T 8Y1002

TRW

APOLLO 11

LM DATA CARD BOOK

June 21, 1969

DO[illegible]TA CARD

JUNE 25, [illegible]

P30

HR	N33	+	0	0				+	0	0			
MIN	TIG	+	0	0	0			+	0	0	0		
SEC		+	0			•		+	0			•	
ΔVX	N81						•						•
ΔVY	LOCAL						•						•
ΔVZ	VERT						•						•
H_A	N42	+					•						•
H_P							•						•
ΔVR		+					•	+					•
BT		X	X	X		•		X	X	X		•	
R	FDAI	X	X	X				X	X	X			
P	INER	X	X	X				X	X	X			
ΔVX AGS	N86						•						•
ΔVY AGS							•						•
ΔVZ AGS							•						•
BSS		X	X	X				X	X	X			
SPA		X	X				•	X	X				•
SXP		X	X	X			•	X	X	X			•

OR

MANUAL SHUT-DOWN

A. ΔVG NEGATIVE (PGNS)

B. V_T: 2 SECONDS OVER BURN
-AND-
AGS VGX 2 FPS OVER

MANUAL TAKEOVER
ATT±5° RATE±5°/sec

LR SELF TEST

H TM (+7994±30) _____

Ḣ TM (-480±6) _____

N66 SLANTRNG (+08275.±5.0) _____

N67 VX (-00494. ±2.0) _____

VY (+01858. ±2.0) _____

VZ (+01329. ±2.0) _____

RR/TM/VHF

R_1	R_2	Ṙ
N78		
TM		
CMC		
VHF		

P52

STAR 1 _____ 2 _____ 3 _____

N05 (STAR ∢ DIFF) _____

[illegible] N93 (TORQUING ∢) X _____

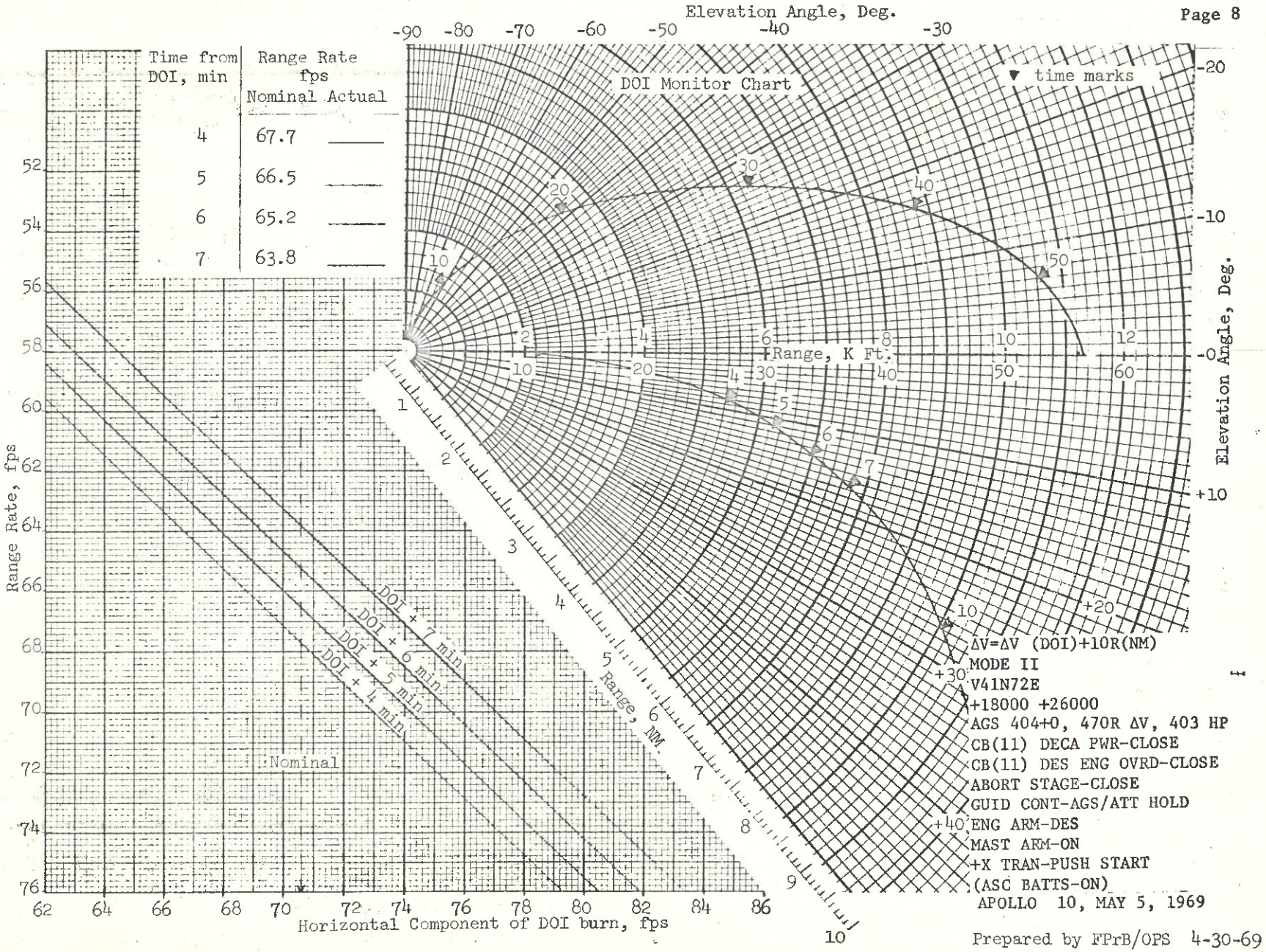
Y _____

Z _____

GET ___ : ___ : ___

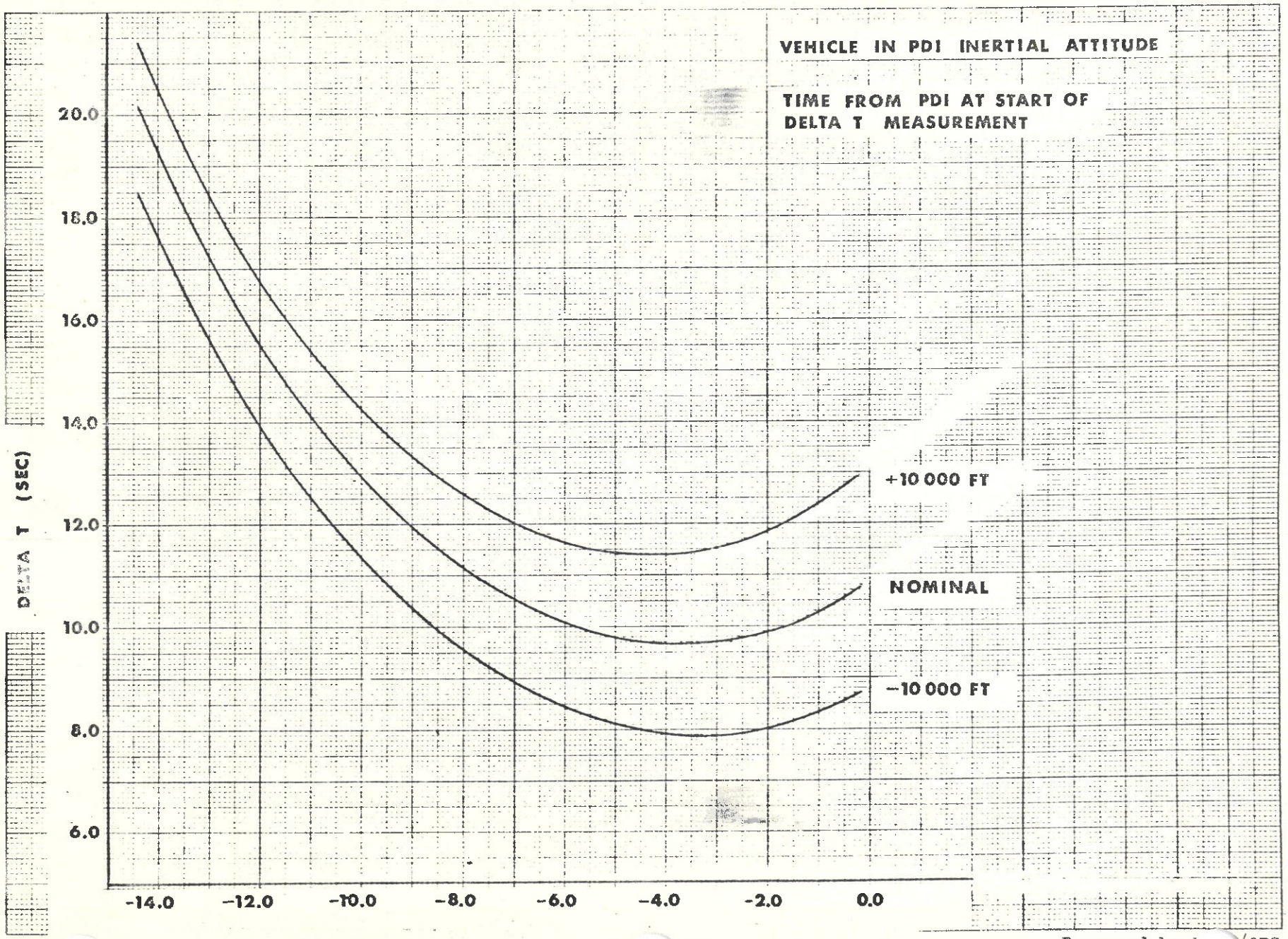
RESIDUALS

		PGNS	AGS
ΔVX	N85		500
ΔVY			501
ΔVZ			502



Prepared by FPrB/OPS 4-30-69

ALTITUDE DETERMINATION CHART



MISSION APOLLO 11, JUNE 19, 1969

Prepared by [redacted]/OPS

PDI DATA CARD

PDI PAD

HRS	TIG	+	0	0				+	0	0		
MIN	PDI	+	0	0	0			+	0	0	0	
SEC		+	0			•		+	0			•
TGO	N61	X	X			•		X	X			•
CROSSRANGE							•					
R	FDAI	X	X	X				X	X	X		
P	AT TIG	X	X	X				X	X	X		
Y		X	X	X				X	X	X		
DEDA 231 IF RQD												

PDI ABORT < 10 MIN

LOG INSERTION GET= __ __ __:__ __:__ __

\+ 5 0:0 0

CSI TIG= __ __ __:__ __:__ __

HRS	N37	+	0	0				+	0	0		
MIN	TPI	+	0	0	0			+	0	0	0	
SEC		+	0			•		+	0			•

PDI ABORT > 10 MIN

HRS		+	0	0				+	0	0		
MIN		+	0	0	0			+	0	0	0	
SEC	PHASING TIG	+	0			•		+	0			•
HRS	N37	+	0	0				+	0	0		
MIN	TPI	+	0	0	0			+	0	0	0	
SEC		+	0			•		+	0			•

NO PDI + 12 ABORT

HR	N33	+	0	0				+	0	0		
MIN	TIG	+	0	0	0			+	0	0	0	
SEC		+	0			•		+	0			•
ΔVX	N81						•					•
ΔVY	LOCAL						•					•
ΔVZ	VERT						•					•
H_A	N42	+					•					•
H_P							•					•
ΔVR		+					•	+				•
BT		X	X	X	:			X	X	X	:	
R	FDAI	X	X	X				X	X	X		
P	INER	X	X	X				X	X	X		
ΔVX AGS	N86						•					•
ΔVY AGS							•					•
ΔVZ AGS							•					•
HRS	N11	+	0	0				+	0	0		
MIN	CSI	+	0	0	0			+	0	0	0	
SEC		+	0			•		+	0			•
HRS	N37	+	0	0				+	0	0		
MIN	TPI	+	0	0	0			+	0	0	0	
SEC		+	0			•		+	0			•

R2 SUN CHECK

N22 _____ N20 _____

_____

_____

P63 RECOVERY

V37E 00E

V25 N07E,102E,200E,E

June 21, 1969

LUNAR SURFACE DATA CARD June 18, 1969

T 2 ABORT			
HR	T2	+ 0 0	+ 0 0
MIN	TIG	+ 0 0 0	+ 0 0 0
SEC		+ 0 .	+ 0 .
HR	N33	+ 0 0	+ 0 0
MIN	PHASING	+ 0 0 0	+ 0 0 0
SEC	TIG	+ 0 .	+ 0 .
HRS	N11	+ 0 0	+ 0 0
MIN	CSI_1	+ 0 0 0	+ 0 0 0
SEC		+ 0 .	+ 0 .
HRS	N37	+ 0 0	+ 0 0
MIN	TPI	+ 0 0 0	+ 0 0 0
SEC		+ 0 .	+ 0 .

P68

N43 _____ . _____ LAT

_____ . _____ LONG

_____ . _____ ALT

P12

N76 _____ . _____ V (HOR) (5515.2)

_____ . _____ V (VERT) (19.5)

_____ . _____ CROSSRANGE (0.0)

NOTE: IF CROSSRANGE >8 N.M., LOAD 8 N.M.

N74 _____ . _____ YAW

_____ . _____ PITCH

T 3 ABORT			
HRS	T3	+ 0 0	+ 0 0
MIN	TIG	+ 0 0 0	+ 0 0 0
SEC		+ 0 .	+ 0 .
HRS	CSM	+ 0 0	+ 0 0
MIN	PERIOD	+ 0 0 0	+ 0 0 0
SEC		+ 0 .	+ 0 .
HRS		+ 0 0	+ 0 0
MIN	P+ΔT	+ 0 0 0	+ 0 0 0
SEC		+ 0 .	+ 0 .
HRS	N11	+ 0 0	+ 0 0
MIN	CSI TIG	+ 0 0 0	+ 0 0 0
SEC		+ 0 .	+ 0 .
HRS	N37	+ 0 0	+ 0 0
MIN	TPI	+ 0 0 0	+ 0 0 0
SEC		+ 0 .	+ 0 .

P12

N76 _____ . _____ V (HOR) (5535.6)

_____ . _____ V (VERT) (32.0)

_____ . _____ CROSSRANGE (0.0)

NOTE: IF CROSSRANGE >8 N.M., LOAD 8 N.M.

N74 _____ . _____ YAW

_____ . _____ PITCH

FIRST REV LUNAR SURFACE ALIGN

47_____

053_____

GET __:__:__ +5:02 __:__:__

544 _____ _____

545 _____ _____

546 _____ _____

04 06, 00001,00003
05 06 00010,00001,00110

06 04_____ V32_____ _____

06 05_____

93_____
04 06,00001,00003
05 06 00010,00002,00110

01 70_____01 70_____

CURSOR	SPIRAL	CURSOR	SPIRAL

01 70 01 70

CURSOR	SPIRAL	CURSOR	SPIRAL

06 05_____

93_____ _____ _____

06 89 Lat ( )_____

Long/2 ( )_____

Alt ( )_____

047_____ 053 _____

04 06,00001,00004

_____:_____:_____

05 06 00010,00003,00110

06 04_____ V32_____

01 70_____01 70_____

CURSOR	SPIRAL	CURSOR	SPIRAL

01 70_____01 70_____

CURSOR	SPIRAL	CURSOR	SPIRAL

06 05_____

93_____ _____

ASCENT PREP LUNAR SURFACE ALIGN

04 06,00001,00003

GET_____:_____:_____
05 06 00010,00003,00110

06 04_____ V32 _____

01 70_____ 01 70_____

CURSOR	SPIRAL	CURSOR	SPIRAL

01 70 01 70

CURSOR	SPIRAL	CURSOR	SPIRAL

06 05_____

93_____ _____ _____

GET __:__:__ +5:02 __:__:__

544 _____ _____

545 _____ _____

546 _____ _____

047 _____

053 _____

04 06,00001,00004

GET _____:_____:_____
05 06 00010,00003,00110

06 04_____ V32 _____

01 70_____ 01 70_____

CURSOR	SPIRAL	CURSOR	SPIRAL

01 70_____ 01 70 _____

CURSOR	SPIRAL	CURSOR	SPIRAL

06 05_____

93_____ _____ _____

SOURCE

DATE JUNE 25, 1969

LM ASCENT PAD

HRS	+	0	0				+	0	0				
MIN TIG	+	0	0	0			+	0	0	0			
SEC	+	0			•		+	0			•		
V (HOR)	+					•	+					•	
V (VERT) N76	+					•	+					•	
*CROSSRANGE		0				•		0				•	
DEDA 047													
DEDA 053													
DEDA 225/226													
DEDA 231													

*NOTE: LOAD 8 MI CROSSRANGE IS GREATER THAN 8

COMMENTS:

LM ASCENT PAD

+	0	0				+	0	0				HRS	
+	0	0	0			+	0	0	0			MIN	TIG
+	0			•		+	0			•		SEC	
+					•	+					•	V (HOR)	
+					•	+					•	V (VERT) N76	
	0				•		0				•	*CROSSRANGE	
												DEDA 047	
												DEDA 053	
												DEDA 225/226	
												DEDA 231	

*NOTE: LOAD 8 MI CROSSRANGE IS GREATER THAN 8

COMMENTS:

	RESIDUALS									
	PGNS					AGS				
Δ VX					•	500				•
Δ VY					•	501				•
Δ VZ					•	502				•

APOLLO FLIGHT DATA FILE

PAGE

JUNE 25, 1969

		PHASING						P30 LM MANEUVER					
HR	N33	+	0	0				+	0	0			
MIN	TIG	+	0	0	0			+	0	0	0		
SEC		+	0			•		+	0			•	
ΔVX	N81					•						•	
ΔVY	LOCAL					•						•	
ΔVZ	VERT					•						•	
H_A	N42	+				•		+				•	
H_P						•						•	
ΔVR		+				•		+				•	
BT		X	X	X	•			X	X	X	•		
R	FDAI	X	X	X				X	X	X			
P	INER	X	X	X				X	X	X			
ΔVX	AGS N86					•						•	
ΔVY	AGS					•						•	
ΔVZ	AGS					•						•	
BSS		X	X	X				X	X	X			
SPA		X	X			•		X	X			•	
SXP		X	X	X		•		X	X	X		•	

SOURCE
DATE

JUNE 25, 1969

CSI DATA CARD

APOLLO FLIGHT DATA FILE

HR	TIG	N11	+	0	0				+	0	0			
MIN	CSI		+	0	0	0			+	0	0	0		
SEC			+	0		.			+	0		.		
N55			(+00001)			(+02660)			(+13000)					
HR	TIG	N37	+	0	0				+	0	0			
MIN	TPI		+	0	0	0			+	0	0	0		
SEC			+	0		.			+	0		.		
ΔVX		N81	+	0		.			+	0		.		
ΔVY				0		.				0		.		
FDAI PITCH			+	X	X				+	X	X			
373	(+0321.3)		+			.			+			.		
275	(+0418.1)		+			.			+			.		

410+1, 605+00777, 416+1

ΔVX	AGS	N86		0	0	.				0	0	.		
ΔVY	AGS			0	0	.				0	0	.		
ΔVZ	AGS			0	0	.				0	0	.		

RESIDUALS

	PGNS			AGS		
N85			.	500		.
			.	501		.
			.	502		.

BURN RULES
PRIORITY: PGNS, CHARTS, CMC, AGS, GND
BURN HIGHEST ORDER SOLUTION WITHIN 3fps OF CMC

P52

STAR 1 ___ 2 ___ 3 ___

N05 (STAR ∤ DIFF) _____

N93 (TORQUING ∤) X _____

Y _____

Z _____

PGNCS

N75

ΔH (15.0)	CSI/CDH (57:58)	CDH/TPI (38:21)
	:	:
	:	:
	:	:
	:	:

N81

ΔVX CSI (+50.5)	YDOT CSI N90 (+0.0)
.	
.	(-) .
.	(-) .
.	(-) .

N82

ΔVX CDH (-0.4)	ΔVY CDH (+0.0)	ΔVZ CDH (+0.0)
.	.	.
.	.	.
.	.	.
.	.	.

PGNCS

AGS

402 ΔH	372 ΔT(CSI-CDH)	267 ΔVG (CSI)

CSM SOLUTION

ΔVX CSI	ΔVY CSI
.	.

371 ΔV CDH

N86 (AGS)

ΔVX	ΔVY	ΔVZ

AGS

TOP

RIGHT-HAND PAGE

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CSI DATA CARD

June 21, 1969

HR MIN SEC TIG CSI N11

+	0	0				+	0	0			
+	0	0	0			+	0	0	0		
+	0			.		+	0			.	

N55 (+00001) (+02660) (+13000)

HR MIN SEC TIG TPI N37

+	0	0				+	0	0			
+	0	0	0			+	0	0	0		
+	0			.		+	0			.	

ΔVX N81	+	0				.	+	0				.
ΔVY		0				.		0				.
FDAI PITCH	+	X	X			.	+	X	X			.
373 (+0321.3)	+					.	+					.
275 (+0418.1)	+					.	+					.

410+1, 605+00777, 416+1

RESIDUALS

	PGNS			AGS		
N85			.	500		.
			.	501		.
			.	502		.

ΔVX
ΔVY
ΔVZ

P52

STAR 1 ____ 2 ____ 3 ____

N05 (STAR ∤ DIFF) _____

N93 (TORQUING ∤) X _____

Y _____

Z _____

ΔVX AGS N86		0	0			.		0	0			.
ΔVY AGS		0	0			.		0	0			.
ΔVZ AGS		0	0			.		0	0			.

PGNCS

N75

ΔH (15.0)	CSI/CDH (57:58)	CDH/TPI (38:21)

N81

ΔVX CSI (+50.5)	YDOT CSI N90 (+0.0)
(-)	
(-)	
(-)	

N82

ΔVX CDH (-0.4)	ΔVY CDH (+0.0)	ΔVZ CDH (+0.0)

AGS

402 ΔH	372 ΔT(CSI-CDH)	267 ΔVG (CSI)

CSM SOLUTION

ΔVX CSI _____ ΔVY CSI _____

N86 (AGS)

ΔVX _____ ΔVY _____ ΔVZ _____

371 ΔV CDH

_____

_____

_____

CSI DATA CARD

June 21, 1969

HR MIN SEC — TIG CSI — N11

HR	+	0	0				+	0	0			
MIN	+	0	0	0			+	0	0	0		
SEC	+	0			•		+	0			•	

N55 (+00001) (+02660) (+13000)

ΔVX
ΔVY
ΔVZ

RESIDUALS

	PGNS			AGS		
N85			•	500		•
			•	501		•
			•	502		•

P52

STAR 1 ____ 2 ____ 3 ____

N05 (STAR ∤ DIFF) _____

N93 (TORQUING ∤) X _____

Y _____

Z _____

HR MIN SEC — TIG TPI — N37

HR	+	0	0				+	0	0			
MIN	+	0	0	0			+	0	0	0		
SEC	+	0			•		+	0			•	

ΔVX N81

ΔVX	+	0				•	+	0				•
ΔVY		0				•		0				•

FDAI PITCH	+	X	X				+	X	X			
373 (+0321.3)	+					•	+					•
275 (+0418.1)	+					•	+					•

410+1, 605+00777, 416+1

ΔVX AGS N86		0	0			•		0	0			•
ΔVY AGS		0	0			•		0	0			•
ΔVZ AGS		0	0			•		0	0			•

PGNCS

N75

ΔH (15.0)	CSI/CDH (57:58)	CDH/TPI (38:21)
•	:	:
•	:	:
•	:	:
•	:	:

N81

ΔVX CSI (+50.5)	YDOT CSI N90 (+0.0)
•	
•	(-) •
•	(-) •
•	(-) •

N82

ΔVX CDH (-0.4)	ΔVY CDH (+0.0)	ΔVZ CDH (+0.0)
•	•	•
•	•	•
•	•	•
•	•	•

PGNCS

AGS

402 ΔH	372 ΔT(CSI-CDH)	267 ΔVG (CSI)
		•

CSM SOLUTION

ΔVX CSI	ΔVY CSI
•	•

N86 (AGS)

ΔVX	ΔVY	ΔVZ

371 ΔV CDH

AGS

SOURCE
DATE

JUNE 25, 1969

CDH DATA CARD

CDH PAD

HR	N13	+	0	0				+	0	0			
MIN	TIG	+	0	0	0			+	0	0	0		
SEC	CDH	+	0			•		+	0			•	
ΔVX			0			•			0			•	
ΔVY	N81		0			•			0			•	
ΔVZ			0			•			0			•	
PLM	FDAI	X	X	X				X	X	X			
373	(+0379.6)	+				•		+				•	
ΔVX	N86		0			•			0			•	
ΔVY	AGS		0			•			0			•	
ΔVZ			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	263
(-)	•	(-)	•	(-)	•
(-)	•	(-)	•	(-)	•

RESIDUALS

		PGNS	AGS	
ΔVX	N85		500	
ΔVY			501	
ΔVZ			502	

PGNCS

N75

ΔH (15.0)	ΔT TPI/CDH (37:31)	TPI SLIP (0:00)
•	:	:
•	:	:
•	:	:
•	:	:

N81

ΔVX (-1.1)	YDOT CDH N90 (+0.0)	ΔVZ (+4.1)
•		•
•	(-) •	•
•	(-) •	•
•	(-) •	•

BURN RULES
SOLUTIONS ARE PGNS, CHARTS, CMC
ON CRITERIA OF $\dot{X}$=2fps AND $\dot{Z}$=6fps
VOTE: 1. PGNS vs CMC
2. PGNS vs CHART
3. CHARTS vs CMC
4. IF ALL ABOVE FAIL
BURN CMC SOLUTION

AGS

402 ΔH	450 ΔVX	452 ΔVZ

CSM SOLUTION

ΔVX	ΔVY	ΔVZ
•	•	•

N86 (AGS)

ΔVX	ΔVY	ΔVZ
•	•	•

APOLLO FLIGHT DATA FILE

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RIGHT-HAND PAGE

PAGE

TPI DATA CARD

JUNE 25, 1969

HR N37	+	0	0				+	0	0			
MIN TIG	+	0	0	0			+	0	0	0		
SEC TPI	+	0			•		+	0			•	
N55	(+00000)						(+026.60)					(+130.00)
ΔVX N81	0					•		0				•
ΔVY	0					•		0				•
ΔVZ	0					•		0				•
ΔVR N42	+	0	0			•	+	0	0			•
RLM	X	X	X				X	X	X			
PLM	X	X	X				X	X	X			
R TPI N54	+	0			•		+	0				
R TPI TIG-5		0				•		0				
F/A (+/-) N59		0	0					0	0			
R/L (+/-) ΔV		0	0									
D/U (+/-) LOS		0	0					0	0			
BT	X	X			•		X	X			•	

307+043.00, 314+0

	RESIDUALS		
	PGNS	AGS	
ΔVX	N85	500	
ΔVY		501	
ΔVZ		502	

BURN RULES

CONSIDERED SOLUTIONS ARE PGNS, CHARTS, CMC
CRITERIA: X=2fps, Y=5fps, Z=6fps
VOTE: 1. PGNS vs CMC
2. PGNS vs CHARTS
3. CHARTS vs CMC
4. IF ALL ABOVE FAIL, BURN CMC SOLUTION.

PGNCS

N37 TIG TPI (126:58:27)	N58 HP (43.7)	N58 ΔV TPI (24.8)	N58 ΔV TPF (31.4)	N81 ΔVX (22.0)	N81 ΔVY (0.0)	N81 ΔVZ (-11.1)	N59 ΔVF/A- (24.8)	N59 ΔVR/L- (0.0)	N59 ΔVR/L- (0.0)
					N90				

AGS

373 TIG TPI	267 ΔVTPI	371 ΔV TPI+TPF	CSM SOLUTION ΔVX	CSM SOLUTION ΔVY	CSM SOLUTION ΔVZ
(+0418.5)					

N86(AGS) ΔVX	N86(AGS) ΔVY	N86(AGS) ΔVZ

SOURCE
ATE

PAGE

LEFT HAND PAGE

APOLLO FLIGHT DATA FILE

TOP