUIT DISC

8 Disconnect CDR O2 Red Hose From PGA
Attach Vacuum Brush To Nozzle Of
CDR O2 Red Hose
CDR SUIT ISOL VLV - SUIT FLOW

9 Vacuum Brush Filter On FWD DUMP VLV

10 Partially Close Hatch And Unstow
One SRC
LMP Hold SRC, CDR Vacuum
Place SRC In Bag And Transfer To CSM
Repeat For Second SRC

11 LMP Hold The Following For CDR To
Vacuum:
CSRC
CSC Cassette
70mm Magazine Bag
Gloves (4)
Helmets (2)
LMP Place Items In Bag While CDR
Holds Bag (Individually)
Transfer Bagged Items To CSM (Individually)

12 Vacuum PGA's

13 Stow Vacuum Brush and 3 Foot
Hose in RHSCC
Receive B5 & B6 From CMP And Stow

CDR IVT TO CSM

1 CB(11) COMM: CDR AUDIO - OPEN
CDR SUIT ISOL - SUIT DISC

2 Disconnect LM Hoses And Stow
Transfer To CSM With ISA

CSM MNVR TO JETTISON ATTITUDE

CONFIGURE S-BAND

1 Verify Jettison Attitude, CSM In Narrow Dead-
band, Attitude Hold
2 S-BAND - PM,PRIM,PRIM,OFF, PCM,OFF/RESET,OFF,HI
VHF A: XMTR - VOICE/RANGE
: RCVR - OFF
VHF B: XMTR - OFF
: RCVR - ON
TRACK MODE - SLEW
PITCH_____

YAW _____
ANTENNA: S-BAND - SLEW
Slew For Max Signal.
UPDATA LINK - DATA

ACTIVATE SECONDARY GLYCOL LOOP

1 WATER TANK SEL - SEC

2 CB(16) ECS: GLYCOL PUMP SEC - CLOSE
GLYCOL - INST (SEC)
SEC EVAP FLOW VLV - OPEN

3 CB(11) ECS: GLYCOL PUMP 2 - OPEN
GLYCOL PUMP 1 - OPEN
GLYCOL PUMP AUTO TRNSFR - OPEN

4 PRIM EVAP FLOW #1 And #2 - CLOSE
CB(11) ECS: CABIN FAN - OPEN

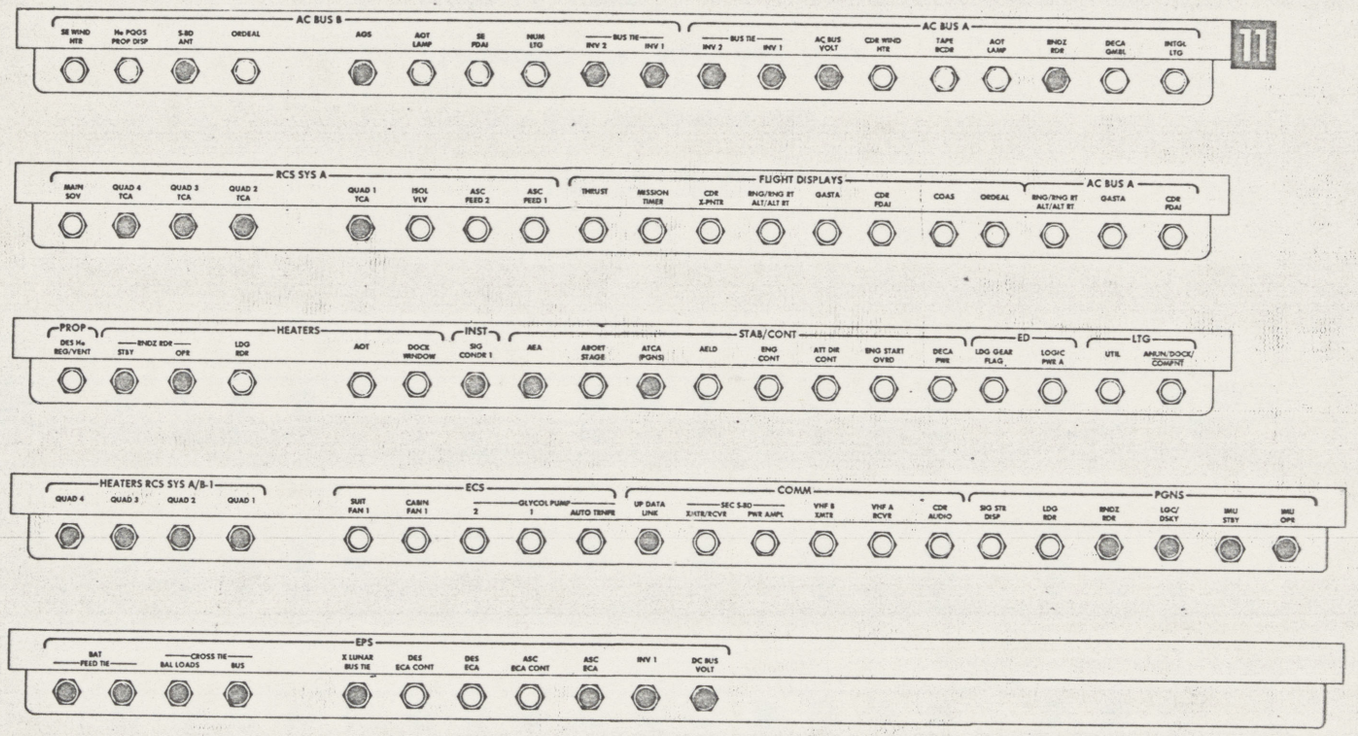
CONFIGURE LM FOR JETTISON

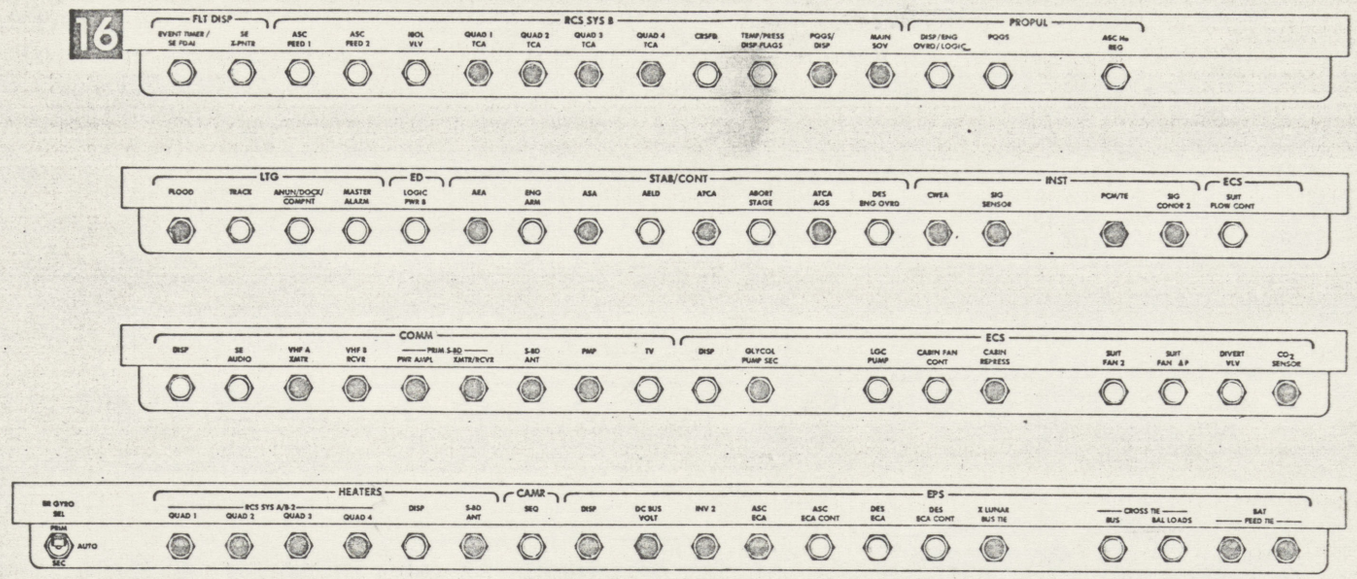
1 MODE CONT: PGNS - ATT HOLD
GUID CONT - PGNS
ATT CONT (3): MODE CONT
V77E

2 SYS A&B FUEL & ASC OXID (4) - tb-bp
SYS A&B QUADS (8) - tb-gray
CRSFD - tb-bp
SYS A&B MAIN SOV (2) - tb-gray

3 SUIT CIRCUIT RELIEF - AUTO

4 Configure CB's Per Chart


AC BUS B
SE WIND HTR
He POGS PROP DISP
S-BD ANT
ORDEAL
AGS
AOT LAMP
SE PDAI
NUIN LTG
BUS TIE
INV 2
INV 1
AC BUS A
BUS TIE
INV 2
INV 1
AC BUS VOLT
CDR WIND HTR
TAPE RCDR
AOT LAMP
RNDZ RDR
DECA GMBL
INTGL LTG
RCS SYS A
MAIN SOV
QUAD 4 TCA
QUAD 3 TCA
QUAD 2 TCA
QUAD 1 TCA
ISOL VLV
ASC FEED 2
ASC FEED 1
FLIGHT DISPLAYS
THRUST
MISSION TIMER
CDR X-PNTR
RNG/RNG RT ALT/ALT RT
GASTA
CDR PDAI
COAS
ORDEAL
AC BUS A
RNG/RNG RT ALT/ALT RT
GASTA
CDR PDAI
PROP
DES He REG/VENT
RNDZ RDR
STBY
OPR
LDG RDR
HEATERS
AOT
DOCK WINDOW
INST
SIG CONDR 1
AEA
ABORT STAGE
ATCA (PGNS)
AELD
STAB/CONT
ENG CONT
ATT DIR CONT
ENG START OVRD
DECA PWR
ED
LDG GEAR FLAG
LOGIC PWR A
LTG
UTIL
AMUN/DOCK/ COMPNT
HEATERS RCS SYS A/B-1
QUAD 4
QUAD 3
QUAD 2
QUAD 1
ECS
SUIT FAN 1
CABIN FAN 1
GLYCOL PUMP
2
1
AUTO TRNPR
COMM
UP DATA LINK
SEC S-BD
XMTR/RCVR
PWR AMPL
VHF B XMTR
VHF A RCVR
CDR AUDIO
PGNS
SIG STR DISP
LDG RDR
RNDZ RDR
LGC/ DSKY
IMU STBY
IMU OPR
EPS
BAT
FEED TIE
CROSS TIE
BAL LOADS
BUS
X LUNAR BUS TIE
DES ECA CONT
DES ECA
ASC ECA CONT
ASC ECA
INV 1
DC BUS VOLT



LMP IVT TO CSM

1 Install ISA on panels 1&2
Stow HSB's on floor
Disconnect LM Hoses And Stow

2 FLOOD Lt - OFF

3 Transfer To CSM