P63-P68

13 If Gyro Angles >5°
F 06 22 ICDU ANGLES 06,I6,M6 (.01°)
PRO
NO ATT Lt - On Then Off
If Gyro Angles <5°

13a Monitor Gyro Torquing
V16N93E (.001°)
KEY REL
(If A/T 00002 OR 00003 & First Pass Through Step 13) To 6
(If A/T 00001 & First Pass Through Step 13) Go To 11, (If A/T 00000, Go To 14)

14 F 50 25 R1 00014 RECHECK or EXIT FINE ALIGN
(RECHECK, A/T 00002 or 00003 Only) PRO To 6
(TERM) V34E To 16

Note: If Present A/T Is 00002 & A Previous P57 Used A/T 00001 or 00003, ENTER To Readout Present LM Lunar Position (Step 15)

15 F 06 89 LAT, LONG/2, ALT (.001°,.01nm)
(TERM) V34E
(ACCEPT) PRO

16 F 37

P63 BRAKING PHASE

1 V37E 63E
*PROG Lt-On *
*V05N09E 01412 IGN *
* ALGORITHM NOT *
* CONVERGING *
* (TERM) V37E00E *
*

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2	F 06 61	T6,TFI		(min-sec)
		R3, CROSSRANGE (-NORTH)		(.1nm)
		SET EVNT TMR TO 60-TFI		
		N33E		
	F 06 33	TIG		(hrs,min,.01sec)
		KEY REL		
		PRO		
3	F 50 25	R1 00014 PERFORM IMU FINE ALIGN		
		(ACCEPT) PRO - See P52/6		
		(BYPASS) ENTR		
4	F 50 18	REQUEST MNVR TO FDAI RPY ANGLES		(.01°)
		(AUTO or TRIM) GUID CONT: PGNS		
		MODE CONT: PGNS - AUTO		
		PRO		
		(MAN) MODE CONT: PGNS - ATT HOLD		
		MNVR		
		PRO To 4		
		(BYPASS) ENTR To 6		
5	06 18	AUTO MNVR TO FDAI RPY ANGLES		(.01°)
		Mon Auto Mnvr To 4		

```
*F 50 25     00500 LR          *
*       TO DESCENT POS         *
*LDG ANT-DES, 10 sec, AUTO*
*PRO                           *
*F 50 25   00203               *
*       GUID CONT - PGNS       *
*       MODE CONT(PGNS)-AUTO*
*       THR CONT - AUTO        *
*       PRO                    *
*                              *
*PROG Lt - On                  *
*V05 N09E    01703 TIG         *
*                  SLIPPED     *
*     V37E 00E EXIT P63        *
```

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6 06 62 VI,TFI, VM (.1fps,min-sec,.1fps)

59:25 DSKY BLANKS
ENG ARM - DES

59:30
06 62 AVE G ON

59:45 Verify ΔVM (R3) <00005

59:55
F 99 62 ENG ON ENABLE
VERIFY +X ULLAGE
PRO
(NO ULLAGE) V34E Exit P63

IGN 06 63 VI (.1fps)
H DOT(-DESCENT) (.1fps)
H(+ABOVE RLS) (ft)
+:05 DES ENG CMD OVRD - ON

*(DPS ABORT) ABORT - PUSH *
(APS ABORT) ABORT STAGE - PUSH

40,000 ft V57E
F 06 68 SLANT RANGE, TG, ΔH(LR-LGC)
(.1nm, min-sec, ft)
(UPDATE) PRO
(EXIT V57) V34E (To 06 63)

F 50 68 SLANT RANGE, TG, ΔH (LR-LGC)
(.1nm, min-sec, ft)
Verify ΔH Decreasing
(STOP UPDATE) ENTR (To 06 68)
(CONTINUE UPDATE) PRO (To 06 63)

(MAN) MODE CONT:PGNS-ATT HOLD

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```
*ALT. & VEL Lt - On*
* RANGE/VELOCITY   *
* NOT GOOD         *
*PROGRAM Lt - On   *
* V05N09E          *
*  00511 LR Not in *
*            Pos 1 *
*LOG ANT-DES,Wait  *
* 10sec, Then AUTO *
```

+08:30 P64 DISPLAYED

P64 APPROACH PHASE

1 P64 DISPLAYED

2 F 06 64 R1,TR/LPD, (sec-deg)
R2 H DOT(-for Descent) (.1fps)
R3 H(+ Landing Site Radius) (ft)

```
*F 05 09  00523 LR DID NOT*
*         ACHIEVE POS 2   *
*(CONTINUE) PRO           *
*                        *
*                        *
*(RECHECK) V32E           *
*                        *
*                        *
*(TERM R12) V34E          *
```

Monitor Attitude Change
To Enable Landing Site
Visibility.

(MAN) MODE CONT:PGNS-ATT HOLD
(TO USE LPD) PRO
(Nominal Landing Site) To 5 When TR=0

3 06 64 Observe Nominal Landing Site
Using LPD And N64 LPD Display.

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4 Redesignate Landing Site
As Desired (+Pitch Redesignates
Landing Site Toward LM)

5 P65 DISPLAYED

P65 LANDING PHASE (AUTO)

1 P65 Displayed

2 F 06 60 V (HOR) (.1fps)
H DOT (-Descent) (.1fps)
H (+ >LANDING SITE RADIUS) (ft)

Monitor Attitude Maneuver To
Local Vertical Attitude
(+Z Downrange)
H DOT (R2)= -00030
MODE CONT: PGNS-ATT HOLD
or AUTO
(ROD LANDING) MODE CONT: PGNS-ATT HOLD
ROD - Activate
To P66
(MAN LANDING) TTCA - Advance Until:
THRUST: CMD=10%
THR CONT - MAN
To P67
(AUTO LANDING) To 3

3 H(actual)= 5.6 ft LUNAR CONTACT Lt - On
MODE CONTROL - ATT HOLD
ENGINE STOP - Push
TD+3:00 PRO

V37E 68E To P68

P66 LANDING PHASE (ROD)

1 P66 Displayed
(From P67)TTCA-Retard Gradually
THRUST IND(Left Side)-Monitor
(Maintain Constant Thrust/
Chamber Pressure)

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2	F	06 60	V(HOR)	(.1fps)
			H DOT(-Descent)	(.1fps)
			H(+ >Landing Site Radius)	(ft)
			ROD - Input ROD As Desired	
			(MAN LANDING) TTCA - Advance Until:	
			THRUST IND: CMD=10%	
			THR CONT - MAN	
			To P67	
3			H(Actual)=5.6 ft LUNAR CONTACT Lt - On	
			ENGINE STOP - Push	
	TD+3:00		PRO	
			V37E 68E To P68	

P70-P71

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P67 LANDING PHASE (MANUAL)

1			P67 Displayed	
2	F	06 60	V(HOR)	(.1fps)
			H DOT (-Descent)	(.1fps)
			H(+ >Landing Site Radius)	(ft)
			(ROD LANDING) THR CONT - AUTO	
			To P66	
3			H(actual)=5.6 ft LUNAR CONTACT Lt - ON	
			ENGINE STOP - Push	
	TD+3:00		PRO	
			V37E 68E To P68	

P68 LANDING CONFIRMATION

1			V37E 68E	
2	F	06 43	LAT(+NORTH),LONG(+EAST),ALT (.01°,,1nm)	
			RECORD LAT _____°	
			LONG _____°	
			ALT _____nm (Nominal zero)	
			PRO	
3	F	37		

LM-6

P70 DPS ABORT

1 ABORT-PUSH (From P63,64,65,66,67)
*F 50 25 R1 00203 *
* GUID CONT - PGNS *
* MODE CONT: PGNS - AUTO*
* THR CONT - AUTO *
* PRO *

2 06 63 VI,H DOT,H (.1fps,ft)
VI Increasing
H DOT Remains Positive
H Increasing

H<25000-Monitor Attitude Mnvr To Local Vertical With Windows Downrange. X-axis Override Inhibited.
H>25000-or H DOT >00400-Monitor Attitude Mnvr To Abort Attitude With Windows Downrange. X-axis Override Restored.

(To Monitor Time To Go And Crossrange Velocity)
V16 N77E

16 77 TG,V(Y) (min-sec,.1fps)
N85E

3 16 85 VG XYZ (LM) (.1fps)
(If Burn >400 sec,
POI+6:20
DES REG (2) - CLOSE)
VGX = 100 fps
DES ENG CMD OVRD - OFF

DPS NULL COMPONENTS
OFF KEY REL

4 F 16 63 VI,HDOT, H (.1fps,ft)
ENG STOP - Push
ENG ARM - OFF
ABORT - Reset
PRO

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5 F 16 85 VG XYZ (LM) (.1fps)
(DISPLAY ORB PARAM) V82E
(TERM) PRO To 7

5 F 16 44 APO ALT,PER ALT,TFF (.1nm,min-sec)
RECORD APO ALT _____ nm,

PER ALT _____ nm,

TFF _____ min-sec
PRO To 5

7 F 37

P71 APS ABORT

1 ABORT STAGE -Push (From P63,64,65,
66,67,70)
*F 50 25 R1 00203 *
* GUID CONT - PGNS *
* MODE CONT: PGNS - AUTO *
* PRO *

APS
IGN 06 63 VI,H DOT,H (.1fps,ft)
ENG START - Push
ENG ARM - ASC
If ENG STOP Lt - On
ENG STOP - Reset
BAL CPL-ON
SYS A&B ASC FEED 2 (2) - OPEN
MAIN SOV(2)-CLOSE
CRSFD - OPEN

VI Increasing
H DOT Remains Positive
H Increasing

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H<25000-Monitor Attitude Mnvr To Local Vertical With Windows Downrange. X-axis Override Inhibited.

H>25000 or H DOT>00400-Monitor Attitude Mnvr To Abort Attitude With Windows Downrange. X-axis Override Restored.

(To Monitor Time To Go And Crossrange Velocity)
V16 N77E

16 77 TG,V(Y) (min-sec,.1fps)
N85E

2 16 85 VG XYZ (LM) (.1fps)
VGX = 200 fps,
MAIN SOV (2) - OPEN
SYS A&B ASC FEED 2(2)-CLOSE
CRSFD-CLOSE
VGX - 100 fps,ENG ARM - OFF
*NO Cutoff *
* ABORT STAGE - Reset*

APS NULL COMPONENTS
OFF KEY REL

3 F 16 63 VI,H DOT,H (.1fps,ft)
ENG STOP - Push Then Reset
PRO

4 F 16 85 VG XYZ (LM) (.1fps)
(DISPLAY ORB PARAM) V82E
(TERM) PRO To 6

5 F 16 44 APO ALT,PER ALT,TFF (.1nm,min-sec)
RECORD APO ALT _____ nm,
PER ALT _____ nm,
TFF _____ min-sec
PRO To 4

6 F 37

Basic Date October 6, 1969
Changed October 31, 1969