APOLLO 12

LM DATA CARD BOOK

QUARTERS COPY

SKB32100081-387

LM DATA CARD BOOK MISSION H-1
CHANGE DATED NOV. 5, 1969

List of Effective Pages - Original - 10/30/69

Total number of pages in this publication is 14 consisting of the following:

Page Number	Issue
Cover	10/30/69
*1	11/5/69
2 thru 4	10/30/69
*5 & 6	11/5/69
7 thru 14	10/30/69

*The asterisk indicates pages changed, added or deleted by the current change.

LM ACTIVATION CARD

DAP PAD

+						+	3	3	9	2	6	LM WT
+						+	3	7	2	0	8	CSM WT
+						+	0	0	5	0	1	GMBL
+						+	0	0	5	6	6	

GYRO TORQUING

												R_1 (3.6)
												R_2 (.8)
												R_3 (3.6)

V06 N20

GET 105 : :	R_1							
	R_2							
	R_3							
GET 106 : :	R_1							
	R_2							
	R_3							
GET 106 : :	R_1							
	R_2							
	R_3							
GET 106 : :	R_1							
	R_2							
	R_3							
GET : :	R_1							
	R_2							
	R_3							

S-BD

P (+68)
Y (+19)
AOS (105 : 45 :)

P (+130)
Y (+23)
AOS (107 : 43 :)

P (+14)
Y (-02)
AOS (109 : 41 :)

AGS

K FACTOR (100 : 00 : 00)

+						+	6	0	3	2	6	224
+						+	5	8	1	5	8	225
+						+	7	0	3	1	2	226
-						-	5	0	1	8	1	227
+						+	5	6	9	5	2	231
												(-00014) 540
												(-00004) 541
												(+00002) 542
												(-00006) 544
												(+00016) 545
												(+00007) 546

UNDOCK GET (107 : 54 : 22)
SEP GET (108 : 24 : 22)

DOI/NO PDI + 12 CARD

DOI RULES

MANUAL SHUT-DOWN IF
- ΔVG NEGATIVE (PGNS)
- 2 SECONDS OVER BURN AND AGS VGX > 2 fps

MANUAL TAKEOVER IF
- ATT > ±5° RATE > ±5°/SEC

1. IF PGNS >10fps IN ANY AXIS: DOI+10 AGS
2. IF AGS AND PGNS DIFFER BY:
   a. <2fps GO AFTER TRIM X TO 5
   b. <5fps AT DOI+30 AND RR CONFIRMS PGNS NO GO:
      DO NO PDI+12, IF GO DO PDI.
   c. >5fps RR CONFIRMS PGNS NO GO: DOI+10

DOI PAD

+	0	0				+	0	0	1	0	9	HRS	N33
+	0	0	0			+	0	0	0	2	3	MIN	TIG
+	0					+	0		0	0	0	SEC	
						-	0	0	7	1	2	ΔVX	N81
						+	0	0	0	0	0	ΔVY	LOCAL
						+	0	0	1	8	6	ΔVZ	VERT
+						+	0	0	5	9	8	H_A	N42
						+	0	0	0	8	9	H_P	
+						+	0	0	7	2	1	ΔVR	
X	X	X				X	X	X	0	2	8	BT	
X	X	X				X	X	X	0	0	0	R	FDAI
X	X	X				X	X	X	3	0	0	P	INER
						-	0	0	7	0	9	ΔVX AGS	
						+	0	0	0	0	0	ΔVY AGS	
						+	0	0	1	9	6	ΔVZ AGS	

NO PDI + 12 ABORT PAD

+	0	0				+	0	0	1	1	0	HRS	N33
+	0	0	0			+	0	0	0	3	1	MIN	TIG
+	0					+	0	5	7	0	0	SEC	
						+	0	1	1	8	3	ΔVX	N81
						+	0	0	0	0	0	ΔVY	LOCAL
						+	0	1	2	8	2	ΔVZ	VERT
+						+	0	1	4	7	4	H_A	N42
						+	0	0	1	3	1	H_P	
+						+	0	1	7	4	4	ΔVR	
X	X	X				X	X	X	0	4	4	BT	
X	X	X				X	X	X	0	0	0	R	FDAI
X	X	X				X	X	X	1	9	9	P	INER
						+	0	1	1	4	5	ΔVX AGS	
						+	0	0	0	0	0	ΔVY AGS	
						+	0	1	3	1	5	ΔVZ AGS	
+	0	0				+	0	0	1	1	1	HRS	N11
+	0	0	0			+	0	0	0	1	6	MIN	CSI
+	0					+	0	0	0	0	0	SEC	
+	0	0				+	0	0	1	1	2	HRS	N37
+	0	0	0			+	0	0	0	5	7	MIN	TPI
+	0					+	0	1	1	5	0	SEC	

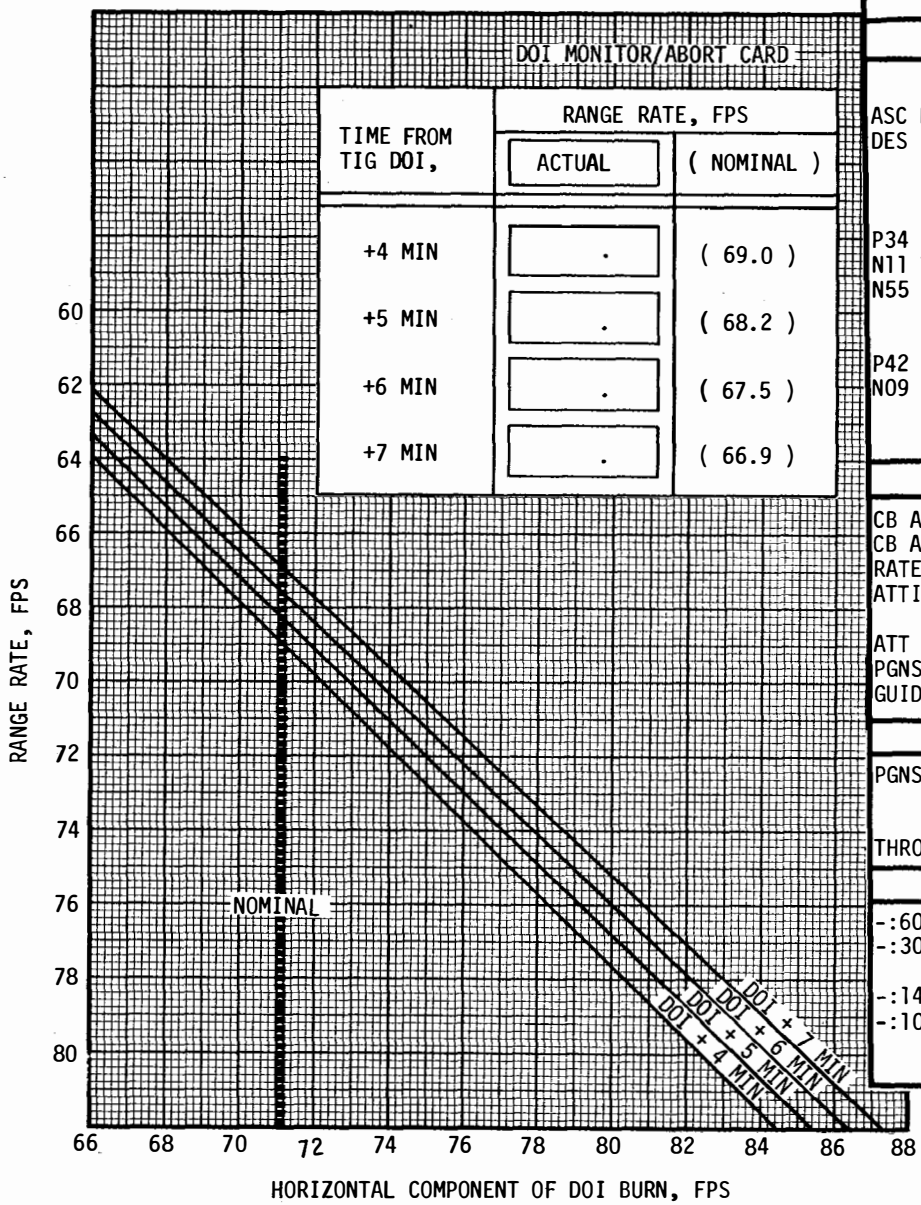
RESIDUALS

PGNS		AGS	
N85	500		ΔVX
	501		ΔVY
	502		ΔVZ

BURN TIME IF > 1 SEC _____:_____

DOI MONITOR/ABORT CARD

TIME FROM TIG DOI,	RANGE RATE, FPS ACTUAL	RANGE RATE, FPS (NOMINAL)
+4 MIN	.	(69.0)
+5 MIN	.	(68.2)
+6 MIN	.	(67.5)
+7 MIN	.	(66.9)



TARGETING PGNS & AGS

PGNS	AGS DPS	AGS APS
ASC BATTS(2)-ON DES BATTS(1&3)-OFF		ASC BATTS(2)-ON DES BATTS(1&3)-OFF
	507+0 THRUST X-AXIS	507+0 THRUST X-AXIS
	306+0 NODE AT TPF	306+0 NODE AT TPF
	616+00004 ULLAGE COUNTER	616+00007 ULLAGE COUNTER
	410+4 TPI EXECUTE	410+4 TPI EXECUTE
P34 N11 TIG TPI (DOI+10)	373 DOI+10 MIN(+0573.0)	373 DOI+10 MIN(+0573.0)
N55 (0,0,060.00)	307 TRANSFER TIME (02000)	307 TRANSFER TIME (02000)
	267 ΔV	267 ΔV
	371 ΔV + BRAKING	371 ΔV + BRAKING
	410+5 EXT ΔV	410+5 EXT ΔV
P42 N09 (1706), PRO	400+1 GUID STEER	400+1 GUID STEER
	411+0	411+1
	500R	500R

SWITCH CONFIGURATION

CB AELD(2)-CLOSE	ENG GMBL-ENABLE	CB AELD(2)-CLOSE
CB ABORT STAGE(2)-CLOSE	RATE/ERR MON-LDG RDR/CMPTR	CB ABORT STAGE(2)-CLOSE
RATE/ERR MON-LDG RDR/CMPTR	ATTITUDE MON-AGS	RATE/ERR MON-LDG RDR/CMPTR
ATTITUDE MON-PGNS	DEAD BAND-MIN	ATTITUDE MON-AGS
	ATT CONT(3)-PULSE	DEAD BAND-MIN
ATT CONT(3)-MODE CONT	AGS MODE CONT-AUTO	ATT CONT(3)-PULSE
PGNS MODE CONT-ATT HOLD	GUID CONT-AGS	AGS MODE CONT-AUTO
GUID CONT-PGNS		GUID CONT-AGS

MANUEVER TO BURN ATT

PGNS MODE CONT-AUTO	ATT CONT(3)-MODE CONT	ATT CONT(3)-MODE CONT
	407+0 (READ)	407+0 (READ)
	500R	500R
THROT/JET-JETS (BOTH)	THROT/JET-JETS (LMP)	THROT/JET-JETS (BOTH)

BURN

-:60 MASTER ARM-ON		-:60 MASTER ARM-ON
-:30 ABORT STAGE-PUSH ENG ARM-ASC	-:30 ABORT PB-PUSH ENG ARM-DES	-:30 ABORT STAGE-PUSH ENG ARM-ASC
-:14 ULLAGE (LMP)		-:14 ULLAGE (LMP)
-:10 STAGE FIRE	-:08 ULLAGE (LMP) +:15 THROTTLE-MAX	-:10 STAGE FIRE

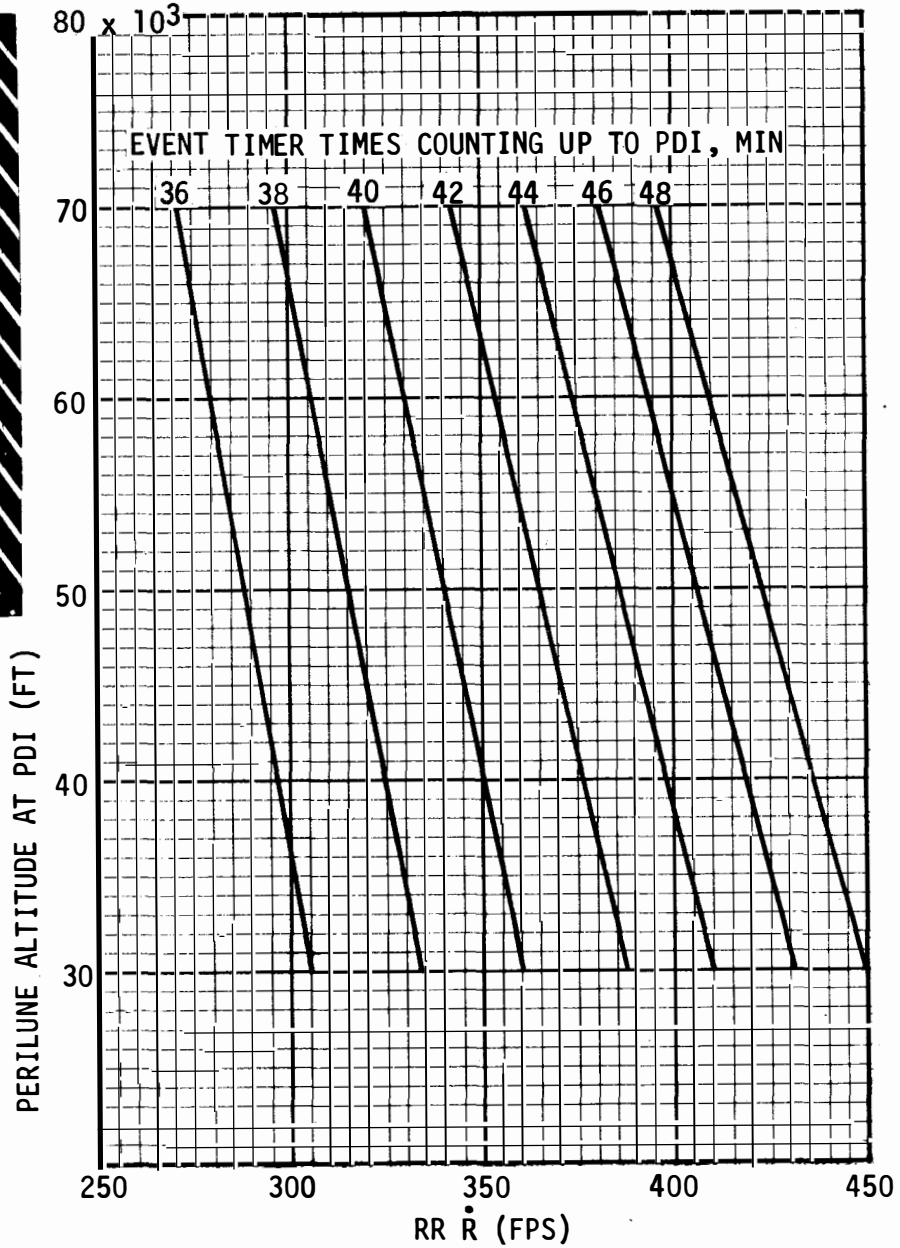
Prepared By FPRB/OPS
MISSION APOLLO 12, NOVEMBER 8, 1969

PDI RULES

1. NO ULLAGE - NO GO FOR PDI
2. NO IGNITION DELAY 5 SEC THEN SET DES ENG OVRD - ON
3. T/W > 1.6 AND DSKY CHANGES > 18fps/2 sec
4. ATT/RATE <5°/SEC
5. ΔH WITHIN LIMITS >10 SEC AND NOT OUT OF LIMITS >60 SEC
6. DATA GOOD AT >10,000 ft
7. IF NO THROTTLE DOWN BY P64 +15 SEC - ABORT
8. BINGO FUEL 1 MIN 34 SEC AFTER LOW LEVEL OR WHEN FUEL QTY <2% UNLESS LANDING IMMINENT.

NOTE: FOR FLASHING LR ALT OR VEL LIGHTS THAT ARE PRECEDED BY A STEADY LR LIGHT, CYCLE THE RADAR TEST SWITCH.

PREDICTED PERILUNE ALTITUDE CHECKS AT PDI



MPAD DATA MODIFIED BY FPRB/OPS
MISSION APOLLO 12, OCTOBER 27, 1969

PDI/PDI 1 ABORT CARD

PDI PAD

+	0	0				+	0	0	1	1	0	HRS TIG
+	0	0	0			+	0	0	0	2	0	MIN PDI
+	0					+	0	0	0	0	0	SEC
X	X					X	X	0	9	3	9	TGO N61
						-	0	0	0	0	2	CROSSRANGE
X	X	X				X	X	X	0	0	0	R FDAI
X	X	X				X	X	X	1	0	9	P AT TIG
X	X	X				X	X	X	0	0	0	Y
						+	5	6	9	3	6	DEDA 231 IF RQD

0 <PDI 1 ≤ 10 MIN ABORT PAD

LOG INSERTION GET= ___ ___ ___:___ ___:___ ___
+ 5 0 0 0
CSI TIG= ___ ___ ___:___ ___:___ ___

+	0	0				+	0	0	1	1	2	HRS N37
+	0	0	0			+	0	0	0	5	7	MIN TPI
+	0					+	0	1	2	0	0	SEC (10 MIN)

T1-1 (10 <PDI 1 ≤ 16:20) ABORT PAD

LOG INSERTION GET= ___ ___ ___:___ ___:___ ___
+ 5 0 0 0
BOOST GET= ___ ___ ___:___ ___:___ ___
+ 1 0 0 0 0
CSI 1, GET= ___ ___ ___:___ ___:___ ___
+ 5 0 : 0 0
CSI 2, GET= ___ ___ ___:___ ___:___ ___

+	0	0				+	0	0	1	1	4	HRS N37
+	0	0	0			+	0	0	0	5	5	MIN TPI
+	0					+	0	4	9	0	0	SEC (12 MIN)

T2-1 (PDI1+21:22) ABORT PAD

LOG INSERTION GET= ___ ___ ___:___ ___:___ ___
+ 5 0 0 0
BOOST GET= ___ ___ ___:___ ___:___ ___
+ 2 4 8 0 0
CSI 1, GET= ___ ___ ___:___ ___:___ ___
+ 5 0 0 0
CSI 2, GET= ___ ___ ___:___ ___:___ ___

+	0	0				+	0	0	1	1	0	HRS
+	0	0	0			+	0	0	0	4	1	MIN TIG
+	0					+	0	1	9	0	0	SEC
+	0	0				+	0	0	1	1	6	HRS N37
+	0	0	0			+	0	0	0	5	4	MIN TPI
+	0					+	0	1	5	0	0	SEC

T2-1 AT PDI + _____ 21:22

N69

												ΔDN RNG
												ΔX RNG
												ΔRLS

THROTTLE DOWN _____:_____

N43

						-	0	0	2	9	8	LAT (+N)
						-	0	2	3	3	9	LONG (+E)
						-	0	0	0	1	3	ALT

PDI/PDI 2 ABORT CARD

PDI PAD

+	0	0				+	0	0	1	1	0	HRS TIG
+	0	0	0			+	0	0	0	2	0	MIN PDI
+	0					+	0	0	0	0	0	SEC
X	X					X	X	0	9	3	9	TGO N61
						-	0	0	0	0	2	CROSSRANGE
X	X	X				X	X	X	0	0	0	R FDAI
X	X	X				X	X	X	1	0	9	P AT TIG
X	X	X				X	X	X	0	0	0	Y
						+	5	6	9	3	6	DEDA 231 IF RQD

T1-2 (0 ≤ PDI 2 ≤ 14:24) ABORT PAD

LOG INSERTION GET= ___ ___ ___:___ ___:___ ___
+ 5 0 : 0 0
CSI TIG= ___ ___ ___:___ ___:___ ___

+	0	0				+	0	0	1	1	4	HRS N37
+	0	0	0			+	0	0	0	5	6	MIN TPI
+	0					+	0	0	0	0	0	SEC (14 MIN)

T2-2 (PDI 2+21:00) ABORT PAD

LOG INSERTION GET= ___ ___ ___:___ ___:___ ___
+ 5 0 : 0 0
BOOST GET= ___ ___ ___:___ ___:___ ___
+ 1 0 0 : 0 0
CSI 1, GET= ___ ___ ___:___ ___:___ ___
+ 5 0 : 0 0
CSI 2, GET= ___ ___ ___:___ ___:___ ___

+	0	0				+	0	0	1	1	2	HRS
+	0	0	0			+	0	0	0	3	3	MIN TIG
+	0					+	0	3	5	0	0	SEC
+	0	0				+	0	0	1	1	6	HRS N37
+	0	0	0			+	0	0	0	5	4	MIN TPI
+	0					+	0	1	8	0	0	SEC

T2-2 AT PDI + _____ 21:00

N69

												ΔDN RNG
												ΔX RNG
												ΔRLS

THROTTLE DOWN _____:_____

N43

						-	0	0	2	9	8	LAT (+N)
						-	0	2	3	3	9	LONG (+E)
						-	0	0	0	1	3	ALT

ABORT/ASCENT CARD

ASCENT RULES

	PGNS	AGS
UNDERBURN		
< 400 fps(20 SEC) NULL RESIDUALS	AUTO, A/H 15 fps	
> 400 fps(20 SEC) A/H BURN Hp	AUTO, A/H 15 fps	

INSERTION
- PGNS & AGS WITHIN 10fps TRIM ACTIVE SYSTEM
- PGNS & AGS DIFFER > 10fps
  - OPTIONS:
    - a. TRIM AGS OR PGNS (X ONLY)
    - b. TWEAK @ 2 MIN (10° OHW OR 253° FDAI)

ATT/RATE ERRORS > 10°/SEC

T3 (1 REV) ABORT PAD

LOG INSERTION GET = ___ ___ ___:___ ___:___ ___
+ 5 0 : 0 0

CSI TIG = ___ ___ ___:___ ___:___ ___
+ 1 3 3 0 0

TPI TIG = ___ ___ ___:___ ___:___ ___

+	0	0				+	0	0	1	1	2	HRS	T3-1
+	0	0	0			+	0	0	0	2	7	MIN	TIG
+	0			.		+	0	1	0	.	3	7	SEC

P22 ACQUISITION TIME ___:___:___
___:___:___

LM ASCENT PAD

+	0	0				+	0	0	1	4	2	HRS	
+	0	0	0			+	0	0	0	0	1	MIN	TIG
+	0					+	0	1	8	.	0	0	SEC
+					.	+	5	5	3	3	.	9	V (HOR)
+					.	+	0	0	3	4	.	4	V (VERT) N76
	0				.	+	0	0	0	0	.	0	*CROSSRANGE
													047
													053
													225/226
													231
													465
													546
+	0	0				+	0	0					HRS
+	0	0	0			+	0	0	0				MIN TIG
+	0					+	0			.			SEC
+						+	1	0	6	9	9		LM WT
+						+	3	5	6	0	7		CSM WT

*NOTE: LOAD 8 NM CROSSRANGE IF GREATER THAN 8 NM
COMMENTS:

+						+							315 (HA)
+						+							403 (HP)

RESIDUALS

PGNS					AGS				
N85				.	500				.	ΔVX
				.	501				.	ΔVY
				.	502				.	ΔVZ

GET(CSI) = GET(LO) + 0:57
GET(TPI) = GET(LO) + 2:37

CSI CARD

HR	TIG N11	+	0	0				+	0	0	1	4	2
MIN	CSI	+	0	0	0			+	0	0	0	5	8
SEC		+	0			.		+	0	0	5	2	0
N55		(+00001)			(+02660)			(+13000)						
HR	TIG N37	+	0	0				+	0	0	1	4	4
MIN	TPI	+	0	0	0			+	0	0	0	3	6
SEC		+	0			.		+	0	2	5	7	0
ΔVX	N81	+	0			.		+	0	0	5	0	3
ΔVY			0			.			0	0	0	0	0
373		+				.		+	0	1	7	8	1
275		+				.		+	0	2	7	6	4

410+1, 605+00777, 416+1, 623 + 0

ΔVX	AGS N86		0				.	+	0	0	5	0	3
ΔVY	AGS		0				.		0	0	0	0	0
ΔVZ	AGS		0				.	+	0	0	0	0	0

RESIDUALS

	PGNS	AGS
ΔVX	N85	500
ΔVY		501
ΔVZ		502

BURN RULES
CRITERIA 3fps
COMPARE: 1 PGNS vs CMC
2 PGNS vs AGS
3 CMC vs AGS

PAGE 8

PGNCS

N75: ΔH (15.0) | CSI/CDH (58:23) | CDH/TPI (39:13)

N81: ΔVX CSI (50.3) | YDOT N90 CSI (+0.0)

N82: ΔVX CDH (+0.0) | ΔVY CDH (+0.0) | ΔVZ CDH (+0.0)

AGS

402 ΔH | 372 CSI-CDH | 267/450 ΔVG (CSI)

CSM SOLUTION (CHANGE SIGN AND SUBTRACT 1 fps ΔVX)
ΔVX CSI | ΔVY CSI

N86 (AGS): ΔVX | ΔVY | ΔVZ

263 Y DOT CSI | 371 ΔV CDH

CDH CARD

HR	N13	+	0	0			+	0	0	1	4	3
MIN	TIG	+	0	0	0		+	0	0	0	5	6
SEC	CDH	+	0				+	0	2	7	5	0
ΔVX			0				-	0	0	0	0	0
ΔVY	N81		0					0	0	0	0	0
ΔVZ			0				-	0	0	0	0	0
PLM	FDAI	X	X	X			X	X	X			
373		+					+	0	2	3	6	5
ΔVX	N86		0				-	0	0	0	0	0
ΔVY	AGS		0				+	0	0	0	0	0
ΔVZ			0				-	0	0	0	0	0

RESIDUALS

	PGNS	AGS
ΔVX	N85	500
ΔVY		501
ΔVZ		502

PLANE CHANGE P30,V90,410+5

TIG CDH _ _ _ : _ _ : _ _ : _ _

- 3 0 : 0 0 . 0 0

TIG PC _ _ _ : _ _ : _ _ : _ _

YDOT

CSM	N90	PGNS	N90	AGS	270
(-)	.	(-)	.		.
(-)	.	(-)	.		.

RESIDUALS

	PGNS	AGS
ΔVX	N85	500
ΔVY		501
ΔVZ		502

PGNCS

N75

ΔH (15.0)	ΔT TPI/CDH (39:13)	TPI SLIP (0:00)
.	:	:
.	:	:
.	:	:

N81

ΔVX (+0.0)	YDOT CDH N90 (+0.0)	ΔVZ (+0.0)
.		.
.	(-) .	.
.	(-) .	.

BURN RULES

CRITERIA $\dot{X}$=2fps And $\dot{Z}$=6fps

COMPARE 1.PGNS vs CMC
2.PGNS vs AGS
3.CMC vs AGS
4.IF ALL ABOVE FAIL BURN CMC SOLUTION

AGS

402 ΔH	450 ΔVX	452 ΔVZ

CSM SOLUTION (CHANGE SIGN)

ΔVX	ΔVY	ΔVZ
.	.	.

N86 (AGS)

ΔVX	ΔVY	ΔVZ
.	.	.

263 ΔVY(CDH) 270 ΔVY (NOW)

PGNCS

AGS

CDH
TPI

HR N37	+	0	0				+	0	0	1	4	4
MIN TIG	+	0	0	0			+	0	0	0	3	6
SEC TPI	+	0					+	0	2	5	7	0
N55	(+00000)			(+026.60)			(+130.00)					
ΔVX N81		0					+	0	0	2	2	0
ΔVY		0					-	0	0	0	0	2
ΔVZ		0					-	0	0	1	1	0
ΔVR N42	+	0					+	0	0	2	4	8
RLM	X	X	X				X	X	X			
PLM	X	X	X				X	X	X			
R TPI N54	+	0					+	0	3	8	2	2
R TPI TIG-5		0					-	0	1	1	2	4
F/A (+/-) N59		0					+	0	0	2	4	7
R/L (+/-) ΔV		0						0				
D/U (+/-) LOS		0						0				
BT	X	X					X	X	0	0	2	2
307+043.00, 314+0												

TPI CARD

RESIDUALS

	PGNS				AGS			
ΔVX	N85				500			
ΔVY					501			
ΔVZ					502			

BURN RULES

CRITERIA: X=2fps, Y=5fps, Z=6fps
COMPARE : 1. PGNS vs CMC
2. PGNS vs AGS
3. CMC vs AGS
4. IF ALL ABOVE FAIL, BURN CMC SOLUTION.
If TIG TPI > 8 Min EARLY - RECYCLE
P32 WITH TIG EQUAL TO NOMINAL TIG - 8 MIN.

PGNCS

N37: TIG TPI (144:36:26) ___:___:___

N58: HP (43.8) ___.___ ; ΔV TPI (24.8) ___.___ ; ΔV TPF (31.6) ___.___

N81: ΔVX (22.0) ___.___ ; ΔVY (-0.2) ___.___ ; ΔVZ (-11.0) ___.___

N59: ΔVF/A- (24.8) ___.___ ; ΔVR/L- (0.0) ___.___ ; ΔVD+/U (0.0) ___.___

N90

AGS

373 TIG TPI ____ (+0276.4)

267 ΔVTPI ____ ΔV 371 TPI+TPF ____

CSM SOLUTION (CHANGE SIGN)
ΔVX ____ ΔVY ____ ΔVZ ____

N86(AGS)
ΔVX ____ ΔVY ____ ΔVZ ____

CSM SOLUTION (CHANGE SIGN)
ΔVX ____ ΔVY ____ ΔVZ ____

P76 PAD

												PURPOSE	
+	0	0				+	0	0				HRS	N33
+	0	0	0			+	0	0	0			MIN	TIG
+	0					+	0					SEC	
												ΔVX	N84
												ΔVY	
												ΔVZ	
												PURPOSE	
+	0	0				+	0	0				HRS	N33
+	0	0	0			+	0	0	0			MIN	TIG
+	0					+	0					SEC	
												ΔVX	N84
												ΔVY	
												ΔVZ	
												PURPOSE	
+	0	0				+	0	0				HRS	N33
+	0	0	0			+	0	0	0			MIN	TIG
+	0					+	0					SEC	
												ΔVX	N84
												ΔVY	
												ΔVZ	
												PURPOSE	
+	0	0				+	0	0				HRS	N33
+	0	0	0			+	0	0	0			MIN	TIG
+	0					+	0					SEC	
												ΔVX	N84
												ΔVY	
												ΔVZ	

P27 PAD

V			V			V			PURP	
: :			: :			: :				
INDEX			INDEX			INDEX			01	1173
									02	
									03	
									04	
									05	
									06	
									07	
									10	
									11	
									12	
									13	
									14	
									15	
									16	
									17	
									20	
									21	1213
									22	
									23	
									24	1216

X	X	X				X	X	X				HRS	
X	X	X	X			X	X	X	X			MIN	
X	X					X	X					SEC	NAV CHECK
	0						0					LAT	N43
												LONG	
+	0					+	0					ALT	

APOLLO 12 FLIGHT DATA FILE

P76/P27
AGS SV/IMPACT

AGS STATE VECTOR PAD	PURP	LOAD
	240	
	241	
	242	
	260	
	261	
	262	
	254	414+2
	244	
	245	
	246	
	264	
	265	
	266	
	272	414+3

AGS STATE VECTOR PAD	PURP	LOAD
	240	
	241	
	242	
	260	
	261	
	262	
	254	414+2
	244	
	245	
	246	
	264	
	265	
	266	
	272	414+3

IMPACT PAD													
+	0	0				+	0	0				HRS	N33
+	0	0	0			+	0	0	0			MIN	TIG
+	0			•		+	0			•		SEC	
					•						•	ΔVX	N81
					•						•	ΔVY	LOCAL
					•						•	ΔVZ	VERT
+					•	+					•	H_A	N42
					•						•	H_P	
+					•	+					•	ΔVR	
X	X	X		•		X	X	X		•		BT	
X	X	X				X	X	X				R	FDAI
X	X	X				X	X	X				P	INER
					•						•	ΔVX	AGS N86
					•						•	ΔVY	AGS
					•						•	ΔVZ	AGS

T(CSI) = GET(LO) + 0:57
T(TPI) = GET(LO) + 2:37

CSI CARD

HR	TIG N11	+	0	0				+	0	0	1	4	2
MIN	CSI	+	0	0	0			+	0	0	0	5	8
SEC		+	0			.		+	0	0	5	2	0
N55		(+00001)					(+02660)					(+13000)	
HR	TIG N37	+	0	0				+	0	0	1	4	4
MIN	TPI	+	0	0	0			+	0	0	0	3	6
SEC		+	0			.		+	0	2	5	7	0
ΔVX	N81	+	0			.		+	0	0	5	0	3
ΔVY			0			.			0	0	0	0	0
373		+				.		+	0	1	7	8	1
275		+				.		+	0	2	7	6	4

410+1, 605+00777, 416+1, 623 + 0

ΔVX	AGS N86		0			.		0	0	5	0	3
ΔVY	AGS		0			.		0	0	0	0	0
ΔVZ	AGS		0			.		0	0	0	0	0

RESIDUALS

	PGNS			AGS		
ΔVX	N85		.	500		.
ΔVY			.	501		.
ΔVZ			.	502		.

BURN RULES
CRITERIA 3fps
COMPARE: 1 PGNS vs CMC
2 PGNS vs AGS
3 CMC vs AGS

APOLLO 12 FLIGHT DATA FILE

PGNCS

N75: ΔH (15.0) | CSI/CDH (58:23) | CDH/TPI (39:13)

N81: ΔVX CSI (50.3) | YDOT N90 CSI (+0.0)

N82: ΔVX CDH (+0.0) | ΔVY CDH (+0.0) | ΔVZ CDH (+0.0)

AGS

402 ΔH | 372 CSI-CDH | 267/450 ΔVG (CSI)

CSM SOLUTION (CHANGE SIGN AND SUBTRACT 1 fps ΔVX)
ΔVX CSI | ΔVY CSI

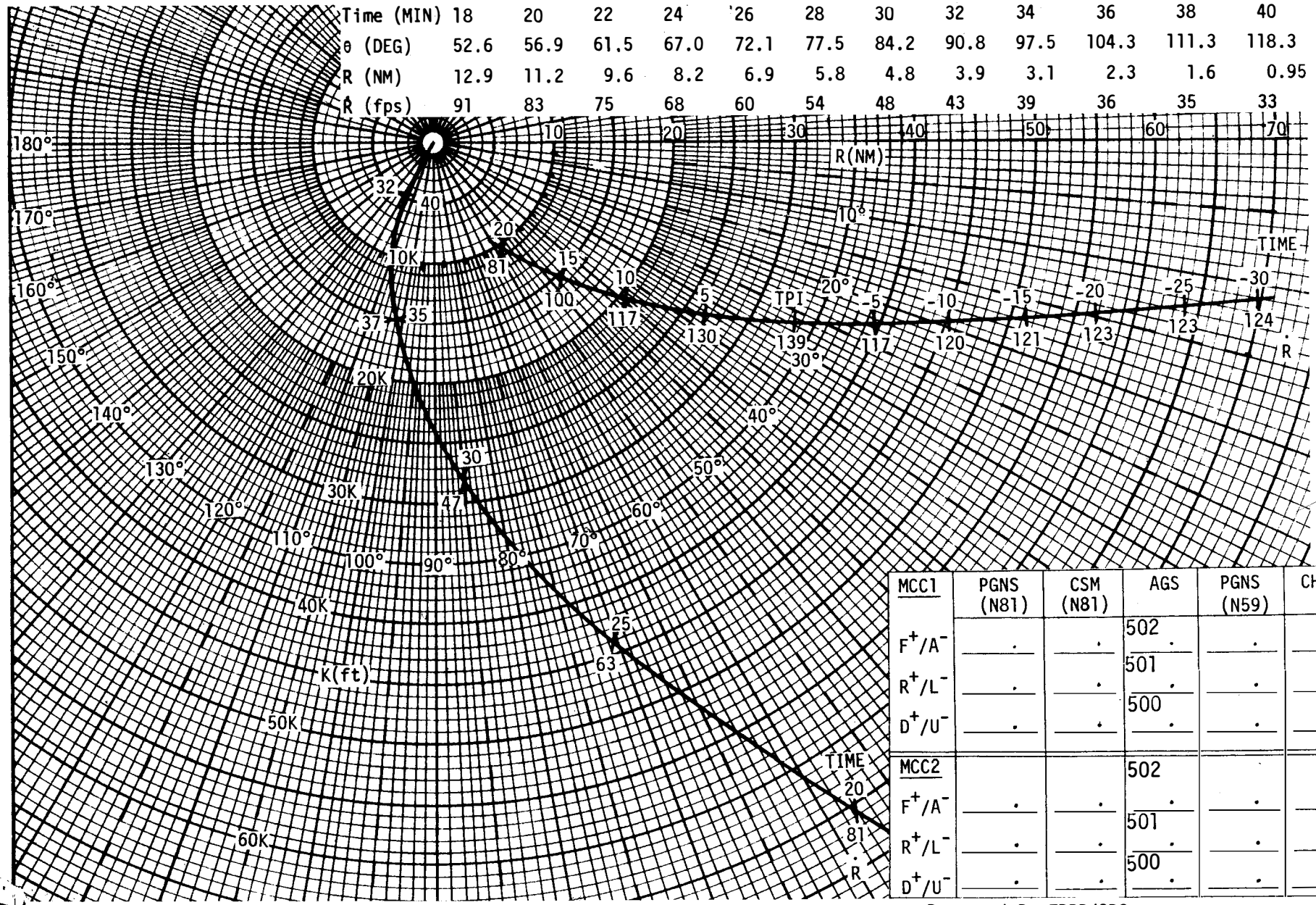
N86 (AGS): ΔVX | ΔVY | ΔVZ

263 Y DOT CSI | 371 ΔV CDH

CSI
REL REF TRAJ

H-1 MISSION RELATIVE REFERENCE TRAJECTORY

Time (MIN)	18	20	22	24	26	28	30	32	34	36	38	40
θ (DEG)	52.6	56.9	61.5	67.0	72.1	77.5	84.2	90.8	97.5	104.3	111.3	118.3
R (NM)	12.9	11.2	9.6	8.2	6.9	5.8	4.8	3.9	3.1	2.3	1.6	0.95
Ṙ (fps)	91	83	75	68	60	54	48	43	39	36	35	33



MCC1	PGNS (N81)	CSM (N81)	AGS	PGNS (N59)	CHART
			502		
F^+/A^-	.	.	.	.	.
			501		
R^+/L^-	.	.	.	.	.
			500		
D^+/U^-	.	.	.	.	.
MCC2					
			502		
F^+/A^-	.	.	.	.	.
			501		
R^+/L^-	.	.	.	.	.
			500		
D^+/U^-	.	.	.	.	.

Prepared By FPRB/OPS
MISSION APOLLO 12, SEPTEMBER 26, 1969