QTA'S

APOLLO 13	
LM DATA CARD BOOK	
PART NO	S/N
SKB 32100082-387	

FINAL

CHANGE
MARCH 30, 1970

APOLLO 13

FINAL

LM DATA CARD BOOK

MARCH 30, 1970 CHANGE

PREPARED BY: T. F. Pykosz MARCH 30, 1970
T. F. PYKOSZ
BOOK MANAGER
TRW TASK 81

APPROVED BY: SIGNATURE AUTHORIZED BY TELECOM: MARCH 30, 1970
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CHIEF
FLIGHT PLANNING BRANCH

It is requested that any organization having comments, questions, or suggestions concerning this document contact T. F. Pykosz, Building 4, Room 278A, Telephone Number HU-3-4015.

This document is under the configuration control of the Crew Procedures Control Board (CPCB). All proposed changes should be submitted to the Apollo Flight Data File Manager, Mr. T. W. Holloway, CF34, Room 230, telephone HU3-4271.

Distribution of this document is controlled by Mr. J. W. O'Neill, Chief, Flight Planning Branch, Flight Crew Support Division.

APOLLO FLIGHT DATA FILE

LM DATA CARD BOOK

BASIC DATE 3/17/70 CHANGE 3/30/70

LIST OF EFFECTIVE PAGES

*Indicates Current Change

PAGE NUMBER	ISSUE
1	3/24/70
2 thru 7	3/17/70
8	3/24/70
*9 thru 11	3/30/70
12 thru 14	3/17/70

This LOEP reflects changes incorporated as a result of approved changes:

027, ΔR VALUES

LM ACTIVATION CARD

DAP PAD

+						+	3	3	7	3	1	LM WT
+						+	3	7	5	0	0	CSM WT
+						+	0	0	4	7	6	GMBL
+						+	0	0	5	7	2	

GYRO TORQUING

												R_1
												R_2
												R_3

V06 N20

GET 97 : ____ : ____	LM	R_1							
		R_2							
		R_3							
	CSM	R_1							
		R_2							
		R_3							
GET 98 : ____ : ____	LM	R_1							
		R_2							
		R_3							
	CSM	R_1							
		R_2							
		R_3							
GET ____ : ____ : ____	LM	R_1							
		R_2							
		R_3							
	CSM	R_1							
		R_2							
		R_3							

S-BD

P	(+112)	AOS	(97 : 21 :)
Y	(+34)		
P	(+130)	AOS	(99 : 10 :)
Y	(+40)		
P	( )	AOS	(: :)
Y	( )		

AGS

K FACTOR (90 : 00 : 00)

+						+	6	0	4	2	7		224
+						+	2	9	4	0	2		225
+						+	6	0	4	6	9		226
-						-	0	1	7	1	8		305
-						-	5	4	5	0	0		662
-						-	3	1	7	0	1		673
												(-00002)	540
												(+00001)	541
												(-00002)	542
												(-00006)	544
												(+00030)	545
												(+00047)	546

UNDOCK/SEP GET (99 : 16 : 21)

APOLLO 13 FLIGHT DATA FILE

PAGE 1

ACTIVATION
GYRO DRIFT COMP

GYRO DRIFT COMPENSATION

ΔT COMPUTATION

N93 PRO TIME _____ : _____

PREVIOUS TORQ TIME _____ : _____

ΔT _____ : _____ [.] HRS

BIAS SHIFT

N93		BIAS SHIFT	
X / ΔT	=	[.]	X DEG/HR
Y / ΔT	=	[.]	Y DEG/HR
Z / ΔT	=	[.]	Z DEG/HR

GYRO DRIFT

	X	Y	Z
NBD (OLD)	0.0150	0.0030	0.0060
BIAS SHIFT	− .	− .	+ .
NBD (NEW)	[.]	[.]	[.]
OCTAL	[ ]	[ ]	[ ]

PROCEDURES

V25N01E	V21N01E
1460E	1460E
NBDX XXXXXE	NBDX XXXXXE E
NBDY XXXXXE	1461E
NBDZ XXXXXE	NBDY XXXXXE E
	1462E
	NBDZ XXXXXE

DEC/HR	OCTAL + DRIFT	OCTAL − DRIFT	DEC/HR	OCTAL + DRIFT	OCTAL − DRIFT
000	00000	00000	.765	14532	63245
.015	00177	77600	.780	14731	63046
.030	00377	77400	.795	15131	62646
.045	00576	77201	.810	15330	62447
.060	00775	77002	.825	15527	62250
.075	01174	76603	.840	15726	62051
.090	01374	76403	.855	16126	61651
.105	01573	76204	.870	16325	61452
.120	01772	76005	.885	16524	61253
.135	02171	75606	.900	16723	61054
.150	02371	75406	.915	17123	60654
.165	02570	75207	.930	17322	60455
.180	02767	75010	.945	17521	60256
.195	03166	74611	.960	17721	60056
.210	03366	74411	.975	20120	57657
.225	03565	74212	.990	20317	57460
.240	03764	74013	1.005	20516	57261
.255	04163	73614	1.020	20716	57061
.270	04363	73414	1.035	21115	56662
.285	04562	73215	1.050	21314	56463
.300	04761	73016	1.065	21513	56264
.315	05160	72617	1.080	21713	56064
.330	05360	72417	1.095	22112	55665
.345	05557	72220	1.110	22311	55466
.360	05756	72021	1.125	22510	55267
.375	06155	71622	1.140	27710	55067
.390	06355	71422	1.115	23107	54670
.405	06554	71223	1.170	23306	54471
.420	06753	71024	1.185	23505	54272
.435	07152	70625	1.200	23705	54072
.450	07352	70425	1.215	24104	53673
.465	07551	70226	1.230	24303	53474
.480	07750	70027	1.245	24502	53275
.495	10150	67627	1.260	24702	53075
.510	10347	67430	1.275	25101	52676
.525	10546	67231	1.290	25300	52477
.540	10745	67032	1.305	25477	52300
.555	11145	66632	1.320	25677	52100
.570	11344	66433	1.335	26076	51701
.585	11543	66234	1.350	26275	51502
.600	11742	66035	1.365	26474	51303
.615	12142	65635	1.380	26674	51103
.630	12341	65436	1.395	27073	50704
.645	12540	65237	1.410	27272	50505
.660	12737	65040	1.425	27472	50305
.675	13137	64640	1.440	27671	50106
.690	13336	64441	1.455	30070	47707
.705	13535	64242	1.470	30267	47510
.720	13734	64043	1.485	30467	47310
.735	14134	63643	1.500	30666	47111
.750	14333	63444			

ALTITUDE CHECK/PDI RULES CARD

PDI RULES

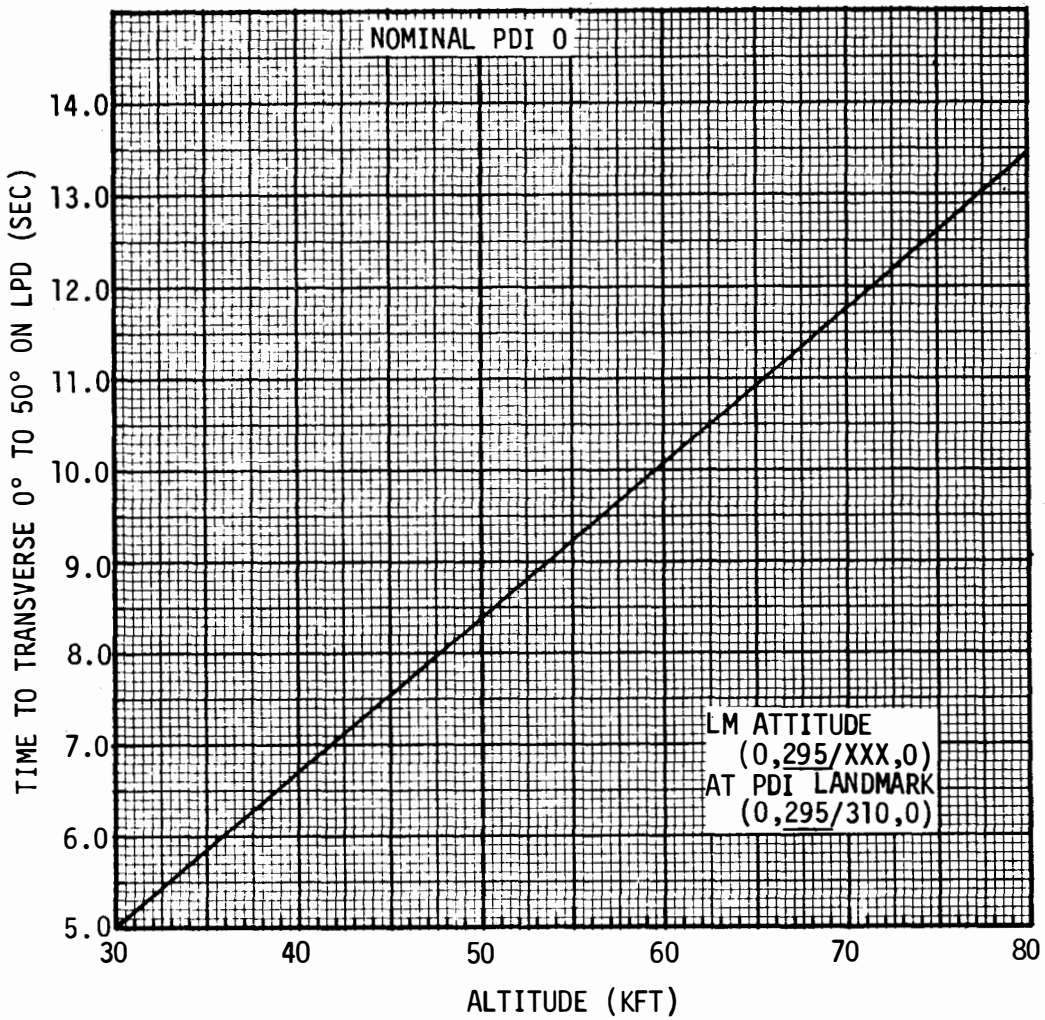
1. NO ULLAGE-NO GO FOR PDI.
2. NO IGNITION DELAY 2 SEC THEN START PB-PUSH; THEN SET DES ENG OVRD-ON AT 5 SEC.
3. T/W >1.6 AND DSKY CHANGES >18 fps/2 SEC.
4. ATT/RATE <5°/SEC.
5. ΔH WITHIN LIMITS >10 SEC AND NOT OUT OF LIMITS >60 SEC.
6. DATA GOOD AT >10,000 FT.
7. IF NO THROTTLE DOWN BY P64 +15 SEC-ABORT.
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.

CSM CIRC BURN													
P76													
+	0	0				+	0	0	1	0	0	HRS	N33
+	0	0	0			+	0	0	0	3	5	MIN	TIG
+	0					+	0	0	5	0	0	SEC	
						+	0	0	6	9	0	ΔVX	N84
						+	0	0	0	0	0	ΔVY	
						+	0	0	1	4	0	ΔVZ	

CSM HA/HP		
CMC	LGC	V82
/	/	OPT 2

ALTITUDE DETERMINATION CHART



PREPARED BY FPRB/OPS
MISSION APOLLO 13, FEBRUARY 3, 1970

PDI 0/NO PDI + 12 CARD

PDI 0 ABORT PAD

+	0	0				+	0	0	1	0	1	HRS	N33	
+	0	0	0			+	0	0	0	3	6	MIN	TIG	
+	0					+	0	5	3	4	0	SEC		A
						+	0	1	0	0	0	ΔVX	N81	
						+	0	0	0	0	0	ΔVY	LV	
						+	0	0	0	1	4	ΔVZ		B
+						+	0	1	3	6	3	HA	N42	
						+	0	0	0	8	4	HP		
+						+	0	1	0	0	0	ΔVR		
X	X	X				X	X	X	0	3	6	BT		
X	X	X				X	X	X	1	8	1	R	FDAI	
X	X	X				X	X	X	0	0	3	P	INER	
						+	0	1	0	0	0	ΔVX	N86	
						+	0	0	0	0	0	ΔVY	AGS	
						+	0	0	0	3	4	ΔVZ		
+	0	0				+	0	0	1	0	2	HRS	N11	
+	0	0	0			+	0	0	0	3	7	MIN	CSI	
+	0					+	0	2	8	6	0	SEC		C
+	0	0				+	0	0	1	0	4	HRS	N37	
+	0	0	0			+	0	0	0	2	2	MIN	TPI	
+	0					+	0	1	1	3	0	SEC		D

RESIDUALS

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

BURN TIME IF > 1 SEC _____:_____

DATE MARCH 17, 1970

NO PDI + 12 ABORT PAD

+	0	0				+	0	0	1	0	3	HRS	N33	
+	0	0	0			+	0	0	0	4	2	MIN	TIG	
+	0					+	0	0	6	5	0	SEC		E
						+	0	1	1	0	2	ΔVX	N81	
						+	0	0	0	0	0	ΔVY	LV	
						-	0	0	4	8	6	ΔVZ		F
+						+	0	1	4	3	9	HA	N42	
						+	0	0	0	8	9	HP		
+						+	0	1	2	0	4	ΔVR		
X	X	X				X	X	X	0	3	8	BT		
X	X	X				X	X	X	1	8	2	R	FDAI	
X	X	X				X	X	X	0	0	2	P	INER	
						+	0	1	1	1	2	ΔVX	N86	
						+	0	0	0	0	0	ΔVY	AGS	
						-	0	0	4	6	1	ΔVZ		
+	0	0				+	0	0	1	0	6	HRS	N11	
+	0	0	0			+	0	0	0	3	7	MIN	CSI	
+	0					+	0	2	1	4	0	SEC		G
+	0	0				+	0	0	1	0	8	HRS	N37	
+	0	0	0			+	0	0	0	1	8	MIN	TPI	
+	0					+	0	4	4	5	0	SEC		H

RESIDUALS

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

BURN TIME IF > 1 SEC _____:_____

LM DATA CARD BOOK

PDI 1 ABORT CARD

PDI 1 PAD

+	0	0				+	0	0	1	0	3	HRS	N33
+	0	0	0			+	0	0	0	3	0	MIN	PDI
+	0					+	0	3	5	3	4	SEC	I
X	X					X	X	0	9	4	5	TGO	N61
						+	0	0	0	0	1	CROSSRANGE	
X	X	X				X	X	X	0	0	0	R	FDAI
X	X	X				X	X	X	1	1	0	P	AT TIG
X	X	X				X	X	X	0	0	0	Y	
												DEDA 231 IF RQD	

(1 <PDI 1 ≤ 5:40) ABORT PAD EARLY

LOG INSERTION GET= ___ ___ ___:___ ___:___ ___
+ 1 0 0 0 0
BOOST GET= ___ ___ ___:___ ___:___ ___
+ 1 0 0 0 0
HAM GET= ___ ___ ___:___ ___:___ ___
+ 1 0 0 0 0
CSI GET= ___ ___ ___:___ ___:___ ___

+	0	0				+	0	0	1	0	8	HRS	N37
+	0	0	0			+	0	0	0	1	8	MIN	TPI
+	0					+	0	4	7	6	0	SEC	J

T1-1 (5:40 <PDI 1 ≤ 15) ABORT PAD LATE

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

+	0	0				+	0	0	1	0	6	HRS	N37
+	0	0	0			+	0	0	0	2	0	MIN	TPI
+	0					+	0	2	9	5	0	SEC	K

T2-1 (PDI 1+20:45) ABORT PAD

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

+	0	0				+	0	0	1	0	3	HRS	N33
+	0	0	0			+	0	0	0	5	1	MIN	TIG
+	0					+	0	1	9	9	0	SEC	L
+	0	0				+	0	0	1	0	8	HRS	N37
+	0	0	0			+	0	0	0	1	8	MIN	TPI
+	0					+	0	4	8	3	0	SEC	M

T2-1 AT PDI + _____ 20:45

N69

												ΔDN RNG
												ΔX RNG
												ΔRLS

THROTTLE DOWN _____:_____

N43

												LAT (+N)
												LONG (+E)
												ALT

PDI 2 ABORT CARD

PDI 2 PAD

+	0	0				+	0	0	1	0	5	HRS	N33
+	0	0	0			+	0	0	0	2	4	MIN	PDI
+	0			.		+	0	1	2	. 7	0	SEC	I
X	X			.		X	X			.		TGO	N61
					.						.	CROSSRANGE	
X	X	X				X	X	X				R	FDAI
X	X	X				X	X	X				P	AT TIG
X	X	X				X	X	X				Y	
												DEDA 231 IF RQD	

(1 <PDI2 ≤8:30) ABORT PAD EARLY

LOG INSERTION GET= ___ ___ ___:___ ___:___ ___
+ 1 0 0 0 0
BOOST GET= ___ ___ ___:___ ___:___ ___
+ 1 0 0 0 0
HAM GET= ___ ___ ___:___ ___:___ ___
+ 1 0 0 0 0
CSI GET= ___ ___ ___:___ ___:___ ___

+	0	0				+	0	0	1	1	0	HRS	N37
+	0	0	0			+	0	0	0	1	7	MIN	TPI
+	0			.		+	0	0	5	. 7	0	SEC	J

T1-2 (8:30 ≤PDI 2 ≤ 15) ABORT PAD LATE

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

+	0	0				+	0	0	1	0	8	HRS	N37
+	0	0	0			+	0	0	0	1	8	MIN	TPI
+	0			.		+	0	4	7	. 6	0	SEC	K

T2-2 (PDI 2+18:56) ABORT PAD

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

+	0	0				+	0	0	1	0	5	HRS	N33
+	0	0	0			+	0	0	0	4	3	MIN	TIG
+	0			.		+	0	0	9	. 3	0	SEC	L
+	0	0				+	0	0	1	0	8	HRS	N37
+	0	0	0			+	0	0	0	1	8	MIN	TPI
+	0			.		+	0	4	8	. 0	0	SEC	M

T2-2 AT PDI + _____ 18:56

N69

												ΔDN RNG
												ΔX RNG
												ΔRLS

THROTTLE DOWN _____:_____

N43

				.						.		LAT (+N)
				.						.		LONG (+E)
					.						.	ALT

FIRST REV ACTIVITY

G&N LUNAR SURFACE CARD

LAUNCH PREP

N20 _____ OG

_____ IG

_____ MG

P57, A/T 1, REFSMMAT
N04 _____, _____ TILT
N05 _____
N93 _____ X _____ Y _____ Z

P57 A/T 2, REFSMMAT
STAR1 _____
CURS _____ SPIR _____
CURS _____ SPIR _____
V32
CURS _____ SPIR _____
V32
CURS _____ SPIR _____

STAR2 _____
CURS _____ SPIR _____
CURS _____ SPIR _____
V32
CURS _____ SPIR _____
V32
CURS _____ SPIR _____
N05 _____ ANGLE DIFF
N93 _____ X
_____ Y
_____ Z
N89 _____ LAT
_____ LONG/2
_____ ALT

047 _____ 053 _____

544 _____ +5:02 _____
545 _____ _____
546 _____ _____

232 _____ 465 _____

P57, A/T 2, REFSMMAT
STAR1 _____
CURS _____ SPIR _____

CURS _____ SPIR _____
V32
CURS _____ SPIR _____
V32
CURS _____ SPIR _____

STAR2 _____
CURS _____ SPIR _____

CURS _____ SPIR _____
V32
CURS _____ SPIR _____
V32
CURS _____ SPIR _____

N05 _____ ANGLE DIFF

N93 _____ X
_____ Y
_____ Z

N89 _____ LAT
_____ LONG/2
_____ ALT

047 _____ 053 _____

P22 ACQ TIME ____:____:____

P57, A/T 3 LANDING SITE
N04 _____, _____ TILT
STAR _____

CURS _____ SPIR _____
V32
CURS _____ SPIR _____
V32
CURS _____ SPIR _____

N05 _____ ANGLE DIFF

N93 _____ X
_____ Y
_____ Z

P22 ACQ TIME ____:____:____

P57, A/T 3, LANDING SITE
N04 _____, _____ TILT

STAR1 _____

CURS _____ SPIR _____
V32
CURS _____ SPIR _____
V32
CURS _____ SPIR _____

N05 _____ ANGLE DIFF

N93 _____ X
_____ Y
_____ Z

377 _____

544 _____ +5:02 _____
545 _____ _____
546 _____ _____

514 _____
515 _____
516 _____

047 _____
053 _____

NOTES:

APOLLO 13 FLIGHT DATA FILE

LUNAR SURFACE
ABORT/ASCENT

ABORT/ASCENT CARD

ASCENT RULES

UNDERBURN

ΔV FPS	TIME SEC	PGNS	AGS
<400	20	NULL RESIDUALS	AUTO, A/H 15fps
>400	20	A/H BURN Hp	AUTO, A/H 15fps

INSERTION

AGS AND PGNS RESIDUALS AGREE WITHIN 10FPS, TRIM TO LESS THAN 2FPS (AGS X-AXIS ONLY) AND STANDBY FOR TWEAK.
TWEAK AT INSERTION PLUS 4 MINUTES (10° OHW OR 250° FDAI)

FOR NO VOICE

PGNS, AGS DIFFER <10FPS, TRIM ACTIVE SYSTEM
PGNS, AGS DIFFER >10FPS, TRIM SYSTEM WHICH AGREES WITH RR
ATT/RATE ERROR >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	0	5	HRS	N33
+	0	0	0			+	0	0	0	4	1	MIN	TIG
+	0			.		+	0	3	7	. 5	0	SEC	N

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

7 121
+04782

LM ASCENT PAD

+	0	0	1	3	7	+	0	0	1	3	7	HRS	N33
+	0	0	0	1	2	+	0	0	0	0	9	MIN	TIG
+	0	5	3	. 0	0	+	0	1	5	. 8	1	SEC	
+	5	5	4	0	. 2	+	5	5	3	3	. 8	V (HOR)	
+	0	0	3	2	. 4	+	0	0	3	6	. 3	V (VERT)	N76
+	0	0	0	0	. 0	+	0	0	0	0	. 0	*CROSSRANGE	
+	3	7	7	5	0	+	0	0	0	0	0	047	
−	7	6	2	3	3	+	4	0	0	0	0	053	
+	5	8	6	7	1	+	5	8	5	8	1	224/226	
+	5	6	9	7	8	+	5	6	9	7	8	231	
+	0	0	3	2	. 4	+	0	0	3	6	. 5	465	
+	0	0	1	3	7	+	0	0	1	3	9	HRS	N37
+	0	0	0	5	8	+	0	0	0	4	5	MIN	TPI
+	0	1	2	. 0	0	+	0	4	0	. 6	0	SEC	
+	1	0	7	7	5	+	1	0	6	8	9	LM WT	
+	3	5	6	3	9	+	3	5	6	7	1	CSM WT	

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

+						HA V82	+						HA 315
+						HP	+						HP 403

RESIDUALS

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

CSI CARD

+	0	0				+	0	0	1	3	8	HRS	N11
+	0	0	0			+	0	0	0	0	6	MIN	CSI
+	0					+	0	0	0	9	0	SEC	
R_1(+00001), R_2(+02660), R_3(+13000)												N55	
+	0	0				+	0	0	1	3	9	HRS	N37
+	0	0	0			+	0	0	0	4	5	MIN	TPI
+	0					+	0	4	0	6	0	SEC	
+	0					+	0	0	4	9	6	ΔVX	N81
+	0					+	0	0	0	0	0	ΔVY	LV
410+1, 605+00777, 416+1, 623+0													
+						+	0	4	8	6	0	373	
+						+	0	5	8	5	8	275	
+	0					+	0	0	4	9	6	ΔVX	N86
+	0					+	0	0	0	0	0	ΔVY	AGS
+	0					+	0	0	0	0	0	ΔVZ	

BURN RULES

CRITERIA IS $\dot{X}$=3fps
PRIORITY OF SOLUTIONS-PGNS, AGS, CMC, CHARTS.

A. RR AGREES WITH VHF WHERE
$\Delta R = \frac{R}{100} + 0.5NM$, ΔR IS ALWAYS ≥1NM
IF TWO OF THREE SOLUTIONS AGREE,
BURN THE PRIORITY SOLUTION.

B. RR DOES NOT AGREE WITH VHF.
MSFN ISOLATES FAILED SYSTEM.

C. V90 5fps-NO BURN.

MAX N49 (2.0,12.0)

PGNS	AGS	
		HA
		HP

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

PGNCS

N75 CSI			N81 CSI		N82 CDH		
ΔH (15.0)	CSI/CDH (58:13)	CDH/TPI (41:27)	ΔVX (49.6)	YDOT(N90) (+0.0)	ΔVX (+0.0)	ΔVY (+0.0)	ΔVZ (+0.0)
.	:	:	.		.	.	.
.	:	:	. (-)	.	.	.	.
.	:	:	. (-)	.	.	.	.

AGS

402 ΔH	372 CSI/CDH	267/450 ΔVG (CSI)	CSM SOLUTION (CHANGE SIGN) ΔVX CSI	ΔVY CSI	263 YDOT CSI	371 ΔV CDH
			.	.		
			.	.		
			.	.		

BIAS
ΔVX= -1.0

CDH/PLANE CHANGE CARD

+	0	0				+	0	0	1	3	9	HRS	N13
+	0	0	0			+	0	0	0	0	4	MIN	CDH
+	0					+	0	1	4	1	0	SEC	
	0					+	0	0	0	0	0	ΔVX	N81
	0					+	0	0	0	0	0	ΔVY	LV
	0					+	0	0	0	0	0	ΔVZ	
X	X	X				X	X	X				PLM	FDAI
+						+	0	5	4	4	2	373	
	0					+	0	0	0	0	0	ΔVX	N86
	0					+	0	0	0	0	0	ΔVY	AGS
	0					+	0	0	0	0	0	ΔVZ	

PLANE CHANGE P30, V90, 410+5

TIG CDH ___ ___ ___:___ ___:___ ___.___ ___
- 3 0 : 0 0 . 0 0

TIG PC ___ ___ ___:___ ___:___ ___.___ ___

YDOT

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

MAX N49 (0.8,5.0)

PGNS	AGS		RESIDUALS PGNS		RESIDUALS AGS	
			___.___	ΔVX N85	___.___	ΔVX 500
		HA	___.___	ΔVY	___.___	ΔVY 501
		HP	___.___	ΔVZ	___.___	ΔVZ 502

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

PGNCS

N75 CDH

ΔH (15.0)	ΔT TPI/CDH (41:27)	TPI SLIP (0:00)
___.___	___:___	___:___
___.___	___:___	___:___
___.___	___:___	___:___

N81 CDH

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

CRITERIA IS $\dot{X}$=2fps, $\dot{Z}$=6fps
PRIORITY OF SOLUTIONS-PGNS,AGS,CMC CHARTS.

A. RR AGREES WITH VHF WHERE $\Delta R = \frac{R}{100} + 0.5$NM, ΔR IS ALWAYS ≥1
IF TWO OF THREE SOLUTIONS AGREE, BURN THE PRIORITY SOLUTION.

B. RR DOES NOT AGREE WITH VHF. MSFN ISOLATES FAILED SYSTEM.

C. V90<5fps-NO BURN.

AGS

402 ΔH	450 ΔVX	452 ΔVZ
___	___	___
___	___	___
___	___	___

CSM SOLUTION (CHANGE SIGN)

ΔVX	ΔVY	ΔVZ
___.___	___.___	___.___
___.___	___.___	___.___
___.___	___.___	___.___

263 ΔVY (CDH) ___ 270 ΔVY (NOW) ___

NK6
+66.5
+2.2
+81.0

TPI CARD

+ 00 + 00139	HRS	N37
+ 000 + 00045	MIN	TPI
+ 0 + 0406.0	SEC	
R1(+00000), R2(+02660), R3(+13000)		N55
+ 0 + 00219	ΔVX	N81
+ 0 + 00001	ΔVY	LV
- 0 - 00110	ΔVZ	
+ 0 + 03777	R	N54
- 0 - 01115	Ṙ	TIG-5
+ 0 + 00245	ΔVF+/A-	N59
+ 0 + 00001	ΔVR+/L-	LOS
- 0 - 00001	ΔVD+/U-	
XX XX 00:22	BT	
307+043.00		

BURN RULES

CRITERIA IS $\dot{X}$=2fps, $\dot{Y}$=5fps, $\dot{Z}$=6fps
PRIORITY OF SOLUTIONS-PGNS, AGS, CMC, CHARTS.

A. RR AGREES WITH VHF WHERE
$\Delta R = \frac{R}{100}$ + 0.5NM, ΔR IS ALWAYS ≥1NM
IF TWO OF THREE SOLUTIONS AGREE,
BURN THE PRIORITY SOLUTION.

B. RR DOES NOT AGREE WITH VHF.
MSFN ISOLATES FAILED SYSTEM.

MAX N49 (0.8,5.0)

PGNS	AGS		RESIDUALS PGNS		AGS	
			— .3	ΔVX N85	— 1.1	ΔVX 500
		HA	.0	ΔVY	.0	ΔVY 501
		HP	+ .1	ΔVZ	+ .2	ΔVZ 502

PGNCS

N37 TPI TIG (139:45:41)	N58 TPI HP (43.3)	ΔV (24.7)	ΔV TPF (31.5)	N81 TPI ΔVX (+21.9)	ΔVY (+0.1)	ΔVZ (-11.0)	N59 TPI ΔVF+/A- (24.5)	ΔVR+/L- (+0.1)	ΔVD+/U- (-0.1)
21.80 21.76									
137 : 58 : 12	44.4	104.9	40.3	.	.	.	+31.0	+3.3	+100.1
: :	44.4	104.8	40.5	+66.5	+2.2	+81.0	+31.7	+2.5	+99.9
: :	.	.	.	.	.	.	.	.	.

AGS

373 TIG	267 ΔV	ΔV	371 TPI+TPF	CSM SOLUTION (CHANGE SIGN) ΔVX	ΔVY	ΔVZ	CSM SOLUTION ΔVX	-ΔVY	ΔVZ
4982									
(+0585.8)				.	.	.	.	.	.
				.	.	.	.	.	.
				.	.	.	.	.	.

P76/P27 PADS

RP 16

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	

DATE MARCH 17, 1970

CSM LM P27 PAD

			V	7	1				V	7	1				V	7	1									PURP
103:25:00						103:25:00						103:25:00														
INDEX			2	1		INDEX			2	1		INDEX			2	4									01	1173
1	5	0	1			1	5	0	1			0	1	7	3	1									02	
0	0	0	0	3		0	0	0	0	5		1	1	2	2	7									03	
0	0	3	4	1		0	0	3	0	7		0	3	4	2	0									04	
1	7	6	4	3		2	0	0	3	4		6	4	3	0	3									05	
7	7	7	6	7		7	7	6	7	1		7	6	3	1	7									06	
5	7	5	4	3		7	3	3	5	3		7	2	0	7	2									07	
7	7	7	7	5		7	7	7	3	5		6	3	7	7	7									10	
7	6	0	5	5		7	6	3	5	1		7	7	6	6	4									11	
7	7	2	4	6		7	1	5	5	5		5	0	1	7	3									12	
4	3	0	2	3		5	6	3	6	5		7	0	5	3	1									13	
6	1	4	2	7		6	2	0	3	4		7	2	0	5	7									14	
7	6	4	4	4		4	0	7	0	3		1	6	1	6	2									15	
7	0	4	3	4		7	0	6	0	4		3	1	5	6	0									16	
4	3	7	3	3		5	3	6	1	5		6	2	7	6	4									17	
0	4	3	4	1		0	4	3	4	1		6	3	5	7	7									20	
1	6	0	0	0		1	6	0	0	0		6	7	6	2	4									21	1213
												7	6	1	7	7									22	
												7	3	5	0	6									23	
												5	3	1	4	7									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	

LM DATA CARD BOOK

DATE MARCH 17, 1970

LM DATA CARD BOOK

AGS SV/IMPACT CARD

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

AGS SV
IMPACT PAD

IMPACT CARD													
+	0	0				+	0	0	1	4	4	HRS	N33
+	0	0	0			+	0	0	0	3	2	MIN	TIG
+	0					+	0	2	0	2	0	SEC	
						-	0	1	8	0	0	ΔVX	N81
						+	0	0	4	5	0	ΔVY	LV
						+	0	0	0	0	0	ΔVZ	
+						+	0	0	5	8	0	H_A	N42
						-	0	0	6	3	1	H_P	
+						+	0	1	8	5	5	ΔVR	
X	X	X				X	X	X	1	1	5	BT	
X	X	X				X	X	X				R	FDAI
X	X	X				X	X	X				P	INER
												ΔVX	N86
												ΔVY	AGS
												ΔVZ	

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+68.0 -1 +94.5