

JSC-09139

ASTP

REVISION A

**CSM RENDEZVOUS
BOOK**

PREPARED BY

PROCEDURES BRANCH

CREW TRAINING & PROCEDURES DIVISION



National Aeronautics and Space Administration

LYNDON B. JOHNSON SPACE CENTER

Houston, Texas

JUNE 1, 1975

48

CHANGE CONTROL RECORD

APOLLO/SOYUZ TEST PROJECT RENDEZVOUS BOOK CHECKLIST-

CONTROL NO.	FDF EDITION INCORPORATED		DISAPPROVED OR OTHER DISPOSITION
	TITLE	DATE	
001		2/12/75	CANCELLED
002	REFERENCE EDITION	2/12/75	
003A	REFERENCE EDITION	2/12/75	
004	TWO RNDZ BOOK ONBOARD	2/12/75	
005	REFERENCE EDITION	2/12/75	
006A	REFERENCE EDITION	2/12/75	
007	REFERENCE EDITION	2/12/75	
008	REFERENCE EDITION	2/12/75	
009	FINAL EDITION	5/1/75	
010	FINAL EDITION	5/1/75	
011	REFERENCE EDITION	2/12/75	
012	REFERENCE EDITION	2/12/75	
013	REFERENCE EDITION	2/12/75	
014	REFERENCE EDITION	2/12/75	
015	REFERENCE EDITION	2/12/75	
016	REFERENCE EDITION	2/12/75	
017	REFERENCE EDITION	2/12/75	
018	REFERENCE EDITION	2/12/75	
019	REFERENCE EDITION	2/12/75	
020	FINAL EDITION	5/1/75	
021	FINAL EDITION	5/1/75	
022	FINAL EDITION	5/1/75	
023	FINAL EDITION	5/1/75	
024	FINAL EDITION	5/1/75	
025	FINAL EDITION	5/1/75	
026	FINAL EDITION	5/1/75	
027		5/1/75	
028		5/1/75	
029	FINAL EDITION	5/1/75	
030	FINAL EDITION	5/1/75	
031	FINAL EDITION	5/1/75	
032	FINAL EDITION	5/1/75	
033	FINAL EDITION	5/1/75	
034	FINAL EDITION	5/1/75	
035	FINAL EDITION	5/1/75	
036	FINAL EDITION	5/1/75	
037	FINAL EDITION	5/1/75	
038	FINAL EDITION	5/1/75	
039	FINAL EDITION	5/1/75	
040	FINAL EDITION	5/1/75	
041	FINAL EDITION	5/1/75	
042	FINAL EDITION	5/1/75	

CHANGE CONTROL RECORD

APOLLO/SOYUZ TEST PROJECT RENDEZVOUS BOOK CHECKLIST

CONTROL NO.	FDF EDITION INCORPORATED		DISAPPROVED OR OTHER DISPOSITION
	TITLE	DATE	
043	FINAL EDITION (REV A)	6/1/75	
044	FINAL EDITION (REV A)	6/1/75	
045	FINAL EDITION (REV A)	6/1/75	
046	FINAL EDITION (REV A)	6/1/75	
047	FINAL EDITION (REV A)	6/1/75	
048	FINAL EDITION (REV A)	6/1/75	
049	FINAL EDITION (REV A)	6/1/75	
050	FINAL EDITION (REV A)	6/1/75	
051	FINAL EDITION (REV A)	6/1/75	

CSM RENDEZVOUS BOOK

ASTP

LIST OF EFFECTIVE PAGES

BASIC 10/25/74
REFERENCE 2/12/75
FINAL 5/1/75
REVISION A 6/1/75

PAGE	DATE	PAGE	DATE
1	6/1/75	2-15	6/1/75
11	6/1/75	2-16	6/1/75
111	6/1/75	2-17	6/1/75
iv	6/1/75	2-18	6/1/75
1-a	6/1/75	2-19	6/1/75
1-1	6/1/75	3-a	6/1/75
1-2	6/1/75	3-b	6/1/75
1-3	6/1/75	3-c	6/1/75
1-4	6/1/75	3-1	6/1/75
1-5	6/1/75	3-2	6/1/75
1-6	6/1/75	3-3	6/1/75
1-7	6/1/75	3-4	6/1/75
1-8	6/1/75	3-5	6/1/75
1-9	6/1/75	3-6	6/1/75
1-10	6/1/75	3-7	6/1/75
1-11	6/1/75	3-8	6/1/75
1-12	6/1/75	3-9	6/1/75
1-133	6/1/75	3-10	6/1/75
1-14	6/1/75	3-11	6/1/75
1-15	6/1/75	3-12	6/1/75
1-16	6/1/75	3-13	6/1/75
1-17	6/1/75	3-14	6/1/75
1-18	6/1/75	3-15	6/1/75
1-19	6/1/75	3-16	6/1/75
1-20	6/1/75	3-17	6/1/75
1-21	6/1/75	3-18	6/1/75
1-22	6/1/75	3-19	6/1/75
1-23	6/1/75	4-1	6/1/75
1-24	6/1/75	4-2	6/1/75
1-25	6/1/75	4-3	6/1/75
2-a	6/1/75	4-4	6/1/75
2-1	6/1/75	5-1	6/1/75
2-2	6/1/75	5-2	6/1/75
2-3	6/1/75	5-3	6/1/75
2-4	6/1/75	5-4	6/1/75
2-5	6/1/75	6-a	6/1/75
2-6	6/1/75	6-1	6/1/75
2-7	6/1/75	6-2	6/1/75
2-8	6/1/75	6-3	6/1/75
2-9	6/1/75	6-4	6/1/75
2-10	6/1/75	6-5	6/1/75
2-11	6/1/75	7-a	6/1/75
2-12	6/1/75	7-b	6/1/75
2-13	6/1/75	7-c	6/1/75
2-14	6/1/75	7-1	6/1/75

PAGE	DATE
7-2	6/1/75
7-3	6/1/75
7-4	6/1/75
7-5	6/1/75
8-1	6/1/75
8-2	6/1/75
9-1	6/1/75
9-2	6/1/75

CONTENTS

	PAGE
1. NOMINAL	1-a
ACTIVE DOCKING	1-20
DOCKED CONFIGURATION	1-22
CONTINGENCY UNDOCKING	1-24
2. CMC FAILURE	2-a
3. IMU FAILURE	3-a
4. VHF, OPTICS & OTHER FAILURES	4-1
5. DELAYED DOCKING TIMELINE	5-1
6. SOYUZ RE-RENDEZVOUS	6-a
7. BOOSTER RENDEZVOUS	7-a
8. ENGLISH/RUSSIAN	8-1
SPACECRAFT AXES	8-2
9. POLAR PLOTS	9-1

LAUNCH → GET ~7+30

GET ~7+30 → DOCK

BACKUP GDC ALIGN PAD

NOMINAL LAUNCH A						POST INS UPDATE B				NOMINAL RNDZ C					RNDZ UPDATE D					
0°/R STARS	3	3	/	3	7		/				3	3	/	3	7		/			
ASCP ^{tw}	R	X	X	2	4	9	6	X	X	X	X	X	2	4	6	3	X	X	X	X
	P	X	X	2	7	7	5	X	X	X	X	0	6	8	2	X	X	X	X	
	Y	X	X	3	3	7	9	X	X	X	X	3	3	2	5	X	X	X	X	

STAR ACQUISITION PAD

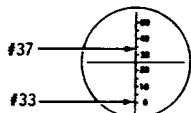
(ACM ATT) NOMINAL LAUNCH A						(ACM ATT) POST INS UPDATE B				(SI +X FWD) NOMINAL RNDZ C					RNDZ UPDATE D								
N22	R	+	1	7	9	0	0	+			0	0	+	0	1	8	0	0	+			0	0
	P	+	2	1	3	0	0	+			0	0	+	1	7	0	0	0	+			0	0
	Y	+	0	0	1	0	0	+			0	0	+	3	3	0	0	0	+			0	0
N71 1ST STAR		X	X	X	X	3	7	X	X	X	X		X	X	X	4	0	X	X	X	X		
TPAC	SA	X	2	3	5	2	0	X			0	X	0	8	6	6	0	X				0	
ANGLES	TA	X	0	4	1	3	0	X	0		0	X	0	2	5	8	0	X	0			0	
N71 2ND STAR		X	X	X	X	4	5	X	X	X	X		X	X	X	4	3	X	X	X	X		
TPAC	SA	X	0	3	4	5	0	X			0	X	0	0	0	8	0	X				0	
ANGLES	TA	X	0	1	2	3	0	X	0		0	X	0	3	1	0	0	X	0			0	
N71 3RD STAR		X	X	X	X	4	2	X	X	X	X		X	X	X	0	1	X	X	X	X		

DEFINITIONS

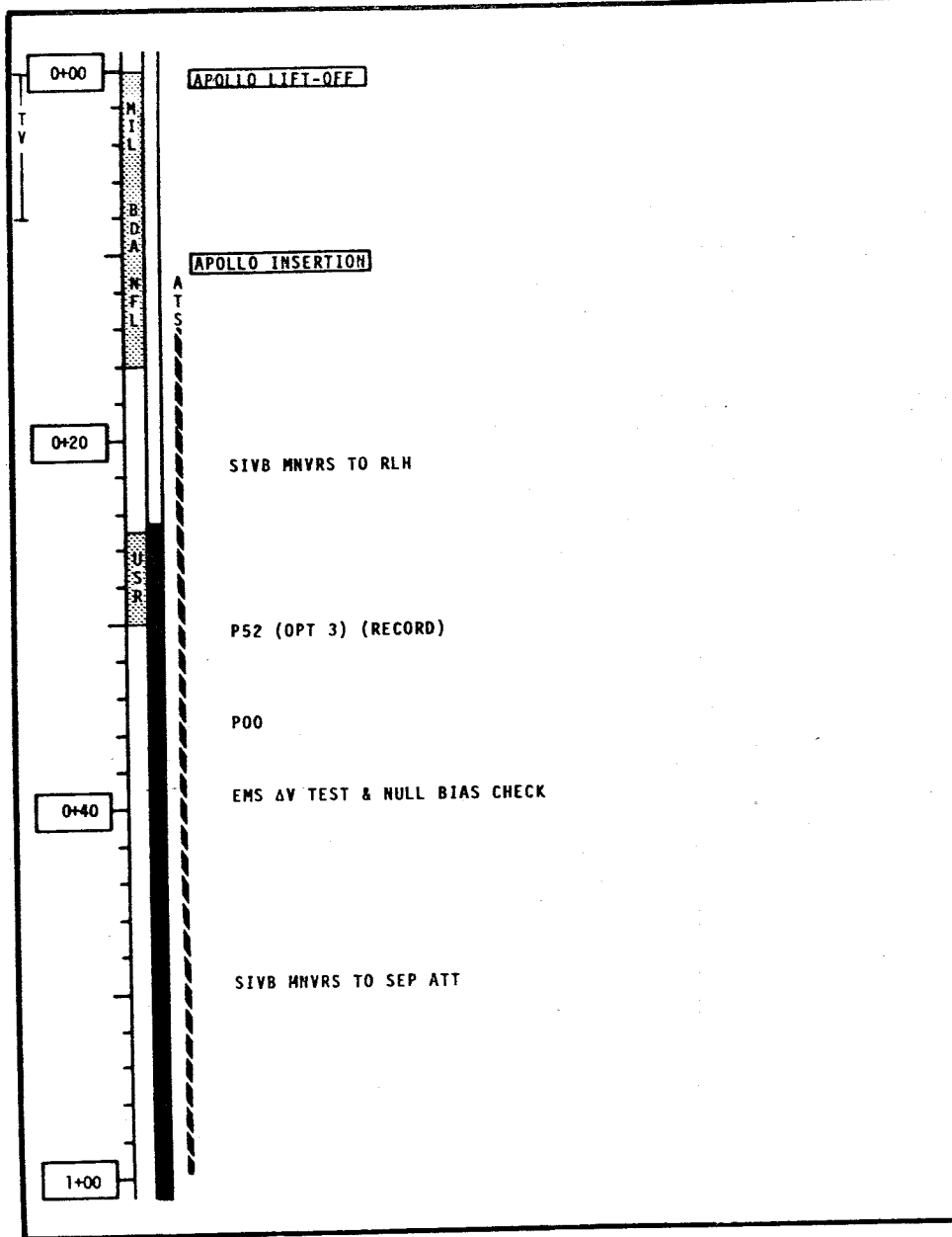
- 0° = ORDEAL ANGLE TO PLACE EARTH HORIZON IN CENTER OF COAS
- H = AVERAGE ALTITUDE
- θ = ORDEAL FDAI PITCH
- TA = TRUHMION ANGLE

STAR AVAILABILITY

- 1.) BACKUP GDC ALIGN STARS ARE VISIBLE FROM SS-8 MIN TO SR+4 MIN.



- 2.) STAR ACQUISITION STARS ARE VISIBLE FROM SS+1 MIN TO SR+7 MIN.



P52 (OPTION 3)

N71 1ST STAR		<input checked="" type="checkbox"/>	0	0	0		
N71 2ND STAR		<input checked="" type="checkbox"/>	0	0	0		
N05(R1) } ERR		<input checked="" type="checkbox"/>					
N93	X						
GYRO TORQUING ANGLES	Y						
	Z						
	HR	+	0	0			
TIME OF GYRO TORQUE	MIN	+	0	0	0		
	SEC	+	0				

EMS ΔV TEST & NULL BIAS CHECK CHECKLIST

EMS MODE-STBY
 EMS FUNC-ΔV SET/VHF RNG
 SET ΔV ind to 1586.8 fps
 EMS MODE-NORMAL
 EMS FUNC-ΔV TEST
 SPS THRUST Lt-on/off (10 sec)
 ΔV ind stops at -0.1 to -41.5

EMS MODE-STBY
 EMS FUNC-ΔV SET/VHF RNG
 SET ΔV ind to (-100.0) fps
 EMS FUNC-ΔV (wait 5 sec)
 EMS MODE-NORMAL (for 1 min 40 sec)
 EMS MODE-STBY
 If ΔV < 1 fps, do not bias
 If ΔV > 1 fps but ≤ 10 fps,
 STDN provide bias in pad ΔVC
 If ΔV > 10 fps, EMS is NO-GO

NOMINAL

1+00
(11103)
(01111)

V
T
R

(11102)
(01111)

1+20

DOCKING

0:00

START SCS DRIFT CHECK (BMAG 2)
ALIGN GDC
RESET AND START DET COUNTING UP

HGA SWITCH LIST

ACQUIRE ATS HGA: MAN, WIDE P -66, Y 30
S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW

1+40

TRANSMIT SEP AND SLA PANEL JET STATUS
TRANSMIT GYRO TORQUE ANGLES AND TIME (Pg 1-1)
TRANSMIT EMS ΔV TEST RESULTS

30:00

2+00

CSH/SIVB SEP ——— START TD&E

START SCS DRIFT CHECK (BMAG 2)
ALIGN GDC
RESET AND START DET COUNTING UP

HGA SWITCH LIST

ACQUIRE ATS HGA: MAN, WIDE P -66, Y 30
S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW

*****IF OHA REQ'D*****
* OHA PRELIMINARY PAD (COPY Pg 1-3) *
* ACM PRELIMINARY PAD (COPY Pg 1-4) *
* * * * *
* P52 (OPT 3) (RECORD) *
* * * * *
* P00: CMC MODE-AUTO *
*****IF BMAG 2>10°/HR/AXIS*****
* START SCS DRIFT CHECK (BMAG 1) *
* ALIGN GDC *
* BMAG MODE(3)-RATE 1 *
* RESET AND START DET COUNTING UP *
* * * * *

GDC/IMU COMPARISON CHECKLIST

VIGN20E
FDAI SELECT-1
FDAI SOURCE-ATT SET
ATT SET-GDC
ZERO FDAI 1 err needles with ASCP tw
Key VERB when ZERO
RECORD N20 values
RECORD ASCP tw values
RECORD DET
FDAI SELECT-1/2

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
X TOTAL ATTITUDE DIFFERENCE GREATER X
X THAN 10 DEG/HR PER AXIS IS X
X UNACCEPTABLE. X
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

HGA SWITCH LIST

ATS-F SYS:
FLT BUS cb-CLOSED (225)
GRP 2 cb-CLOSED
ATS PWR A/P-1 (230)
HGA XPHDR-PRIM
UP TLH RELAY-UP TLH
HGA PWR-ON

BMAG 2 GDC/IMU COMPARISON RESULTS

N20	R	+							
IMU	P	+							
	Y	+							
ASCP tw	R	X	X	X	X	X	X	X	X
	P	X	X	X	X	X	X	X	X
	Y	X	X	X	X	X	X	X	X
DET (30:00)	ΔT	X	X	X	X	X	X	X	X

BMAG 1 GDC/IMU COMPARISON RESULTS

N20	R	+							
IMU	P	+							
	Y	+							
ASCP tw	R	X	X	X	X	X	X	X	X
	P	X	X	X	X	X	X	X	X
	Y	X	X	X	X	X	X	X	X
DET (30:00)	ΔT	X	X	X	X	X	X	X	X

P52 (OPTION 3)

N71 1ST STAR	X	0	0	0				
N71 2ND STAR	X	0	0	0				
N05(R1) } ERR	X							
N93	X							
GYRO TORQUING ANGLES	Y							
	Z							
HR	+	0	0					
TIME OF GYRO TORQUE	MIN	+	0	0	0			
	SEC	+	0					

2+00
(11102)
(01111)

2+20

+30:00

0:00

2+40

3+00

TRANSMIT GDC/IMU COMPARISON RESULTS (Pg 1-2)

SIVB MNVRS TO EXTRACTION ATT
V48E, LOAD N47 REG 1 = CSM/DN WT

*****IF BMAG 2>10°/HR/AXIS*****
* END SCS DRIFT CHECK (BMAG 1) *
* (GDC/IMU COMPARISON C/L Pg 1-2) *

P30
P41
CSM/DN EXTRACTION
AEM

*****FOR M=14 RNDZ*****
* DP START PGA DOFFING (Pg 1-5), *
* THEN CP *
* AC START SNACK PERIOD, DOFF *
* AFTER ACM *

UNSTOW CUE CARDS (DATA CARD KIT-R3)

PSM ACTIVATION (AFTER VAN AOS) *****IF OHA REQ'D*****
TRANSMIT EXTRACTION & AEM STATUS
* STDN UPLINK (P27) (CSM S.V. & *
* OHA TARGET LOAD) *
* OHA FINAL PAD (COPY) *
* (IF REQ'D) COPY PIPA BIAS UPDATE *
*

MNVR TO ACM NOMINAL PAD ATT (Pg 1-4)

SNACK PERIOD

* TRANSMIT GYRO TORQUE ANGLES AND *
* TIME (Pg 1-2) *
* V48E (LOAD 2 JET) (11002) *
* (LOAD WT, PT & YT IF REQ'D) *
* P30 (VERIFY N33 & N81 PAD VALUES) *
* P00 *
* V49 & V41H91 TO PAD DATA *
* IF STAR HOT IN SXT FOV-G&H NO GO *
* PERFORM GDC HORIZ CK *
* IF HORIZ >5° OF MK-DO NOT BURN *
* GO TO SPS BURN CUE CARD *
* (BANK A) *
* P40 *

OHA PAD DATA

	NOMINAL	PRELIMINARY	FINAL
N33 HR	+	+	+
TIG OHA MIN	+	+	+
SEC	+	+	+
N81 ΔV _X	+	+	+
ΔV _{CHA} ΔV _Y	+	+	+
ΔV _Z	+	+	+
N22 R	+	+	+
OHA P	+	+	+
Y	+	+	+
ΔV _C	+	+	+
BT	+	+	+

MT + PT YT

BURN ATT CHECK

STAR	+	0
SA	+	0
TA	+	0 0

BURN ATT CHECK UPDATE

STAR	+	0
SA	+	0
TA	+	0 0

HORIZON CK DATA: TIG MINUS _____ MIN, WINDOW MK _____ DEG

PSM ACTIVATION SWITCH LIST

SC CONT/MODE-CMC/FREE
SM RCS QUAD He A,B,C,D-CLOSE, tb(4)-bp
SM RCS PRPLNT A,B,C,D-CLOSE, tb(8)-bp
SM RCS PSM He-OPEN, tb-gray
SM RCS PSM PRPLNT A,B,C,D-OPEN, tb(4)-gray
SC CONT/MODE-CMC/AUTO

PIPA BIAS UPDATE PAD

	ADDRESS	DATA
X	1 4 5 2	
Y	1 4 5 4	
Z	1 4 5 6	

SPS BURN STATUS

		AFTER TRIM	
ΔTIG		+	+
ΔVC		+	+
FDAI (IF ATTITUDE NOT NOMINAL)	R	+	+
	P	+	+
	Y	+	+
N85 (IF V6 > .2)	VGX	0 0	
	VGY	0 0	
	VGZ	0 0	

NOMINAL

NOMINAL

3+00
(11102)
(01111)

STDN UPLINK (P27) (CSM & SOYUZ
S.V.'s & PIPA BIAS UPDATE)
ACM PRELIMINARY PAD (COPY)

* * * * *
* OHA () *
* (TRIM VGX +0.2) *
* RECORD BURN STATUS (Pg 1-3) *
* TRANSMIT OHA BURN STATUS *
* MINVR TO ACM NOMINAL *
* PAD ATT (Pg 1-4) *
* CONT WITH NOMINAL PROCEDURES *
* * * * *

ACQUIRE ATS HGA: MAN, WIDE P -78, Y 34
S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW
BACKUP GDC ALIGH PAD &
STAR ACQUISITION PAD
(COPY Pg 1-a)

3+20

P52 (OPT 3) (RECORD)

STDN UPLINK (P27) (ACM TARGET LOAD)
ACM FINAL PAD (COPY)
TRANSMIT GYRO TORQUE ANGLES AND TIME
POO; CMC MODE-AUTO
IF IMU DRIFT (P52 H93) > 1.5°/HR-G&N NO GO
PERFORM SCS BURN

(11002)
(01111)

V48E (LOAD 2 JET)
(LOAD WT, PT & YT IF REQ'D)

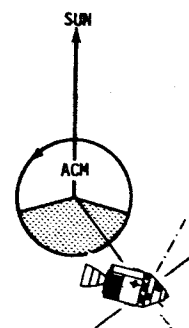
-12:00

P30 (VERIFY N33 & N81 PAD VALUES)

GO TO SPS BURN CUE CARD
(BANK A)

3+40

P40



0:00

ACM (179, 34/213, 1)
(TRIM VGX +0.2)
RECORD BURN STATUS
TRANSMIT BURN STATUS
POO

PGA DOFFING (Pg 1-5)

*****FOR M=14 RNDZ*****
* AC START PGA DOFFING (Pg 1-5) *
* CP & DP START SNACK PERIOD *

4+00

ACM PAD DATA

		NOMINAL					PRELIMINARY					FINAL						
N33	HR	+	X	X	0	0	3	+	X	X			+	X	X			
TIG	ACM MIN	+	X	X		4	5	+	X	X			+	X	X			
	SEC	+	X	X	0	0	0	0	+	X	X			+	X	X		
N81	ΔV _X	+	X	X	0	1	6	7	+	X	X			+	X	X		
ΔV ACM	ΔV _Y	+	X	X	0	0	0	0	+	X	X			+	X	X		
	ΔV _Z	-	X	X	0	1	2	1	+	X	X			+	X	X		
N22	R	+	1	7	9	0	0	+			0	0	+			0	0	
	ACM	P	+	2	1	3	0	0	+			0	0	+			0	0
		Y	+	0	0	1	0	0	+			0	0	+			0	0
	ΔV _C	X	X	X	0	0	8	1	X	X	X			X	X	X		
	BT	X	X	X	0	0	0	1	X	X	X			X	X	X		
	ΔVC AT IGN	+	X	X					+	X	X			+	X	X		
	ΔVC TAILOFF	-	X	X					-	X	X			-	X	X		
WT		+							PT					YT				

BURN ATT CHECK

STAR	X	X	X	X			
SA	+						0
TA	+						0 0

BURN ATT CHECK UPDATE

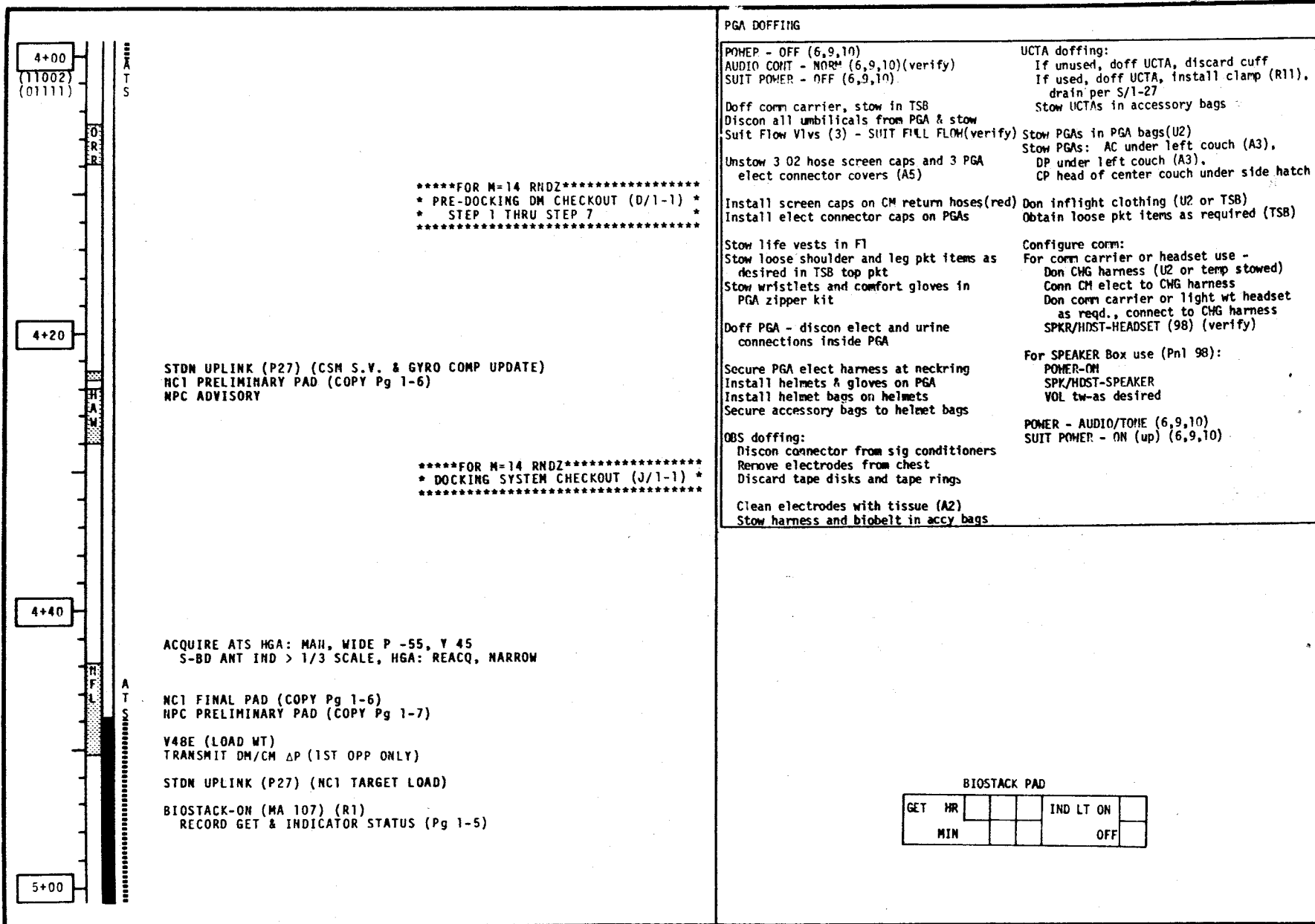
STAR	X	X	X	X			
SA	+						0
TA	+						0 0

P52 (OPTION 3)

N71 1ST STAR	X	0	0	0		
N71 2ND STAR	X	0	0	0		
N05(RT) } ERR	X					
N93	X					
GYRO TORQUING ANGLES	Y					
	Z					
	HR	+	0	0		
TIME OF GYRO TORQUE	MIN	+	0	0	0	
	SEC	+	0			

SPS BURN STATUS

ATIG	X	X			
AFTER TRIM					
ΔVC	X				
FDAI (IF ATTITUDE NOT NOMINAL)	R	+	X	X	
	P	+	X	X	
	Y	+	X	X	
N85 (IF VG > .2)	VGX		0	0	
	VGY		0	0	
	VGZ		0	0	



*****FOR M=14 RNDZ*****
 * PRE-DOCKING DM CHECKOUT (D/1-1) *
 * STEP 1 THRU STEP 7 *

*****FOR M=14 RNDZ*****
 * DOCKING SYSTEM CHECKOUT (J/1-1) *

PGA DOFFING

POHEP - OFF (6,9,10)
 AUDIO COM1 - NORM (6,9,10)(verify)
 SUIT POWER - OFF (6,9,10)

UCTA doffing:
 If unused, doff UCTA, discard cuff
 If used, doff UCTA, install clamp (R11),
 drain per S/1-27
 Stow UCTAs in accessory bags

Doff comm carrier, stow in TSB
 Discon all umbilicals from PGA & stow
 Suit Flow Vlvs (3) - SUIT FILL FLOW(verify)
 Stow PGAs in PGA bags(U2)
 Stow PGAs: AC under left couch (A3),
 DP under left couch (A3).
 CP head of center couch under side hatch

Unstow 3 O2 hose screen caps and 3 PGA
 elect connector covers (A5)

Install screen caps on CM return hoses (red)
 Install elect connector caps on PGAs

Don inflight clothing (U2 or TSB)
 Obtain loose pkt items as required (TSB)

Stow life vests in F1
 Stow loose shoulder and leg pkt items as
 desired in TSB top pkt
 Stow wristlets and comfort gloves in
 PGA zipper kit

Configure comm:
 For comm carrier or headset use -
 Don CHG harness (U2 or temp stowed)
 Conn CM elect to CHG harness
 Don comm carrier or light wt headset
 as reqd., connect to CHG harness
 SPKR/HDST-HEADSET (98) (verify)

Doff PGA - discon elect and urine
 connections inside PGA

For SPEAKER Box use (Pnl 98):
 POWER-ON
 SPK/HDST-SPEAKER
 VOL tw-as desired

Secure PGA elect harness at necking
 Install helmets & gloves on PGA
 Install helmet bags on helmets
 Secure accessory bags to helmet bags

POWER - AUDIO/TONE (6,9,10)
 SUIT POWER - ON (up) (6,9,10)

OBS doffing:
 Discon connector from sig conditioners
 Remove electrodes from chest
 Discard tape disks and tape rings

Clean electrodes with tissue (A2)
 Stow harness and biobelt in accy bags

BIOSTACK PAD

GET	HR		IND LT ON
	MIN		OFF

NOMINAL

NOMINAL

DATE 6/1/75

5+00
(11002)
(01111)

5+20

-12:00

5+40
0:00

6+00

ZFF PHOTOS (J/10-1)

P52 (OPT 3) (RECORD)
BYPASS TORQUE IF N93 < 00.300 DEG

P00
IF IMU DRIFT (P52 N93) > 1.5°/HR-G&N NO GO
PERFORM SCS BURN

MNVR TO STDN NCI BURN (PITCH) ATT

P30 (VERIFY N33 & N81 PAD VALUES)

GO TO SPS BURN CUE CARD
(BANK B)

P40

NC1 (181,358/59,0)
(TRIM VGX +0.2)
RECORD BURN STATUS

P00
IF NPC NOT REQ'D
MHVR TO SI +X FWD ATT
(ATT = 12,14,332)

CP CM HEIGHT & LEG VOLUME
MEASUREMENTS (1ST OPP ONLY)
AC & DP (IF TIME PERMITS)
RECORD (EXP C/L Pgs 1-59/51)

TRANSMIT NCI BURN STATUS
TRANSMIT GYRO TORQUE ANGLES
AND TIME
CSM ALONE WT (COPY Pg 1-7)

*****IF NPC REQ'D*****
* MNVR TO P38 ATT (180,160,0) *

*****FOR M=14 RNDZ*****
* PRE-DOCKING DM CHECKOUT (D/1-2) *
* STEP 8 THRU COMPLETION *
* (IF NPC REQ'D, PERFORM AS MANY *
* COMPLETE STEPS BEFORE NPC AS *
* POSSIBLE, CONTINUE AFTER NPC) *

*****FOR M=14 RNDZ*****
* CHARGE BATT A (AFTER HAW AOS) *

NC1 PAD DATA

		NOMINAL				PRELIMINARY				FINAL			
N33	HR	+	0	0	5	+				+			
FIG NCI	MIN	+			4	+				+			
	SEC	+	2	8	1	0	+			+			
N81 -V NCI	ΔV _X	+	0	6	6	3	+			+			
	ΔV _Y	+	0	0	0	0	+			+			
	ΔV _Z	+	0	0	0	2	+			+			
N22 NCI	R	+	1	8	1	0	0	+		0	0	+	
	P	+	0	5	9	0	0	+		0	0	+	
	Y	+	0	0	0	0	0	+		0	0	+	
	ΔV _C	+	0	5	3	7	+			+			
	BT	+	0	0	0	3	+			+			

WT	+				
----	---	--	--	--	--

PT					
----	--	--	--	--	--

YT					
----	--	--	--	--	--

BURN ATT CHECK					
STAR	+				
SA	+				0
TA	+				0 0

BURN ATT CHECK UPDATE					
STAR	+				
SA	+				0
TA	+				0 0

P52 (OPTION 3)					
N71-1ST STAR	+	0	0	0	
N71-2ND STAR	+	0	0	0	
N05(RT) † ERR	+				
N93 GYRO TORQUING ANGLES	X				
	Y				
	Z				
TIME OF GYRO TORQUE	HR	+	0	0	
	MIN	+	0	0	0
	SEC	+	0		

SPS BURN STATUS					
ATIG	+				
AFTER TRIM					
AVC	+				
FDAI (IF ATTITUDE NOT NOMINAL)	R	+			
	P	+			
	Y	+			
N85 (IF VG > .2)	VGX		0	0	
	VGY		0	0	
	VGZ		0	0	

UVA LAMP TURN ON PAD
(FOR M=14 RNDZ)

GET HR			
MIN			

PAGE 1-6

6+00
(11002)
(01111)

6+20

(61011)
(01111)

6+40

(61011)
(01111)

7+00

A T T C M N I F L B D A

IF NPC NOT REQ'D
SET HGA: MAN P -54, Y 265
S-BD ANT IND > 1/3 SCALE
HGA: REACQ, NARROW

STDN UPLINK (P27) (NOMINAL RNDZ REFSHMAT)
P52 (OPT 3) (RECORD)

P52(OPT 1: COARSE ALIGN)(RECORD)

P00; CMC MODE-AUTO
ALIGN GDC TO IMU
VERIFY SI +X FWD ATT(18,170,330)
V48E (LOAD LM ASCENT DAP, 5°DB & 0.2°/SEC RATE)
LOAD N47 REG 1 = CSM WT (REF PAD Pg 1-7)
REG 2 = +04460

CMC MODE-FREE
V46E
CMC MODE-AUTO
TRANSMIT GYRO TORQUE ANGLES AND TIME (OPT'S 3 & 1)

START EAT PERIOD

*****IF NPC REQ'D*****
SET HGA: MAN P -51, Y 96
S-BD ANT IND > 1/3 SCALE
HGA: REACQ, NARROW

STDN UPLINK (P27) (CSM S.V.)
NPC FINAL PAD (COPY)

V48E (LOAD 2°/SEC) (11003)
(LOAD WT)

ENTER P38 (G/5-10) 20 MIN
PRIOR TO TIG
BYPASS AUTO MNVR
VERIFY P38 ATT (180,160,0)
LOAD N33 & N81 PAD VALUES
SET DET

GO TO SPS BURN CUE CARD
(BANK A)

P40, MNVR TO BURN ATT (INSURE
ROLL = PAD ROLL)
OHC-SET IN TPAC ANGLES OF BURN
ATT CHECK PAD STAR.
IF STAR > 5° FROM CTR OF SCT-
DO NOT BURN NPC.
NPC (TRIM VGY +0.2)
RECORD BURN STATUS (Pg 1-8)
RHC-MNVR TO ZERO YAW (FDAI)
BYPASS P20 AUTO MNVR
GDC ALIGN AFTER P38 IMU TORQUE

V48E (LOAD LM ASCENT DAP,
5°DB & 0.2°/SEC RATE)
LOAD N47 REG 1 = CSM WT
(REF PAD Pg 1-7)
REG 2 = +04460

CMC MODE-FREE
V46E
CMC MODE-AUTO

MNVR TO SI +X FWD ATT
(ATT = 12,14,332)

NPC PAD DATA

		PRELIMINARY				FINAL			
N33	HR	+	X	X	X	+	X	X	X
TIG NPC MIN	SEC	+				+			
N81	ΔV X	+	X			+	X		
ΔV NPC	ΔV Y	+	X			+	X		
	ΔV Z	+	X			+	X		
N22	R	+				+	0	0	
NPC	P	+				+	0	0	
	Y	+				+	0	0	
ΔV C									
BT									

WT	+						
PT							
YT							

BURN ATT CHECK

STAR	+	X	X	X	X	
SA	+					0
TA	+					0 0

BURN ATT CHECK UPDATE

STAR	+	X	X	X	X	
SA	+					0
TA	+					0 0

LM ASCENT DAP DATA

CSM WT	+				
--------	---	--	--	--	--

P52 (OPTION 3)

N71 1ST STAR	X	0	0	0
N71 2ND STAR	X	0	0	0
N05(R1) ‡ ERR	X			
N93	X			
GYRO TORQUING ANGLES	Y			
	Z			
TIME OF GYRO TORQUE	HR	+	0	0
	MIN	+	0	0 0
	SEC	+	0	

P52 (OPTION 1)

N71 1ST STAR	X	0	0	0
N71 2ND STAR	X	0	0	0
N05(R1) ‡ ERR	X			
N93	X			
GYRO TORQUING ANGLES	Y			
	Z			
TIME OF GYRO TORQUE	HR	+	0	0
	MIN	+	0	0 0
	SEC	+	0	

NOMINAL

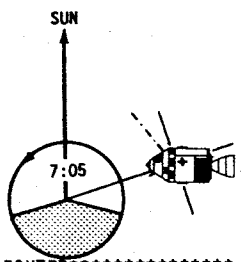
NOMINAL

DATE 6/1/75

7+00
(61011)
(01111)

A T S

*****FOR M=14 RNDZ*****
* CONTINUE PRE-DOCKING DM CHECKOUT *



7+20

*****IF NPC EXECUTED*****
* STDH UPLINK (P27) (NOMINAL RNDZ *
* REF5HMT) *
* TRANSMIT NPC BURN STATUS *
* * * * *

7+40

SET HGA: MAN P -29, Y 259
HGA: REACQ, NARROW

DIRECT O2 VLV-CLOSE(cw)
PWR DOWN CHECKLIST (Pg 1-8)
PRESLEEP (S/1-49)

* P52(OPT 1: COARSE ALIGN)(RECORD) *
* * * * *

15+30

STDH UPLINK(P27)(LIFT-OFF TIME)
SYNC MISSION TIMER TO CMC
CLOCK (V16HG5) UPON STDH CUE
STDH UPLINK (P27)(JET ON
MONITOR LOADS)
STDH UPLINK (P27) (ATS S.V. &
HGA EMP) (1ST OPP ONLY)

* P00: CMC MODE-AUTO *
* ALIGN GDC TO IMU *
* VERIFY SI +X FWD ATT(18,170,330) *
* TRANSMIT GYRO TORQUE ANGLES *
* AND TIME *

GO TO FLIGHT PLAN (Pg 4.1-6)

*****FOR M=14 RNDZ*****
* UVA LAMPS SHUT DOWN (Pg 1-8) *
* TERMINATE BATT A CHARGE (UPON *
* STDH CUE) THEN CHARGE BATT B *

SPS BURN STATUS

ATIG									
AFTER TRIM									
ΔVC									
FDAI (IF ATTITUDE NOT NOMINAL)	R	+							
	P	+							
	Y	+							
N85 (IF VG > .2)	VGX		0	0					
	VGY		0	0					
	VGZ		0	0					

P52 (OPTION 1)

N71 1ST STAR			0	0	0				
N71 2ND STAR			0	0	0				
N05(R1) § ERR									
N93 GYRO TORQUING ANGLES	X								
	Y								
	Z								
TIME OF GYRO TORQUE	HR	+	0	0					
	MIN	+	0	0	0				
	SEC	+	0						

PWR DOWN CHECKLIST

BMAG PWR #1-OFF
OHC-DRIVE TRUH <1G DEG
OPTICS ZERO-ZERO
G/N PWR OPTICS-OFF

UVA LAMPS SHUT DOWN CHECKLIST
(FOR M=14 RNDZ)

VERIFY > 2 HR SINCE UVA LAMP BURN IN GET
(RECORDED Pg 1-6)
UVA ABSORPTION LAMPS-OFF
UVA ABSORPTION POWER-OFF
DISCONNECT UVA CABLE
REATTACH DUST CAPS
STOW CABLE (A1)

PAGE 1-8

6:50
46+30

STDN UPLINK (P27) (CSM &
SOYUZ S.V.'s)
NC2 PRELIM PAD & TPI TIG (N37)
(COPY Pg 1-12)

*****IF REFSMMAT REALIGN REQ'D*****
* STDN UPLINK (P27)(RNDZ REFSMMAT) *
* BACKUP GDC ALIGN PAD & *
* STAR ACQUISITION PAD *
* (COPY Pg 1-a) *
* RNDZ/RNDZ REALIGN PAD *
* (COPY Pg 2-a) *
* * * * *

OPTICS PWR UP CHECKLIST (Pg 1-9)*
P52 (OPT 3) (RECORD)

OPTICS PWR UP CHECKLIST (Pg 1-9)
P52 (OPT 3) (RECORD)
* * * * *

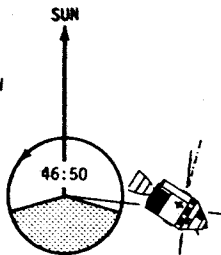
P00; CMC MODE-AUTO

P52(OPT 1: COARSE ALIGN)(RECORD)
* * * * *

46+40

* P00; CMC MODE-AUTO *
* ALIGN GDC TO IMU *

ACQUIRE ATS HGA: MAN, WIDE P 13, Y 230
S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW



L10H CANISTER CHANGE
(6 INTO B, STOW 4 IN A4)

*****FOR M=14 RNDZ*****
* STOW 2 IN A4 *

46+50

47+00

OPTICS PWR UP CHECKLIST

VERIFY OPTICS MANUAL DRIVE DISENGAGED
OPTICS ZERO-OFF
OPT MODE-MAN
G/N PWR OPTICS-0n(up)
OHC-DRIVE TRUN <10 DEG
OPT ZERO-ZERO (15 SEC)

P52 (OPTION 3)

N71 1ST STAR	<input checked="" type="checkbox"/>	0	0	0			
N71 2ND STAR	<input checked="" type="checkbox"/>	0	0	0			
N05(RT) } ERR	<input checked="" type="checkbox"/>						
N93	X						
GYRO TORQUING ANGLES	Y						
	Z						
	HR	+	0	0			
TIME OF GYRO TORQUE	MIN	+	0	0	0		
	SEC	+	0				

P52 (OPTION 1)

N71 1ST STAR	<input checked="" type="checkbox"/>	0	0	0			
N71 2ND STAR	<input checked="" type="checkbox"/>	0	0	0			
N05(RT) } ERR	<input checked="" type="checkbox"/>						
N93	X						
GYRO TORQUING ANGLES	Y						
	Z						
	HR	+	0	0			
TIME OF GYRO TORQUE	MIN	+	0	0	0		
	SEC	+	0				

NOMINAL

NOMINAL

DATE 6/1/75

7:00

47+00
(61011)
(01111)

A
T
S

TV CHFKLIST (Pg 1-10)

CM2/DAC/25/CX02-BRKT, MIR (f8,1/250,=) 2 FPS
UTILITY POWER-ON

FURNACE SHUT DOWN (D/7-6) (1ST OPP ONLY)

TV- GRD CMD
47+10 - 47+37

*****FOR M=14 RNDZ*****
* BIOSTACK-OFF (MA 107) (R1) *
* RECORD GET & INDICATOR STATUS *
* GET HR [] [] [] IND LT ON [] *
* MIN [] [] [] OFF [] *

DM CLOSEOUT
DP TRANSFER TO DM
OPEN cb CAUT/WARN DMB (815)
DM1 & DM2 TV STA PWR-OFF (808)
DP TRANSFER TO CM
TERMINATE CM-DM ATMOSPHERE MIXING
INSTALL HATCH 1 (DECAL)(S/2-9)
HATCH 1 PRESSURE EQUALIZATION
VLV-CLOSE(cw)/LOCK(verify)



CM CAMR 1

END MANUAL HEAT SOAK AND
PERFORM HELIUM INJECTION(D/7-5)
(1ST OPP ONLY)

*****FOR M=14 RNDZ*****
* cb VHF FM XCVR DMA-CLOSE(verify)*
* (PNL 815) *
* VHF FM-T/R (verify) (6) *
* DP PERFORM MCC-H/MCC-M/APOLLO *
* COMM CHECK *



DM CAMR 1



DM CAMR 2

ZFF PHOTOS (J/10-1)

U
S
R

47+30

7:30

7:00

7:00

PAGE 1-10

50
8:00
8:10
8:00

47+30
(61011)
(01111)

U
S
R

BMAG PWR #1-WARMUP

H2 PURGE LINE HTR-ON(up)

47+40

P32; BYPASS MINKEY OPTION & AUTO MNVR
LOAD N28 PAD VALUE (Pg 1-12)
VERIFY N37 = PAD VALUE (Pg 1-12)
P32 (RECYCLE: RECORD Pg 1-12)

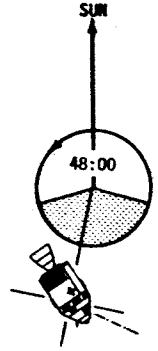
(11002)
(01111)

P00
CMC MODE-FREE
V48E LOAD CSM ONLY DAP,
0.5°DB & 0.5°/SEC RATE)
LOAD H47 REG 1 = CSM/DM WT (REF NC2 PAD Pg 1-12)
REG 2 = +0

V46E
CMC MODE-AUTO

47+50

P52 (OPT 3) (RECORD)



BORESIGHT STAR
4 - ACHERNAR
(232, 16, 0)

P00; CMC MODE-AUTO
COAS LOS DETERMINATION CHECKLIST

H2/O2 FUEL CELL PURGE (S/1-6) (20 MIN AFTER LINE HTR-ON)

WASTE WATER DUMP CHECKLIST

48+00

P00

NOMINAL

P52 (OPTION 3)

N71 1ST STAR	X	0	0	0
N71 2ND STAR	X	0	0	0
N05(R1) ERR	X			
N93	X			
GYRO TORQUING ANGLES	Y			
	Z			
HR		+	0	0
TIME OF GYRO TORQUE	MIN	+	0	0
	SEC	+	0	

COAS LOS DETERMINATION CHECKLIST

- COAS PWR-ON(up)
MNVR TO BORESIGHT ATTITUDE
CMC MODE-FREE
V37E52E
F 04 06 R1 00001
R2 00003
PRD
F 50 25 00015
ENTER
F 01 70 0000E STAR CODE
LOAD BORESIGHT STAR CODE
OPT MODE-CMC(verify)
OPT ZERO-OFF
PRD
06 92 SHAFT,TRUN
- BORESIGHT ON STAR AND
MARK with VERB key
RECORD SHAFT,TRUN
(NOMINAL = 0°, +57.470°)
TO VERIFY: KEY RLSE
AND REPEAT STEP 2
- V37E00E
CMC MODE-AUTO
OPT MODE-MAN
CMC-Drive trun<10°
OPT ZERO-ZERO

COAS LOS DETERMINATION

N92	SA	+					
	TA	+					

WASTE WATER DUMP CHECKLIST

- BAT VENT VLV-CLOSED (252)
- H2O QTY IND-HASTE (Panel 2)
- WATER CMIT PRESS REL VLV-DUMP A (352)
- Monitor HASTE H2O QTY IND-decreasing (~5% Per Min)
- When WASTE H2O QTY IND- 60%
- WATER CMIT PRESS REL VLV-2
- BAT VENT VLV-VENT (252)

NOMINAL

8:20

8:30

8:40

8:45

48+00

(11002)
(01111)

NC2 FINAL PAD (COPY)
NCC PRELIMINARY PAD (COPY Pg 1-14)
NSR PRELIMINARY PAD (COPY Pg 1-15)
TRANSMIT GYRO TORQUE ANGLES AND TIME (OPT's 3 & 1)(Pg's 1-9 & 1-11)

H2 PURGE LINE HTR-OFF (10 MIN AFTER PURGE)

UNSTOW HP-65 KIT(U1) & CHECKLIST(R1)
VELCRO (HOOK) FROM U3 (IN PIN STRAIGHTENING KIT)
HP-65 CHECKOUT (Pg 1)

48+10

MNVR TO NC2 FINAL PAD ATT

BHAG PWR #1-0H

48+20

P32; BYPASS AUTO MNVR
LOAD N28 PAD VALUE
VERIFY N37 = PAD VALUE (Pg 1-12)
SET DET

P				Y		
---	--	--	--	---	--	--

ACQUIRE ATS HGA: MAN, WIDE P -35, Y 144
S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW

-12:00

P32 (FINAL COMP: RECORD)

GO TO SPS BURN CUE CARD
(BANK A)

P40

48+30

NC2 PAD DATA

		NOMINAL			PRELIMINARY			FINAL		
N28	HR	+	0	4	8	+		+		
TIG NC2	MIN	+		3	4	+		+		
	SEC	+	0	4	1	0				
NB1	ΔV_X	-	0	3	6	4				
ΔV_{NC2}	ΔV_Y	+	0	0	0	0				
	ΔV_Z	+	0	0	0	0				
N22	R	+	0	0	0	0	0	+	0	0
NC2	P	+	0	3	4	0	0	+	0	0
	Y	+	0	0	0	0	0	+	0	0
	ΔV_C		0	2	3	7				
BT			0	0	0	2				

WT	+				
PT					
YT					

BURN ATT CHECK

STAR	+								
SA	+								0
TA	+								0 0

BURN ATT CHECK UPDATE

STAR	+								
SA	+								0
TA	+								0 0

TPI TIG N37

--	--	--	--	--	--	--	--	--	--

NC2 ONBOARD DATA

		P32 RECYCLE			P32 FINAL COMP		
NB4	ΔV_{NCC}	+	0		+	0	
	ΔH_{NCC}	+	0	0	+	0	0
	ΔV_{NSR}	+	0	0	+	0	0
NB1	ΔV_X		0			0	
ΔV_{NC2}	ΔV_Y	+	0	0	0	0	0
	ΔV_Z	+	0	0	0	0	0

SPS BURN STATUS

ATIG						
AFTER TRIM						
ΔV_C						
FDAI (IF ATTITUDE NOT NOMINAL)	R	+				
	P	+				
	Y	+				
NB5 (IF VG > .2)	VGX		0	0		
	VGY		0	0		
	VGZ		0	0		

XXXXXXXXXXXXXXXXXXXXXXXXXXXX
X NB1 COMP LIMITS NA X
X X
X STDN SOLN PRIME X
X IF STDN SOLN NOT AVAILABLE X
X DO NOT BURN NC2 X
XXXXXXXXXXXXXXXXXXXXXXXXXXXX

0:50

9:00

9:10

9:00

SOYUZ MHVRS TO ORBITAL ATTITUDE RATE

SUN

NC2

48+30
(11002)
(01111)

00:00

NC2 (0,182/34,0) (R=263.3 NM)
(TRIM VGX +0.2)
RECORD BURN STATUS
TRANSMIT NC2 BURN STATUS

P33

V67E; LOAD N99 WITH +10000, +100, +1; PRO

48+40

DP ESTABLISH VHF AM & FM COMM WITH SOYUZ (PERFORM CHECKS FROM PANEL 6 ONLY)

SET DET

XXXXXXXXXXXXXXXXXXXXXXXXXXXX
X UNREASONABLE UPDATE X
X 1.00 NM, 6.0 FPS X
XXXXXXXXXXXXXXXXXXXXXXXXXXXX

TV- GRD CMD
48+50 - 49+00

48+50

DP PERFORM VHF AM COMM CK

49+00

NOMINAL

VHF AM AND FM COMM

VHF FM-T/R (6)
VHF AM-T/R
VHF FM-T/R (9)
VHF AM-T/R
VHF AM A-SIMPLEX (3)
VHF AM SQUELCH A tw-noise + 1
VHF ANTENNA-RIGHT
MODE-VOX (10)
VOX SENS tw-S
VHF FM-RCV

VHF FM tw-5
S BAND-T/R
S BAND tw-full decrease
POWER-AUDIO
MASTER tw-5
INTERCOM-T/R
INTERCOM tw-full decrease
VHF AM-OFF
AUDIO CONTROL-BACKUP
PHONE/MIC CONNECT-ON

◀This is Apollo. Я АПОЛЛОН.
◀How do you read? КАК БЫ СЛЫШИТЕ?

* If no comm, repeat *
* statements until comm *
* established. If still *
* no comm by (TBD) GET, *
* inform MCC. *

VHF AM COMM CHECK 48+59

◀Configure for VHF AM check. ГОТОВЬТЕСЬ К ПРОВЕРКЕ СВЯЗИ НА УКВ АМ.
VHF FM-OFF
◀This is Apollo on VHF AM. Я АПОЛЛОН НА УКВ АМ.

* If no comm, repeat *
* statement until comm *
* established. If still *
* no comm, inform MCC. *

VHF FM COMM CHECK 49+08

◀Configure for VHF FM check. ГОТОВЬТЕСЬ К ПРОВЕРКЕ СВЯЗИ НА УКВ ЧМ.
VHF FM-T/R (6)
VHF AM-OFF
◀This is Apollo on VHF FM. Я АПОЛЛОН НА УКВ ЧМ.

* If no comm, repeat *
* statement until comm *
* established. If still *
* no comm, inform MCC. *

VHF RANGING COMM CHECK 49+23

◀Turn on VHF ranging. ВКЛЮЧИТЬ ИЗМЕРЕНИЕ ДАЛЬНОСТИ.

VHF AM A-OFF(ctr)
VHF AM B-DUPLEX
VHF RANGING-ON(up)
VHF ANTENNA-RIGHT(verify)
EIS FUNC-ΔV SET/VHF RNG
EIS MODE-BACKUP/VHF RNG
VHF RNG-RESET
◀Ranging lockup established. РЕЖИМ ИЗМЕРЕНИЯ ДАЛЬНОСТИ УСТАНОВЛЕН.
◀Range miles. ДАЛЬНОСТЬ _____ МИЛЬ.

VHF FM-T/R (6)
VHF AM-T/R
◀This is Apollo on VHF ranging. Я АПОЛЛОН НА РЕЖИМЕ ИЗМЕРЕНИЯ ДАЛЬНОСТИ.

* If no comm, *
* VHF FM-T/R (6) *
* Continue nominal RNDZ *
* procedures, inform MCC. *

◀VHF AM and FM comm checked. ПРОВЕРИЛ СВЯЗЬ УКВ ЧМ И АМ.
VHF FM-T/R (6)

* If ranging lockup is lost, *
* Your voice degrading ranging lockup. ГОЛОС УХУДШАЕТ РЕЖИМ *
* VHF RNG-RESET (1) ИЗМЕРЕНИЯ ДАЛЬНОСТИ. *
* Ranging lockup established. РЕЖИМ ИЗМЕРЕНИЯ ДАЛЬНОСТИ УСТАНОВЛЕН. *

NOMINAL

DATE 6/1/75

9:20 am
9:30 am
9:40 am
9:50 am

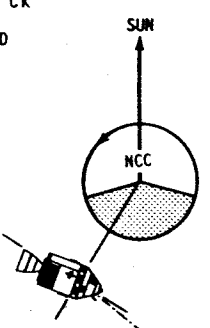
49+00 (11002) (01111) U.S.S.R. (10102) (01111) NCC FINAL PAD (COPY) NSR FINAL PAD (COPY Pg 1-15) V48E (LOAD B/D TRANS) (LOAD WT)

-12:00 P33 (FINAL COMP: RECORD)

DP PERFORM VHF FM COMM CK
GO TO SPS BURN CUE CARD (BANK A)

49+10 VHF FM SPEC RANGE = 162 NM

P40



00:00 NCC (180,349/21,359) (R=145.5 NM) (TRIM VG's +0.2) RECORD BURN STATUS P34, V32E (P34 RECYCLE: RECORD CMC MATCHED PAIR)(Pg 1-15) REPORT COMM CHECK RESULTS TRANSMIT NCC BURN STATUS V76E (LOAD N72 WITH TIG NSR-28) SET DET NCC completed. NCC BURNISHED. DP PERFORM VHF RANGING VOICE CHECK WITH SOYUZ

49+20 VHF RANGING SPEC RANGE = 144 NM

V87E (START VHF MARKING) R HP-65 DATA FOR NSR-28

-28:00 VHF

49+30

XXXXXXXXXXXXXXXXXXXXXXXXXXXX
X UNREASONABLE UPDATE X
X 0.50 NM, 3.0 FPS X
XXXXXXXXXXXXXXXXXXXXXXXXXXXX

NCC PAD DATA

		NOMINAL				PRELIMINARY				FINAL			
N11	HR	+	0	4	9	+				+			
TIG NCC	MIN	+		1	8	+				+			
	SEC	+	0	3	4	0				+			
N81	ΔV _X	+	0	3	9	6							
	ΔV _Y	-	0	0	0	6							
	ΔV _Z	+	0	0	6	4							
N22	R	+	1	8	0	0	0			+		0	0
	NCC	P	+	0	2	1	0	0		+		0	0
	Y	+	3	5	9	0	0			+		0	0
	ΔV _C		0	2	7	4							
	BT		G	0	0	2							
WT		+								PT			
										YT			

BURN ATT CHECK

STAR							
SA	+					0	
TA	+					0	0

BURN ATT CHECK UPDATE

STAR							
SA	+					0	
TA	+					0	0

NCC ONBOARD DATA

SPS BURN STATUS

ΔTIG							
AFTER TRIM							
ΔVC							
FDAI (IF ATTITUDE NOT NOMINAL)	R	+					
	P	+					
	Y	+					
N85 (IF VG > .2)	VGX		0	0			
	VGY		0	0			
	VGZ		0	0			
TRANSMIT N81 APPLIED							

P33 FINAL COMP

N82	ΔV _X	0					
ΔV _{NSR}	ΔV _Y	0					
	ΔV _Z	0					
	N81	ΔV _X	0				
ΔV _{NCC}	ΔV _Y	0					
	ΔV _Z	0					

XXXXXXXXXXXXXXXXXXXXXXXXXXXX
X N81 COMP LIMITS +1.5,+7.0,+10.0 FPS X
X X CMC/STDN WITHIN LIMITS GO CMC X
X X NO AGREEMENT-NORMALLY GO STDN X
XXXXXXXXXXXXXXXXXXXXXXXXXXXX

N13 (TIG NSR)							
		2	8				
N72							

PAGE 1-14

4:57 am
10:00 am
10:00 am
10:00 am

49+30
-24:00
(10102)
(01111)
-20:00
-16:00
49+40
-12:00
49+50
00:00
50+00

VHF
18
A
G
O
A
G
O
A
T
S

R HP-65 DATA FOR NSR-24

R HP-65 DATA FOR NSR-20

V48E (LOAD WT)

R HP-65 DATA FOR NSR-16

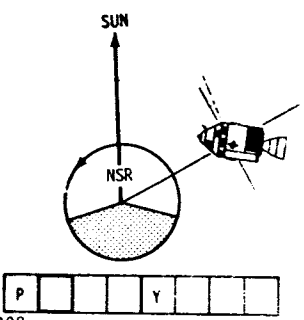
R HP-65 DATA FOR NSR-12
V88E (TERMINATE VHF MARKING)
V77E (TERMINATE VHF RANGE RATE PROCESSING ROUTINE)
P34 (FINAL COMP: RECORD)

GO TO SPS BURN CUE CARD
(BANK A)

P40

NSR (176,307/188,357) (R=81.0 NM)
(TRIM VG's +0.2)
RECORD BURN STATUS
P35
TRANSMIT NSR BURN STATUS
← NSR completed. NSR BURNED.

ACQUIRE ATS HGA: MAN, WIDE P -19, Y 308
S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW



XXXXXXXXXXXXXXXXXXXXX
X UNREASONABLE UPDATE X
X 0.50 NM, 3.0 FPS X
XXXXXXXXXXXXXXXXXXXXX

NSR PAD DATA

TIG NSR(N13)=TIG NCC(N11) + 00:37:00=

			NOMINAL			PRELIMINARY			FINAL		
N81	ΔV_X	+	0	1	7	0					
ΔV_{NSR}	ΔV_Y	-	0	0	1	4					
	ΔV_Z	+	0	2	1	2					
N22	R	+	1	7	6	0	0	+		0	0
NSR	P	+	1	8	8	0	0	+		0	0
	Y	+	3	5	7	0	0	+		0	0
	ΔV_C		0	1	4	5					
	BT		0	0	0	1					
	ΔVC AT IGN	+						+			
	ΔVC TAILOFF	-						-			
WT	+							PT			
								YT			

BURN ATT CHECK

STAR							
SA	+						0
TA	+						0 0

BURN ATT CHECK UPDATE

STAR							
SA	+						0
TA	+						0 0

NSR ONBOARD DATA

			P34 RECYCLE			P34 FINAL COMP		
N75	ΔV_{NSR}	+	0	0		+	0	0
	$\Delta T(NSR/TP1)$	+			B	+		B
	$\Delta T(TP1/TP1)$				B			B
N81	ΔV_X		0			0		
	ΔV_Y		0			0		
	ΔV_Z		0			0		

NSR HP-65 SOLN

ΔV_X							
ΔV_Y							
ΔV_Z							

SPS BURN STATUS

ΔTIG					
AFTER TRIM					
ΔVC					
FD41 (IF ATTITUDE NOT NOMINAL)	R	+			
	P	+			
	Y	+			
N85 (IF VG > .2)	VGX		0	0	
	VGY		0	0	
	VGZ		0	0	
TRANSMIT N81 APPLIED					

XXXXXXXXXXXXXXXXXXXXX
X N81 COMP LIMITS NA X
X BURN MATCHED PAIR SOLN (P34 RECYCLE) X
X OR STDN FINAL SOLN, IF NCC WAS X
X BURNED CMC OR STDN, RESPECTIVELY X
X IF NCC EXECUTION IS QUESTIONABLE-THE ORDER X
X OF PRIORITIES ARE: X
X HP-65 X
X CMC UNMATCHED X
X STDN UNMATCHED X
X DO NOT BURN NSR X
XXXXXXXXXXXXXXXXXXXXX

NOMINAL

NOMINAL

10:30
am

10:30
am

10:40
am

10:50
am

50+00

(10102)
(01111)
-53:00

50+10

50+20

-32:00

50+30

Y32E (1ST P35 RECYCLE: RECORD), (RECORD N37)
REF TPI EARLY/LATE LOGIC
REACQUIRE VHF RANGING (R=74 NM) FOR HP-65 DATA
SET DET

Y76E (LOAD N72 WITH HP-65 TPI TIG 1-32) XXXXXXXXXXXXXXXXXXXXXXX
X UNREASONABLE UPDATE X
X 0.50 NM, 3.0 FPS X
XXXXXXXXXXXXXXXXXXXXXXXXXXXX

REMOVE POLAR PLOT
SNACK PERIOD

TPI PRELIMINARY PAD (COPY Pg 1-17)
DOCKING ATTITUDE PAD (COPY Pg 1-19)

R HP-65 DATA FOR TPI-32 (GET)

N37
S
X
T
M
A
D
S
X
T
U
S
R

TV- GRD CHD
50+12 - 50+22

*****TPI EARLY/LATE LOGIC*****

* 1ST RECYCLE

- * IF 2 SOLUTIONS INDICATE TIG SLIP >+8 MIN FROM PRE-NC2 N37 (Pg 1-12)
- * ADJUST LOCATION OF 2ND RECYCLE +5 MIN

* 2ND RECYCLE

- * IF CMC SOLUTION INDICATES TIG SLIP >+10 MIN FROM PRE-NC2 N37:
- * USE CMC TIG OPTION:
 - RECALL P35, PRO TO N37, LOAD PRE-NC2 N37+10 MIN
 - PRO TO N55, SPECIFY TIG OPTION (V22E, +E)
- * CONTINUE HP-65 SOLUTION FOR FINAL ΔV COMPARISON
- * AT FINAL COMP-USE NOMINAL COMPARISON LOGIC
 - IF ALL COMPARISONS DISAGREE-BURN THE SOLUTION
 - WHOSE TIG (CMC 2ND RECYCLE, STDN PREL PAD)
 - COMPARES CLOSEST WITH HP-65 TPI TIG 2.

HP-65 TPI TIG 1									
-			3	2					
N72									

TPI TIG (N37)

PRE-NC2 (Pg 1-12)									
RECYCLES 1ST									
2ND									
HP-65 TPI TIG 2									

			1ST P35 RECYCLE				2ND P35 RECYCLE					
N37 TIG TPI	HR		+	0	0			+	0	0		
	MIN		+	0	0	0		+	0	0	0	
	SEC		+	0				+	0			
N58	ΔV _{TPI}		+	0	0			+	0	0		
	ΔV _{TPF}		+	0	0			+	0	0		
	ΔT(TPI/TPI)					B					B	
N81 ΔV _{TPI}	ΔV _X			0	0				0	0		
	ΔV _Y			0	0				0	0		
	ΔV _Z			0	0				0	0		
V16N59 ΔV (LOS)	ΔV _F			0	0				0	0		
	ΔV _R			0	0				0	0		
	ΔV _D			0	0				0	0		

XXXXXXXXXXXXXXXXXXXX
X UNREASONABLE UPDATE X
X 0.50 NM, 3.0 FPS X
XXXXXXXXXXXXXXXXXXXX

50+30
-24:00

50+40
-14:00

50+50

00:00

+3:00

+4:30
51+00

S
X
T
/
V
H
F

R HP-65 DATA FOR TPI-24 (GET)

V32E (2WD P35 RECYCLE: RECORD),(RECORD N37)(Pg 1-16)

TPI FINAL PAD (COPY)

V48E (LOAD 4 JET, 2°/SEC)
(LOAD WT)

R HP-65 DATA FOR TPI-16 (GET)

V77E (TERMINATE VHF RANGE RATE PROCESSING ROUTINE)
V83E, SET ORDEAL (FDAI 1) H=118

R HP-65 DATA FOR TPI-14 (GET)

SET HDSUPFLG (V25H7E, 106E, 2000E, 1E)

LOAD N78 REG 3 = ZERO (V23H78E, +E)

P35 (FINAL COMP: RECORD)

PRO, N59E (RECORD)

RHC-MNVR TO ZERO ROLL (ROLL RIGHT)

GO TO SPS BURN CUE CARD

ULLAGE AT -15 SEC
(BANK A)

P40

TPI (359,29/29,2) (R=21.2 NM)
(TRIM VG's +0.2)

P36 (VERIFY TRACK ROLL ATT ~ ZERO DEG)

← TPI completed. TPI BURN IN.

REACQUIRE VHF RANGING (R=18 NM)

V87E (START VHF MARKING)

FDAI 1-ORB RATE

IGNORE ATT ERROR NEEDLES
& UPLINK ACTIVITY LIGHT

SUN

TPI

CENTER SOYUZ IN SXT WHEN
READING HP-65 DATA θ AND TA

θ AND TA HP-65 DATA FOR TPI+4:30

XXXXXXXXXXXXXXXXXXXX
X UNREASONABLE UPDATE X
X 0.50 NM, 3.0 FPS X
XXXXXXXXXXXXXXXXXXXX

TPI PAD DATA

		NOMINAL			PRELIMINARY			FINAL		
N37	HR	+	0	5	0			+		
TIG TPI	MIN	+		5	4			+		
	SEC	+	2	5	1	0		+		
N81	ΔV _X	+		1	9	5				
ΔV _{TPI}	ΔV _Y	+		0	0	7				
	ΔV _Z	-		1	0	0				
N59	ΔV _F /BT (RCS)	+	2	1	9	5	5			
ΔV _R /BT (LOS)		+	0	0	7	0	4			
	ΔV _D /BT	+	0	0	0	0	0			
	ΔV _C	+	0	0	9	2				
	BT	+	0	0	0	1				
N22	R	+	3	5	9	0	0		0	0
(SPS USING N81)	P	+	0	2	9	0	0		0	0
	Y	+	0	0	2	0	0		0	0
ΔVC AT IGN		+								
ΔVC TAILOFF		-								

WT

PT

YT

BURN ATT CHECK

BURN ATT CHECK UPDATE

STAR				
SA	+			0
TA	+			0 0

STAR				
SA	+			0
TA	+			0 0

TPI ONBOARD DATA

TPI HP-65 SOLN

TIG					
ΔV _X					
ΔV _Y					
ΔV _Z					

XXX
 X N81 COMP LIMITS +1.5,+3.0,+3.0 FPS X
 X X
 X CMC/HP-65 WITHIN LIMITS GO CMC X
 X IF NOT CMC/STDN WITHIN LIMITS GO CMC X
 X IF NOT HP-65/STDN WITHIN LIMITS GO HP-65 X
 X NO AGREEMENT GO STDN X
 X X
 X FOR HP-65/STDN-USE CMC TIG OPTION: X
 X RECALL P35, PRO TO N37, LOAD HP-65/STDN TIG; X
 X PRO TO N55, SPECIFY TIG OPTION (V22E,+E), X
 X PRO TO N81, LOAD ΔV'S. X
 XXX

P35 FINAL COMP

N37	HR	+	0	0		
TIG TPI	MIN	+	0	0	0	
	SEC	+	0			
N58	ΔV _{TPI}	+	0	0		
	ΔV _{TPF}	+	0	0		
	Δ(TPI/TPI)					
N81	ΔV _X		0	0		
ΔV _{TPI}	ΔV _Y		0	0		
	ΔV _Z		0	0		
V16N59E	ΔV _F		0	0		
ΔV (LOS)	ΔV _R		0	0		
	ΔV _D		0	0		

NOMINAL

NOMINAL

DATE 6/1/75

XXXXXXXXXXXXXXXXXXXXX
 X UNREASONABLE UPDATE X
 X 0.50 NM, 3.0 FPS X
 XXXXXXXXXXXXXXXXXXXXX

SM RCS QUAD HTRS(4)-OFF(000) 074

51+00
 (11103)
 (01111)

+7:30 R HP-65 DATA FOR TPI+7:30

+8:30 R, θ AND TA HP-65 DATA FOR TPI+8:30
 +9:00 PRO (P36 FINAL COMP: RECORD)

P41

+12:00 **TPM1**

P36
 V25N33E (LOAD TPI TIG)

+15:00 **51+10**

+16:30 θ AND TA HP-65 DATA FOR TPI+16:30

+19:30 R HP-65 DATA FOR TPI+19:30

+20:30 R, θ AND TA HP-65 DATA FOR TPI+20:30
 +21:00 PRO (P36 FINAL COMP: RECORD)

P41

+24:00 **TPM2**

51+20

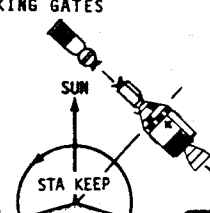
P37 (ACCEPT AUTO MHVR) (N54 = R, \dot{R} , θ FROM NAVIGATED STATE VECTORS)
 STOW HP-65 KIT(U1) & CHECKLIST(R1)
 CMC MODE-HOLD (MONITOR LOS RATES AND RANGE RATE)
 PRE-BRAKING SWITCH LIST (Pg 1-18)

PRO (P48) (N77 = R, \dot{R} , θ) (R, \dot{R} FROM R27 VHF RANGING FILTER)
 V48E (LOAD 0.5°/SEC)
 VTR/DAC SWITCH LIST (Pg 1-18)
 NULL LOS RATES AND ADJUST RANGE RATE TO BRAKING GATES
 N83 (ΔV_X , ΔV_Y , ΔV_Z CONT) (OPTIONAL)

(11102)
 (01111)

51+30

STATION KEEP ON SOYUZ +X AXIS (R₂ 150 FT)
 Apollo stationkeeping. ЕСТЬ ЗАБЕЖАНИЕ АПОЛЛОНА.



CENTER SOYUZ IN SXT WHEN READING HP-65 DATA θ AND TA

TPM1 ONBOARD DATA

N59	ΔV_F	P36 FINAL COMP				TPM1 HP-65 SOLN			
		ΔV_R	ΔV_D						
$\Delta V_{(LOS)}$		0	0						
		0	0						
		0	0						

TPM2 ONBOARD DATA

N59	ΔV_F	P36 FINAL COMP				TPM2 HP-65 SOLN			
		ΔV_R	ΔV_D						
$\Delta V_{(LOS)}$		0	0						
		0	0						
		0	0						

PRE-BRAKING SWITCH LIST

- | | |
|---------------------------|-----------------------------|
| MAN ATT(3)-RATE CMD | ATT SET-GDC |
| LIMIT CYCLE-OFF | THC PWR-PWR |
| DBD/RATE-MIN/LOW | RHC PWR NORMAL #2-AC/DC |
| BMAG MODE(3)-ATT 1/RATE 2 | RHC PWR DIRECT #2-MNA/MNB |
| SC CONT-SCS | AUTO RCS SELECT(16)-MNA/MNB |
| FDAI SCALE-5/1 | THC-ARMED |
| FDAI SELECT-1/2 | RHC #2-ARMED |
| FDAI SOURCE-ATT SET | |

VTR/DAC SWITCH LIST

- | |
|--|
| VTR POWER(3)-ON(UP) |
| HEAD WHEEL DRIVE MOTOR-ON (MOTOR ON LT-ON) |
| MODE-RECORD (RECORD LT-ON) |
| DAC-ON |
| (If desired)HDC CX06 |

BRAKING GATES			θ (DEG)	
R(NM)	R(FPS)	R(FT)	SOLAR PANEL	BODY
1.00	30	6000		
.50	20	3000	0.5	
.25	10	1500	1.0	
.08	5	500	3.1	1.0
.05		300	5.2	1.7
.03		200	7.9	2.6
.02		130		3.9
.01		60		8.4



CM CAMR 2

11:50 am

12:00 am

12:10

12:20

V
T
R

51+30

V25N22E (LOAD DOCKING ATT) (Pg 1-19)
 ▲Initiating orientation of Apollo. НАЧИНАЮ ОРИЕНТАЦИЮ АПОЛЛОНА.
 MNVR TO DOCKING ROLL ATT (-60° CCW)
 V62E (REF ERROR NEEDLES)
 VTR/TV SWITCH LIST (Pg 1-19)

A
T
S

▲Orientation established. ОРИЕНТАЦИЯ УСТАНОВЛЕНА.
 ▲Initiate docking orientation as programmed. НАЧНИТЕ ОРИЕНТАЦИЮ
 ACQUIRE ATS HGA: MAN, WIDE P -36, Y 44 СТЫКОВКИ ПО ПРОГРАММЕ.
 S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW

(11111)
 (00146)
 (00000)

 (05000)
 (00500)

51+40

V44E (VERIFY DOCKED DAP LOAD) (DO NOT ACTIVATE UNTIL DOCKING IS COMPLETE)
 EMS FUNC/MODE-ΔV SET/STBY
 SET ΔVC = -100.0 FPS
 EMS FUNC-ΔV

ACTIVE DOCKING PREPARATION CHECKLIST (Pg 1-20)

MONITOR SOYUZ MNVR ON SOYUZ +X AXIS

SC CONT/MODE-SCS/FREE
 ACTIVE DOCKING CHECKLIST (Pg 1-21)

SOYUZ MNVRS TO DOCKING ATT
 51+44:25 - 51+47:00

TV - GRD CMD
 51+48 - 52+09

51+50

M
A
D

CSM/SOYUZ INTERFACE SEAL COMPRESSED

52+00

SUNSET
 AT 52:05

DOCKING ATTITUDE

		NOMINAL						UPDATE					
N22	R	+	3	0	0	0	0	+				0	0
	P	+	1	5	7	0	0	+				0	0
	Y	+	0	0	0	0	0	+				0	0

VTR/TV SWITCH LIST

VTR HEAD WHEEL DRIVE MOTOR-OFF(400)
 (MOTOR ON LT-OFF)

ON TV CAMERA AT LOCATION 606:
 CAMERA-AVG, SLAVE, LINEAR
 LENS (F, ZOOM, FOC)-22, 25, infinity

NOMINAL

ACTIVE DOCKING PREPARATION CHECKLIST

- ***** CAUTION *****
- * GUIDE RING-EXTD/RETR MUST BE OPERATED
 - * BY SYSTEM A OR B ONLY (SINGLE MOTOR).
 - * DYNAMIC FORCES USING TWO MOTORS COULD
 - * CREATE STRUCTURAL LOADS BEYOND
 - * DESIGN LIMITS.
 - *
 - * STRUCT LATCH-CLOSE/OPEN MUST BE OPERATED
 - * BY SYSTEM A OR B ONLY (SINGLE MOTOR).
 - * STALLED GEAR BOX LOAD USING TWO
 - * MOTORS COULD EXCEED CABLE BREAKING
 - * STRENGTH.
 - *
 - * MCC MAY ADVISE THAT MOTORS IN BOTH
 - * SYSTEMS ARE DEGRADED. THEREFORE,
 - * BOTH SYSTEMS (A&B) MAY BE OPERATED
 - * SIMULTANEOUSLY.
- *****

PNL

NOTE

3 MONITOR FC 1 OR 2(SYSTEM A) OR FC 3
(SYSTEM B) CURRENT WHEN OPERATING
STRUCT LATCH, GUIDE RING, OR BACKUP
PASSIVE MOTORS.

- 275 5
- * IF SYSTEM B MOTORS REQUIRED:
 - * CB MAIN B BAT BUS B-CLOSE(VERIFY)
 - * MAIN BUS TIE B/C-ON(UP)
 - *
 - * IF SYSTEM A&B MOTORS REQUIRED:
 - * MAIN BUS TIE (2)-ON(UP)
 - *
 - * TO AVOID EXCESS CURRENT DRAIN
 - * ON ENTRY BATTERIES:
 - * MAIN BUS TIE (2)-OFF(DN)
 - * AFTER SYSTEM TASK PERFORMED.

DOCKING SYSTEM PREPARATION:

DOCKING SYSTEM A:

- 274
- CB IND LOGIC MHA-CLOSE
 - CB IND PMR AC1-CLOSE
 - CB CONTROL BAT A-CLOSE
 - CB MOTORS ACT(3)-CLOSE
 - CB DN POWER (2)-CLOSE(VERIFY)

DOCKING SYSTEM B:

- 274
- CB IND LOGIC MHB-CLOSE
 - CB IND PMR AC2-CLOSE
 - CB CONTROL BAT B-CLOSE
 - CB MOTORS AC2(3)-CLOSE



2 STRUCT LATCH OPEN LT-ON(VERIFY)
PASSIVE LT-ON(VERIFY)

230 2



- * IF NO COMM:
 - * DSE: (HBR/RCD/FWD/CMD RESET)
 - * UP TEL-RELAY
- GUIDE RING A-EXTD(~40 SEC)(MAY CAUSE
JET FIRINGS)
PASSIVE LT-OUT
GUIDE RING EXTD LT-ON
- GUIDE RING A-OFF(CTR)
- * IF NO COMM:
 - * DSE: (LBR/RCD/FWD/CMD RESET)

CONTINGENCY DOCKING SYSTEM EXTENSION VERIFICATION

PNL
-30:00



2 CM4/NK(B2)/300MM-EYEPIECE(A5)
LENS BRKT(A5)/DAC MOUNT(U1)

STRUCT LATCH OPEN LT-ON (VERIFY)
PASSIVE LT-ON (VERIFY)

ROTATE CAMERA TO PLACE SMALLEST VISIBLE
LINE ON TARGET IN THE RANGEFINDER.
FOCUS CAMERA (FROM LOW END OF LENS SCALE)
AND RECORD RANGE.

**WARNING: DO NOT DISTURB CAMERA UNTIL
GUIDE RING IS EXTENDED.**

MCC WILL ADVISE WHEN TO EXTEND
AND RETRACT GUIDE RING.

0:00



2 GUIDE RING A-EXTEND (~40 SEC)
(MAY CAUSE JET FIRINGS)

PASSIVE LT-OUT
GUIDE RING EXTD LT-ON

GUIDE RING A-OFF (CTR)
FOCUS CAMERA (FROM LOW END OF LENS SCALE)
ON THE SAME LINE AND RECORD RANGE.

RANGE AT EXTENSION _____
RANGE AT RETRACTION _____
DISTANCES EXTENDED _____

COMPUTE GUIDE RING EXTENSION DISTANCE (RANGE
AT EXTENSION MINUS RANGE AT RETRACTION).

2 GUIDE RING A-RETRACT (~40 SEC)
GUIDE RING EXTD LT-OFF
PASSIVE LT-ON

GUIDE RING A-OFF (CTR)

RESTOW CAMERA ASSEMBLY COMPONENTS

APOLLO ACTIVE DOCKING:
 PHL ← INFORM SOYUZ : READY FOR DOCKING.
 ARE YOU READY?
 INFORM APOLLO : READY FOR DOCKING.
 ← INFORM SOYUZ : APPROACHING SOYUZ.
 TO INITIATE APPROACH:
 * IF NO COMM BETWEEN SPACECRAFT AND *
 * SOYUZ WISHES TO TERMINATE APOLLO *
 * APPROACH: SOYUZ WILL TURN ON BEACON *
 * LTS FOR 10 SEC, THEN OFF (TWICE) *
 1 VERIFY DOCKING ATTITUDE
 -05:00 ENG MODE-NORMAL
 THC-THRUST +X (4 JET) (ΔVC=-100.5FPS)
 THC/RHC-MAINTAIN RELATIVE ALIGNMENT
 (CLOSING ΔV=0.5 FPS)
 CHANGE DAC = 12FPS
 * IF NO COMM: *
 230 * USE: (NBR/RCD/FWD/CND RESET) *
 * UP TEL-RELAY *
 181 * TV STA SEL CH-CH(UP) *
 * TV STA SEL CH1-CH2(DN) *
 400 * YTR HEAD WHEEL DRIVE MOTOR-ON (MOTOR ON LT-ON) *
 * MODE-RECORD (RECORD LT-ON) *
 AT CONTACT:
 ← INFORM SOYUZ : CONTACT.
 INFORM APOLLO : CONTACT.
 00:00
 2 THC-THRUST +X (4 JET) AT CONTACT FOR 5 SEC MAX
 GUIDE RING CAPTURE LT-ON (CAPTURE LT MAY BLINK)
 OR WHEN SOYUZ REPORTS CAPTURE. (IF NEG. THC-1 SEC)
 * IF SES CONTROL REQD: *
 * MAIN ATT(3)-RIN TRP *
 * (<2 SEC AFTER CAPTURE) *
 * AUTO RCS SELECT : A3,C4,B3,D4-OFF *
 * : B/D ROLL(4)-OFF *
 * DBD/RATE-MIN/NI *
 * BMAG MODE(3)-ATT 1/MATE 2 *
 * MAIN ATT(3)-RATE CHD *
 * SC COMT-SES *
 1 SC COMT-CHC/FREE (<2 SEC AFTER CAPTURE)
 8 AUTO RCS SELECT: A3,C4,B3,D4-OFF
 1 SC COMT-ENG/AUTO
 ← INFORM SOYUZ : CAPTURE.
 INFORM APOLLO : CAPTURE.
 WAIT FOR SPACECRAFT TO STABILIZE(2 MIN)
 ← INFORM SOYUZ : INITIATING RETRACTION.
 TO RETRACT:
 2 GUIDE RING A-RETRACT(~40 SEC)
 GUIDE RING EXTD LT-OUT
 STRUCT RING CONTACT LT-ON
 (WAIT 2 SEC)
 GUIDE RING A-OFF(CTR)
 TO PRELOAD STRUCTURAL LATCHES:
 2 STRUCT LATCH A-CLOSE(~8 SEC)
 STRUCT LATCH OPEN LT-OUT
 STRUCT LATCH CLOSE LT-ON(LT MAY FLICKER)
 STRUCT LATCH A-OFF(CTR)
 ← INFORM SOYUZ : DOCKING COMPLETED.
 INFORM APOLLO : INTERFACE SEAL COMPRESSED.
 SOYUZ SYSTEM CHECK
 DAC/TV-OFF
 PERFORM STANDARD APOLLO DOCKED CONFIGURATION(Pg 1-22)



NOMINAL

Активная стыковка "Аполлона"
 # панели ← СООБЩИТЬ НА "СОЮЗ": Готов к стыковке.
 Вы готовы?
 - СООБЩИТЬ НА "АПОЛЛОН": Готов к стыковке.
 ← СООБЩИТЬ НА "СОЮЗ": Подхожу к "Союзу".
 Начало подхода:
 + В случае отсутствия связи между кораблями при решении +
 + "Союза" остановить подход. "Союз" включит на 10 сек. +
 + и выключит маяки /дважды/ +
 - ПРОВЕРИТЬ ориентацию для стыковки
 - РЕЖИМ СИСТ. КОНТРОЛЯ ВХОДА В АТМОС. - НОРМАЛЬНЫЙ
 - С помощью РУ* перемещением ПОДАТЬ импульс +X
 /4 двигателя/ /ΔV = -100,5 фут./сек./
 - С помощью РУ вращением и перемещением ОБЕСПЕЧИТЬ
 согласование положения с "Союзом"
 /Заключительное ΔV = 0,5 фут. в сек./
 - При зависании УСТАНОВИТЬ на камере "ДАК"
 12 кадр./сек.
 В момент касания:
 ← СООБЩИТЬ НА "СОЮЗ": Есть касание.
 - СООБЩИТЬ НА "АПОЛЛОН": Есть касание.
 00:00
 2 - При контакте с помощью РУ перемещением ПОДАТЬ
 импульс +X /4 двигателя/ на 5 сек. макс.
 - Тр-т ЗАХВАТ КОЛЬЦА горит /Возможно мигание/
 или "Союз" сообщил о сцепке
 + Если требуется управление кораблем с помощью систем +
 + управления стабилизацией:
 + - РУЧНОЕ УПРАВЛ. ОРИЕНТ. /3/ - МИНИМАЛЬНАЯ
 + ИМПУЛЬС /<2 сек. после сцепки/ +
 + - ВЫБОР АВТ. РЕЖИМА РСУ: A3,C4,B3,D4 - ВЫКЛ +
 + : КРЕН B/D /4/ - ВЫКЛ +
 + - ЗОНА НЕЧУВСТВИТЕЛЬНОСТИ/СКОРОСТЬ - МИНИМУМ/ВЫСОКАЯ +
 + - РЕЖИМ ПИРОПЛАТФОРМ /3/ - ОРИЕНТ. 1/СКОРОСТЬ 2 +
 + - РУЧНОЕ УПРАВЛ. ОРИЕНТ. /3/ - УПРАВЛ. СКОРОСТЬ +
 + - УПРАВЛ. КОРАБЛЕМ - СИСТЕМА УПРАВЛ. СТАБИЛИЗАЦИЕЙ +
 1 - УПРАВЛ. КОРАБЛЕМ - ЭВМ/НЕСТАБИЛ. /<2 сек. после сцепки/
 8 - ВЫБОР АВТ. РЕЖИМА РСУ A3,C4,B3,D4 - ВЫКЛ
 1 - УПРАВЛ. КОРАБЛЕМ - ЭВМ/АВТ.
 ← СООБЩИТЬ НА "СОЮЗ": Есть сцепка.
 - СООБЩИТЬ НА "АПОЛЛОН": Есть сцепка.
 - ОЖИДАТЬ стабилизации кораблей /2 мин./
 ← СООБЩИТЬ НА "СОЮЗ": Начинаю стягивание.
 Стягивание:
 2 - КОЛЬЦО С НАПРАВЛЯЮЩИМИ А - ВТЯНУТЬ /~40 сек./
 - Тр-т КОЛЬЦО ВЫДВИНУТО гаснет
 - Тр-т КАСАНИЕ ШПАНГОУТА загорается
 /ЖДАТЬ 2 сек./
 - КОЛЬЦО С НАПРАВЛЯЮЩИМИ А - ВЫКЛ /Среднее положение/
 Предварительная нагрузка активных кривков:
 2 - АКТИВНЫЕ КРЮКИ А - ЗАКР /~8 сек./
 - Тр-т АКТИВНЫЕ КРЮКИ ОТКРЫТЫ гаснет
 - Тр-т АКТИВНЫЕ КРЮКИ ЗАКРЫТЫ загорается
 /Возможно мигание/
 - АКТИВНЫЕ КРЮКИ А - ВЫКЛ /Среднее положение/
 ← СООБЩИТЬ НА "СОЮЗ": Стыковка выполнена.
 - СООБЩИТЬ НА "АПОЛЛОН": Стык обжат.
 Проверка систем "Союза"
 - "ДАК"/ТВ - ВЫКЛ
 - Далее СМОТРИ инструкции по штатному управлению
 "Аполлоном" в состыкованном состоянии /Стр. 1-22/
 *Ручка управления



NOMINAL

STANDARD APOLLO DOCKED CONFIGURATION

PNL

P00
V93

* IF NOT PREVIOUSLY PERFORMED: *
* V44E N87 R1 11111 *
* R2 00146 *
* R3 00000 *
* N89 R1 +05000(RATE 0.5 DEG/SEC) *
* R2 +00500(DBD 5.0 DEG) *

V45E(ACTIVE DOCKED DAP)

RHC(BOTH)-LOCKED
THC-LOCKED

1 EMS FUNC/MODE-OFF/STBY
FDAI SCALE-5/1
FDAI SELECT-1/2
FDAI SOURCE-ATT SET
ATT SET-GDC
LIMIT CYCLE-OFF
DBD/RATE-MIN/Hi
THC PWR-OFF
RHC PWR NORMAL(2)-OFF
RHC PWR DIRECT(2)-OFF

8 * IF SCS CONTROL REQD: *
1 * AUTO RCS SELECT : A/C ROLL(4)-MNA/MNB *
* : B/D ROLL(4)-OFF *
* : C3,A4,D3,B4-MNA/MNB *
* : A3,C4,B3,D4-OFF *
* FDAI SELECT-1 *
* BMAG MODE(3)-ATT 1/RATE 2 *
* MAN ATT(3)-RATE CMD *
* SC CONT-SCS *

MAN ATT(ROLL)-MIN IMP
MAN ATT(PITCH,YAW)-RATE CMD
SC CONT-CMC
CMC MODE-AUTO
BMAG MODE(3)-RATE 2

2 GUIDE RING A&B-OFF(CTR)
STRUCT LATCH A&B-OFF(CTR)



ACTIVE DOCKING SYSTEM:
GUIDE RING CAPTURE LT-ON
STRUCT RING CONTACT LT-ON
STRUCT LATCH CLOSE LT-ON

* PASSIVE DOCKING SYSTEM: *
* STRUCT LATCH OPEN LT-ON *
* GUIDE RING CAPTURE LT-ON *
* PASSIVE LT-ON *
* STRUCT RING CONTACT LT-ON *

PNL

5 MAIN BUS TIE(2)-OFF

8 AUTO RCS SELECT : A/C & B/D ROLL(8)-MNA/MNB *
: PITCH & YAW(8)-OFF *
* IF SCS REQD: *
* A/C ROLL(4)-MNA/MNB(VERIFY) *
* B/D ROLL(4)-OFF(VERIFY) *
* C3,A4,D3,B4-MNA/MNB(VERIFY) *
* A3,C4,B3,D4-OFF(VERIFY) *

13 FDAI(2)-INRTL

15 COAS PWR-OFF

122 OPTICS ZERO-ZERO

DOCKING SYSTEM A:
274 CB THD LOGIC MNA-OPEN
CB THD PWR AC1-OPEN
CB CONTROL BAT A-OPEN
CB MOTORS AC1(3)-OPEN
CB DM POWER(2)-CLOSED(VERIFY)

DOCKING SYSTEM B:
CB THD LOGIC MNB-OPEN
CB THD PWR AC2-OPEN
CB CONTROL BAT B-OPEN
CB MOTORS AC2(3)-OPEN

SM RCS QUAD HTR A-SEC
SM RCS QUAD HTR BCD(3)-PRIM

INFORM SOYUZ : DOCKING SYSTEM POWER OFF.

VHF RANGE BIAS CHECK: *
* IF VHF RANGING OFF: *
* TURN ON VHF RANGING *
* VHF AM A-OFF(CTR) *
* VHF AM B-DUPLEX *
* VHF RANGING-ON(UP) *

P25
LOAD N72 ALL ZEROS
PRO

9 VHF RWG-RESET(12 SEC)

REPORT : TIME WHEN VHF BIAS
CHECK WAS INITIATED.

MCC-H ADVISE APOLLO WHEN TO TERMINATE P25.

P00

3 CONFIGURE FOR VHF SIMPLEX A
VHF RANGING-OFF
VHF AM A-SIMPLEX
VHF AM B-OFF(CTR)

* IF NO COMM: *
* DSE: (LBR/RCD/FWD/CMD RESET) *
400 * YTR HEAD WHEEL DRIVE MOTOR-OFF (MOTOR ON LT-OFF) *
* *
181 * TV STA SEL CM1-UP TLM(CTR) *
* TV STA SEL CM-UP TLM(CTR) *

GO TO DM CHECKLIST (D/2-1)

APOLLO CONTINGENCY UNDOCKING

PHL
1

V48E(61102,11111)(DO NOT ACTIVATE DAP)

EMS FUNC/MODE-ΔV SET/STBY
SET ΔVC=+100.0 FPS
EMS FUNC-ΔV

←INFORM SOYUZ : PREPARING FOR UNDOCKING.

DOCKING SYSTEM PREPARATION:

274

DOCKING SYSTEM A:
CB IND LOGIC MVA-CLOSE
CB IND PMR AC1-CLOSE
CB CONTROL BAT A-CLOSE
CB MOTORS AC1(3)-CLOSE

DOCKING SYSTEM B:
CB IND LOGIC MVB-CLOSE
CB IND PMR AC2-CLOSE
CB CONTROL BAT B-CLOSE
CB MOTORS AC2(3)-CLOSE

DOCKING STATUS LIGHTS:

GUIDE RING CAPTURE LT-ON(VERIFY)
STRUCT RING CONTACT LT-ON(VERIFY)
STRUCT LATCH CLOSE LT-ON(VERIFY)



2

- * IF SOYUZ CLOSED ACTIVE HOOKS: *
- * ←INFORM SOYUZ : OPEN YOUR ACTIVE HOOKS. *
- * INFORM APOLLO : ACTIVE HOOKS OPEN. *

←INFORM SOYUZ : OPENING ACTIVE HOOKS

STRUCT LATCH A-OPEN(≈8 SEC)
STRUCT LATCH CLOSE LT-OUT
STRUCT LATCH OPEN LT-ON



- * IF STRUCT LATCH OPEN LT-OUT: *
- * USE BU PROCEDURE FOR APOLLO ACTIVE *
- * UNDOCKING JOINT OPS CKLT Pg J/3-4 *

STRUCT LATCH A-OFF(CTR)

-03:00 ←INFORM SOYUZ : READY FOR UNDOCKING.

INFORM APOLLO : READY FOR UNDOCKING.

РАССТЫКОВКА АПОЛЛОНА В НЕПЛАТНОЙ СИТУАЦИИ

У панели:

1

- ВВЕСТИ глагол 48 /61102, 11111/ ЦАП не включать
- СИСТ. КОНТРОЛЯ ВХОДА В АТМОС. - переключатель ФУНКЦИЯ/РЕЖИМ УСТАНОВИТЬ в положение УСТАВКА ΔV/РЕЖИМ ГОТОВНОСТИ
- УСТАНОВИТЬ на счетчике ΔV +100,0 фут./сек.
- СИСТ. КОНТРОЛЯ ВХОДА В АТМОС. - переключатель ФУНКЦИЯ УСТАНОВИТЬ в положение ΔV

← СООБЩИТЬ на "Союз": Готовлюсь к расстыковке.

Подготовка стыковочных систем:

274

Стыковочная система А:

- НАЖАТЬ АЗС ШИНЫ "А" ЛОГИКИ ИНДИКАТОРОВ
- НАЖАТЬ АЗС ИНДИКАТОРОВ ПИТ. ПЕРЕМ. ТОКА 1
- НАЖАТЬ АЗС УПРАВЛ. ПИТАНИЕМ ОТ БАТАРЕИ А
- НАЖАТЬ АЗС ПИТ. ПРИВОДОВ ПЕРЕМ. ТОКА 1 /3/

Стыковочная система В:

- НАЖАТЬ АЗС ШИНЫ "В" ЛОГИКИ ИНДИКАТОРОВ
- НАЖАТЬ АЗС ИНДИКАТОРОВ ПИТ. ПЕРЕМ. ТОКА 2
- НАЖАТЬ АЗС УПРАВЛ. ПИТАНИЕМ ОТ БАТАРЕИ В
- НАЖАТЬ АЗС ПИТ. ПРИВОДОВ ПЕРЕМ. ТОКА 2 /3/

Транспаранты состояния стыковки

- Тр-т ЗАХВАТ КОЛЬЦА горит /Проверить/
- Тр-т КАСАНИЕ ШПАНГОУТА горит /Проверить/
- Тр-т АКТИВНЫЕ КРЮКИ ЗАКРЫТЫ горит /Проверить/

+ Если активные крюки "Союза" закрыты: +
+ ← СООБЩИТЬ на "Союз": Откройте ваши активные +
+ крюки. +

+ - СООБЩИТЬ на "Аполлон": Активные крюки +
+ открыты. +

← СООБЩИТЬ на "Союз": Открываю активные крюки.

- АКТИВНЫЕ КРЮКИ А - ОТКР /≈8 сек./
- Тр-т АКТИВНЫЕ КРЮКИ ЗАКРЫТЫ гаснет
- Тр-т АКТИВНЫЕ КРЮКИ ОТКРЫТЫ загорается

+ Если не горит тр-т "АКТИВНЫЕ КРЮКИ ОТКРЫТЫ" +
+ СМОТРИ резервные операции по активной рас- +
+ стыковке "Аполлона", инструкция по совместной +
+ работе, стр. J/3-4/ +

- АКТИВНЫЕ КРЮКИ А - ВЫКЛ /Среднее положение/

-03:00 ← СООБЩИТЬ на "Союз": Готов к расстыковке.

- СООБЩИТЬ на "Аполлон": Готов к расстыковке.

PHL

1 TO INITIATE ACTIVE UNDOCKING:
EPS MODE-NORMAL

←INFORM SOYUZ : INITIATING UNDOCKING
5,4,3,2,1 MARK.



2 CAPTURE LATCH A&B-RELEASE (MOM)
GUIDE RING CAPTURE LT-OUT
PASSIVE LT-ON
STRUCT RING CONTACT LT-OUT

00:00 MONITOR UNDOCKING ΔVc=+100.2 FPS

8 AUTO RCS SELECT(16)-MNA/MNB
1 BMAG MODE(3)-ATT 1/RATE 2
MAR ATT(3)-RATE CMD
SC COMT-SCS
EPS FUNC/MODE-OFF/STBY
W46E(ACTIVATE APOLLO DAP)

←INFORM SOYUZ : UNDOCKING COMPLETED.

INFORM APOLLO : UNDOCKING COMPLETED.

274 DOCKING SYSTEM A:
CB IND LOGIC MNA-OPEN
CB IND PMR AC1-OPEN
CB CONTROL BAT A-OPEN
CB MOTORS AC1(3)-OPEN

DOCKING SYSTEM B:
CB IND LOGIC MNB-OPEN
CB IND PMR AC2-OPEN
CB CONTROL BAT B-OPEN
CB MOTORS AC2(3)-OPEN

5 MAIN BUS TIE (2)-OFF(ON)

№ панели

1 Начало активной расстыковки:
- РЕЖИМ СИСТ. КОНТРОЛЯ ВХОДА В АТМОС. - НОРМАЛЬНЫЙ

← СООБЩИТЬ на "Союз": Вачинаю расстыковку
5,4,3,2,1 MARK.



2 - ЗАЩЕЛКИ КОЛЬЦА А и В - ОТКР /Мгновенно/
- Тр-т ЗАХВАТ КОЛЬЦА гаснет
- Тр-т ПАССИВНО загорается
- Тр-т КАСАНИЕ ШПАНГОУТА гаснет

00:00 - КОНТРОЛИРОВАТЬ по счетчику: ΔV при расстыковке =
+100,2 фут./сек.

8 - ВЫБОР АВТ. РЕЖИМА РСУ /16/ - ШИНА А/ШИНА В
1 - РЕЖИМ ГИРОПЛАТФОРМ /3/ - ОРИЕНТ. 1/СКОРОСТЬ 2
- РУЧНОЕ УПРАВЛ. ОРИЕНТ. /3/ - УПРАВЛ. СКОРОСТЬЮ
- УПРАВЛ. КОРАБЛЕМ - СИСТЕМА УПРАВЛ. СТАБИЛИЗАЦИЕЙ
- СИСТ. КОНТРОЛЯ ВХОДА В АТМОС. - переключатели
ФУНКЦИЯ/РЕЖИМ УСТАНОВИТЬ в положения
ВЫКЛ/РЕЖИМ ГОТОВНОСТИ
- ВВЕСТИ глагол 46 /Включить ЦАП/

← СООБЩИТЬ на "Союз": Расстыковка выполнена.

СОООЩИТЬ на "Аполлон": Расстыковка выполнена.

274 Стыковочная система А:
- ВЫКЛЮЧИТЬ АЗС ШИНЫ "А" ЛОГИКИ ИНДИКАТОРОВ
- ВЫКЛЮЧИТЬ АЗС ИНДИКАТОРОВ ПИТ. ПЕРЕМ. ТОКА 1
- ВЫКЛЮЧИТЬ АЗС УПРАВЛ. ПИТАНИЕМ ОТ БАТАРЕИ А
- ВЫКЛЮЧИТЬ АЗС ПИТ. ПРИВОДОВ ПЕРЕМ. ТОКА 1 /3/

Стыковочная система В:
- ВЫКЛЮЧИТЬ АЗС ШИНЫ "В" ЛОГИКИ ИНДИКАТОРОВ
- ВЫКЛЮЧИТЬ АЗС ИНДИКАТОРОВ ПИТ. ПЕРЕМ. ТОКА 2
- ВЫКЛЮЧИТЬ АЗС УПРАВЛ. ПИТАНИЕМ ОТ БАТАРЕИ В
- ВЫКЛЮЧИТЬ АЗС ПИТ. ПРИВОДОВ ПЕРЕМ. ТОКА 2 /3/

5 - СОЕДИНЕНИЕ ГЛАВНЫХ ШИН /2/ - ВЫКЛ /Вниз/

WHEN CMC FAILURE OCCURS

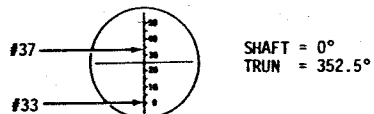
- 1.) **PERFORM CMC FAILURE SWITCH LIST**
 SC CONT-SCS
 DBD/RATE-MIN/HIGH
 BMAG MODE(3)-ATT 1/RATE 2
 MAN ATT(3)-RATE CMD
 FDAI SELECT-1
 FDAI SOURCE-ATT SET
 ATT SET-IMU
 LIMIT CYCLE-OFF
 IF STDN CONFIRMS: cb GUID/NAV COMPUTER MNA,MNB-open (5)

- 2.) **PERFORM IMU GO/NO GO CHECK**
 IF GDC & IMU COMPARE WITHIN 5°-IMU IS GO
 IF NOT-PERFORM REMAINING PROCEDURES
 ATT SET-IMU (VERIFY)
 SET ASCP tw TO STAR ACQ PAD ATT (Pg 2-a)
 RHC-MNVR TO STAR ACQ PAD ATT
 BMAG MODE(3)-RATE 2
 RATE-LOW
 BMAG MODE(3)-ATT 1/RATE 2
 RHC-MNVR (TRIM) TO ZERO FDAI 1 ERROR NEEDLES
 OHC-SET IN TPAC ANGLES OF 1ST PAD STAR
 IF STAR<5° FROM CTR OF SCT-IMU IS GO
 *IF STAR>5° FROM CTR OF SCT
 * PERFORM BACKUP GDC & IMU ALIGN
 * CHECKLIST (G/3-12) REF PAD (Pg 2-a)
 RATE-HIGH

- 3.) **PROCEED TO APPROPRIATE POINT IN TIMELINE AND AT NEXT STDN SITE:**
 a) REPORT TRANSFER TO CMC FAIL C/L
 b) PERFORM STDN/MET CLOCK CHECK

STAR AVAILABILITY

- 1.) BACKUP GDC ALIGN STARS ARE VISIBLE FROM SS-8 MIN TO SR+4 MIN.



- 2.) STAR ACQUISITION STARS ARE VISIBLE FROM SS+1 MIN TO SR+7 MIN.

NOTES

- 1.) AN IMU GO/NO GO CHECK (STEP 2.) IS REQUIRED BEFORE OBTAINING INITIAL IMU DRIFT DATA.
- 2.) RECOMMEND TRACKING OF HORIZON AND SOYUZ: DBD/RATE-MIN/HIGH, MAN ATT PITCH-MIN IMP

DEFINITIONS

θD = ORDEAL ANGLE TO PLACE EARTH HORIZON IN CENTER OF COAS
 H = AVERAGE ALTITUDE
 θ = ORDEAL FDAI PITCH

LAUNCH / RNDZ REALIGN PAD

		NOMINAL LAUNCH					POST INS UPDATE						
ASCP tw	R	X	X	0	0	5	0	X	X				
	P	X	X	1	5	2	2	X	X				
	Y	X	X	3	5	6	4	X	X				

RNDZ/RNDZ REALIGN PAD

		RNDZ UPDATE				
ASCP tw	R	X	X			
	P	X	X			
	Y	X	X			

LAUNCH → GET ~ 7+30

GET ~ 7+30 → DOCK

BACKUP GDC ALIGN PAD

		NOMINAL LAUNCH A					POST INS UPDATE B					NOMINAL RNDZ C					RNDZ UPDATE D													
0°/R STARS		3	3	/	3	7	X		/		X	3	3	/	3	7	X		/		X									
ASCP tw	R	X	X		2	4	9	6	X	X							X	X		2	4	6	3	X	X					
	P	X	X		2	7	7	5	X	X							X	X		0	6	8	2	X	X					
	Y	X	X		3	3	7	9	X	X							X	X		3	3	2	5	X	X					

STAR ACQUISITION PAD

		NOMINAL LAUNCH A (ACM ATT)					POST INS UPDATE B (ACM ATT)					NOMINAL RNDZ C (SI +X FWD)					RNDZ UPDATE D							
ASCP tw	R	+	1	7	9	0	0	+			0	0	+	0	1	8	0	0	+			0	0	
	P	+	2	1	3	0	0	+			0	0	+	1	7	0	0	0	+			0	0	
	Y	+	0	0	1	0	0	+			0	0	+	3	3	0	0	0	+			0	0	
1ST STAR		X	X			3	7	X	X							X	X							
TPAC ANGLES	SA	X	2	3	5	2	0	X				0	X	0	8	6	6	0	X				0	
	TA	X	0	4	1	3	0	X	0			0	X	0	2	5	8	0	X	0			0	
2ND STAR		X	X			4	5	X	X							X	X							
TPAC ANGLES	SA	X	0	3	4	5	0	X				0	X	0	0	0	8	0	X				0	
	TA	X	0	1	2	3	0	X	0			0	X	0	3	1	0	0	X	0			0	
3RD STAR		X	X			4	2	X	X							X	X							

CMC FAILURE

CMC FAILURE

CMC FAILURE

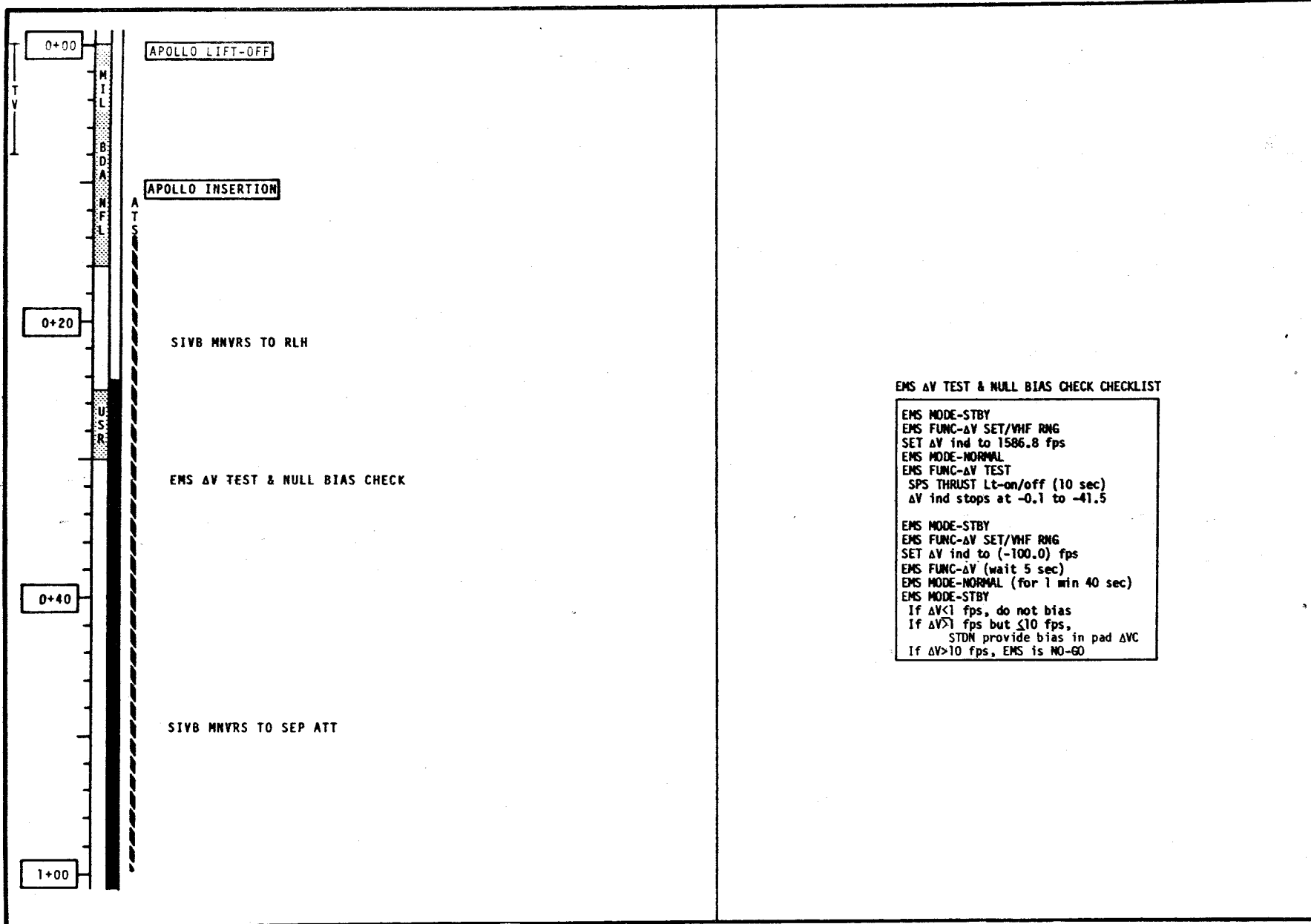
CMC FAILURE

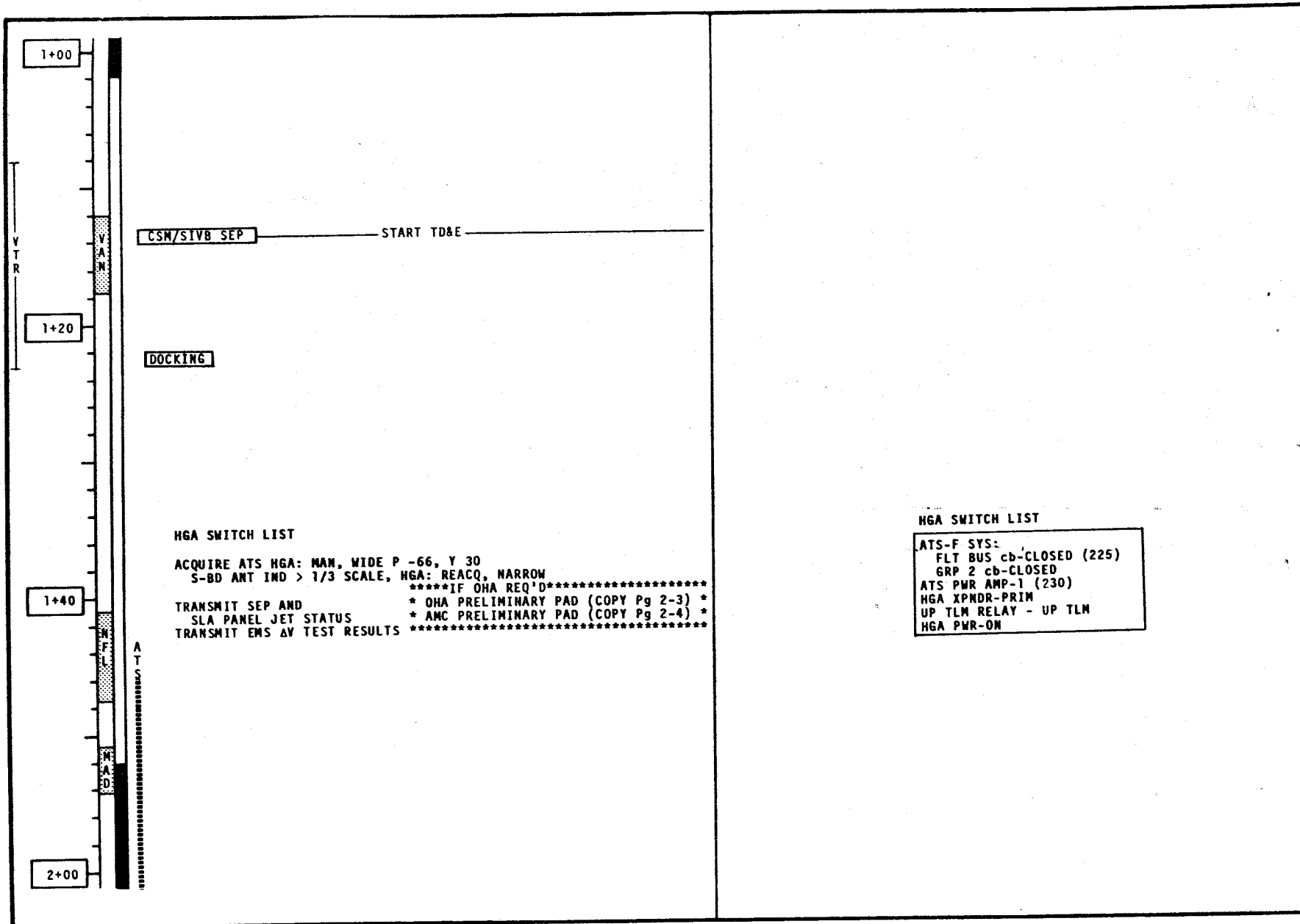
CMC FAILURE

CMC FAILURE

CMC FAILURE

CMC FAILURE





CSM/SIVB SEP

START TD&E

DOCKING

HGA SWITCH LIST

ACQUIRE ATS HGA: MAN. WIDE P -66, Y 30
 S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW
 *****IF OHA REQ'D*****
 TRANSMIT SEP AND * OHA PRELIMINARY PAD (COPY Pg 2-3) *
 SLA PANEL JET STATUS * AMC PRELIMINARY PAD (COPY Pg 2-4) *
 TRANSMIT EMS ΔV TEST RESULTS *****

HGA SWITCH LIST

ATS-F SYS:
 FLT BUS cb-CLOSED (225)
 GRP 2 cb-CLOSED
 ATS PWR AMP-1 (230)
 HGA XPNDR-PRIM
 UP TLM RELAY - UP TLM
 HGA PWR-ON

CMC FAILURE

CMC FAILURE

CMC FAILURE

CMC FAILURE

CMC FAILURE

CMC FAILURE

CMC FAILURE

2+00

2+20

0:00

2+40

3+00

SIVB MNVRS TO EXTRACTION ATT

RECORD IMU & GDC ATT

ALIGN GDC

CSM/DW EXTRACTION END TD&E

AEM

TV(2)/VTR POWER(3)-OFF
DSE:(LBR/RCD/FWD/CMD RESET)

UNSTOW CUE CARDS (DATA CARD KIT-R3)

PSM ACTIVATION (AFTER VAN AOS)

TRANSMIT EXTRACTION &
AEM STATUS

TRANSMIT IMU & GDC ATT

MNVR TO ACM NOMINAL
PAD ATT (Pg 2-4)

SHACK PERIOD

*****FOR M=14 RNDZ*****

* DP START PGA DOFFING (Pg 2-5), *

* THEN CP

* AC START SHACK PERIOD, DOFF

* AFTER ACM

*****IF OHA REQ'D*****

* OHA FINAL PAD (COPY)

* SET DET

* SET ASCP tw TO OHA BURN ATT

* MNVR & DRIVE SXT TO PAD DATA

* IF STAR NOT IN SXT FOV-USE HORIZ

* CK(+5°) TO DETERMINE IF IMU OR

* GDC IS GO

* GO TO SPS BURN CUE CARD(SCS Δ)

* (BANK A)

OHA PAD DATA

		NOMINAL	PRELIMINARY	FINAL
N33	HR	+ [grid]	+ [grid]	+ [grid]
TIG CHA	MIN	+ [grid]	+ [grid]	+ [grid]
	SEC	+ [grid]	+ [grid]	+ [grid]
N81	ΔV X	[grid]	[grid]	[grid]
ΔV CHA	ΔV Y	+ 0 0 0 0	[grid]	[grid]
	ΔV Z	[grid]	[grid]	[grid]
	BT	[grid]	[grid]	[grid]
N22	R	+ [grid]	+ [grid]	+ [grid]
OHA	P	+ [grid]	+ [grid]	+ [grid]
	Y	+ [grid]	+ [grid]	+ [grid]
	ΔV C	[grid]	[grid]	[grid]

WT + [grid] PT [grid] YT [grid]

BURN ATT CHECK

STAR	[grid]
SA	+ [grid]
TA	+ [grid]

BURN ATT CHECK UPDATE

STAR	[grid]
SA	+ [grid]
TA	+ [grid]

HORIZON CK DATA: TIG MINUS ___ MIN, WINDOW MK ___ DEG

IMU & GDC ATT

IMU ASCP tw	R	[grid]
	P	[grid]
	Y	[grid]
GDC ASCP tw	R	[grid]
	P	[grid]
	Y	[grid]

SPS BURN STATUS

ATIG	[grid]
AFTER TRIM	
ΔVC	[grid]

PSM ACTIVATION SWITCH LIST

MAN ATT(3)-MIN IMP

SM RCS QUAD He A,B,C,D-CLOSE, tb(4)-bp

SM RCS PRPLNT A,B,C,D-CLOSE, tb(8)-bp

SM RCS PSM He-OPEN, tb-gray

SM RCS PSM PRPLNT A,B,C,D-OPEN, tb(4)-gray

MAN ATT(3)-RATE CMD

DATE 6/1/75

3+00

GDC S

ACM PRELIMINARY PAD (COPY)
 BACKUP GDC ALIGN PAD &
 STAR ACQUISITION PAD
 (COPY Pg 2-a)

 * QHA (. / .) *
 * RECORD BURN STATUS (Pg 2-3) *
 * TRANSMIT OHA BURN STATUS *
 * MNVR TO ACM NOMINAL *
 * PAD ATT (Pg 2-4) *
 * CONT WITH NOMINAL PROCEDURES *****

ACQUIRE ATS HGA: MAN, WIDE P -78, Y 34
 S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW

NFL
 M A D

3+20

ACM (179,34/213,1)

MNVR TO STAR ACQ PAD "B" ATT
 RECORD IMU & GDC ATT
 OHC-SET IN TPAC ANGLES
 OF 1ST PAD STAR
 IF STAR >5° FROM CTR OF SCT
 PERFORM BACKUP GDC & IMU
 ALIGNMENT (6/3-12), THEN
 REPEAT STAR CK TO VERIFY
 ACM FINAL PAD (COPY)
 TRANSMIT IMU & GDC ATT

SET DET

SET ASCP tw TO ACM BURN ATT

GO TO SPS BURN CUE CARD(SCS Δ)
 (BANK A)

3+40

0:00

RECORD BURN STATUS
 TRANSMIT ACM BURN STATUS

PGA DOFFING (Pg 2-5)

*****FOR M=14 RNDZ*****
 * AC START PGA DOFFING (Pg 2-5) *
 * CP & DP START SNACK PERIOD *****

4+00

ACM PAD DATA

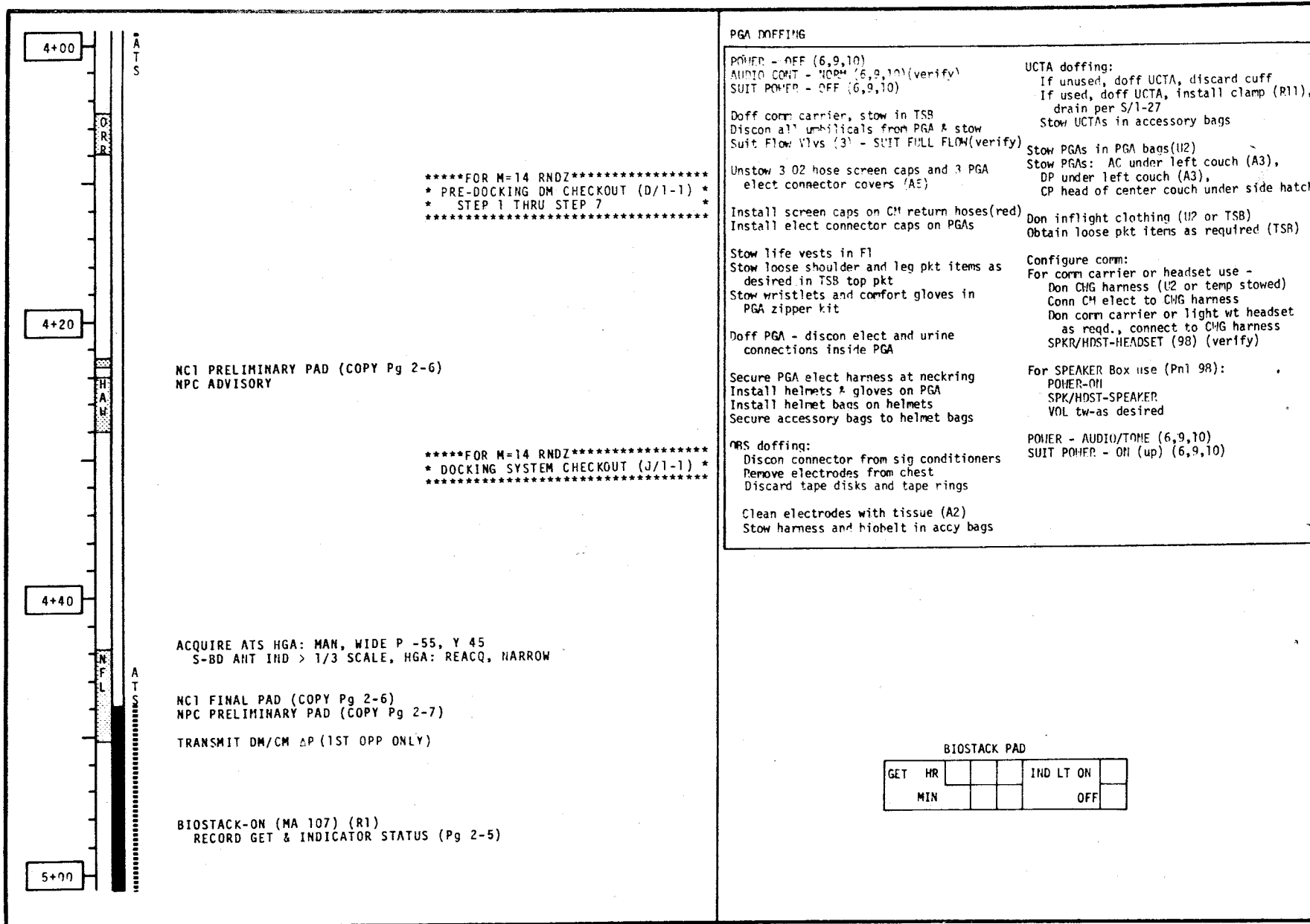
	NOMINAL	PRELIMINARY	FINAL
N33 HR	+ 0 0 3	+ X X X X	+ X X X X
TIG ACM MIN	+ 4 5	+ X X X X	+ X X X X
SEC	+ 0 0	+ X X X X	+ X X X X
N81 ΔV _x	+ 0 1 6 7	+ X X X X	+ X X X X
ΔV _y	+ 0 0 0 0	+ X X X X	+ X X X X
ΔV _z	- 0 1 2 1	+ X X X X	+ X X X X
N22 R	+ 1 7 9 0 0	+ X X X X	+ X X X X
ACM P	+ 2 1 3 0 0	+ X X X X	+ X X X X
Y	+ 0 0 1 0 0	+ X X X X	+ X X X X
ΔV _c	+ 0 0 8 1	+ X X X X	+ X X X X
BT	+ 0 0 0 1	+ X X X X	+ X X X X
ΔVC AT IGN	+ X X X X	+ X X X X	+ X X X X
ΔVC TAILOFF	- X X X X	- X X X X	- X X X X

WT	+ X X X X	PT	X X X X	YT	X X X X
----	-----------	----	---------	----	---------

BURN ATT CHECK			BURN ATT CHECK UPDATE		
STAR	X X X X		STAR	X X X X	
SA	+ X X X X	0	SA	+ X X X X	0
TA	+ X X X X	0 0	TA	+ X X X X	0 0

IMU & GDC ATT		
IMU ASCP tw	R	X X X X
	P	X X X X
	Y	X X X X
GDC ASCP tw	R	X X X X
	P	X X X X
	Y	X X X X

SPS BURN STATUS		
ATIG	X X X X	
AFTER TRIM		
ΔVC	X X X X	



*****FOR M=14 RNDZ*****
 * PRE-DOCKING DM CHECKOUT (D/1-1) *
 * STEP 1 THRU STEP 7

NCI PRELIMINARY PAD (COPY Pg 2-6)
 NPC ADVISORY

*****FOR M=14 RNDZ*****
 * DOCKING SYSTEM CHECKOUT (J/1-1) *

ACQUIRE ATS HGA: MAN, WIDE P -55, Y 45
 S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW

NCI FINAL PAD (COPY Pg 2-6)
 NPC PRELIMINARY PAD (COPY Pg 2-7)

TRANSMIT DM/CM ΔP (1ST OPP ONLY)

BIOSTACK-ON (MA 107) (R1)
 RECORD GET & INDICATOR STATUS (Pg 2-5)

PGA DOFFING

POWER - OFF (6,9,10)
 AUDIO CONT - 40PM (6,9,10)(verify)
 SUIT POWER - OFF (6,9,10)

Do off comm carrier, stow in TSB
 Discon all umbilicals from PGA & stow
 Suit Flow Vlvs (3) - SUIT FULL FLOW(verify)

Unstow 3 O2 hose screen caps and 3 PGA
 elect connector covers (A5)

Install screen caps on CM return hoses(red)
 Install elect connector caps on PGAs

Stow life vests in F1
 Stow loose shoulder and leg pkt items as
 desired in TSB top pkt
 Stow wristlets and comfort gloves in
 PGA zipper kit

Do off PGA - discon elect and urine
 connections inside PGA

Secure PGA elect harness at neckring
 Install helmets & gloves on PGA
 Install helmet bags on helmets
 Secure accessory bags to helmet bags

QRS doffing:
 Discon connector from sig conditioners
 Remove electrodes from chest
 Discard tape disks and tape rings

Clean electrodes with tissue (A2)
 Stow harness and biohelt in accy bags

UCTA doffing:
 If unused, doff UCTA, discard cuff
 If used, doff UCTA, install clamp (R11),
 drain per S/1-27
 Stow UCTAs in accessory bags

Stow PGAs in PGA bags(U2)
 Stow PGAs: AC under left couch (A3),
 DP under left couch (A3),
 CP head of center couch under side hatch

Don inflight clothing (U? or TSB)
 Obtain loose pkt items as required (TSR)

Configure comm:
 For comm carrier or headset use -
 Don CHG harness (U2 or temp stowed)
 Conn CM elect to CHG harness
 Don comm carrier or light wt headset
 as reqd., connect to CHG harness
 SPKR/HDST-HEADSET (98) (verify)

For SPEAKER Box use (Pnl 98):
 POWER-ON
 SPK/HDST-SPEAKER
 VOL tw-as desired

POWER - AUDIO/TONE (6,9,10)
 SUIT POWER - ON (up) (6,9,10)

BIOSTACK PAD

GET	HR			IND	LT	ON
	MIN					OFF

5+00

5+20

-12:00

5+40
0:00

6+00

ZFF PHOTOS (J/10-1)

SET DET

MNVR TO STAR ACQ PAD "B" ATT
RECORD IMU & GDC ATT
OHC-SET IN TPAC ANGLES
OF 1ST PAD STAR
IF STAR >5° FROM CTR OF SCT
PERFORM BACKUP GDC & IMU
ALIGNMENT (6/3-12), THEN
REPEAT STAR CK TO VERIFY

MNVR TO STDN NCI BURN (PITCH) ATT

SET ASCP tw TO NCI BURN ATT

GO TO SPS BURN CUE CARD(SCS A)
(BANK B)

NCI (181,358/59,0)

RECORD BURN STATUS

IF NPC NOT REQ'D
MNVR TO SI +X FND ATT
(ATT = 12,14,332)

CP CM HEIGHT & LEG VOLUME
MEASUREMENTS (1ST OPP ONLY)
AC & DP (IF TIME PERMITS)
RECORD (EXP C/L Pgs 1-59/51)

TRANSMIT NCI BURN STATUS
TRANSMIT IMU & GDC ATT

*****IF NPC REQ'D*****
* MNVR TO PRE-NPC ATT (180,160,0) *

*****FOR M=14 RNDZ*****
* PRE-DOCKING DM CHECKOUT (D/1-2) *
* STEP 8 THRU COMPLETION *
* (IF NPC REQ'D, PERFORM AS MANY *
* COMPLETE STEPS BEFORE NPC AS *
* POSSIBLE, CONTINUE AFTER NPC) *

*****FOR M=14 RNDZ*****
* CHARGE BATT A (AFTER HAW ADS) *

NCI PAD DATA

		NOMINAL					PRELIMINARY					FINAL					
N33	HR	+	+	+	0	0	5	+	+	+	+	+	+	+	+	+	+
TIG NCI	MIN	+	+	+	4	1		+	+	+	+	+	+	+	+	+	+
	SEC	+	+	+	2	8		+	+	+	+	+	+	+	+	+	+
N81	ΔV _X	+	+	+	0	6	6	3	+	+	+	+	+	+	+	+	+
	ΔV _Y	+	+	+	0	0	0	0	+	+	+	+	+	+	+	+	+
	ΔV _Z	+	+	+	0	0	0	2	+	+	+	+	+	+	+	+	+
N22	R	+	+	+	1	8	1	0	0	+	+	+	+	+	+	+	+
	P	+	+	+	0	5	9	0	0	+	+	+	+	+	+	+	+
	Y	+	+	+	0	0	0	0	0	+	+	+	+	+	+	+	+
	ΔV _C	+	+	+	0	5	3	7	+	+	+	+	+	+	+	+	+
	BT	+	+	+	0	0	0	3	+	+	+	+	+	+	+	+	+

MT + [X] [X] [X] [X] [X] [X]

PT [] [] [] [] [] []

YT [] [] [] [] [] []

BURN ATT CHECK

STAR	[X]	[X]	[X]	[X]	[X]	[X]	[X]	[X]	[X]
SA	+								0
TA	+								0 0

BURN ATT CHECK UPDATE

STAR	[X]	[X]	[X]	[X]	[X]	[X]	[X]	[X]	[X]
SA	+								0
TA	+								0 0

IMU & GDC ATT

IMU ASCP tw	R	[X]	[X]	[X]	[X]	[X]	[X]	[X]	[X]
	P	[X]	[X]	[X]	[X]	[X]	[X]	[X]	[X]
	Y	[X]	[X]	[X]	[X]	[X]	[X]	[X]	[X]
GDC ASCP tw	R	[X]	[X]	[X]	[X]	[X]	[X]	[X]	[X]
	P	[X]	[X]	[X]	[X]	[X]	[X]	[X]	[X]
	Y	[X]	[X]	[X]	[X]	[X]	[X]	[X]	[X]

SPS BURN STATUS

ΔTIG	[X]	[X]	[X]	[X]	[X]	[X]	[X]	[X]	[X]
AFTER TRIM									
ΔVC	[X]	[X]	[X]	[X]	[X]	[X]	[X]	[X]	[X]

UVA LAMP TURN ON PAD (FOR M=14 RNDZ)

GET HR	[]	[]	[]	[]
MIN	[]	[]	[]	[]

6+00

6+20

6+40

7+00

ATC

IF NPC NOT REQ'D
 SET HGA: MAN P -54, Y 265
 S-BD ANT IND > 1/3 SCALE
 HGA: REACQ, NARROW

GDC & IMU LAUNCH/RHDZ REALIGN
 CHECKLIST (Pg 2-8)

MHVR TO STAR ACQ PAD "C" ATT
 IMU DRIFT CHECK (RATE-LOW)
 RECORD SA'S AND TA'S
 REQUIRED TO CENTER STARS
 IN SXT (40,43)
 RECORD GET WHEN FINISHED

VERIFY SI +X FWD ATT
 (ATT=18,170,330)
 TRANSMIT IMU DRIFT CHECK DATA

*****IF NPC REQ'D*****
 * SET HGA: MAN P -51, Y 96
 * S-BD ANT IND > 1/3 SCALE
 * HGA: REACQ, NARROW
 * NPC FINAL PAD (COPY)
 * SET DET
 * SET ASCP tw TO NPC BURN ATT
 * MHVR TO BURN ATT(IMU)
 * NOTE: IMU/GDC OUT-OF-PLANE
 * REALIGN NOT REQ'D FOR NPC.
 * OHC-SET IN TPAC ANGLES OF BURN
 * ATT CHECK PAD STAR.
 * IF STAR >5° FROM CTR OF SCT-
 * PERFORM BACKUP GDC & IMU
 * ALIGNMENT (G/3-12), THEN
 * REPEAT STAR CK TO VERIFY.

GO TO SPS BURN CUE CARD(SCS Δ)
 (BANK A)

HPC

RECORD BURN STATUS (Pg 2-8)

MHVR TO SI +X FWD ATT
 (ATT = 12,14,332)

START EAT PERIOD

NPC PAD DATA

		PRELIMINARY				FINAL			
N33	HR	+	X	X	X	+	X	X	X
TIG NPC	MIN	+	X	X	X	+	X	X	X
	SEC	+	X	X	X	+	X	X	X
N81	ΔV _X	X	X	X	X	X	X	X	X
ΔV NPC	ΔV _Y	X	X	X	X	X	X	X	X
	ΔV _Z	X	X	X	X	X	X	X	X
N22	R	+			0	0	+		0
NPC	P	+			0	0	+		0
	Y	+			0	0	+		0
	ΔV _C	X	X	X	X	X	X	X	X
	BT	X	X	X	X	X	X	X	X

WT	+	X	X	X	X
----	---	---	---	---	---

PT				
----	--	--	--	--

YT				
----	--	--	--	--

STAR	X	X	X	X	
SA	+				0
TA	+				0 0

STAR	X	X	X	X	
SA	+				0
TA	+				0 0

IMU DRIFT CHECK

ASCP tw	R	X	X	X	X
	P	X	X	X	X
	Y	X	X	X	X
1ST STAR		X	X	X	X
TPAC ANGLES	SA	X	X	X	X
	TA	X	X	X	X
2ND STAR		X	X	X	X
TPAC ANGLES	SA	X	X	X	X
	TA	X	X	X	X
TIME OF DRIFT CHECK	HR	+	0	0	
	MIN	+	0	0	0
	SEC	+	0	X	X

ΔV TOTAL
 ΔVZ
 ΔVY
 MSA=70°
 NPC BURN TECHNIQUE

7+00

7+20

7+40

15+30

*****FOR M-14 RNDZ*****
 * CONTINUE PRE-DOCKING DM CHECKOUT*

*****IF NPC EXECUTED*****
 * TRANSMIT NPC BURN STATUS*

SET HGA: MAN_P -29, Y 259
 HGA: REACQ, NARROW
 PWR DOWN CHECKLIST (Pg 2-8)
 DIRECT 02 VLV-CLOSE(cw)

PRESLEEP (S/1-49)

SYNCHRONIZE MISSION TIMER TO
 SOYUZ GET UPON STDN CUE

GO TO FLIGHT PLAN (Pg 4.1-6)

SPS BURN STATUS

ATIG	X	X	X	X	X	X
AFTER TRIM						
AVC	X	X	X	X	X	X

IMU DRIFT CHECK

ASCP tw	R	X	X	X	X	X
	P	X	X	X	X	X
	Y	X	X	X	X	X
1ST STAR		X	X	X	X	X
TPAC ANGLES	SA	X	X	X	X	X
	TA	X	X	X	X	X
2ND STAR		X	X	X	X	X
TPAC ANGLES	SA	X	X	X	X	X
	TA	X	X	X	X	X
TIME OF DRIFT CHECK	HR	+	0	0	0	0
	MIN	+	0	0	0	0
	SEC	+	0	0	0	0

GDC & IMU LAUNCH/RNDZ REALIGN CHECKLIST

ASSUMPTIONS: 1) GDC & IMU ARE ALIGNED TO LAUNCH REFSMMAT.
 2) GDC & IMU COMPARE WITHIN 5° (IF NOT, PERFORM BACKUP GDC & IMU ALIGNMENT) (G/3-12)

FDAI SELECT-1
 FDAI SOURCE-ATT SET
 ATT SET-IMU

SET ASCP tw TO 0,0,0
 RHC-MNVR TO 0,0,0 ON FDAI 1(IMU)
 BMAG MODE(3)-RATE 2
 DBD/RATE-MIN/LOW
 BMAG MODE(3)-ATT 1/RATE 2
 RHC-TWEAK MNVR TO ZERO FDAI 1 ERR NEEDLES

SET ASCP tw to LAUNCH/RNDZ REALIGN PAD VALUES (Pg 2-a)
 ATT SET-GDC
 GDC ALIGN pb-push
 SET ASCP tw TO 0,0,0

IMU CAGE-ON(up) & HOLD (untill MNVR complete)
 RHC-MNVR TO 0,0,0 ON FDAI 1(GDC)
 BMAG MODE(3)-RATE 2
 DBD/RATE-MIN/LOW
 BMAG MODE(3)-ATT 1/RATE 2
 RHC-TWEAK MNVR TO ZERO FDAI 1 ERR NEEDLES
 IMU CAGE-RELEASE

ATT SET-IMU
 RATE-HIGH
 ROLL 180° TO HEADS DOWN ATT

PWR DOWN CHECKLIST

OHC-DRIVE TRUN <10 DEG
 OPTICS ZERO-ZERO
 G/N PWR OPTICS-OFF

UVA LAMPS SHUT DOWN CHECKLIST
 (FOR M-14 RNDZ)

VERIFY > 2 HR SINCE UVA LAMP BURN IN GET (RECORDED Pg 1-6)
 UVA ABSORPTION LAMPS-OFF
 UVA ABSORPTION POWER-OFF
 DISCONNECT UVA CABLE
 REATTACH DUST CAPS
 STOW CABLE (A1)

46+30

STAR ACQUISITION PAD
(COPY Pg 2-a)
NC2 PRELIM PAD & TPI TIG (N37)
(COPY Pg 2-12)

*****IF REFSMMAT REALIGN REQ'D*****
* RNDZ/RNDZ REALIGN PAD &
* BACKUP GDC ALIGN PAD
* (COPY Pg 2-a)

OPTICS PWR UP CHECKLIST (Pg 2-9)

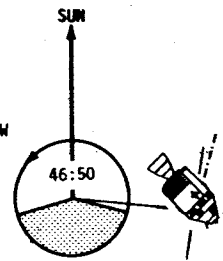
* OPTICS PWR UP CHECKLIST (Pg 2-9)
* GDC & IMU RNDZ/RNDZ REALIGN
* CHECKLIST (Pg 2-9)

46+40

* MNVR TO STAR ACQ PAD "D" ATT
* IMU DRIFT CHECK(RATE-LOW)
* RECORD SA'S AND TA'S
* REQUIRED TO CENTER STARS
* IN SXT (33,42)
* RECORD GET WHEN FINISHED

46+50

ACQUIRE ATS HGA: MAH, WIDE P 13, Y 230
S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW



47+00

L10H CANISTER CHANGE
(6 INTO B, STOW 4 IN A4)

*****FOR M=14 RNDZ*****
* STOW 2 IN A4

OPTICS PWR UP CHECKLIST

VERIFY OPTICS MANUAL DRIVE DISENGAGED
OPTICS ZERO-OFF
OPT MODE-MAN
1.1 FAR OPTICS-ON(up)
OHC-DRIVE TRUN <10 DEG
OPT ZERO-ZERO (15 SEC)

GDC & IMU RNDZ/RNDZ REALIGN CHECKLIST

ASSUMPTIONS: 1) GDC & IMU ARE ALIGNED
TO RNDZ REFSMMAT.
2) GDC & IMU COMPARE WITHIN
5° (IF NOT, PERFORM
BACKUP GDC & IMU
ALIGNMENT) (G/3-12)

FDAI SELECT-1
FDAI SOURCE-ATT SET
ATT SET-IMU

SET ASCP tw TO 0,0,0
RHC-MNVR TO 0,0,0 ON FDAI 1(IMU)
BMAG MODE(3)-RATE 2
DBD/RATE-MIN/LOW
BMAG MODE(3)-ATT 1/RATE 2
RHC-TWEAK MNVR TO ZERO FDAI 1 ERR NEEDLES

SET ASCP tw to RNDZ/RNDZ REALIGN
PAD VALUES (Pg 2-a)
ATT SET-GDC
GDC ALIGN pb-push
SET ASCP tw TO 0,0,0

IMU CAGE-ON(up) & HOLD (until MNVR complete)
RHC-MNVR TO 0,0,0 ON FDAI 1(GDC)
BMAG MODE(3)-RATE 2
DBD/RATE-MIN/LOW
BMAG MODE(3)-ATT 1/RATE 2
RHC-TWEAK MNVR TO ZERO FDAI 1 ERR NEEDLES
IMU CAGE-RELEASE

ATT SET-IMU
RATE-HIGH
ROLL 180° TO HEADS DOWN ATT

IMU DRIFT CHECK

ASCP tw	R	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	P	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Y	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	1ST STAR	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
TPAC ANGLES	SA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	TA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	2ND STAR	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
TPAC ANGLES	SA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	TA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	HR	+	0	0									
TIME OF DRIFT CHECK	MIN	+	0	0	0								
	SEC	+	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

47+00

TV CHECKLIST (Pg 2-10)

CM2/DAC/25/CX02-BRKT, MIR (f8,1/250,=) 2 FPS
UTILITY POWER-ON

FURNACE SHUT DOWN (D/7-6) (1ST OPP ONLY)

TV- GRD CMD
47+10 - 47+37

*****FOR M=14 RNDZ*****
* BIOSTACK-OFF (MA 107) (R1)
* RECORD GET & INDICATOR STATUS *
* GET HR [] [] [] [] IND LT ON [] *
* MIN [] [] [] [] OFF [] *

DM CLOSEOUT

DP TRANSFER TO DM
OPEN cb CAUT/WARN DMB (815)
DM1 & DM2 TV STA PWR-OFF (808)
DP TRANSFER TO CM
TERMINATE CM-DM ATMOSPHERE MIXING
INSTALL HATCH 1 (DECAL) (S/2-9)
HATCH 1 PRESSURE EQUALIZATION
VLV-CLOSE(cw)/LOCK(verify)

END MANUAL HEAT SOAK AND
PERFORM HELIUM INJECTION(D/7-5)
(1ST OPP ONLY)

*****FOR M=14 RNDZ*****
* cb VHF FM XCVR DMA-CLOSE(verify)*
* (PNL 815) *
* VHF FM-T/R (verify) (6) *
* DP PERFORM MCC-H/MCC-M/APOLLO *
* COMM CHECK *

ZFF PHOTOS (J/10-1)

47+10

47+20

47+30

TV CHECKLIST

Remove TV camera and U-mount (location 11)
Position U-mount X, Y, Z - 105, 190, 65
Remount camera (location 11) (pin in hole 4)
Install polarized filters on couch lights and camera
On TV camera at location 606:
Verify camera - PEAK, SLAVE, LINEAR
Note: Select AVG if white content of scene
rises above approx 10%
Verify lens (F, ZOOM, FOC) - 22, 100, infinity
(Adjust ZOOM as range requires)
On pnl 181:
CM/DM CAMR POWER-ON(up)(verify)
TV AMPL-ON
CM1 TV STA POWER-ON
CM2 TV STA POWER-ON
On pnl 808:
DM1 TV STA POWER-ON
DM2 TV STA POWER-ON
Check monitors, adjust camera pointing and
lens if required



CM CAMR 1



DM CAMR 1



DM CAMR 2

47+30

47+40

47+50

48+00

H2 PURGE LINE HTR-ON(up)

MNVR TO STAR ACQ PAD "D" ATT
IMU DRIFT CHECK(RATE-LOW)
RECORD SA'S AND TA'S REQUIRED
TO CENTER STARS IN SXT (33,42)
RECORD GET WHEN FINISHED

SUN

48:00

H2/O2 FUEL CELL PURGE (S/1-6) (20 MIN AFTER LINE HTR-ON)

WASTE WATER DUMP CHECKLIST

IMU DRIFT CHECK

ASCP tw	R	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	P	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Y	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
1ST STAR		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
TPAC ANGLES	SA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	TA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2ND STAR		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
TPAC ANGLES	SA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	TA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
TIME OF DRIFT CHECK	HR	+	0	0																
	MIN	+	0	0	0															
	SEC	+	0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

WASTE WATER DUMP CHECKLIST

BAT VENT VLV-CLOSED (252)
H2O QTY IND-WASTE (Panel)
WATER CONT PRESS REL VLV-DUMP A (352)
Monitor WASTE H2O QTY IND-decreasing
(~5% PER MIN)
When WASTE H2O QTY IND-60%
WATER CONT PRESS REL VLV-2
BAT VENT VLV-VENT (252)

48+00

NC2 FINAL PAD (COPY)
 NCC PRELIMINARY PAD (COPY Pg 2-14)
 NSR PRELIMINARY PAD (COPY Pg 2-15)
 TRANSMIT IMU DRIFT CHECK DATA (Pg's 2-9 & 2-11)

H2 PURGE LINE HTR-OFF (10 MIN AFTER PURGE)

UNSTOW HP-65 KIT(U1) & CHECKLIST(R1)
 VELCRO (HOOK) FROM U3 (IN PIN STRAIGHTENING KIT)
 HP-65 CHECKOUT (Pg 1)

MNVR TO NC2 FINAL PAD ATT

48+10

48+20

SET DET

P				Y		
---	--	--	--	---	--	--

ACQUIRE ATS HGA: MAN, WIDE P -35, Y 144
 S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW

SET ASCP tw TO NC2 BURN ATT

-12:00

GO TO SPS BURN CUE CARD(SCS A)
 (BANK A)

48+30

NC2 PAD DATA

		NOMINAL	PRELIMINARY	FINAL
N28	HR	+ 0 4 8	+ [X] [X] [X] [X] [X] [X]	+ [X] [X] [X] [X] [X] [X]
TIG NC2	MIN	+ 3 4	+ [X] [X] [X] [X] [X] [X]	+ [X] [X] [X] [X] [X] [X]
	SEC	+ 0 4	+ [X] [X] [X] [X] [X] [X]	+ [X] [X] [X] [X] [X] [X]
N81	ΔV_X	- 0 3 6 4	[X] [X] [X] [X] [X] [X]	[X] [X] [X] [X] [X] [X]
ΔV_{NC2}	ΔV_Y	+ 0 0 0 0	[X] [X] [X] [X] [X] [X]	[X] [X] [X] [X] [X] [X]
	ΔV_Z	- 0 0 0 1	[X] [X] [X] [X] [X] [X]	[X] [X] [X] [X] [X] [X]
			[X] [X] [X] [X] [X] [X]	[X] [X] [X] [X] [X] [X]
N22	R	+ 0 0 0 0 0	+ [X] [X] [X] [X] [X] [X]	+ [X] [X] [X] [X] [X] [X]
NC2	P	+ 0 3 4 0 0	+ [X] [X] [X] [X] [X] [X]	+ [X] [X] [X] [X] [X] [X]
	Y	+ 0 0 0 0 0	+ [X] [X] [X] [X] [X] [X]	+ [X] [X] [X] [X] [X] [X]
			[X] [X] [X] [X] [X] [X]	[X] [X] [X] [X] [X] [X]
	ΔV_C	[X] [X] 0 2 3 7	[X] [X] [X] [X] [X] [X]	[X] [X] [X] [X] [X] [X]
	BT	[X] [X] 0 0 0 0	[X] [X] [X] [X] [X] [X]	[X] [X] [X] [X] [X] [X]

MT	+ [X] [X] [X] [X] [X] [X]	PT	[] [] [] [] [] []	YT	[] [] [] [] [] []
----	---------------------------	----	-------------------------	----	-------------------------

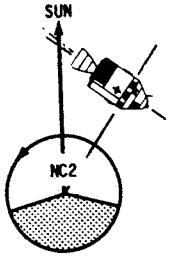
	BURN ATT CHECK					
STAR	[X] [X] [X] [X] [X] [X]	[] [] [] [] [] []				
SA	+ [] [] [] [] [] []	0 [] [] [] [] [] []				
TA	+ [] [] [] [] [] []	0 0 [] [] [] [] [] []				

	BURN ATT CHECK UPDATE					
STAR	[X] [X] [X] [X] [X] [X]	[] [] [] [] [] []				
SA	+ [] [] [] [] [] []	0 [] [] [] [] [] []				
TA	+ [] [] [] [] [] []	0 0 [] [] [] [] [] []				

TPI TIG R37 [] [] [] [] [] [] [] [] [] []

SPS BURN STATUS

ATIG	[X] [X] [X] [X] [X] [X]	[] [] [] [] [] []
AFTER TRIM		[] [] [] [] [] []
AVC	[] [] [] [] [] []	[X] [X] [X] [X] [X] [X]

<p>48+30</p> <p>0:00</p> <p>48+40</p> <p>48+50</p> <p>49+00</p>	<p style="text-align: center;">SOYUZ MNVRS TO ORBITAL ATTITUDE RATE</p> <p>NC2 (0,182/34,0) (R=263.3 NM)</p> <p>RECORD BURN STATUS TRANSMIT NC2 BURN STATUS</p> <p>ROLL LEFT TO 180°, THEN PITCH DOWN ~ 145° TO TRACK HORIZON (ATT ~ 180,175,0)</p> <p>DP ESTABLISH VHF AM & FM COMM WITH SOYUZ (PERFORM CHECKS FROM PANEL 6 ONLY)</p> <p>SET DET</p> <p>DP PERFORM VHF AM COMM CK</p>		<p style="text-align: center;">TV- GRD CMD 48+50 - 49+00</p> <p style="text-align: center;">VHF AM SPEC RANGE = 196 NM</p>	<p>VHF AM AND FM COMM:</p> <p>VHF FM-T/R (6) VHF AM-T/R VHF FM-T/R (9) VHF AM-T/R VHF AM A-SIMPLEX (3) VHF AM SQUELCH A tw-noise + 1 VHF ANTENNA-RIGHT MODE-VOX (10) VOX SENS tw-8 VHF FM-RCV</p> <p>VHF FM tw-5 S BAND-T/R S BAND tw-full decrease POWER-AUDIO MASTER tw-5 INTERCOM-T/R INTERCOM tw-full decrease VHF AM-OFF AUDIO CONTROL-BACKUP PHONE/MIC CONNECT-OI</p> <p>◀ This is Apollo. Я АПОЛЛОН. ◀ How do you read? КАК ВЫ СЛЫШИТЕ?</p> <p>VHF AM COMM CHECK 48+59</p> <p>◀ Configure for VHF AM check. ГОТОВЬТЕСЬ К ПРОВЕРКЕ СВЯЗИ НА УКВ АМ. VHF FM-OFF ◀ This is Apollo on VHF AM. Я АПОЛЛОН НА УКВ АМ.</p> <p>VHF FM COMM CHECK 49+08</p> <p>◀ Configure for VHF FM check. ГОТОВЬТЕСЬ К ПРОВЕРКЕ СВЯЗИ НА УКВ ЧМ. VHF FM-T/R (6) VHF AM-OFF ◀ This is Apollo on VHF FM. Я АПОЛЛОН НА УКВ ЧМ.</p> <p>VHF RANGING COMM CHECK 49+23</p> <p>◀ Turn on VHF ranging. ВКЛЮЧИТЕ ИЗМЕРЕНИЕ ДАЛЬНОСТИ.</p> <p>VHF AM A-OFF(ctr) VHF AM B-DUPLEX VHF RANGING-ON(up) VHF ANTENNA-RIGHT(verify) EIS FUNC-ΔV SET/VHF RNG EIS MODE-BACKUP/VHF RNG VHF RNG-RESET</p> <p>◀ Ranging lockup established. РЕЖИМ ИЗМЕРЕНИЯ ДАЛЬНОСТИ УСТАНОВЛЕН. ◀ Range _____ miles. ДАЛЬНОСТЬ _____ МИЛЬ. VHF FM-OFF(6) VHF AM-T/R ◀ This is Apollo on VHF ranging. Я АПОЛЛОН НА РЕЖИМЕ ИЗМЕРЕНИЯ ДАЛЬНОСТИ.</p> <p>◀ VHF AM and FM comm checked. ПРОВЕРИЛ СВЯЗЬ УКВ ЧМ И АМ.</p>
---	--	--	--	---

49+00 U.S. R. NCC FINAL PAD (COPY)
NSR FINAL PAD (COPY Pg 2-15)

-12:00 SET ASCP tw TO NCC BURN ATT

49+10 DP PERFORM VHF FM COMM CK
GO TO SPS BURN CUE CARD(SCS Δ)
(BANK A)

SUN

NCC

0:00 **NCC** (180,349/21,359) (R=145.5 NM)

49+20 RECORD BURN STATUS
REPORT COMM CHECK RESULTS
TRANSMIT NCC BURN STATUS
PITCH UP TO TRACK HORIZON

SET DET
NCC completed. NCC ENJOY/HEH.
DP PERFORM VHF RANGING VOICE CHECK WITH SOYUZ

-28:00 R HP-65 DATA FOR NSR-28

49+30

NCC PAD DATA

		NOMINAL				PRELIMINARY				FINAL				
N11	HR	+	X	X	0 4 9	+	X	X		+	X	X		
TIG NCC	MIN	+	X	X	1 8	+	X	X		+	X	X		
	SEC	+	X	0 3	X	+	X	X	X	+	X	X	X	
N81	ΔV _X	+	X	0 3 9	6									
	ΔV _Y	-	X	0 0 0	6									
	ΔV _Z	+	X	0 0 6	4									
N22	R	+	1 8 0 0 0			+			0 0	+			0 0	
	NCC	P	+	0 2 1 0 0			+			0 0	+			0 0
	Y	+	3 5 9 0 0			+			0 0	+			0 0	
	ΔV _C		X	0 2 7	4									
	BT		X	0 0 0	2									
WT		+	X	X	X	X				PT				
										YT				

BURN ATT CHECK				BURN ATT CHECK UPDATE							
STAR	+	X	X	X	X	STAR	+	X	X	X	X
SA	+				0	SA	+				0
TA	+				0 0	TA	+				0 0

SPS BURN STATUS

ATIG		X	X			
AFTER TRIM						
ΔVC		X				

N11 (TIG NCC)						
	+			0 9		
NSR-28						

49+30

-24:00 R HP-65 DATA FOR HSR-24

-20:00 R HP-65 DATA FOR NSR-20
SET ORDEAL (FDAI 1) WITH COAS
BORESIGHTED ON HORIZON

0D=346, H=111

-16:00 R HP-65 DATA FOR HSR-16

49+40

-12:00 R HP-65 DATA FOR HSR-12
SET ASCP tw TO NSR BURN ATT

GO TO SPS BURN CUE CARD(SCS A)
(BANK A)

FOR HP-65 SOLN
MHRV TO AND MAINTAIN ORDEAL BURN ATT (~.06°/SEC)
(BURN ΔVT SPS)
(BURN ΔVY TIMED RCS), WITH
AUTO RCS SELECT(16)-MNA/HNB

RCS X AXIS
1 FPS=2.50 SEC
RCS Y&Z AXIS
1 FPS=5.00 SEC

NSR (176,307/188,357) (R=81.0 NM)

RECORD BURN STATUS
TRANSMIT NSR BURN STATUS
←NSR completed.NSR BURN OTHER.

ACQUIRE ATS HGA: MAN, WIDE P -19, Y 308
S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW

TRACK SOYUZ IH BOTTOM OF CDR WINDOW (ATT ~ 180,212,0)

49+50

AG 0

0:00

50+00

NSR PAD DATA

TIG NSR(N13)=TIG NCC(N11) + 00:37:00= _____ : _____ : _____

		NOMINAL					PRELIMINARY					FINAL					
N81	ΔV _X	+	0	1	7	0											
ΔV _{NSR}	ΔV _Y	-	0	0	1	4											
	ΔV _Z	+	0	2	1	2											
N22	R	+	1	7	6	0	0	+			0	0	+			0	0
NSR	P	+	1	8	8	0	0	+			0	0	+			0	0
	Y	+	3	5	7	0	0	+			0	0	+			0	0
	ΔV _C		0	1	4	5											
	BT		0	0	0	1											
	ΔVC AT IGN	+						+					+				
	ΔVC TAILOFF	-						-					-				
WT		+															
PT																	
YT																	

BURN ATT CHECK					BURN ATT CHECK UPDATE				
STAR					STAR				
SA	+			0	SA	+			0
TA	+			0	TA	+			0

NSR ONBOARD DATA

XX

X N81 COMP LIMITS NA X

X USE STDN ΔVY IN ALL CASES X

X IF NCC EXECUTION IS QUESTIONABLE-THE ORDER X

X OF PRIORITIES ARE: X

X HP-65 X

X STDN UNMATCHED X

X DO NOT BURN NSR X

XX

SPS BURN STATUS

		NSR HP-65 SOLN				
ΔV _X						
ΔV _Y	*	S	T	D	N	*
ΔV _Z						

		ORDEAL BURN ATT				
ΔVT (IN PLANE)	+					
ΔV TAIL OFF	-			1	3	0
ΔV _C	+					
ΔV _Y BT						

		AFTER TRIM				
ΔTIG						
FDAI (INTRL)	R					
(FOR HP-65 BURN ONLY)	P					
	Y					
ΔV _C						

TRANSMIT ΔVC LOADED

50+00

A T S

REACQUIRE VHF RANGING (R=74 NM) FOR HP-65 DATA
R HP-65 DATA FOR TPI TIG 1

R PP-65 DATA FOR TPI TIG 1

SET DET
REMOVE POLAR PLOT
SNACK PERIOD

50+10

TV

PAD

50+20

-32:00

U S P

50+30

D

TPI PRELIMINARY PAD (COPY Pg 2-17)
DOCKING ATTITUDE PAD (COPY Pg 2-19)

R HP-65 DATA FOR TPI-32 (GET)

HP-65 TPI TIG 1											
-			3	2							
TPI-32											

TV- GRD CMD
50+12 - 50+22

50+30
-24:00

U
S
R
A
T
S
M
A
R
K
E
T
I
M
E
L
I
N
E
S
C
A
L
E
I
N
M
I
N
U
T
E
S
A
N
D
S
E
C
O
N
D
S

R HP-65 DATA FOR TPI-24 (GET)

TPI FINAL PAD (COPY)

-16:00

R HP-65 DATA FOR TPI-16 (GET)

50+40
-14:00

R HP-65 DATA FOR TPI-14 (GET)
MNVR TO BORESIGHT COAS ON HORIZON
SET ORDEAL (FDAI 1)

$\theta D=345, H=118$

-12:00

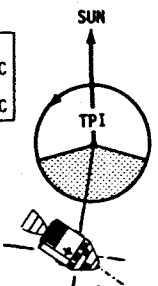
SET ASCP \pm TO TPI BURN ATT
RCH-MNVR TO ZERO ROLL (ROLL RIGHT)

GO TO SPS BURN CUE CARD(SCS A)
(BANK A)

FOR HP-65 SOLUTION
MNVR TO AND MAINTAIN ORDEAL BURN ATT ($\sim 0.6^\circ/\text{SEC}$)
(BURN ΔV SPS)

50+50

RCS X AXIS
1 FPS=2.50 SEC
RCS Y&Z AXIS
1 FPS=5.00 SEC



TPI (359,29/29,2) (R=21.2 NM)

TPI completed. TPI ENJOYER.
REACQUIRE VHF RANGING (R=18 NM)

CENTER SOYUZ IN COAS WHEN
READING HP-65 DATA

+4:30
51+00

HP-65 DATA FOR TPI+4:30

TPI PAD DATA

		NOMINAL	PRELIMINARY	FINAL
N37	HR	+ 0 5 0	+ 0 5 0	+ 0 5 0
TIG	TPI MIN	+ 5 4	+ 5 4	+ 5 4
	SEC	+ 2 5	+ 2 5	+ 2 5
N81	ΔV_X	+ 1 9 5	+ 1 9 5	+ 1 9 5
ΔV_{TPI}	ΔV_Y	+ 0 0 7	+ 0 0 7	+ 0 0 7
	ΔV_Z	- 1 0 0	- 1 0 0	- 1 0 0
N59	$\Delta V_r/\text{BT}$ (RCS)	+ 2 1 9 5 5	+ 2 1 9 5 5	+ 2 1 9 5 5
ΔV	$\Delta V_r/\text{BT}$ (LOS)	+ 0 0 7 0 4	+ 0 0 7 0 4	+ 0 0 7 0 4
	$\Delta V_d/\text{BT}$	+ 0 0 0 0 0	+ 0 0 0 0 0	+ 0 0 0 0 0
	ΔV_C	+ 0 0 0 2	+ 0 0 0 2	+ 0 0 0 2
	BT	+ 0 0 0 1	+ 0 0 0 1	+ 0 0 0 1
N22	R	+ 3 5 9 0 0	+ 3 5 9 0 0	+ 3 5 9 0 0
(SPS USING N81)	P	+ 0 2 9 0 0	+ 0 2 9 0 0	+ 0 2 9 0 0
	Y	+ 0 0 2 0 0	+ 0 0 2 0 0	+ 0 0 2 0 0
ΔV_C	AT IGN	+ 0 0 0 0 0	+ 0 0 0 0 0	+ 0 0 0 0 0
ΔV_C	TALLOFF	- 0 0 0 0 0	- 0 0 0 0 0	- 0 0 0 0 0

WT + 0 0 0 0 0 PT 0 0 0 0 0 YT 0 0 0 0 0

BURN ATT CHECK

STAR	SA	TA
	+ 0	+ 0 0

BURN ATT CHECK UPDATE

STAR	SA	TA
	+ 0	+ 0 0

TPI ONBOARD DATA

XXXXXXXXXXXXXXXXXXXXXXXXXXXX
X N81 COMP LIMITS NA X
X STDN SOLN PRIME X
X IF STDN SOLN NOT AVAILABLE X
X USE HP-65 SOLN X
XXXXXXXXXXXXXXXXXXXXXXXXXXXX

TPI HP-65 SOLN

TIG	ΔV_X	ΔV_Y	ΔV_Z
	+ 0 0 0	+ 0 0 0	+ 0 0 0

ORDEAL BURN ATT

ΔV_T (IN PLANE)	ΔV TAIL OFF	ΔV_C
+ 1 3 0	- 1 3 0	+ 1 3 0

SM RCS QUAD HTRS(4)-OFF(ctr) (274)

51+00

+7:30 R HP-65 DATA FOR TPI+7:30

+8:30 R AND θ HP-65 DATA FOR TPI+8:30
 THC PWR-ON(up)
TPM1 BURN ASAP WITH SOYUZ BORESIGHTED IN COAS
 (AVF RCS WITH EMS) (AVD TIMED RCS)
 REACQUIRE VHF RANGING (R=11 NM)

RCS X AXIS
 1 FPS=2.50 SEC
 RCS Y&Z AXIS
 1 FPS=5.00 SEC

◀Turn on your orientation lights. ВКЛЮЧИТЕ ВАШИ ОГНИ ОРИЕНТАЦИИ.

51+10

+16:30 θ HP-65 DATA FOR TPI+16:30

CENTER SOYUZ IN COAS WHEN
 READING HP-65 DATA θ

+19:30 R HP-65 DATA FOR TPI+19:30

+20:30 R AND θ HP-65 DATA FOR TPI+20:30
 THC PWR-ON(up)
TPM2 BURN ASAP WITH SOYUZ BORESIGHT IN COAS
 (AVF RCS WITH EMS) (AVD TIMED RCS)
 REACQUIRE VHF RANGING (R=3 NM)

RCS X AXIS
 1 FPS=2.50 SEC
 RCS Y&Z AXIS
 1 FPS=5.00 SEC

STOW HP-65 KIT(U1) & CHECKLIST(R1)
 MONITOR LOS RATES AND CALCULATE AVE RANGE RATE FOR R=1.5 NM

PRE-BRAKING SWITCH LIST (Pg 2-18) $R=(\Delta R(\text{nm})/1 \text{ MIN})100$

VTR/DAC SWITCH LIST (Pg 2-18)
 NULL LOS RATES AND ADJUST RANGE RATE TO BRAKING GATES (TIMED RCS)

51+20

51+30

STATION KEEP ON SOYUZ +X AXIS (R~150FT)
 Apollo stationkeeping ЕСТЬ ЗАВИСАНИЕ АПОЛЛОНА.

TPM1 ONBOARD DATA

TPM1 HP-65 SOLN

ΔV (LOS)	ΔV_F	[Grid]				$\Delta V_{D BT}$
	ΔV_R	[Grid]				
	ΔV_D	[Grid]				

TPM2 ONBOARD DATA

TPM2 HP-65 SOLN

ΔV (LOS)	ΔV_F	[Grid]				$\Delta V_{D BT}$
	ΔV_R	[Grid]				
	ΔV_D	[Grid]				

PRE-BRAKING SWITCH LIST

MAN ATT(3)-RATE CMD	ATT SET-IMU
LIMIT CYCLE-OFF	THC PWR-PWR
DBD/RATE-MIN/LOW	RHC PWR NORMAL #2-AC/DC
BMAG MODE(3)-ATT 1/RATE 2	RHC PWR DIRECT #2-MNA/MNB
SC CONT-SCS	AUTO RCS SELECT(16)-MNA/MNB
FDAI SCALE-5/1	THC-ARMED
FDAI SELECT-1	RHC #2-ARMED
FDAI SOURCE-ATT SET	

VTR/DAC SWITCH LIST

VTR POWER(3)-ON(UP)
 HEAD WHEEL DRIVE MOTOR-ON (MOTOR ON LT-ON)
 MODE-RECORD (RECORD LT-ON)
 DAC-ON
 (IF desired)HDC CX06

BRAKING GATES			θ (DEG)	
R(NM)	R(FPS)	R(FT)	SOLAR PANEL	BODY
1.00	30	6000		
.50	20	3000	0.5	
.25	10	1500	1.0	
.08	5	500	3.1	1.0
.05		300	5.2	1.7
.03		200	7.9	2.6
.02		130		3.9
.01		60		8.4

CM CAMR 2

V
T
R

51+30

A
T
S

51+40

M
A
D

51+50

C
S
M

52+00

LOAD ASCP tw WITH DOCKING ATT (Pg 2-19)
 ◀Initiating orientation of Apollo. НАЧИНАЮ ОРИЕНТАЦИЮ АПОЛЛОНА.
 MNVR TO DOCKING ROLL ATT (-60° CCW)
 (REF ATT SET ERROR NEEDLES)
 VTR/TV SWITCH LIST (Pg 2-19)

◀Orientation established. ОРИЕНТАЦИЯ УСТАНОВЛЕНА.
 ▶Initiate docking orientation as programmed. НАЧНИТЕ ОРИЕНТАЦИЮ
 СТЫКОВКИ ПО ПРОГРАММЕ.

ACQUIRE ATS HGA: MAN, WIDE P -36, Y 44
 S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW

EMS FUNC/MODE-ΔV SET/STBY
 SET ΔVC = -100.0 FPS
 EMS FUNC-ΔV

ACTIVE DOCKING PREPARATION CHECKLIST (Pg 1-20)

MONITOR SOYUZ MNVR ON SOYUZ +X AXIS

SOYUZ MNVRS TO DOCKING ATT
 51+44:25 - 51+47:00

ACTIVE DOCKING CHECKLIST (Pg 1-21)

TV- GRD CMD
 51+48 - 52+09

CSM/SOYUZ INTERFACE SEAL COMPRESSED

SUNSET
 AT 52:05

DOCKING ATTITUDE

		NOMINAL			UPDATE		
ASCP tw	R	X	X	3	0	0	X
	P	X	X	1	5	7	X
	Y	X	X	0	0	0	X

VTR/TV SWITCH LIST

VTR HEAD WHEEL DRIVE MOTOR-OFF(400)
 (MOTOR ON LT-OFF)

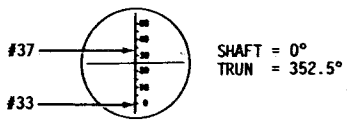
ON TV CAMERA AT LOCATION 606:
 CAMERA-AVG, SLAVE, LINEAR
 LENS (F, ZOOM, FOC)-22, 25, infinity

WHEN IMU FAILURE OCCURS

- 1.) PERFORM IMU FAILURE SWITCH LIST
 SC COHT-SCS
 IMU PWR-OFF
 DBD/RATE-MIN/HIGH
 BMAG MODE(3)-ATT 1/RATE 2
 MAH ATT(3)-RATE CMD
 FDAI SELECT-1
 FDAI SOURCE-ATT SET
 ATT SET-GDC
 LIMIT CYCLE-OFF
- 2.) SET REFSMMAT FLAG
 KEY V37E99E; V25N7E, 77E, 19909E, 1E
- 3.) INITIALIZE NO-DAP CONFIG
 (VERIFY CSM DAP ACTIVATED PRIOR TO NO-DAP CONFIG)
 KEY V48E, V21E, 0E, PRO, PRO, V24E AND LOAD
 PT & YT REQD FOR REST OF RNDZ, PRO, V46E
- 4.) "SINGLE SENSOR POST TPI
 KEY V57E, V22E, 1E, PRO
- 5.) EMP SL-50
 REQUEST UPLINK AT 1ST AVAILABLE OPPORTUNITY
 (MANUAL LOAD ON Pg 3-c)
- 6.) PROCEED TO APPROPRIATE POINT IN TIMELINE
AND AT NEXT STDN SITE - REPORT TRANSFER TO IMU FAIL C/L

STAR AVAILABILITY

- 1.) BACKUP GDC ALIGN STARS VISIBLE FROM SS-8 MIN TO SR+4 MIN.



- 2.) STAR ACQUISITION STARS ARE VISIBLE FROM SS+1 MIN TO SR+7 MIN.

DEFINITIONS

θD = ORDEAL ANGLE TO PLACE EARTH HORIZON IN CENTER OF COAS
 H = AVERAGE ALTITUDE
 θ = ORDEAL FDAI PITCH

NOTES

- 1.) N20 NEED NOT AGREE WITH CURRENT SC ATT EXCEPT FOR OPTICS MARKS, COAS LOS DETERM, P52 CALC OF N22, EMP SL-50 CALC OF N22, AND Y83 CALC OF THETA.
- 2.) LOAD R81 DURING FINAL COMP TO AGREE WITH ΔV'S TO BE BURNED; LOAD H59 FOR TPM'S.
- 3.) IF LOS ATT IS DESIRED (WHEN P20 IS RUNNING) KEY V22N73E, +E, V16N22E.
- 4.) RECOMMEND TRACKING OF HORIZON AND SOYUZ; DBD/RATE-MIN/HIGH, MAH ATT PITCH-MIN IMP
- 5.) EMP SL-50 CONVERTS GYRO TORQUE ANGLES (N93) INTO RESULTANT ACTUAL CDU ANGLES (N22) AND SETS H20=N22.
- 6.) USE VHF MARKING TO UPDATE CMC STATE VECTORS.

LAUNCH → GET ~ 7+30

GET ~ 7+30 → DOCK

BACKUP GDC ALIGN PAD

		NOMINAL LAUNCH A					POST INS UPDATE B					NOMINAL RNDZ C					RNDZ UPDATE D								
0°/R STARS		3	3	/	3	7						3	3	/	3	7									
ASCP	R	X	X	X	2	4	9	6						X	X	X	2	4	6	3					
	P	X	X	X	2	7	7	5						X	X	X	0	6	8	2					
	Y	X	X	X	3	3	7	9						X	X	X	3	3	2	5					

STAR ACQUISITION PAD

		(ACM ATT) NOMINAL LAUNCH A					(ACM ATT) POST INS UPDATE B					(SI +X FWD) NOMINAL RNDZ C					RNDZ UPDATE D								
N22	R	+	1	7	9	0	0	+				0	0	+	0	1	8	0	0	+				0	0
	P	+	2	1	3	0	0	+				0	0	+	1	7	0	0	0	+				0	0
	Y	+	0	0	1	0	0	+				0	0	+	3	3	0	0	0	+				0	0
N71 1ST STAR		X	X	X	X	3	7	X	X	X	X			X	X	X	X	4	0	X	X	X	X		
TPAC	SA	X	2	3	5	2	0	X					0	X	0	8	6	6	0	X					0
ANGLES	TA	X	0	4	1	3	0	X	0				0	X	0	2	5	8	0	X	0				0
N71 2ND STAR		X	X	X	X	4	5	X	X	X	X			X	X	X	X	4	3	X	X	X	X		
TPAC	SA	X	0	3	4	5	0	X					0	X	0	0	0	8	0	X					0
ANGLES	TA	X	0	1	2	3	0	X	0				0	X	0	3	1	0	0	X	0				0
N71 3RD STAR		X	X	X	X	4	2	X	X	X	X			X	X	X	X	0	1	X	X	X	X		

GDC REFSMMAT REALIGN (P52)

- Notes:
1. P51 Is Not Required As-Long-As A Valid REFSMMAT Is Stored Or Can Be Obtained Via STDN Uplink.
 2. If DAP Related Extended Verbs (i.e. V46, V48 Load) Are Executed, EMP SL-50 Will Require Reloading.
 3. It Is Desirable To Maintain A Constant Inertial Att Throughout The Entire P52 OPT 3 (Or P52 OPT 3 & OPT 1) Procedure. If A Mnvr Is Required, However, Reload N20 With The New Att.
 4. It Is Probable That The GDC Drift Rate Will Be Greater Than The BMAG's. As A Result, The FDAI Ball May Be Drifting Whereas The SC IS Maintaining An Inertial Att. Therefore, The SC Att Should Not Be Slaved To The Initial Ball Reading, And N20 Should Not Be Reloaded Unless A Mnvr Is Actually Commanded By The Astronaut.

Assumptions: REFSMMAT Flag SET; CSM DAP Has Been Activated, Followed By A NO-DAP Initialization; EMP SL-50 Has Been Loaded.

(P52 OPT 3)

1. BMAG MODE(3)-RATE 2
DBD/RATE-MIN/LOW
BMAG MODE(3)-ATT 1/RATE 2
LIMIT CYCLE-ON(up)
2. RHC-Mnvr To Acquire Star Pair (If Req'd, Ref STAR ACQ PAD)
ATT SET-GDC (verify)
ZERO FDAI 1 Error Needles With ASCP tw.
V25N20E
Load N20 With ASCP tw Angles.
3. V37E52E
Proceed Thru P52 And Perform Star Marks.
(If Att Mnvr Required Between Star Marks Reload N20)
4. F 06 05 Accept Angular Separation Error (Reg 1) Up To .40 Deg.
PRO
F 06 93 TORQUING ANGLES OG,IG,MG (.001 Deg)
V5N26E
Verify N26 = 10001,1642,50006 (If Not: Reload N26)
KEY RLSE
V30E *F 01 70 (RESTART)*
*Redo 2nd Mark *
- F 06 22 NEW ICDU ANGLES OG,IG,MG (.01 Deg)
Set ASCP tw To N22 Values.
GDC Align pb-Push.
PRO (Sets N20 = N22)
- F 06 93 TORQUING ANGLES OG,IG,MG (.001 Deg)
V32E
- F 50 25 00014 ALIGNMENT CHECK
(Perform 3rd Star Check) PRO
5. V3700E
(If Immediately Followed By P52 OPT 1, Bypass Remaining Procedures)
LIMIT CYCLE-OFF
RATE-HIGH

(P52 OPT 1) (If Immediately Preceded By P52 OPT 3, Steps 1 & 2 May Not Be Required)

1. BMAG MODE(3)-RATE 2
DBD/RATE-MIN/LOW
BMAG MODE(3)-ATT 1/RATE 2
LIMIT CYCLE-ON(up)
2. RHC-Mnvr To Acquire Star Pair (If Req'd, Ref STAR ACQ PAD)
ATT SET-GDC (verify)
ZERO FDAI 1 Error Needles With ASCP tw.
V25N20E
Load N20 With ASCP tw Angles.
3. V37E52E
Align GDC to N22.
Record N22 And
Load N20 With N22.
PRO On GYRO TORQUE Request (Reg 1 = 00013).
Ignore PROG ALARM (#'s 211 & 217)
Do Not Touch DSKY Until F 50 25 00015 Is Displayed Or The New REFSMMAT Will Be Lost. (Will Take ~5 Min)
Continue In P52 And Perform Star Check To Verify Alignment
4. If Star Check Fails: Continue In P52 And Perform Star Marks
(Ref P52 OPT 3 Procedures, Steps 3, 4 & 5)
5. V37E00E
LIMIT CYCLE-OFF
RATE-HIGH

EMP SL-50 MANUAL LOAD

DSKY LOAD	(REG 3 ADDRESS)	
V2111E		77776E
3242E		E
6006E	(3242)	34124E
N15E		E
77775E		55237E
E		E
2703E		35040E (3270)
E		E
2661E		4647E
E		E
77775E		24000E
E		E
2711E		20456E
E		E
2667E	(3250)	5537E
E		E
77775E		1677E
E		E
2717E		5537E
E		E
2675E		4E
E		E
77634E		6E (3300)
E		E
24017E		31300E
E		E
47471E		52033E
E		E
77634E		31301E
E		E
24017E	(3260)	54034E
E		E
34747E		5537E (3305)
E		E
77634E		
E		V25N26E
24017E		10001E
E		1642E
47303E		50006E
E		

To Verify EMP Load:

V1N1E
 3242E
 (Verify Reg 1 = 6006)
 N15E
 (Verify Reg 1 = 77775)

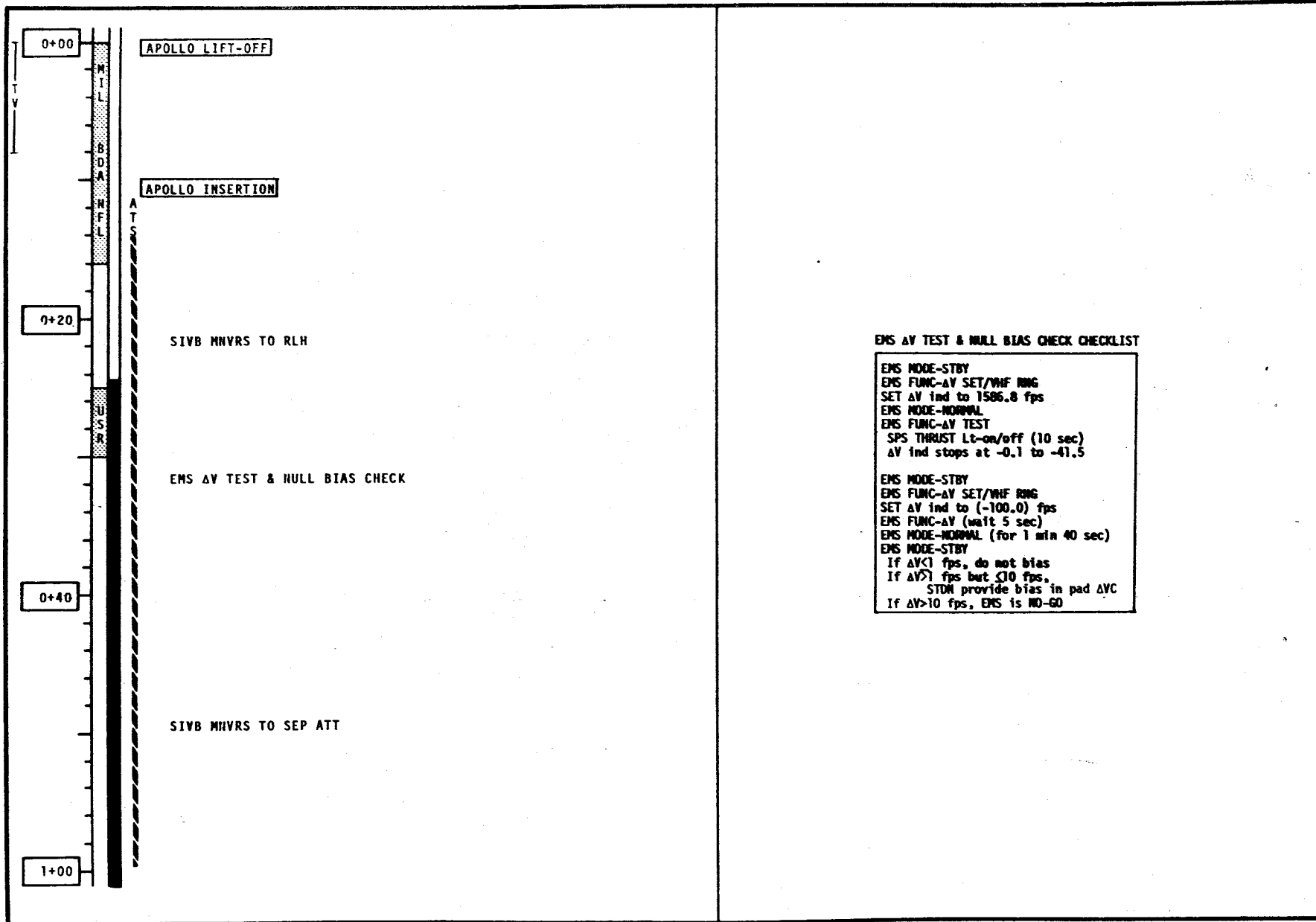
Key ENTER To Verify Successive Values.

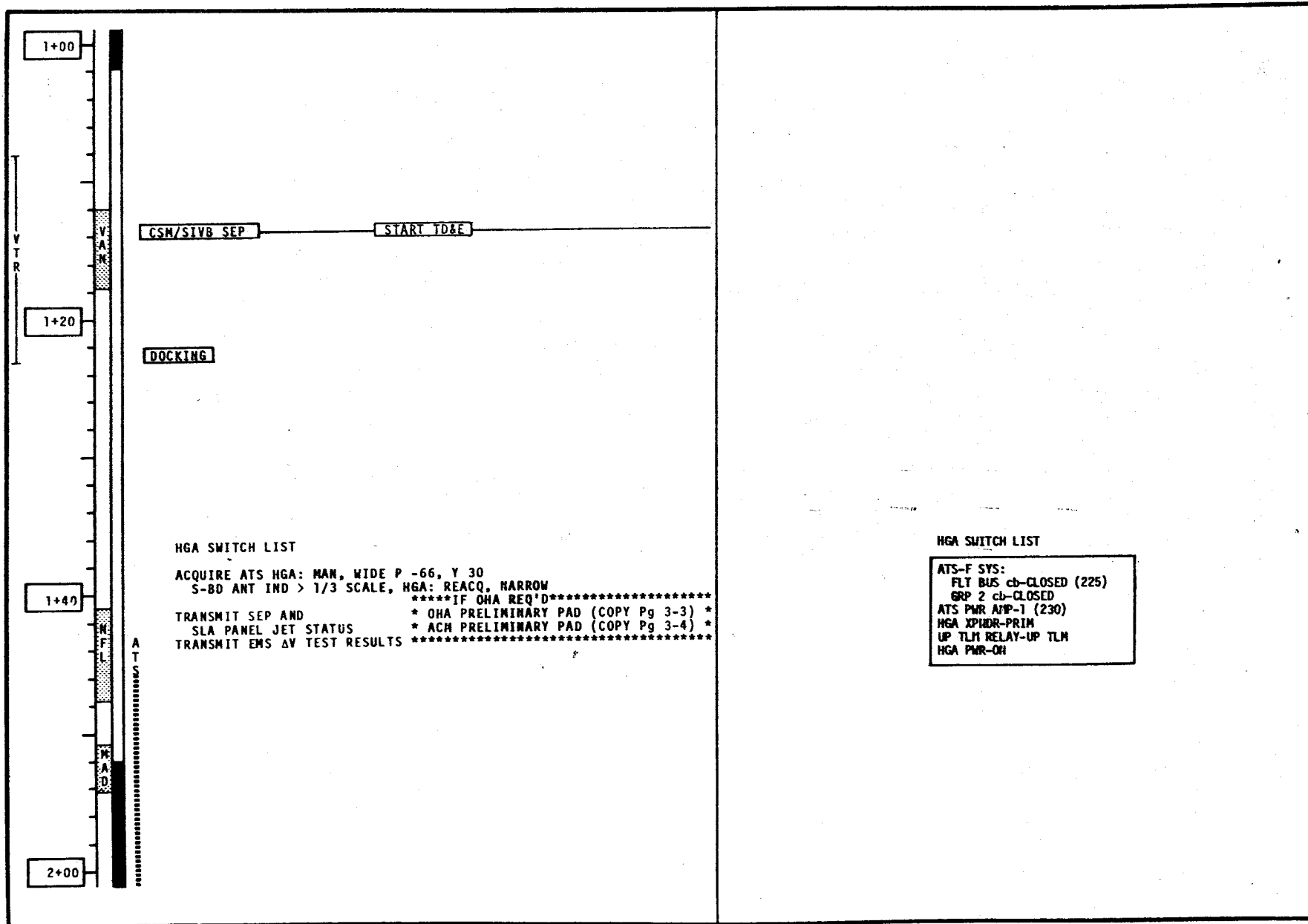
If Incorrect Load Discovered:
 Record Address (Reg 3) And Correct Value.
 Continue Verification.

To Correct EMP Load:

V21E1E
 Load Recorded Address, ENTER
 Load Correct Value, ENTER

Key ENTER For Additional Corrections &
 Load Address & Value.





IMU FAILURE

IMU FAILURE

IMU FAILURE

IMU FAILURE

IMU FAILURE

IMU FAILURE

IMU FAILURE

2+00

2+20

0:00

2+40

3+00

SIVB MNVRS TO EXTRACTION ATT

RECORD GDC ATT

ALIGN GDC

POO

CSM/DH EXTRACTION

AEM

END TD&E

TV(2)/VTR POWER(3)-OFF
DSE:(LBR/RCD/FWD/CMD RESET)

UNSTOW CUE CARDS (DATA CARD KIT-R3)
PSM ACTIVATION (AFTER VAN AOS)
TRANSMIT EXTRACTION &
AEM STATUS
TRANSMIT GDC ATT

MNVR TO ACM NOMINAL
PAD ATT (Pg 3-4)

SNACK PERIOD

*****FOR M=14 RNDZ*****
* DP START PGA DOFFING (Pg 3-5), *
* THEN CP *
* AC START SNACK PERIOD, DOFF *
* AFTER ACM *

*****IF OHA REQ'D*****
* STDN UPLINK (P27) (CSM S.V. & *
* OHA TARGET LOAD) *
* OHA FINAL PAD (COPY) *
* *
* SET DET *
* SET ASCP tw TO OHA BURN ATT *
* *
* MNVR, LOAD N20 & *
* V41N91 TO PAD DATA *
* IF STAR NOT IN SXT FOV- *
* PERFORM HORIZ CK *
* IF HORIZ >5° OF MK-DO NOT BURN *
* *
* GO TO SPS BURN CUE CARD(SCS ↓) *
* (BANK A) *

OHA PAD DATA

		NOMINAL	PRELIMINARY	FINAL
N33	HR	+ [X] [X] [X] [X]	+ [X] [X] [X] [X]	+ [X] [X] [X] [X]
TIG	OHA MIN	+ [X] [X] [X] [X]	+ [X] [X] [X] [X]	+ [X] [X] [X] [X]
	SEC	+ [X] [X] [X] [X]	+ [X] [X] [X] [X]	+ [X] [X] [X] [X]
N81	ΔV _X	[X] [X] [X] [X]	[X] [X] [X] [X]	[X] [X] [X] [X]
ΔV _{CHA}	ΔV _Y	+ 0 0 0 0	[X] [X] [X] [X]	[X] [X] [X] [X]
	ΔV _Z	[X] [X] [X] [X]	[X] [X] [X] [X]	[X] [X] [X] [X]
		[X] [X] [X] [X]	[X] [X] [X] [X]	[X] [X] [X] [X]
N22	R	+ [X] [X] [X] [X]	+ [X] [X] [X] [X]	+ [X] [X] [X] [X]
OHA	P	+ [X] [X] [X] [X]	+ [X] [X] [X] [X]	+ [X] [X] [X] [X]
	Y	+ [X] [X] [X] [X]	+ [X] [X] [X] [X]	+ [X] [X] [X] [X]
	ΔV _C	[X] [X] [X] [X]	[X] [X] [X] [X]	[X] [X] [X] [X]
	BT	[X] [X] [X] [X]	[X] [X] [X] [X]	[X] [X] [X] [X]

WT	+ [X] [X] [X] [X]	PT	[] [] [] []	YT	[] [] [] []
----	-------------------	----	-----------------	----	-----------------

		BURN ATT CHECK	BURN ATT CHECK UPDATE
STAR		[X] [X] [X] [X]	[X] [X] [X] [X]
SA	+ [X] [X] [X] [X]	[X] [X] [X] [X]	[X] [X] [X] [X]
TA	+ [X] [X] [X] [X]	[X] [X] [X] [X]	[X] [X] [X] [X]

HORIZON CK DATA: TIG MINUS _____ MIN, WINDOW MK _____ DEG

GDC ATT

GDC	R	[X] [X] [X] [X]
ASCP	P	[X] [X] [X] [X]
tw	Y	[X] [X] [X] [X]

SPS BURN STATUS

ΔTIG	[X] [X] [X] [X]
AFTER TRIM	
ΔVC	[X] [X] [X] [X]

PSM ACTIVATION SWITCH LIST

MAN ATT(3)-MIN IMP
SM RCS QUAD He A,B,C,D-CLOSE, tb(4)-bp
SM RCS PRPLNT A,B,C,D-CLOSE, tb(8)-bp
SM RCS PSM He-OPEN, tb-gray
SM RCS PSM PRPLNT A,B,C,D-OPEN, tb(4)-gray
MAN ATT(3)-RATE CMD

3+00

G
D
S

STDN UPLINK (P27) (CSM & SOYUZ S.V.'s)
ACM PRELIMINARY PAD (COPY)

OHA (. / .)

RECORD BURN STATUS (Pg 3-3)
P77 (VERIFY OHA PAD VALUES); P00
TRANSMIT OHA BURN STATUS
MNR TO ACM NOMINAL
PAD ATT (Pg 3-4)
CONT WITH NOMINAL PROCEDURES

ACQUIRE ATS HGA: MAN, WIDE P -78, Y 34
S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW
BACKUP GDC ALIGN PAD &
STAR ACQUISITION PAD
(COPY Pg 3-a)

P52 (OPT 3) (REF Pg 3-b) (RECORD)
(IF STARS NOT AVAILABLE
REF STAR ACQ PAD "B") (Pg 3-a)

STDN UPLINK (P27) (ACM TARGET LOAD)
ACM FINAL PAD (COPY)
TRANSMIT GYRO TORQUE ANGLES AND TIME
P00

SET DET

SET ASCP tw TO ACM BURN ATT

GO TO SPS BURN CUE CARD(SCS Δ)
(BANK A)

3+20

N
F
L

A
T
S

SUN

3+40

0:00

ACH (179,34/213,1)

RECORD BURN STATUS
P77 (VERIFY ACM PAD VALUES); P00
TRANSMIT ACM BURN STATUS

PGA DOFFING (Pg 3-5)

*****FOR M=14 RNDZ*****
* AC START PGA DOFFING (Pg 3-5) *
* CP & DP START SNACK PERIOD *

ACM PAD DATA

		NOMINAL				PRELIMINARY				FINAL			
N33	HR	+	0	0	3	+				+			
TIG	ACM MIN	+		4	5	+				+			
	SEC	+	0	0		+				+			
N81	ΔV _X	+	0	1	6	7							
ΔV _{ACM}	ΔV _Y	+	0	0	0	0							
	ΔV _Z	-	0	1	2	1							
N22	R	+	1	7	9	0	0		0	0		0	0
	P	+	2	1	3	0	0		0	0		0	0
	Y	+	0	0	1	0	0		0	0		0	0
	ΔV _C	+	0	0	8	1							
	BT	+	0	0	0	1							
	ΔVC AT IGN	+											
	ΔVC TAILOFF	-											
WT		+											
PT													
YT													

BURN ATT CHECK

STAR					
SA	+				0
TA	+				0 0

BURN ATT CHECK UPDATE

STAR					
SA	+				0
TA	+				0 0

P52 (OPTION 3)

N71 1ST STAR		0	0	0	
N71 2ND STAR		0	0	0	
N05(R1) § ERR					
N93	X				
	Y				
	Z				
GYRO TORQUING ANGLES					
HR	+	0	0		
TIME OF GDC ALIGN	MIN	+	0	0	0
	SEC	+	0		

SPS BURN STATUS

ΔTIG					
AFTER TRIM					
ΔVC					

4+00	A T S	<p>*****FOR M=14 RNDZ***** * PRE-DOCKING DM CHECKOUT (D/1-1) * * STEP 1 THRU STEP 7 * *****</p>	PGA DOFFING														
4+20	O R R	<p>STDN UPLINK (P27) (CSM S.V.) NC1 PRELIMINARY PAD (COPY Pg 3-6) NPC ADVISORY</p>	<p>POWER - OFF (6,9,10) AUDIO COM1 - NORM (6,9,10)(verify) SUIT POWER - OFF (6,9,10)</p> <p>UCTA doffing: If unused, doff UCTA, discard cuff If used, doff UCTA, install clamp (R11), drain per S/1-27 Stow UCTAs in accessory bags</p> <p>Doff comm carrier, stow in TSB Discon all umbilicals from PGA & stow Suit Flow V1vs (3) - SUIT FILL FLOW(verify) Stow PGAs in PGA bags(U2) Stow PGAs: AC under left couch (A3), CP under left couch (A3), CP head of center couch under side hatch</p> <p>Unstow 3 O2 hose screen caps and 3 PGA elect connector covers (A5)</p> <p>Install screen caps on CM return hoses(red) Install elect connector caps on PGAs</p> <p>Stow life vests in F1 Stow loose shoulder and leg pkt items as desired in TSB top pkt Stow wristlets and comfort gloves in PGA zipper kit</p> <p>Doff PGA - discon elect and urine connections inside PGA</p> <p>Secure PGA elect harness at neckring Install helmets & gloves on PGA Install helmet bags on helmets Secure accessory bags to helmet bags</p> <p>OBS doffing: Discon connector from sig conditioners Remove electrodes from chest Discard tape disks and tape rings</p> <p>Clean electrodes with tissue (A2) Stow harness and biobelt in accy bags</p> <p>Configure comm: For comm carrier or headset use - Don CHG harness (U2 or temp stowed) Conn CM elect to CHG harness Don comm carrier or light wt headset as reqd., connect to CHG harness SPKR/HDST-HEADSET (98) (verify)</p> <p>For SPEAKER Box use (Pn1 98): POWER-ON SPK/HDST-SPEAKER VOL tw-as desired</p> <p>POWER - AUDIO/TONE (6,9,10) SUIT POWER - ON (up) (6,9,10)</p>														
4+40	H A W	<p>ACQUIRE ATS HGA: MAN, WIDE P -55, Y 45 S-BD ANT IND > 1/3 SCALE, HGA: REACQ, HARROW</p>															
5+00	N F L	<p>NC1 FINAL PAD (COPY Pg 3-6) NPC PRELIMINARY PAD (COPY Pg 3-7)</p> <p>TRANSMIT DM/CM ΔP (1ST OPP ONLY)</p> <p>STDN UPLINK (P27) (NC1 TARGET LOAD)</p> <p>BIOSTACK-ON (MA 107) (R1) RECORD GET & INDICATOR STATUS (Pg 3-5)</p>	<p>BIOSTACK PAD</p> <table border="1"> <tr> <td>GET</td> <td>HR</td> <td></td> <td></td> <td>IND</td> <td>LT</td> <td>ON</td> </tr> <tr> <td></td> <td>MIN</td> <td></td> <td></td> <td></td> <td></td> <td>OFF</td> </tr> </table>	GET	HR			IND	LT	ON		MIN					OFF
GET	HR			IND	LT	ON											
	MIN					OFF											

5+00

5+20

-12:00

5+40
0:00

6+00

ZFF PHOTOS (J/10-1)

SET DET

P52 (OPT 3) (REF Pg 3-b) (RECORD)
(IF STARS NOT AVAILABLE
REF STAR ACQ PAD "B") (Pg 3-a)

P00

MNVR TO STDN NC1 BURN (PITCH) ATT

SET ASCP ϵ_w TO NC1 BURN ATT

GO TO SPS BURN CUE CARD(SCS Δ)
(BANK B)

NC1 (181,358/59,0)

RECORD BURN STATUS
P77 (VERIFY NC1 PAD VALUES); P00

IF NPC NOT REQ'D
MNVR TO SI +X FWD ATT
(ATT = 12,14,332)

CP CM HEIGHT & LEG VOLUME
MEASUREMENTS (1ST OPP ONLY)
AC & DP (IF TIME PERMITS)
RECORD (EXP C/L Pgs 1-59/51)

TRANSMIT NC1 BURN STATUS
TRANSMIT GYRO TORQUE ANGLES
AND TIME

*****IF NPC REQ'D*****
* MNVR TO PRE-NPC ATT (180,160,0) *

*****FOR M-14 RNDZ*****
* PRE-DOCKING DM CHECKOUT (D/1-2) *
* STEP 8 THRU COMPLETION *
* (IF NPC REQ'D, PERFORM AS MANY *
* COMPLETE STEPS BEFORE NPC AS *
* POSSIBLE, CONTINUE AFTER NPC) *

*****FOR M-14 RNDZ*****
* CHARGE BATT A (AFTER HAW AOS) *

NC1 PAD DATA

		NOMINAL				PRELIMINARY				FINAL					
N33	HR	+	X	X	0	0	5	+	X	X		+	X	X	
TIG NC1	MIN	+	X	X		4	1	+	X	X		+	X	X	
	SEC	+	X	X	2	8	X	+	X	X		+	X	X	
NB1	ΔV_x	+	X	X	0	6	6	3							
ΔV_{NC1}	ΔV_y	+	X	X	0	0	0	0							
	ΔV_z	+	X	X	0	0	0	2							
N22	R	+	1	8	1	0	0			0	0			0	0
NC1	P	+	0	5	9	0	0			0	0			0	0
	Y	+	0	0	0	0	0			0	0			0	0
	ΔV_C	X	X	X	0	5	3	7	X	X	X	X	X	X	X
	BT	X	X	X	0	0	0	3	X	X	X	X	X	X	X

WT + X X X X X

PT

YT

BURN ATT CHECK

STAR	X	X	X	X	X
SA	+				0
TA	+				0 0

BURN ATT CHECK UPDATE

STAR	X	X	X	X	X
SA	+				0
TA	+				0 0

SPS BURN STATUS

Δ TIG	X	X			
AFTER TRIM					
ΔV_C	X				

P52 (OPTION 3)

N71 1ST STAR	X	0	0	0	
N71 2ND STAR	X	0	0	0	
N05(R1) } ERR	X				
N93	X				
GYRO TORQUING ANGLES	Y				
	Z				
HR	+	0	0		
MIN	+	0	0	0	
SEC	+	0			

UVA LAMP TURN ON PAD (FOR M-14 RNDZ)

GET HR			
MIN			

NPC PAD DATA

		PRELIMINARY				FINAL			
N33	HR	+	X	X	X	+	X	X	X
TIG NPC	MIN	+	X	X	X	+	X	X	X
	SEC	+	X	X	X	+	X	X	X
N81	ΔV_X								
ΔV_{NPC}	ΔV_Y								
	ΔV_Z								
N22	R	+		0	0	+		0	0
NPC	P	+		0	0	+		0	0
	Y	+		0	0	+		0	0
	ΔV_C								
	BT								

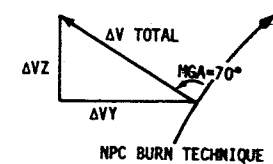
WT	+	X	X	X	X	PT					YT				
----	---	---	---	---	---	----	--	--	--	--	----	--	--	--	--

BURN ATT CHECK					
STAR		X	X	X	X
SA	+				0
TA	+				0 0

BURN ATT CHECK UPDATE					
STAR		X	X	X	X
SA	+				0
TA	+				0 0

P52 (OPTION 3)

N71 1ST STAR	X	0	0	0	
N71 2ND STAR	X	0	0	0	
N05(RT) } ERR	X				
N93	X				
GYRO TORQUING ANGLES	Y				
	Z				
HR	+	0	0		
TIME OF GDC ALIGN	MIN	+	0	0	0
	SEC	+	0		



IF NPC NOT REQ'D
 SET HGA: MAN P -54, Y 265
 S-BD ANT IND > 1/3 SCALE
 HGA: REACQ, NARROW

STDN UPLINK (P27) (NOMINAL RNDZ REFSMMAT)
 P52 (OPT 3)(REF Pg 3-b)(RECORD)

P52 (OPT 1; COARSE ALIGN)
 (REF Pg 3-b)

POO
 VERIFY SI +X FWD ATT
 (ATT = 18,170,330)

TRANSMIT GYRO TORQUE ANGLES AND TIME

*****IF NPC REQ'D*****
 SET HGA: MAN P -51, Y 96
 S-BD ANT IND > 1/3 SCALE
 HGA: REACQ, NARROW

STDN UPLINK (P27 (CSM S.V. & NPC TARGET LOAD)
 NPC FINAL PAD (COPY)
 SET DET
 P52(OPT 3)(REF Pg 3-b)(RECORD)

POO
 NOTE: GDC OUT-OF-PLANE REALIGN NOT REQ'D FOR NPC

SET ASCP tw TO NPC BURN ATT

GO TO SPS BURN CUE CARD(SCS Δ) (BANK A)

NPC

RECORD BURN STATUS (Pg 3-8)
 P77 (VERIFY NPC PAD VALUES);POO

MNVR TO SI +X FWD ATT
 (ATT = 12,14,332)

START EAT PERIOD

6+00

6+20

6+40

7+00

Vertical scale with labels: A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z

7+00

7+20

7+40

15+30

*****FOR M=14 RNDZ*****
 * CONTINUE PRE-DOCKING DM CHECKOUT *

*****IF NPC EXECUTED*****
 * STDN UPLINK (P27) (NOMINAL RNDZ
 REFSMMAT)
 * TRANSMIT NPC BURN STATUS *
 * * * * *

SET HGA: MAN P -29, Y 259
 HGA: REACQ, NARROW
 PWR DOWN CHECKLIST (Pg 3-8)
 DIRECT O2 VLV-CLOSE(cw)

PRESLEEP (S/1-49)

STDN UPLINK(P27)(LIFT-OFF TIME)
 SYNC MISSION TIMER TO CMC
 CLOCK (V16N65) UPON STDN CUE
 STDN UPLINK (P27) (ATS S.V. &
 HGA EMP) (1ST OPP ONLY)

GO TO FLIGHT PLAN (Pg 4.1-6)

SPS BURN STATUS

ATIG	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AFTER TRIM							
AVC	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

P52 (OPTION 3)

N71 1ST STAR	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N71 2ND STAR	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N05(R1) } ERR	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
N93	X	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GYRO TORQUING ANGLES	Y	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Z	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TIME OF	HR	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GDC	MIN	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ALIGN	SEC	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PWR DOWN CHECKLIST

OHC-DRIVE TRUN <10 DEG
 OPTICS ZERO-ZERO
 G/N PWR OPTICS-OFF

UVA LAMPS SHUT DOWN CHECKLIST
 (FOR M=14 RNDZ)

VERIFY > 2 HR SINCE UVA LAMP BURN IN GET
 (RECORDED Pg 1-6)
 UVA ABSORPTION LAMPS-OFF
 UVA ABSORPTION POWER-OFF
 DISCONNECT UVA CABLE
 REATTACH DUST CAPS
 STOW CABLE (A1)

46+30

Y
A
H

STON UPLINK (P27) (CSM & SOYUZ S.V.'s)
 STAR ACQUISITION PAD (COPY Pg 3-a)
 NC2 PRELIM PAD & TPI TIG (N37) (COPY Pg 3-12)

*****IF REFSMHT REALIGN REQ'D*****
 * STON UPLINK(P27)(RNDZ REFSMMAT) *
 * BACKUP GDC ALIGN PAD (COPY Pg 3-2) *
 * RNDZ/RNDZ REALIGN PAD (COPY Pg 2-a) *
 * * * * *

OPTICS PWR UP CHECKLIST (Pg 3-9) * OPTICS PWR UP CHECKLIST (Pg 3-9) *
 P52 (OPT 3)(REF Pg 3-b)(RECORD) * P52 (OPT 3)(REF Pg 3-b)(RECORD) *
 * * * * *

P00

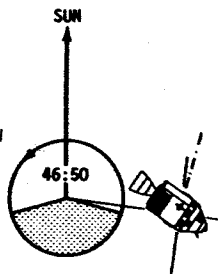
* P52 (OPT 1: COARSE ALIGN) (REF Pg 3-b)
 * * * * *

* P00

46+40

46+50

ACQUIRE ATS HGA: MAN, WIDE P 13, Y 230
 S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW



L10H CANISTER CHANGE
 (6 INTO B, STOW 4 IN A4)

*****FOR M-14 RNDZ*****
 * STON 2 IN A4)

47+00

OPTICS PWR UP CHECKLIST

VERIFY OPTICS MANUAL DRIVE DISENGAGED
 OPTICS ZERO-OFF
 OPT MODE-MAN
 G/N PWR OPTICS-OH(up)
 OHC-DRIVE TRUN <10 DEG
 OPT ZERO-ZERO (15 SEC)

P52 (OPTION 3)

N71 1ST STAR	<input checked="" type="checkbox"/>	0	0	0		
N71 2ND STAR	<input checked="" type="checkbox"/>	0	0	0		
N05(R1) ↓ ERR	<input checked="" type="checkbox"/>					
N93	X					
GYRO TORQUING ANGLES	Y					
	Z					
TIME OF GDC ALIGN	HR	+	0	0		
	MIN	+	0	0	0	
	SEC	+	0			

47+00

TV CHECKLIST (Pg 3-10)

CM2/DAC/25/CX02-BRKT, MIR (f8,1/250,∞) 2 FPS
UTILITY POWER-ON

FURNACE SHUT DOWN (D/7-6) (1ST OPP ONLY)

TV- GRD CMD
47+10 - 47+37

*****FOR M=14 RNDZ*****
* BIOSTACK-OFF (MA 107) (R1) *
* RECORD GET & INDICATOR STATUS *
* GET HR [] [] [] IND LT ON [] [] *
* MIN [] [] [] OFF [] [] *

DM CLOSEOUT

DP TRANSFER TO DM
OPEN cb CAUT/WARN DMB (815)
DM1 & DM2 TV STA PWR-OFF (808)
DP TRANSFER TO CM
TERMINATE CM-DM ATMOSPHERE MIXING
INSTALL HATCH 1 (DECAL) (S/2-9)
HATCH 1 PRESSURE EQUALIZATION
VLV-CLOSE(cw)/LOCK(verify)

END MANUAL HEAT SOAK AND
PERFORM HELIUM INJECTION(D/7-5)
(1ST OPP ONLY)

*****FOR M=14 RNDZ*****
* cb VHF FM XCVR DMA-CLOSE(verify)*
* (PNL 815) *
* VHF FM-T/R (verify) (6) *
* DP PERFORM MCC-H/MCC-H/APOLLO *
* COMM CHECK *

ZFF PHOTOS (J/10-1)

47+10

47+20

47+30

TV CHECKLIST

Remove TV camera and U-mount (location 11)
Position U-mount X, Y, Z - 105, 190, 65
Remount camera (location 11) (pin in hole 4)
Install polarized filters on couch lights and camera
On TV camera at location 606:
Verify camera - PEAK, SLAVE, LINEAR
Note: Select AVG if white content of scene
rises above approx 10%
Verify lens (F, ZOOM, FOC) - 22, 100, infinity
(Adjust ZOOM as range requires)
On pnl 181:
CM/DM CAMR POWER-ON(up)(verify)
TV AMPL-ON
CM1 TV STA POWER-ON
CM2 TV STA POWER-ON
On pnl 808:
DM1 TV STA POWER-ON
DM2 TV STA POWER-ON
Check monitors, adjust camera pointing and
lens if required



CM CAMR 1



DM CAMR 1



DM CAMR 2

47+30

U.S. AIR FORCE

47+40

H2 PURGE LINE HTR-ON(up)

P32; BYPASS MINKEY OPTION
LOAD N28 PAD VALUE (Pg 3-12)
VERIFY N37 = PAD VALUE (Pg 3-12)

P32 (RECYCLE: RECORD Pg 3-12)

P00

47+50

48+00

H2/O2 FUEL CELL PURGE (S/1-6)
(20 MIN AFTER LINE HTR-ON)

P52 (OPTION 3)

N71 1ST STAR	X	0	0	0		
N71 2ND STAR	X	0	0	0		
N05(R1) § ERR	X					
N93	X					
GYRO TORQUING ANGLES	Y					
	Z					
TIME OF GDC ALIGN	HR	+	0	0		
	MIN	+	0	0	0	
	SEC	+	0			

COAS LOS DETERMINATION CHECKLIST

- COAS PMR-ON(up)
MNR TO BORESIGHT ATTITUDE
MAN ATT(3)-MIN IMP
BORESIGHT ON STAR AND OBTAIN EXACT BORESIGHT ATTITUDE FROM ASCP tw (with FDAI 1 ERROR NEEDLES ZEROED)
LOAD N20 WITH ASCP tw VALUES
MAN ATT(3)-RATE CMD
- F 04 06 V37E52E
R1 00001
R2 00003
PRD
F 50 25 00015
ENTER
F 01 70 000DE STAR CODE
Load STAR CODE
OPT MODE-CMC(verify)
OPT ZERO-OFF
PRD
06 92 SHAFT,TRUM
RECORD SHAFT,TRUM
(NOMINAL = 0°, +57.470°)
- V37E00E
OPT MODE-MAN
OHC-Drive trun<10°
OPT ZERO-ZERO

COAS LOS DETERMINATION

N92	SA	+					
	TA	+					

SUN

48:00

48+00

V
A
N

NC2 FINAL PAD (COPY)
NCC PRELIMINARY PAD (COPY Pg 3-14)
NSR PRELIMINARY PAD (COPY Pg 3-15)
TRANSMIT GYRO TORQUE ANGLES & TIME (Pg 3-9)

P52 (OPT 3) (REF Pg 3-b)(RECORD Pg 3-11)

H2 PURGE LINE HTR-OFF (10 MIN AFTER PURGE)
WASTE WATER DUMP CHECKLIST (Pg 3-12)
PERFORM COAS LOS DETERMINATION CHECKLIST (Pg 3-11)

48+10

UNSTOW HP-65 KIT(U1) & CHECKLIST(R1)
VELCRO (HOOK) FROM U3 (IN PIN STRAIGHTENING KIT)
HP-65 CHECKOUT (Pg 1)

BORESIGHT STAR
4 - ACHERNAR
(232, 16, 0)

P00
MNRV TO NC2 FINAL PAD ATT

48+20

P32
LOAD N28 PAD VALUE
VERIFY N37 = PAD VALUE (Pg 3-12)
SET DET

P Y

ACQUIRE ATS HGA: MAN, WIDE P -35, Y 144
S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW

-12:00

P32 (FINAL COMP: RECORD)
(LOAD STDN SOLN)(FOR P77)

P00
GO TO SPS BURN CUE CARD(SCS Δ)
(BANK A)

48+30

A
T
S

NC2 PAD DATA

		NOMINAL	PRELIMINARY	FINAL
N28	HR	+ 0 4 8		
TIG NC2	MIN	+ 3 4		
	SEC	+ 0 4		
N81	ΔV _X	- 0 3 6 4		
	ΔV _{NC2}	+ 0 0 0 0		
	ΔV _Z	- 0 0 0 1		
N22	R	+ 0 0 0 0 0	+ 0 0	+ 0 0
	P	+ 0 3 4 0 0	+ 0 0	+ 0 0
	Y	+ 0 0 0 0 0	+ 0 0	+ 0 0
ΔV _C		0 2 3 7		
		0 0 0 2		
BT				

MT	+ 0 0 0 0 0	PT	0 0 0 0	YT	0 0 0 0
----	-------------	----	---------	----	---------

BURN ATT CHECK

STAR	0 0 0 0 0
SA	+ 0
TA	+ 0 0

BURN ATT CHECK UPDATE

STAR	0 0 0 0 0
SA	+ 0
TA	+ 0 0

TPI TIG N37

NC2 ONBOARD DATA

		P32 RECYCLE	P32 FINAL COMP
N84	ΔV _{NCC}	+ 0	+ 0
	ΔH _{NCC}	+ 0 0	+ 0 0
	ΔV _{NSR}	+ 0 0	+ 0 0
N81	ΔV _X	0	0
	ΔV _{NC2}	+ 0 0 0 0 0	+ 0 0 0 0 0
	ΔV _Z	+ 0 0 0 0 0	+ 0 0 0 0 0

WASTE WATER DUMP CHECKLIST

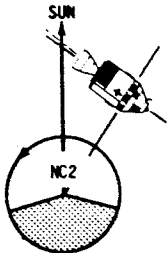
BAT VENT VLV-CLOSED (252)
H2O QTY IND-WASTE (Panel 2)
WATER CONT PRESS REL VLV-DUMP A (352)
Monitor WASTE H2O QTY IND-decreasing
(~5% Per Min)
When WASTE H2O QTY IND-60%
WATER CONT PRESS REL VLV-2
BAT VENT VLV-VENT (252)

XXXXXXXXXXXXXXXXXXXXXXXXXXXXX
X N81 COMP LIMITS HA X
X X
X STDN SOLN PRIME X
X IF STDN SOLN NOT AVAILABLE X
X DO NOT BURN NC2 X
XXXXXXXXXXXXXXXXXXXXXXXXXXXXX

SPS BURN STATUS

ΔTIG	0 0 0 0 0
AFTER TRIM	
ΔVC	0 0 0 0 0

SOYUZ MNVRS TO ORBITAL ATTITUDE RATE



48+30

A C H

0:00

NC2 (0,182/34,0) (R=263.3 NM)

RECORD BURN STATUS
P77 (VERIFY NC2 PAD VALUES)
TRANSMIT NC2 BURN STATUS
TRANSMIT GYRO TORQUE ANGLES AND TIME (Pg 3-11)
P33

ROLL LEFT TO 180°, THEN
PITCH DOWN ~ 145° TO TRACK HORIZON
(ATT ~ 180,175,0)

48+40

DP ESTABLISH VHF AM & FM COMM WITH SOYUZ (PERFORM CHECKS FROM PANEL 6 ONLY)

SET DET

U S R

48+50

49+00

DP PERFORM VHF AM COMM CK

TV- GRD CMD
48+50 - 49+00

VHF AM SPEC RANGE
= 196 NM

VHF AM AND FM COMM

<p>VHF FM-T/R (6) VHF AM-T/R VHF FM-T/R (9) VHF AM-T/R VHF AM A-SIMPLEX (3) VHF AM SQUELCH A tw-noise + 1 VHF ANTENNA-RIGHT MODE-VOX (10) VOX SENS tw-3 VHF FM-RCV</p>	<p>VHF FM tw-5 S BAND-T/R S BAND tw-full decrease POWER-AUDIO MASTER tw-5 INTERCOM-T/R INTERCOM tw-full decrease VHF AM-OFF AUDIO CONTROL-BACKUP PHONE/MIC CONNECT-ON</p>
--	---

◀ This is Apollo. Я АПОЛЛОН.
◀ How do you read? РАК ЕМ СТЕБИТЕ?

* If no comm, repeat *
* statements until comm *
* established. If still *
* no comm by (TBD) GET, *
* inform MCC. *

VHF AM COMM CHECK 48+59

◀ Configure for VHF AM check. ГОТОВЬТЕСЬ К ПРОВЕРКЕ СВЯЗИ НА УКВ АМ.
VHF FM-OFF
◀ This is Apollo on VHF AM. Я АПОЛЛОН НА УКВ АМ.

* If no comm, repeat *
* statement until comm *
* established. If still *
* no comm, inform MCC. *

VHF FM COMM CHECK 49+08

◀ Configure for VHF FM check. ГОТОВЬТЕСЬ К ПРОВЕРКЕ СВЯЗИ НА УКВ ЧМ.
VHF FM-T/R (6)
VHF AM-OFF
◀ This is Apollo on VHF FM. Я АПОЛЛОН НА УКВ ЧМ.

* If no comm, repeat *
* statement until comm *
* established. If still *
* no comm, inform MCC. *

VHF RANGING COMM CHECK 49+23

◀ Turn on VHF ranging. ВКЛЮЧИТЕ ИЗМЕРЕНИЕ ДАЛЬНОСТИ.

VHF AM A-OFF(ctr)
VHF AM B-DUPLEX
VHF RANGING-ON(up)
VHF ANTENNA-RIGHT(verify)
EIS FUNC-AV SET/VHF RNG
EIS MODE-BACKUP/VHF RNG
VHF RNG-RESET

◀ Ranging lockup established. РЕЖИМ ИЗМЕРЕНИЯ ДАЛЬНОСТИ УСТАНОВЛЕН.
◀ Range _____ miles. ДАЛЬНОСТЬ _____ МИЛЬ.

VHF FM-OFF(6)
VHF AM-T/R
◀ This is Apollo on VHF ranging. Я АПОЛЛОН НА РЕЖИМЕ ИЗМЕРЕНИЯ ДАЛЬНОСТИ.

* If no comm, *
* VHF FM-T/R (6) *
* Continue nominal RNDZ *
* procedures, inform MCC. *

◀ VHF AM and FM comm checked. ПРОВЕРИЛ СВЯЗЬ УКВ ЧМ И АМ.
VHF FM-T/R (6)

* If ranging lockup is lost, *
* Your voice degrading ranging lockup. ПОЛОЖИТЕ НАЧАЛО РЕЖИМУ *
* VHF RNG-RESET (1) ИЗМЕРЕНИЯ ДАЛЬНОСТИ. *
* Ranging lockup established. РЕЖИМ ИЗМЕРЕНИЯ ДАЛЬНОСТИ УСТАНОВЛЕН. *

49+30

VHF

-24:00

R HP-65 DATA FOR NSR-24
PITCH UP 15° (TO MAINTAIN VHF LOCK-ON)
P52 (OPT 3) (REF Pg 3-b)(RECORD Pg 3-16)

XXXXXXXXXXXXXXXXXXXXXXXXX
X UNREASONABLE UPDATE X
X 1.00 NM, 6.0 FPS X
XXXXXXXXXXXXXXXXXXXXXXXXX

-20:00

R HP-65 DATA FOR NSR-20

WHEN P52 COMPLETE: P34, V87E;
CONTINUE TO TRACK HORIZON

-16:00

VHF

49+40

R HP-65 DATA FOR NSR-16

-12:00

R HP-65 DATA FOR NSR-12
V77E (TERMINATE VHF RANGE RATE PROCESSING ROUTINE)
P34 (FINAL COMP: RECORD)
(LOAD ΔVX & ΔVZ, IF REQ'D, & STDN ΔVY)
V25N20E (LOAD PAD BURN ATT)

GO TO SPS BURN CUE CARD(SCS Δ)
FOR HP-65 OR CMC SOLUTION:
IN P40 AT F50 18, RECORD BURN ATT

N18	R								
BURN ATT	P								
ATT	Y								
N40	ΔV _T	+							
ΔV TAIL OFF	-					1	3	0	
ΔV _C	+								

P40

NSR (176,307/188,357) (R=81.0 NM)

RECORD BURN STATUS
P77 (LOAD CMC COMPUTED RECYCLE ΔVY)
TRANSMIT NSR BURN STATUS
←NSR completed. NSR BURN ATT
ACQUIRE ATS HGA: MAN, WIDE P -19, Y 308
S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW

P35
V22N78E,+E; V16H22E (+X-AXIS TRACK ATT)
TRACK SOYUZ IN BOTTOM OF CDR WINDOW (ATT ~ 180,212,0)

ATT

49+50

0:00

50+00

NSR PAD DATA

TIG NSR(N13)=TIG MCC(N11) + 00:37:00= _____ : _____ : _____

		NOMINAL					PRELIMINARY					FINAL								
NS1	ΔV _X	-			0	1	7	0												
ΔV _{NSR}	ΔV _Y	-			0	0	1	4												
	ΔV _Z	+			0	2	1	2												
N22	R	+			1	7	6	0	0											
NSR	P	+			1	8	8	0	0											
	Y	+			3	5	7	0	0											
	ΔV _C				0	1	4	5												
	BT				0	0	0	1												
ΔVC AT IGN	+																			
ΔVC TAILOFF	-																			

WT + [X][X][X][X][X] PT [][][][][] YT [][][][][]

BURN ATT CHECK					BURN ATT CHECK UPDATE				
STAR					STAR				
SA	+			0	SA	+			0
TA	+			0	TA	+			0

NSR ONBOARD DATA

P34 RECYCLE					P34 FINAL COMP				
N75	ΔH _{NSR}	+	0	0	+	0	0		
	ΔT(NSR/TPI)	+		B	+		B		
	ΔT(TPI/TPI)			B			B		
N81	ΔV _X	0			0				
ΔV _{NSR}	ΔV _Y	0			* S T D N *				
	ΔV _Z	0			0				

XX

X N81 COMP LIMITS NA X

X USE STDN ΔVY IN ALL CASES X

X BURN STDN MACHED PAIR SOLN X

X IF MCC EXECUTION IS QUESTIONABLE-THE ORDER X

X OF PRIORITIES ARE: X

X HP-65 X

X CMC UNMACHED X

X STDN UNMACHED X

X DO NOT BURN HSR X

XX

NSR HP-65 SOLN				
ΔV _X				
ΔV _Y	* S T D N *			
ΔV _Z				

SPS BURN STATUS

ΔTIG	[X][X][][][]
AFTER TRIM	[][][][][][][][][]
ΔVC	[][][][][][][][][]
TRANSMIT BURN ATT & ΔVC LOADED	[][][][][][][][][]

50+00

-53:00

50+10

50+20

-32:00

50+30

V32E (1ST P35 RECYCLE: RECORD),(RECORD N37)
 REF TPI EARLY/LATE LOGIC
 REACQUIRE VHF RANGING (R=74 NM) FOR SV UPDATING AND HP-65 DATA

V87E (START VHF MARKING)
 SET DET

XXXXXXXXXXXXXXXXXXXXX
 X UNREASONABLE UPDATE X
 X 0.50 NM, 3.0 FPS X
 XXXXXXXXXXXXXXXXXXXXX

V76E (LOAD N72 WITH HP-65 TPI TIG 1-32)

REMOVE POLAR PLOT
 SNACK PERIOD

TV- GRD CMD
 50+12 - 50+22

TPI PRELIMINARY PAD (COPY Pg 3-17)
 DOCKING ATTITUDE PAD (COPY Pg 3-19)
 TRANSMIT GYRO TORQUE ANGLES AND TIME (Pg 3-16)

R HP-65 DATA FOR TPI-32 (GET)

*****TPI EARLY/LATE LOGIC*****
 * 1ST RECYCLE
 * IF 2 SOLUTIONS INDICATE TIG SLIP>+8 MIN FROM PRE-NC2 N37(Pg 3-12)
 * ADJUST LOCATION OF 2ND RECYCLE +8 MIN
 *
 * 2ND RECYCLE
 * IF CMC SOLUTION INDICATES TIG SLIP>+10 MIN FROM PRE-NC2 N37:
 * USE CMC TIG OPTION:
 * RECALL P35, PRO TO N37, LOAD PRE-NC2 N37+10 MIN
 * PRO TO N55, SPECIFY TIG OPTION (V22E, +E)
 * CONTINUE HP-65 SOLUTION FOR FINAL ΔV COMPARISON
 * AT FINAL COMP-USE NOMINAL COMPARISON LOGIC
 * IF ALL COMPARISONS DISAGREE-BURN THE SOLUTION
 * WHOSE TIG (CMC 2ND RECYCLE, STDN PREL PAD)
 * COMPARES CLOSEST WITH HP-65 TPI TIG 2.

P52 (OPTION 3)

N71 1ST STAR		X	0	0	0		
N71 2ND STAR		X	0	0	0		
N05(R1) ERR		X					
N93	X						
GYRO TORQUING ANGLES	Y						
	Z						
TIME OF GDC ALIGN	HR	+	0	0			
	MIN	+	0	0	0		
	SEC	+	0				

HP-65 TPI TIG 1									
				3	2				
N72									

TPI TIG (N37)

PRE-NC2 (Pg 3-12)									
RECYCLES	1ST								
	2ND								
HP-65 TPI TIG 2									

		1ST P35 RECYCLE				2ND P35 RECYCLE			
N37	HR	+	0	0		+	0	0	
TIG TPI	MIN	+	0	0	0	+	0	0	0
	SEC	+	0			+	0		
N58	ΔV TPI	+	0	0		+	0	0	
	ΔV TPF	+	0	0		+	0	0	
	ΔT(TPI/TPI)				B				B
N81	ΔV X		0	0			0	0	
	ΔV TPI	ΔV Y	*	S	T	D	N	*	*
	ΔV Z		0	0			0	0	
V16N59	ΔV F		0	0			0	0	
	ΔV (LOS)	ΔV R		0	0		0	0	
	ΔV D		0	0			0	0	

50+30
-24:00

-16:00
50+40
-14:00

-12:00

50+50

0:00
+3:00
+4:30
51+00

U
S
R

V
H
F

V
H
F

V
H
F

R HP-65 DATA FOR TPI-24 (GET)

XXXXXXXXXXXXXXXXXXXXX
X UNREASONABLE UPDATE X
X 0.50 NM, 3.0 FPS X
XXXXXXXXXXXXXXXXXXXXX

V32E (2ND P35 RECYCLE: RECORD),(RECORD N37)(Pg 3-16)

TPI FINAL PAD (COPY)

V48E (LOAD WT)

R HP-65 DATA FOR TPI-16 (GET)
V77E (TERMINATE VHF RANGE RATE PROCESSING ROUTINE)
V57E, V22E, 1E, PRO (POST TPI SINGLE SENSOR MRI LOGIC)
SET HDSUPFLG (V25N7E, 106E, 2000E, 1E)
R HP-65 DATA FOR TPI-14 (GET)
MNVR TO BORESIGHT COAS ON HORIZON
SET ORDEAL (FDAI 1)

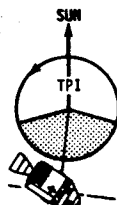
RD=345, H=118

P35 (FINAL COMP: RECORD)
(LOAD ΔV_X & ΔV_Z , IF REQ'D, & STDN ΔV_Y)
PRO, N59E (RECORD)
RHC-MNVR TO ZERO ROLL (ROLL RIGHT)
V25N20E (LOAD PAD BURN ATT)

		P40			
N16	R				
BURN	P				
ATT	Y				
N40	ΔV_T	+			
ΔV TAIL OFF	-			1	3.0
ΔV_C	+				

GO TO SPS BURN CUE CARD(SCS Δ)
FOR HP-65 OR CMC SOLUTION:
IN P40 AT F50 18, RECORD BURN ATT
SET ASCP tw TO BURN ATT
E,E TO 06 40, RECORD ΔV_T
POO
(BANK A)

*****IF DRIFT RATES EXCESSIVE*****
* BURN WITH SOYUZ BORESIGHTED IN COAS *
* (ΔV_F , ΔV_R , & ΔV_D TIMED RCS) WITH *
* AUTO RCS SELECT(16)-MAN/MNB *



RCS X AXIS
1 FPS=2.50 SEC
RCS Y&Z AXIS
1 FPS=5.00 SEC

CENTER SOYUZ IN COAS WHEN
READING HP-65 DATA 9

TPI (359,29/29,2) (R=21.2 NM)
P77; RATE-LOW
P36
TPI completed. TPI ВЫПОЛНЕН.
REACQUIRE VHF RANGING (R=18 NM)
V87E (START VHF MARKING)
FDAI 1-ORB RATE

8 HP-65 DATA FOR TPI+4:30

XXXXXXXXXXXXXXXXXXXXX
X UNREASONABLE UPDATE X
X 0.50 NM, 3.0 FPS X
XXXXXXXXXXXXXXXXXXXXX

TPI PAD DATA

		NOMINAL					PRELIMINARY					FINAL								
N37	HR	+	+	+	+	0	5	0	+	+	+	+	+	+	+	+	+	+		
TIG	TPI MIN	+	+	+	+			5	4	+	+	+	+	+	+	+	+	+		
	SEC	+	+	+	+	2	5			+	+	+	+	+	+	+	+	+		
N81	ΔV_X	+	+	+	+	1	9	5	+	+	+	+	+	+	+	+	+	+		
ΔV_{TPI}	ΔV_Y	+	+	+	+	0	0	7	+	+	+	+	+	+	+	+	+	+		
	ΔV_Z	-	-	-	-	1	0	0	-	-	-	-	-	-	-	-	-	-		
N59	$\Delta V_F/BT$ (RCS)	+	+	+	+	2	1	9/5	5	+	+	+	+	+	+	+	+	+		
ΔV (LOS)	$\Delta V_R/BT$	+	+	+	+	0	0	7/0	4	+	+	+	+	+	+	+	+	+		
	$\Delta V_D/BT$	+	+	+	+	0	0	0/0	0	+	+	+	+	+	+	+	+	+		
	ΔV_C	+	+	+	+	0	0	9	2	+	+	+	+	+	+	+	+	+		
	BT	+	+	+	+	0	0	0	i	+	+	+	+	+	+	+	+	+		
N22	R	+	+	+	+	3	5	9	0	0	+	+	+	+	0	0	+	+	0	0
(SPS USING N81)	P	+	+	+	+	0	2	9	0	0	+	+	+	+	0	0	+	+	0	0
	Y	+	+	+	+	0	0	2	0	0	+	+	+	+	0	0	+	+	0	0
ΔV_C AT IGN		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
ΔV_C TAILOFF		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

WT	+																	
PT																		
YT																		

		BURN ATT CHECK					BURN ATT CHECK UPDATE						
STAR		+	+	+	+	+	STAR		+	+	+	+	+
SA						0	SA						0
TA						0	TA						0

TPI ONBOARD DATA

TPI HP-65 SOLM

		TIG					P35 FINAL COMP						
LOS ΔV_F	ΔV_X	+	+	+	+	+	N37	HR	+	+	+	+	+
ΔV_D	ΔV_Y	+	+	+	+	+	TIG	TPI MIN	+	+	+	+	+
ΔV_R	ΔV_Z	+	+	+	+	+		SEC	+	+	+	+	+
ΔV_D	ΔV_F	+	+	+	+	+	N58	ΔV_{TPI}	+	+	+	+	+
	ΔV_R	+	+	+	+	+		ΔV_{TPF}	+	+	+	+	+
	ΔV_D	+	+	+	+	+	$\Delta T(TPI/TPI)$						B

N81 COMP LIMITS $\pm 1.5, NA, \pm 3.0$ FPS

USE STDN ΔV_Y IN ALL CASES

CMC/HP-65 WITHIN LIMITS GO CMC
X IF NOT CMC/STDN WITHIN LIMITS GO CMC
X IF NOT HP-65/STDN WITHIN LIMITS GO HP-65
X NO AGREEMENT GO STDN

X FOR HP-65/STDN-USE CMC TIG OPTION:
X RECALL P35, PRO TO N37, LOAD HP-65/STDN TIG;
X PRO TO N55, SPECIFY TIG OPTION (V22E,+E),
X PRO TO N81, LOAD ΔV 's.

51+00 SM RCS QUAD HTRS(4)-OFF(ctr)(274)

XXXXXXXXXXXXXXXXXXXXX
X UNREASONABLE UPDATE X
X 0.50 NM, 3.0 FPS X
XXXXXXXXXXXXXXXXXXXXX

+7:30 R HP-65 DATA FOR TPI+7:30

+8:30 R AND θ HP-65 DATA FOR TPI+8:30

+9:00 PRO (P36 FINAL COMP: RECORD)
(LOAD N59 R2 WITH +ZERO)
P41; P00; THC PWR-ON(up)
BURN WITH SOYUZ BORESIGHTED IN COAS
(ΔV_F RCS WITH EMS) (ΔV_D TIMED RCS)

+12:00 **TPM1**
P77
P36, V25N33E (LOAD TPI TIG)
REACQUIRE VHF RANGING (R=8 NM)

+15:00 **TPM1**
RCS X AXIS
1 FPS=2.50 SEC
RCS Y&Z AXIS
1 FPS=5.00 SEC

+15:00 Turn on your orientation lights. ВКЛЮЧИТЕ ВАШИ ОПНН ОРИЕНТАЦИОН.
51+10 V87E (START VHF MARKING)

+16:30 θ HP-65 DATA FOR TPI+16:30

+19:30 R HP-65 DATA FOR TPI+19:30

+20:30 R AND θ HP-65 DATA FOR TPI+20:30

+21:00 PRO (P36 FINAL COMP: RECORD)(HP-65 SOLN PRIME)
(LOAD N59 R2 WITH +ZERO)(LOAD R1 & R3 WITH HP-65 SOLN)
P00; THC PWR-ON(up)
BURN WITH SOYUZ BORESIGHTED IN COAS
(ΔV_F RCS WITH EMS) (ΔV_D TIMED RCS)

+24:00 **TPM2**
P77
REACQUIRE VHF RANGING (R=2 NM)

51+20 STOW HP-65 KIT(U1) & CHECKLIST(R1)
P25; LOAD N72 WITH +ZERO
(MONITOR LOS RATES AND RANGE RATE)
(N77=R,R,-00001)(R,R FROM R27 VHF RANGING FILTER)
PRE-BRAKING SWITCH LIST (Pg 3-18)

VTR/DAC SWITCH LIST (Pg 3-18)
NULL LOS RATES AND ADJUST RANGE RATE TO BRAKING GATES
V76E, PRO AFTER EACH THRUSTING (ALLOW 20 SEC FOR CONVERGENCE)

51+30 STATION KEEP ON SOYUZ +X AXIS (R~150 FT)
Apo11o stationkeeping. ЭТОТ БАВНОУМНЕ АНОЛТОБА.

TPM1 ONBOARD DATA

P36 FINAL COMP		TPM1 HP-65 SOLN				ΔV_D BT	
N59	ΔV_F	0	0				
ΔV (LOS)	ΔV_R						
	ΔV_D	0	0				

TPM2 ONBOARD DATA

P36 FINAL COMP		TPM2 HP-65 SOLN				ΔV_D BT	
N59	ΔV_F	0	0				
ΔV (LOS)	ΔV_R						
	ΔV_D	0	0				

PRE-BRAKING SWITCH LIST

MAN ATT(3)-RATE CMD	ATT SET-GDC
LIMIT CYCLE-OFF	THC PWR-PWR
DBD/RATE-MIN/LOW	RHC PWR NORMAL #2-AC/DC
BMAG MODE(3)-ATT 1/RATE 2	RHC PWR DIRECT #2-MNA/MNB
SC CONT-SCS	AUTO RCS SELECT(16)-MNA/MNB
FDAI SCALE-5/1	THC-ARMED
FDAI SELECT-1	RHC #2-ARMED
FDAI SOURCE-ATT SET	

VTR/DAC SWITCH LIST

VTR POWER(3)-ON(UP)
HEAD WHEEL DRIVE MOTOR-ON (MOTOR ON LT-ON)
MODE-RECORD (RECORD LT-ON)
DAC-ON
(IF desired)HDC CX06

BRAKING GATES			θ (DEG)	
R(NM)	R(FPS)	R(FT)	SOLAR PANEL	BODY
1.00	30	6000		
.50	20	3000	0.5	
.25	10	1500	1.0	
.08	5	500	3.1	1.0
.05		300	5.2	1.7
.03		200	7.9	2.6
.02		130		3.9
.01		60		8.4

V
T
R

A
T
T

M
A
D

U
S
R

51+30

LOAD ASCP tw WITH DOCKING ATT (Pg 3-19)
 Initiating orientation of Apollo. НАВИГАЦИОННО-ОРИЕНТАЦИОННОЕ АПОЛЛО.
 MNVR TO DOCKING ROLL ATT (-60° CCW)
 (REF ATT SET ERROR NEEDLES)
 VTR/TV SWITCH LIST (Pg 3-19)

Orientation established. ОРИЕНТАЦИЯ УСТАНОВЛЕНА.
 Initiate docking orientation as programmed. НАВЕРИТЕ ОРИЕНТАЦИОННО-ОРИЕНТАЦИОННОЕ АПОЛЛО ПО ПРОГРАММЕ.
 СТИКОВКИ ПО ПРОГРАММЕ.

ACQUIRE ATS HGA: MAN, WIDE P -36, Y 44
 S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW

EMS FUNC/MODE-ΔV SET/STBY
 SET ΔVC = -100.0 FPS
 EMS FUNC-ΔV

51+40

ACTIVE DOCKING PREPARATION CHECKLIST (Pg 1-20)

MONITOR SOYUZ MNVR ON SOYUZ +X AXIS

SOYUZ MNVRS TO DOCKING ATT
 51+44:25 - 51+47:00

SC CONT/MODE-SCS/FREE
 ACTIVE DOCKING CHECKLIST (Pg 1-21)

TV - GRD CMD
 51+48 - 52+09

51+50

CSM/SOYUZ INTERFACE SEAL COMPRESSED

52+00

SUNSET
 AT 52:05

DOCKING ATTITUDE

		NOMINAL			UPDATE		
ASCP tw	R		3	0	0		
	P		1	5	7		
	Y		0	0	0		

VTR/TV SWITCH LIST

VTR HEAD WHEEL DRIVE MOTOR-OFF(400)
 (MOTOR ON LT-OFF)

ON TV CAMERA AT LOCATION 606:
 CAMERA-AVG, SLAVE, LINEAR
 LENS (F, ZOOM, FOC)-22, 25, infinity

CANNOT SEE THROUGH OPTICS

Note: Use STDN ΔVY For All Burns.

FOR IMU ALIGNMENTS

Delete P52's While Attached To Booster.

If COAS Not Calibrated-

1. If GDC & IMU Compare Within 5 Deg-
Perform COAS LOS DETERMINATION Procedures (Pg 1-11) ASAP.
If Not- Verify IMU Alignment:
Use P21 (G/4-4) To Obtain Altitude.
Mnvr To & Maintain +X Axis Track Of Horizon.
Key V83E & Verify Depression Angle.
80 NM Alt = 348 Deg Dep Ang 200 NM Alt = 341 Deg Dep Ang
120 NM Alt = 345 Deg Dep Ang 240 NM Alt = 339 Deg Dep Ang
160 NM Alt = 343 Deg Dep Ang
If IMU Compare Within 5 Deg-
Perform COAS LOS DETERMINATION Procedures (Pg 1-11) ASAP.
If Not- Use Nominal COAS Angles (+0, +57470) For P54's.

2. In Place Of P52 OPT 3-
Use P20 OPT 1 To Obtain Star Sighting Attitudes:

Load N78 With +ZERO's.
Load 1ST Star, Record N18 And
Perform Auto Mnvr To Star Att.
Recall P20, Load 2ND Star & Record.
Recall P20, Load 3RD Star & Record.
Perform P54 OPT 3 (G/3-9):
Verify N94 Loaded With COAS
LOS Angles Recorded (Pg 1-11).
SC CONT/MODE-CMC/FREE
Center Star In COAS With RHC.
ENTER To Mark (ENTER On V50N25 00016 To Reject)
Manually Mnvr To 2ND Star.
For Subsequent P54's (With Same REFSMMAT), Can Use
V49 Mnvr To 1ST Star.

STAR	ROLL	PITCH	YAW
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

3. In Place of P52 OPT 1 COARSE ALIGN- Perform
P52 OPT 1 PULSE TORQUE (ENTER On Torque Request)
(Do Not Perform Star Sightings).

If COAS LOS DETERMINATION Has Been Performed-
Repeat Above Steps 2 & 3, As Required.

FOR STATE VECTOR UPDATING

Pre NCC - None, Except For Possible STDN Uplink.
Post NCC- Before Initiating VHF Marks:
Key V67E And Load N99 With +10000, +100, +1; PRO.
Post HSR- Perform VHF Marking (V87E) In Place Of SXT Marking.
Post TPI- (Pg 1-17) ENTER To Bypass P36 Auto Mnvr To Track Att.
Key V22N78E, +E (For COAS Tracking).
Key V58E, Perform Auto Mnvr To COAS Track Att.
Use VHF Marking (V87E) Along With COAS Marking (V54E).
Load N94 With COAS LOS Angles Recorded (Pg 1-11).
PRO To F 53 45.
SC CONT/MODE-CMC/FREE
Center Soyuz In COAS With RHC.
ENTER To Mark (V86E To Reject). To Avoid Taking Unwanted Marks,
Be Sure To Terminate COAS Marking Routine (PRO On F 53 45)
Before Keying Vxx Or Nxx ENTER. V16NxxE Is Permissible.
Read θ For TPM HP-65 Soln From ORDEAL FDAI While Centering
Soyuz in COAS.

OPTICS FROZEN

Before Doing IMU Align Or SV Updating (Perform One Time)

1. OPTICS POWER-ON
2. OPT ZERO-ZERO
3. VERIFY SXT/SCT LOS SLAVED
IF NOT CONTINUE USING SCT
4. RECORD TPAC'S
IF TA NEGATIVE (XXX.XX) SUBTRACT 270°
5. KEY V64E, LOAD N94 WITH SA & TA
PRO, RECORD N78 REG 1 & 2
PRO
6. GO TO IMU ALIGN OR SV UPDATING PROCEDURE

TPAC'S

SA	_____
TA	_____

N78

R1	_____
R2	_____

Delete P52's While Attached To Booster.

In Place Of P52 OPT 3-

Use P20 OPT 1 To Obtain Star Sighting Attitudes:
Load N78 With Values Recorded Above.
Load 1ST Star, Record N18 And
Perform Auto Mnvr To Star Att.
Recall P20, Load 2ND Star & Record.
Recall P20, Load 3RD Star & Record.

STAR	ROLL	PITCH	YAW
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Perform P54 OPT 3 (G/3-9):
Verify N94 Loaded With Recorded SA & TA.
SC CONT/MODE-CMC/FREE
Center Star In SXT With MIC.
ENTER To Mark (ENTER On V50N25 00016 To Reject)
Manually Mnvr To 2ND Star.

For Subsequent P54's (With Same REFSMMAT), Can Use
V49 Mnvr To 1ST Star.

In Place of P52 OPT 1 COARSE ALIGN - Perform
P52 OPT 1 PULSE TORQUE (ENTER On Torque Request)
(DO NOT Perform Star Sightings).

FOR STATE VECTOR UPDATING

1. Each Time MINKEY Is Initiated (PRO On Minkey Option)
ENTER To Bypass Auto Mnvr To Track Att.
Key V64E, Verify N94 Loaded With Recorded SA & TA,
PRO, Verify N78 Values, PRO.
Key V58E, Perform Auto Mnvr To Soyuz Track Att.
2. Use COAS Marking Routine (V54E), But Use SXT Instead Of COAS.
Verify N94 Loaded With Recorded SA & TA.
PRO To F 53 45.
SC CONT/MODE-CMC/FREE
Center Soyuz In SXT With MIC.
ENTER To Mark (V86E To Reject). To Avoid Taking Unwanted Marks,
Be Sure to Terminate COAS Marking Routine (PRO On F 53 45)
Before Keying Vxx Or Nxx ENTER. V16Nxx Is Permissible.

SOYUZ TRACKER LIGHTS FAILED

Notes: 1. Perform NOMINAL Rndz Timeline (SXT Marks Not Possible When Soyuz In Darkness).
2. If Post TPM1 Lighting Will Allow, TPM2 Soln Accuracy Will Be Greatly Improved If At Least One SXT Mark Is Incorporated.
3. Nominally, HP-65 Soln Not Possible For TPM1 And TPM2.
Immediately- V57E, V22E, 1E, PRO (For Post TPI Single Sensor WRI Logic)

MARK BUTTON FAILED

FAILED OPEN (Bit 6 Channel 16 Remains = Zero)
Note: Normal DSKY Operations (e.g. V76E, V16N78E) Are Permitted During Marking Periods.
Before Marking-
Load Following EHP(SL-5) (Can Be Loaded Anytime)
V25N26E
1E (1cs Time Delay)
2151E (Fixed Memory Add-
16067E res of MARKDIF)
For EACH Mark-
Key V31 (Do Not Key ENTER)
ENTER (When Target Centered)
(ENTER Must Be Done From NAV DSKY)
After Completion Of SXT NAV (TPM2)-
Key V21N26E, OE (To Disable EMP SL-5)
FAILED CLOSE (Bit 6 Channel 16 Remains = One)
Note: EMP SL-5 Is Not Required.
Perform ALL Program Procedures On MAIN DSKY.
To Mark- Depress ANY
Key on NAV DSKY (Except PRO).

EMS ΔV/RANGE DISPLAY BLANK

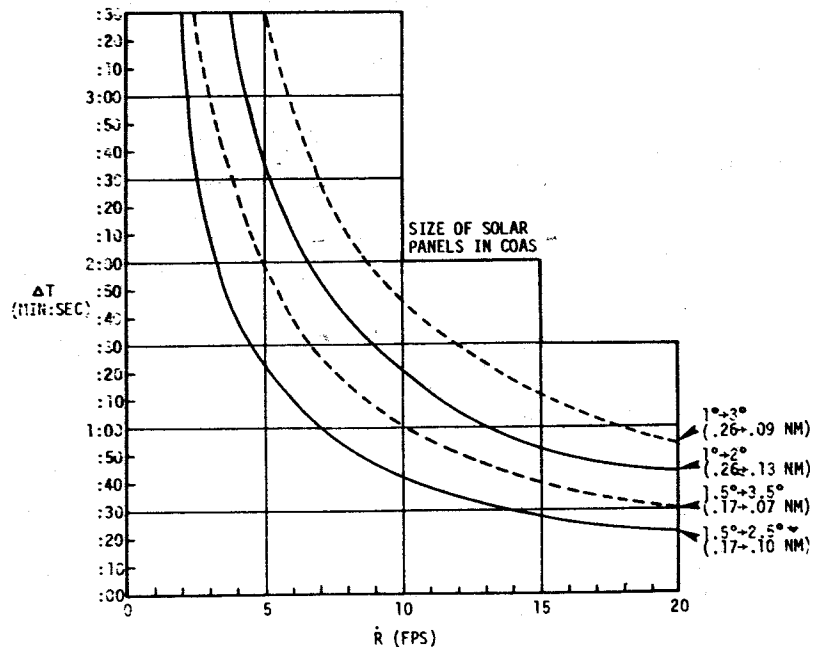
For SCS Burns- EMS FUNC-OFF (Make Timed Burns)
SPS THRUST-DIRECT ON (To Initiate Burn)
ΔV THRUST-OFF (To Terminate Burn)
SPS THRUST-NORMAL
For Hp-65 Data: Pre NSR- V76E (Use VHF Range Rate Processing Routine)
V25E, Load N72 With GET Of Next Data Point.
PRO
N76E (To Read Range)
TPI TIG- V76E, V25E, +E, +E, PRO (To Terminate
Optimized Range Calculations)
N76E (To Read Current Range)
Pre TPI- V76E (Use VHF Range Rate Processing Routine)
V25E, Load N72 With GET Of Next Data Point.
PRO
N76E (To Read Range)
(TPI-14)-V76E, V25E, +E, +E, PRO (To Terminate
Optimized Range Calculations)
V76E (To Read Current Range)
Post TPI-V76E, V25E, +E, +E, PRO (To Terminate
Optimized Range Calculations)
N76E (To Read Current Range)

NO VHF RANGING

Note: HP-65 Solutions Not Possible, Delete:
V87's (Used To Enable VHF Marking)
V76's (Used To Enable VHF Range Rate Processing Routine)
Immediately- V77E (To Terminate VHF Range Rate Processing Routine)
V88E (To Terminate VHF Marking)
V57E, V22E, 1E, PRO (For Post TPI Single Sensor WRI Logic)
Braking- V37E47E, V83E (Monitor R & R)

CAUTION: WORSE CASE CMC RANGE ERROR CAN BE ~.8 NM.
REF BRAKING GATE TABLE (Pg 1-18) FOR SIZE VS RANGE.
IF SOLAR PANEL GROWTH BECOMES APPARENT (.25° TO .5°)
BEFORE FIRST BRAKING GATE, BEGIN BRAKING IMMEDIATELY.

Establish R = -25.0 FPS At 1 NM, Then RESET DET Counting UP.
Load EMS = -25.0, EMS FUNC/MODE-ΔV/NORMAL
When DET = 01:00, Brake EMS To -20.0 (R = .75 NM)
= 02:15, -15.0 (R = .50 NM)
When Soyuz Solar Panel = 1° In COAS (Or DET = 03:45)
Brake EMS To -10.0 (R = .25 NM)
Obtain ΔT For Change In COAS (1° to 3°, 1° to 2°,
1.5° to 3.5°, Or 1.5° to 2.5°)
Use Chart To Determine R For Final Braking.



QUAD FAILED: CMC CONTROL

QUAD HE(1) (Failed Quad)-CLOSE (Mom)
 PRIM/SEC PRPLNT(1) (Failed Quad)-CLOSE (Mom)
 AUTO RCS SELECT(4) (Failed Quad)-OFF
 SC CONT-CMC/AUTO (Maintain CMC Control Until Docked)
 V48E, Load H47 Per Table (Load XX As Specified In Nominal C/L)

FAILED QUAD	A	B	C	D
DAP LOAD	101XX	110XX	101XX	110XX
	00111	11011	01101	11110

NOTES FOR RCS TRANSLATION:

- 50% Reduction In Effectiveness For All Axes.
- Degraded Attitude Hold Authority.
- Unwanted ΔV_X For Y & Z Translation.
- For Quad A Or C Failed With Z Translation:
Possible Loss Of PITCH Control
(Partially Compensate By Using The RHC To Initiate An UP/DOWN Rate Prior To +/- Z Translation).
- For Quad B Or D Failed With Y Translation:
Possible Loss Of YAW Control
(Partially Compensate By Using The RHC To Initiate A LEFT/RIGHT Rate Prior To +/- Y Translation).
- If $N85 > 5$ FPS In Any Axis, Rotate S/C To Maximize ΔV_X .
If $N85 \leq 5$ FPS In All Axes, Trim ΔV_X Last.

NOTES FOR SPS BURNS:

- Use 2 Jet, 20 Second Ullage. (Review Notes 1 & 2)
- Trim Residuals Using Note 6.

NOTES FOR BRAKING:

- In The PRE-BRAKING SWITCH LIST:
Use SC CONT-CMC/AUTO rather than SCS Control.
- Verify 0.5°/Sec Rate Is In The DAP Prior To Braking.
- Initiate Braking ASAP (2 Quads) (Review Note 1)
- Use SCS Control (MIN/LOW) To Make Accurate LOS Rate Checks.
- A Low LOS Rate Must Be Maintained. (Not Enough Translation Authority To Control Rate Buildup Later On)
- LOS Rate Control Gives Pronounced Changes To Closure Rate.

NOTES FOR DOCKING:

- CMC ATT DB (0.5°) Is Being Used For Docking;
Not The SCS DB (0.2°).
- Immediately Prior To Contact, The RHC May Be Used To Center The COAS On The Target.

QUAD FAILED: SCS CONTROL

QUAD HE(1) (Failed Quad)-CLOSE (Mom)
 PRIM/SEC PRPLNT(1) (Failed Quad)-CLOSE (Mom)
 AUTO RCS SELECT(4) (Failed Quad)-OFF
 SC CONT-SCS
 DBD/RATE-MIN/LOW
 BMAG MODE(3)-ATT 1/RATE 2

NOTES FOR RCS TRANSLATION:

- Translation And Attitude Control Depend On Proper Manipulation Of AUTO RCS SELECT Switches.
- For All Single Axis Translation:
AUTO RCS SELECT (Failed Quad Plus Table)-OFF

FAILED QUAD	A	B	C	D
+X TRANS	(5.0)	(5.0)	A4-OFF (5.0)	B4-OFF (5.5)
-X TRANS	C4-OFF* (5.0)	D4-OFF** (5.5)	A3-OFF (5.5)	B3-OFF (5.5)
+Y TRANS	C1-OFF (10.5)	Note 7	A2-OFF (10.5)	Note 7
-Y TRANS	C2-OFF (10.5)	Note 7	A1-OFF (10.5)	Note 7
+Z TRANS	Note 6	D1-OFF (10.5)	Note 6	B2-OFF (10.5)
-Z TRANS	Note 6	D2-OFF (10.5)	Note 6	B1-OFF (10.5)

() = Approximate Number Of Seconds To Obtain 1.0 FPS.

* Cycle ON To Control PITCH.

** If Required, Cycle ON To Control YAW.

- 50% Reduction In Effectiveness For All Axes.
- Degraded Attitude Hold Authority.
- Unwanted ΔV Normal To Translation Axis.
- For Quad A Or C Failed With Z Translation:
Possible Loss Of PITCH Control (Partially Compensate By Using The RHC To Initiate An UP/DOWN Rate Prior To +/- Z Translation).
- For Quad B Or D Failed With Y Translation:
Possible Loss Of YAW Control (Partially Compensate By Using The RHC To Initiate A LEFT/RIGHT Rate Prior To +/- Y Translation).
- If $N85 > 5$ FPS In Any Axis, Rotate S/C To Maximize ΔV_X .
If $N85 \leq 5$ FPS In All Axes, Trim ΔV_X Last.

NOTES FOR SPS BURNS:

- Use 2 Jet, 20 Second Ullage. (Review Notes 3 & 4).
- Trim Residuals Using Note 8.

NOTES FOR BRAKING:

- If Possible, Use SC CONT-CMC/HOLD Rather Than SCS. (Reference CMC Control Procedures And Verify 0.5°/Sec Rate Is Loaded Into DAP).
- Initiate Braking ASAP (2 Quads) (Review Note 3).
- A Low LOS Rate Must Be Maintained. (Not Enough Translation Authority To Control Rate Buildup Later On.)
- LOS Rate Control Gives Pronounced Changes To Closure Rate.

NOTES FOR DOCKING:

- Immediately Prior To Contact, The RHC May Be Used To Center The COAS On The Target.

MAX THRUSTING RCS BURN (4 JET X TRANSLATION)

- Notes: 1. Max Duration For Any Continuous Burn Or Total Accumulated Multiple Short Duration Burns During ANY 45 Min Period Is 150 Sec For +X RCS Jets And 50 For -X RCS Jets. (Nominal RCS Targeting Limit Will Be 100 Sec +X, 50 Sec -X).
2. There Must Be At Least 45 Min Of Elapsed Time Between A Max Duration Burn And Other RCS Burns (Max Or Otherwise).

-X RCS ($\Delta V_{Total} < 0$ or = 50 Sec)

1. Use P41.
V25N17E; Load N17 = (Any roll), (N18pitch \pm 180), (360 - N18yaw)
2. Load EMS = $-\Delta V_{TOTAL}$
V63E; Manually Mnv To -X Burn Att Using N17 Error Needles.
3. At TIG, Translate -X RCS & Trim N85 Residuals.

+X RCS / -X RCS (100 Sec $< \Delta V_{TOTAL} \leq$ 200 Sec)

1. Use P41 & Auto Mnv To N18 Burn Att.
2. V25N17E; Load N17 = (Any roll), (N18pitch \pm 180), (360 - N18yaw)
3. Load EMS = +X ΔV_{TOTAL}
4. At TIG, Translate +X RCS = +X ΔV_{TOTAL}
V63E
5. Manually Mnv To -X Burn Att Using N17 Error Needles.
6. Load EMS = -X ΔV_{TOTAL}
7. Translate -X RCS & Trim N85 Residuals.

+X RCS / SPS

1. Use P40 & Auto Mnv To N18 Burn Att.
2. Load EMS = ($\Delta V_{TOTAL} - \Delta V_{TAILOFF}$)
3. Translate +X RCS Ullage = 100 Sec (Do Not PRO On V99N40)
4. Perform SPS SCS Auto Burn.
5. Key ENTER On V99N40 After SPS Engine Cutoff.
6. Trim N85 Residuals.

+X RCS / SPS / -X RCS ($\Delta V_{TOTAL} > 200$ Sec)

1. Use P40 & Auto Mnv To N18 Burn Att.
2. V25N17E; Load N17 = (Any roll), (N18pitch + 180), (360 - N18yaw)
3. Load EMS = ($\Delta V_{TOTAL} - \Delta V_{TAILOFF} - \Delta V_{XRCS}$)
4. Translate +X RCS Ullage = 100 Sec (Do Not PRO on V99N40)
5. Perform SPS SCS Auto Burn.
6. Key ENTER On V99N40 After SPS Engine Cutoff.
V63E
7. Manually Mnv To -X Burn Att Using N17 Error Needles)
8. Load EMS = $-\Delta V_{XRCS}$
9. Translate -X RCS & Trim N85 Residuals.

<p>52+00</p> <p>V T R</p> <p>U S R</p> <p>52+20</p> <p>52+40</p> <p>V T R</p> <p>53+00</p>	<p>INFORM SOYUZ : APOLLO DOCKING DELAYED. ОТКАЗОВА АПОЛЛОНА ОТКЛАДЫВАЕТСЯ.</p> <p>INFORM SOYUZ : IS YOUR ORIENTATION SYSTEM ACTIVATED? ВАША СИСТЕМА ОРИЕНТАЦИИ ВКЛЮЧЕНА?</p> <p>* IF YES: INFORM SOYUZ : APOLLO WILL ATTEMPT DOCKING AT 52+42. АПОЛЛОН ПОВТОРИТ ПОПЫТКУ СТЫКОВКИ В 52+42.</p> <p>* IF NO: INFORM SOYUZ : APOLLO WILL ATTEMPT DOCKING AT 53+23. АПОЛЛОН ПОВТОРИТ ПОПЫТКУ СТЫКОВКИ В 53+23.</p> <p>EXTERIOR LIGHTS RUN/EVA-RUN/EVA</p> <p>* IF NO COMM: DSE: (LBR/RCD/FWD/CMD RESET) VTR HEAD WHEEL DRIVE MOTOR-OFF (MOTOR ON LT-OFF)</p> <p>DAC-OFF SC CONT/MODE-CMC/AUTO</p> <p>INFORM SOYUZ : TURN ON VHF SIMPLEX A. ВКЛЮЧИТЕ УКВ СИМПЛЕКС А.</p> <p>VHF RANGING-OFF VHF AM A-SIMPLEX VHF AM B-OFF</p> <p>* IF SOYUZ ORIENTATION SYSTEM REMAINED ACTIVATED AFTER NOMINAL DOCKING ATTEMPT: EMS FUNC/MODE-ΔV SET/STBY SET ΔVC=-100.0 FPS EMS FUNC-ΔV</p> <p>SOYUZ STAYS IN DOCKING ATTITUDE FOR DOCKING AT 52+42</p> <p>DAC-ON (IF DESIRED) HDC/CX06 SC CONT/MODE-SCS/FREE ACTIVE DOCKING CHECKLIST (Pg 1-21)</p> <p>VTR 52+36 - 52+50</p> <p>DOCK(AT SR) 52+42</p> <p>EXTERIOR LIGHTS RUN/EVA-OFF</p> <p>* IF NO DOCKING (AT SR): DSE: (LBR/RCD/FWD/CMD RESET) VTR HEAD WHEEL DRIVE MOTOR-OFF (MOTOR ON LT-OFF) DAC-OFF SC CONT/MODE-CMC/AUTO</p>	<p>53+00</p> <p>Q U I</p> <p>B O A T</p> <p>V T R</p> <p>53+20</p> <p>H A D</p> <p>U S R</p> <p>53+40</p> <p>54+00</p>	<p>VERIFY STATIONKEEPING ON SOYUZ +X AXIS (R₁₅₀ FT)</p> <p>EMS FUNC/MODE-ΔV SET/STBY SET ΔVC=-100.0 FPS EMS FUNC-ΔV</p> <p>ACQ ATS HGA: MAN, WIDE P -43, Y 16 S-BD ANT IND > 1/3 SCALE HGA: REACQ, NARROW</p> <p>DAC-ON (IF DESIRED) HDC/CX06 SC CONT/MODE-SCS/FREE ACTIVE DOCKING CHECKLIST (Pg 1-21)</p> <p>VTR 53+12 - 53+26</p> <p>SOYUZ MNVRS TO DOCKING ATT 53+16 - 53+19</p> <p>DOCK(ONE REV LATE) 53+23</p> <p>* IF NO DOCKING: CONTINUE *</p> <p>VTR HEAD WHEEL DRIVE MOTOR-OFF (MOTOR ON LT-OFF) DAC-OFF SC CONT/MODE-CMC/AUTO</p> <p>EXTERIOR LIGHTS RUN/EVA-RUN/EVA</p> <p>INFORM SOYUZ : APOLLO DOCKING DELAYED. СТЫКОВКА АПОЛЛОНА ОТКЛАДЫВАЕТСЯ.</p> <p>INFORM SOYUZ : APOLLO WILL ATTEMPT DOCKING AT 54+52. АПОЛЛОН ПОВТОРИТ ПОПЫТКУ СТЫКОВКИ В 54+52.</p> <p>GUIDE RING A-RETRACT (~40 SEC)</p> <p>GUIDE RING EXTEND LT-OUT PASSIVE LT-ON</p> <p>GUIDE RING A-OFF (CTR)</p> <p>DSE: (LBR/RCD/FWD/CMD RESET)</p>
--	---	--	---

DELAYED DOCKING

DELAYED DOCKING

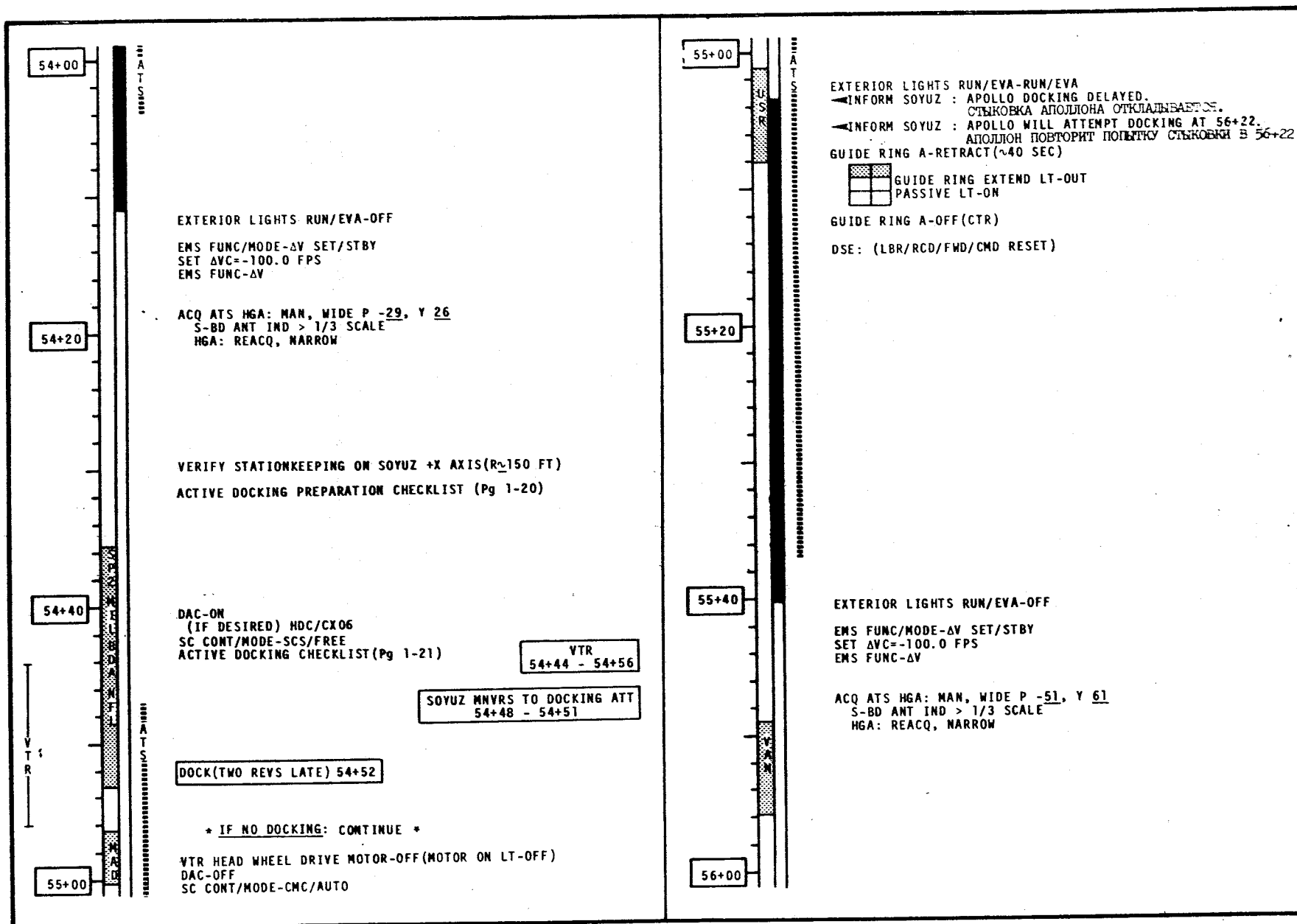
DELAYED DOCKING

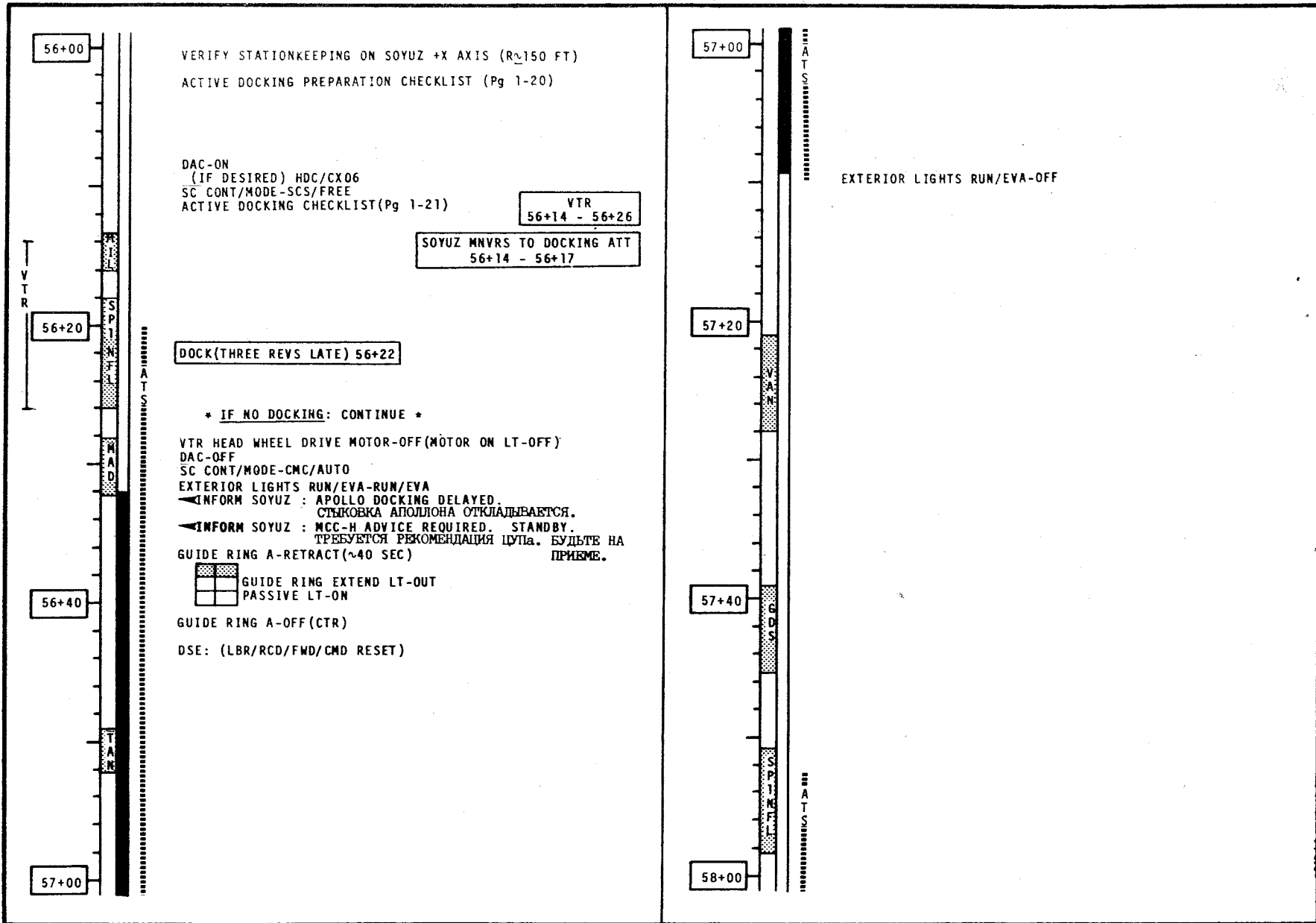
DELAYED DOCKING

DELAYED DOCKING

DELAYED DOCKING

DELAYED DOCKING





SOYUZ RE-RENDEZVOUS POLAR PLOT (WT = 290°)

BASIC ASSUMPTIONS

- (Pre C/L) o Apollo in heads down configuration (HDSUPFLG RESET). (nominal for ATS coverage pre-TPI2)
- (Pre C/L) o IMU aligned to re-rndz REFSMMAT (re-rndz REFSMMAT related to TPI2 same as nominal is to TPI1)
- (Pre C/L) o Soyuz VHF ranging is off, configured for comm on SIMPLEX AM. (to conserve Soyuz battery)
- (Pre C/L) o STDN supplied maneuvers have been executed, placing Apollo/Soyuz in a stable orbit condition. (Apollo trailing Soyuz 47 ± 10 NM and $\Delta H = \text{Zero}$ at TPI1)
- maybe (Pre C/L) o STDN will advise crew when to obtain pre-TPI1 relative range data. (will be used by STDN in determining TPI1 solution)
- o TPI1 ideally only maneuver required other than braking.
- o TPI2 orbital conditions same as nominal TPI. (2 min before midnight, $\Delta H = 10 \pm 2$ NM, Elev = 27°, $\omega T = 130^\circ$)
- o Pre-TPI2 procedures close to nominal.
- o Post-TPI2 procedures same as nominal

STATE VECTOR UPDATING

- (Pre C/L) o Uplinked before entering checklist.
- o Uplinked again before TPI1.
- o SXT and VHF marks after TPI1.

MANEUVER SOLUTION

- o TPI1 - STDN (Final pad only will be computed)
- o TPI2 - CMC (P35) (Nominally zero)
- o TPM1 - CMC (P36) and HP-65
- o TPM2 - CMC (P36) and HP-65

PAD DATA SUPPLIED BY STDN (all voiced pre-TPI1)

- o Relation of GET to checklist.
- o Pg 6-1 ATS AOS/LOS GET's. ATS HGA angles STDN AOS/LOS GET's. USR AOS/LOS GET's.
- o Pg 6-2 TPI1 Final Pad
- o Pg 6-3 TPI2 TIG
- o Pg 6-5 Docking Attitude.

STDN UPLINKED DATA

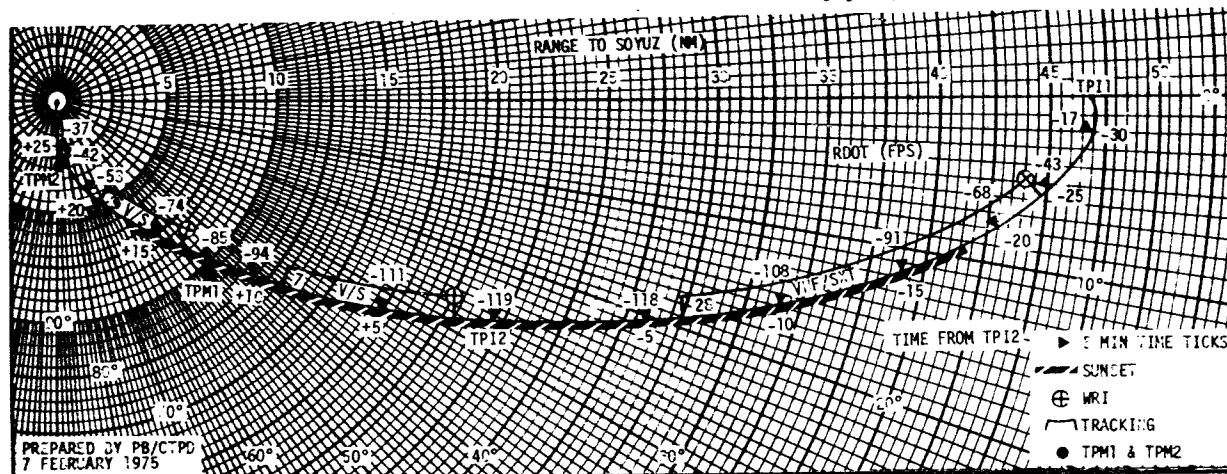
- (Pre C/L) o State vectors (CSM & Soyuz)
- (Pre C/L) o REFSMMAT
- o State vectors (CSM & Soyuz)
- o TPI1 Target Load

DATA VOICED TO STDN

- maybe (Pre C/L) o Pre-TPI1 relative range (may be done before entering checklist)
- o Pg 6-1 P52 (OPT 3)
- o Pg 6-2 TPI1 SPS Burn status
- o General status report on TPI2, TPM1, TPM2.

APOLLO/SOYUZ COMMUNICATION

- o Request VHF ranging on for pre-TPI1 range data; after recording data, request VHF ranging off, configure to SIMPLEX AM, to conserve Soyuz battery.
- o Pg 6-1 request Soyuz beacon on.
- o Pg 6-2 report TPI1 completed. request VHF ranging on.
- o Pg 6-3 report TPI2 completed.
- o Pg 6-4 request Soyuz orientation lights on. report Apollo station keeping.
- o Pg 6-5 (nominal docking related comm)



SOYUZ RE-RNDZ SOYUZ RE-RNDZ SOYUZ RE-RNDZ SOYUZ RE-RNDZ SOYUZ RE-RNDZ SOYUZ RE-RNDZ SOYUZ RE-RNDZ

SOYUZ RE-RNDZ

(11103)
(01111)

-12:00

V4GE (LOAD 4 JET, 2°/SEC)
(LOAD WT, PT & YT)

P30 (VERIFY N33 & N31 PAD VALUES)

GO TO SPS BURN CUE CARD (USE P41 IF ΔV<19 FPS)
ULLAGE AT -15 SEC
(BANK A)

P40

0:00

TPI1 (/) (R = 47 NM)
(TRIM VG's +0.2)
RECORD BURN STATUS
◀TPI1 completed.TPI1 БИТОВИЕН.

P35E; VERIFY N37 PAD VALVE, SELECT TIG OPTION (N55 REG 2 = +ZERO)
V32E (P35 RECYCLE: RECORD Pg 6-3)

◀Turn on VHF ranging. БИТОВИЕН ДАТЕНОТН.
VHF RANGING SWITCH LIST, ACQUIRE VHF RANGING (R = 47 NM)

-33:00

⊗ V37E (START VHF RANGING)

S
X
T
/
V
H
F

XXXXXXXXXXXXXXXXXXXXX
X UNREASONABLE UPDATE X
X 1.00 NM, 6.0 FPS X
XXXXXXXXXXXXXXXXXXXXX

TPI1 PAD DATA

		NOMINAL			FINAL		
N33	HR	+	+	+	+	+	+
TIG	MIN	+	+	+	+	+	+
	SEC	+	+	+	+	+	+
N31	ΔV _x	-	1	8	8		
	ΔV _y	+	0	0	0		
	ΔV _z	+	2	2	6		
N22	R	+	0	0	+	0	0
	P	+	0	0	+	0	0
	Y	+	0	0	+	0	0
	ΔV _C	+	0	1	6	4	
	BT	+					
	ΔVC AT IGN	+					
	ΔVC TAILOFF	-					

WT + PT YT

BURN ATT CHECK

STAR	+	+	+	+	+	+	+
SA	+						0
TA	+						0

VHF RANGING SWITCH LIST

VHF AM A-OFF(ctr)				
VHF AM B-DUPLEX				
VHF RANGING-ON(up)				
VHF ANTENNA-RIGHT(verify)				
EMS FUNC-ΔV SET/VHF RNG				
EMS MODE-BACKUP/VHF RNG				
VHF RNG-RESET				

SPS BURN STATUS

ΔTIG	+	+	+	+	+	+	+
AFTER TRIM							
ΔVC	+	+	+	+	+	+	+
FDAI (IF ATTITUDE NOT NOMINAL)	R	+					
	P	+					
	Y	+					
N85 (IF VG > .2)	VGX	0	0				
	VGY	0	0				
	VGZ	0	0				

(11103)
(01111)

S
X
T
/
V
H
F

XXXXXXXXXXXXXXXXXXXXX
X UNREASONABLE UPDATE X
X 1.00 NM, 6.0 FPS X
XXXXXXXXXXXXXXXXXXXXX

UNSTOW HP-65 KIT (U1) & CHECKLIST (R1)
HP-65 CHECKOUT (Pg 1)

REMOVE POLAR PLOT

V83E, SET ORDEAL (FDAI 1)

H=118

SET HDSUP FLG (V25N7E, 106E, 2000E, 1E)

LOAD N78 REG 3 = ZERO (V23N78E, +E)
P35 (FINAL COMP: RECORD)
PRO, N59E (RECORD)
RHC-MMVR TO ZERO ROLL (ROLL RIGHT)

IGNORE ATT ERROR NEEDLES
& UPLINK ACTIVITY LIGHT

P41

TPI2 (R = 21 NM)
(TRIM VG's +0.2)
P36 (VERIFY TRACK ROLL ATT ~ ZERO DEG)
TPI2 completed. TPI2 ВЫПОЛНЕН.
REACQUIRE VHF RANGING (R = 18 NM)

FDAI 1-ORB RATE

θ AND TA HP-65 DATA FOR TPI2+4:30

CENTER SOYUZ IN SXT WHEN
READING HP-65 DATA θ AND TA

XXXXXXXXXXXXXXXXXXXXX
X UNREASONABLE UPDATE X
X 0.50 NM, 3.0 FPS X
XXXXXXXXXXXXXXXXXXXXX

TPI2 PAD DATA

		NOMINAL					FINAL				
N37	HR	+	X	X	X	X	+	X	X	X	X
TIG TPI	MIN	+	X	X	X	X	+	X	X	X	X
	SEC	+	X	X	X	X	+	X	X	X	X

TPI2 ONBOARD DATA

		P35 RECYCLE					P35 FINAL COMP				
N55	REG 2 ELEV	X					X				
N58	ΔV _{TPI}	+	0	0			+	0	0		
	ΔV _{TPF}	+	0	0			+	0	0		
	ΔT(TPI/TPI)	+	0	0	B	0	0	+	0	0	B
N81	ΔV _X		0	0				0	0		
ΔV _{TPI}	ΔV _Y		0	0				0	0		
	ΔV _Z		0	0				0	0		
N59	ΔV _F		0	0				0	0		
ΔV (LOS)	ΔV _R		0	0				0	0		
	ΔV _D		0	0				0	0		

XXXXXXXXXXXXXXXXXXXXX
X UNREASONABLE UPDATE X
X 0.50 NM, 3.0 FPS X
XXXXXXXXXXXXXXXXXXXXX

SM RCS QUAD HTRS(4)-OFF(ctr)(274)

R HP-65 DATA FOR TPI2+7:30

R, θ AND TA HP-65 DATA FOR TPI2+8:30
PRO (P36 FINAL COMP: RECORD)

P41

TPM1

P36
V25N33E (LOAD TPI2 TIG)

←Turn on your orientation lights. ВКЛЮЧИТЕ ВАШИ ОГНИ ОРИЕНТАЦИИ.

CENTER SOYUZ IN SXT WHEN
READING HP-65 DATA θ AND TA

θ AND TA HP-65 DATA FOR TPI2+16:30

R HP-65 DATA FOR TPI2+19:30

R, θ AND TA HP-65 DATA FOR TPI2+20:30
PRO (P36 FINAL COMP: RECORD)

P41

TPM2

P37 (ACCEPT AUTO MNVR)(N54 = R, \dot{R} , θ FROM NAVIGATED STATE VECTORS)
STOW HP-65 KIT(U1) & CHECKLIST(R1)
CMC MODE-HOLD (MONITOR LOS RATES AND RANGE RATE)
PRE-BRAKING SWITCH LIST (Pg 6-4)

PRO (P48)(N77 = R, \dot{R} , θ)(R, \dot{R} FROM R27 VHF RANGING FILTER)
V48E (LOAD 0.5°/SEC)
VTR/DAC SWITCH LIST (Pg 6-4)N
NULL LOS RATES AND ADJUST RANGE RATE TO BRAKING GATES.
N83 ($\Delta V_X, \Delta V_Y, \Delta V_Z$ CONT OPTIONAL)

STATION KEEP ON SOYUZ +X AXIS ($R \approx 150$ FT)
←APOLLO stationkeeping. ЕСТЬ ЗАВИСАНИЕ АПОЛЛОНА.

TPM1 ONBOARD DATA

			P36 FINAL COMP				TPM1 CHART SOLN				
N59	ΔV_F		0	0							
$\Delta V_{(LOS)}$	ΔV_R		0	0							
	ΔV_D		0	0							

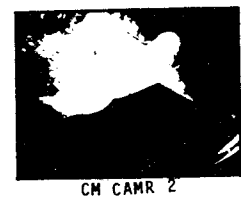
TPM2 ONBOARD DATA

			P36 FINAL COMP				TPM2 CHART SOLN				
N59	ΔV_F		0	0							
$\Delta V_{(LOS)}$	ΔV_R		0	0							
	ΔV_D		0	0							

- PRE-BRAKING SWITCH LIST**
- | | |
|---------------------------|-----------------------------|
| MAN ATT(3)-RATE CMD | ATT SET-GDC |
| LIMIT CYCLE-OFF | THC PWR-PWR |
| DBD/RATE-MIN/LOW | RHC PWR NORMAL #2-AC/DC |
| BMAG MODE(3)-ATT 1/RATE 2 | RHC PWR DIRECT #2-MNA/MNB |
| SC CONT-SCS | AUTO RCS SELECT(16)-MNA/MNB |
| FDAI SCALE-5/1 | THC-ARMED |
| FDAI SELECT-1/2 | RHC #2-ARMED |
| FDAI SOURCE-ATT SET | |

- VTR/DAC SWITCH LIST**
- | |
|--|
| VTR POWER(3)-ON(UP) |
| HEAD WHEEL DRIVE MOTOR-ON (MOTOR ON LT-ON) |
| MODE-RECORD (RECORD LT-ON) |
| DAC-ON |
| (IF desired)HDC CX06 |

BRAKING GATES			θ (DEG)	
R(NM)	R(FPS)	R(FT)	SOLAR PANEL	BODY
1.00	30	6000		
.50	20	3000	0.5	
.25	10	1500	1.0	
.08	5	500	3.1	1.0
.05		300	5.2	1.7
.03		200	7.9	2.6
.02		130		3.9
.01		60		8.4



V25N22E (LOAD DOCKING ATT) (Pg 6-5)
 ◀Initiating orientation of Apollo. НАЧИНАЮ ОРИЕНТАЦИЮ АПОЛЛО.
 MNVR TO DOCKING ROLL ATT
 V62E (REF ERROR NEEDLES)
 VTR/TV SWITCH LIST (Pg 6-5)

◀Orientation established. ОРИЕНТАЦИЯ УСТАНОВЛЕНА.
 ◀Initiate docking orientation as programmed. НАЧИНАЮ ОРИЕНТАЦИЮ
 ДОКОВОМУ ПО ПРОГРАММЕ.

V44E (VERIFY DOCKED DAP LOAD) (DO NOT ACTIVATE UNTIL
 DOCKING IS COMPLETE)

EMS FUNC/MODE-ΔV SET/STBY
 SET ΔVC = -100.0 FPS
 EMS FUNC-ΔV

ACTIVE DOCKING PREPARATION CHECKLIST (Pg 1-20)

MONITOR SOYUZ MNVR ON SOYUZ +X AXIS

SOYUZ MNVRS TO DOCKING ATT

SC CONT/MODE-SCS/FREE
 ACTIVE DOCKING CHECKLIST (Pg 1-21)

TV- GRD CMD

CSM/SOYUZ INTERFACE SEAL COMPRESSED

SUNSET IN
 ~ 5 MIN

DOCKING ATTITUDE

N22	R	+				0	0
	P	+				0	0
	Y	+				0	0

VTR/TV SWITCH LIST

VTR HEAD WHEEL DRIVE MOTOR-OFF(400)
 (MOTOR ON LT-OFF)

ON TV CAMERA AT LOCATION 606:
 CAMERA-AVG, SLAVE, LINEAR
 LENS (F, ZOOM, FOC)-22, 25, infinity

(11111)
 (00146)
 (00000)

 (05000)
 (00500)

BASIC ASSUMPTIONS

- o HGA will be deployed ASAP after SEPARATION MUVR
- o No IMU re-alignment (maintain Launch REFSMMAT)
- o STDN tracking not as accurate as CMC SXT tracking.
- o STDN SOR1 & SOR2 maneuver solutions will be computed using CMC state vectors.
- o P52 OPT 3 will be performed during first 3 night periods following SEP.
- o Pre-TPI ΔH = zero nm, TPI to TPF ω = 200°.
- o Return to Launch C/L after Station Keeping for Docking, Extraction, etc.

PAD DATA SUPPLIED BY STDN

- o Pg 7-c GET, HGA's & ATT's for ATS coverage
- o Pg 7-c HC Final Pad, SOR1 Final Pad
- o Pg 7-1 1ST INTERCEPT TIME Pad, TPI TIG Pad, SOR2 Final Pad
- o Pg 7-2 2ND INTERCEPT TIME Pad
- o Pg 7-4 DOCKING ATTITUDE Pad

STDN UPLINKED DATA

- o State Vectors (before Post-NC SXT marking)

DATA VOICED TO STDN

- o SEP status
- o Pg 7-c P52 (OPT 3), HC Burn Status, SOR1 Burn Status
- o Pg 7-1 SOR2 Burn Status
- o General status report on TPI, TPM1, TPM2

STATE VECTOR UPDATING

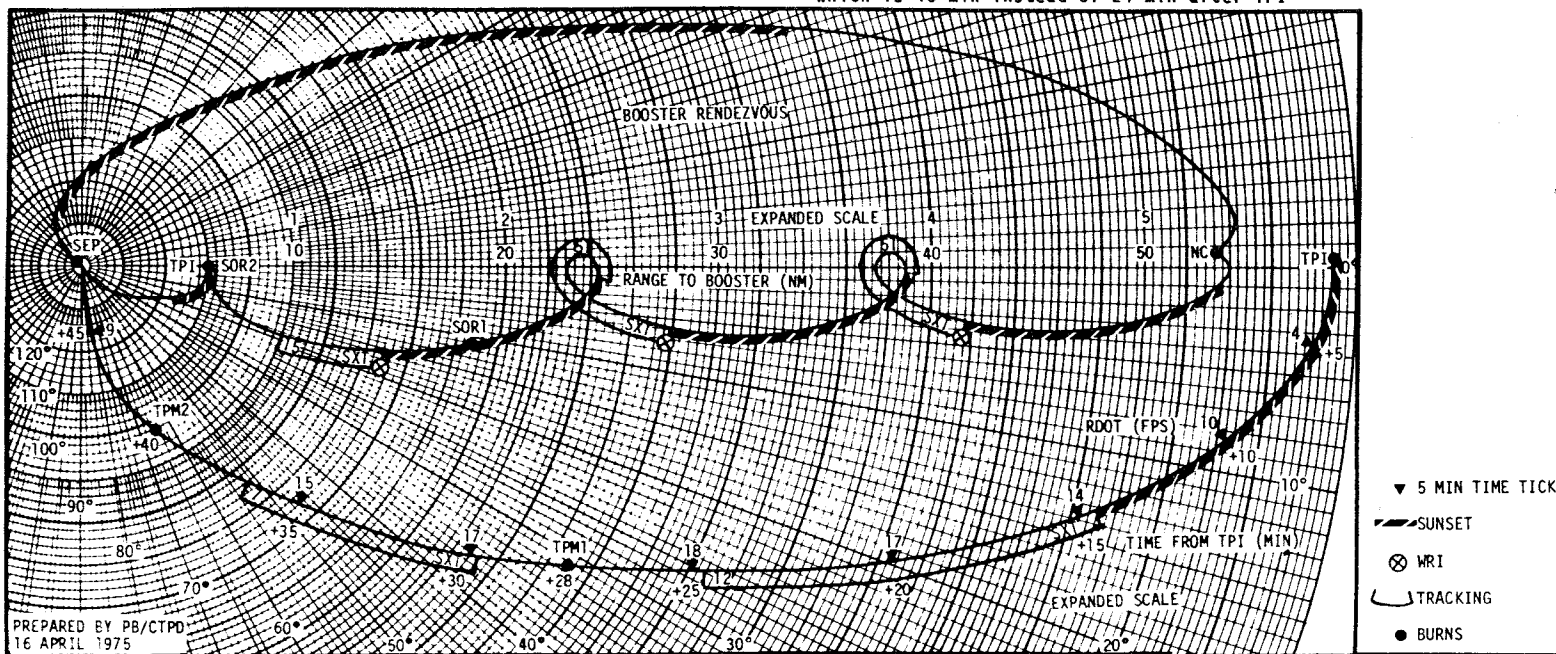
- o Uplinked after NC
- o SXT marks during each day period following NC
- o Nav programs- P20 OPT 4 used pre-SOR2, P36 used post-SOR2
- o W-Matrix initialization- Load with 2000/2 before first mark.
Force initialization (V93E) to occur with first mark of each of the 3 pre-SOR2 marking periods.
No initialization desired (bypass MINKEY) during the post-SOR2 marking periods.

MANEUVER SOLUTIONS

- o HC, SOR1 & SOR2 - STDN (final PAD only will be computed)
- o TPI, TPM1 & TPM2 - CMC(P36)

ONBOARD TARGETING

- o TPI - Use P36 instead of P35 to compute solution
Load 1ST INTERCEPT TIME (pad Pg 7-1), allows final comp to be done 23 min instead of 3 min before TIG.
No Recycle
PRO for Final Comp at TIG-23 min.
Key V16N81E and record ΔV_X & ΔV_Z
Use P30/P41(40) with P36 H81 values of ΔV_X & ΔV_Z and with ΔV_Y = Zero. (Note: will have to load H33 in P30 with TPI TIG, since P36 computed one to be 3 min from PRO)
- o TPM's - Use 2ND INTERCEPT TIME (pad Pg 7-2) for both midcourses
TPM1 is 38 min instead of 12 min after TPI
TPM2 is 12 min (nominal) after TPM2,
which is 40 min instead of 24 min after TPI



BOOSTER RNDZ

BOOSTER RNDZ

BOOSTER RNDZ

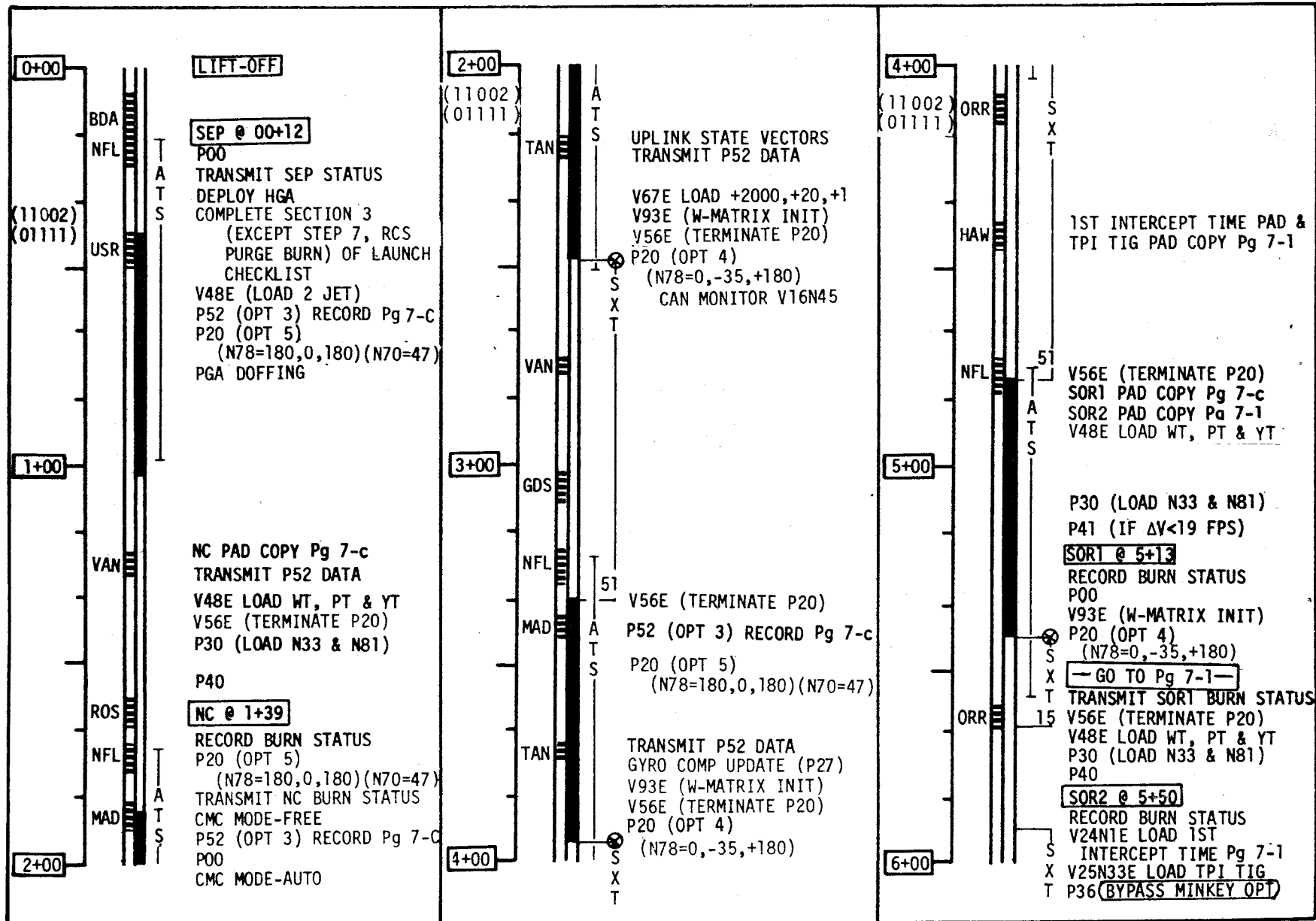
BOOSTER RNDZ

BOOSTER RNDZ

BOOSTER RNDZ

BOOSTER RNDZ

BOOSTER RNDZ



XXXXXXXXXXXXXXXXXXXXX
 X UNREASONABLE UPDATE X
 X 0.50 NM, 3.0 FPS X
 XXXXXXXXXXXXXXXXXXXXX

S
X
T

6+00
 (11002)
 (01111)

-35:00

6+10

-23:00

20

PRO at TIG -23 MIN (P36 FINAL COMP: RECORD)
 N81E (RECORD ΔVX & ΔVZ)

P00
 2ND INTERCEPT TIME PAD (COPY)
 DOCKING ATTITUDE PAD (COPY Pg 7-4)
 TRANSMIT SOR2 BURN STATUS (Pg 7-1)
 ACQUIRE ATS HGA: MAN, HIDE P, Y
 S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW

6+20
 (11103)
 (01111)

CM2/DAC/25/CX02-BRKT, MIR(f8,1/250,∞) 2 FPS
 UTILITY POWER-ON

V48E (LOAD 4 JET, 2°/sec)

RHC-MNVR TO ZERO ROLL

-12:00

P30
 LOAD N33 (TPI TIG PAD Pg 7-1)
 LOAD N81 (ΔVY=ZERO, RECORDED P36 ΔVX & ΔVZ)
 V24N1E (LOAD 2ND INTERCEPT TIME) (Pg 7-2)

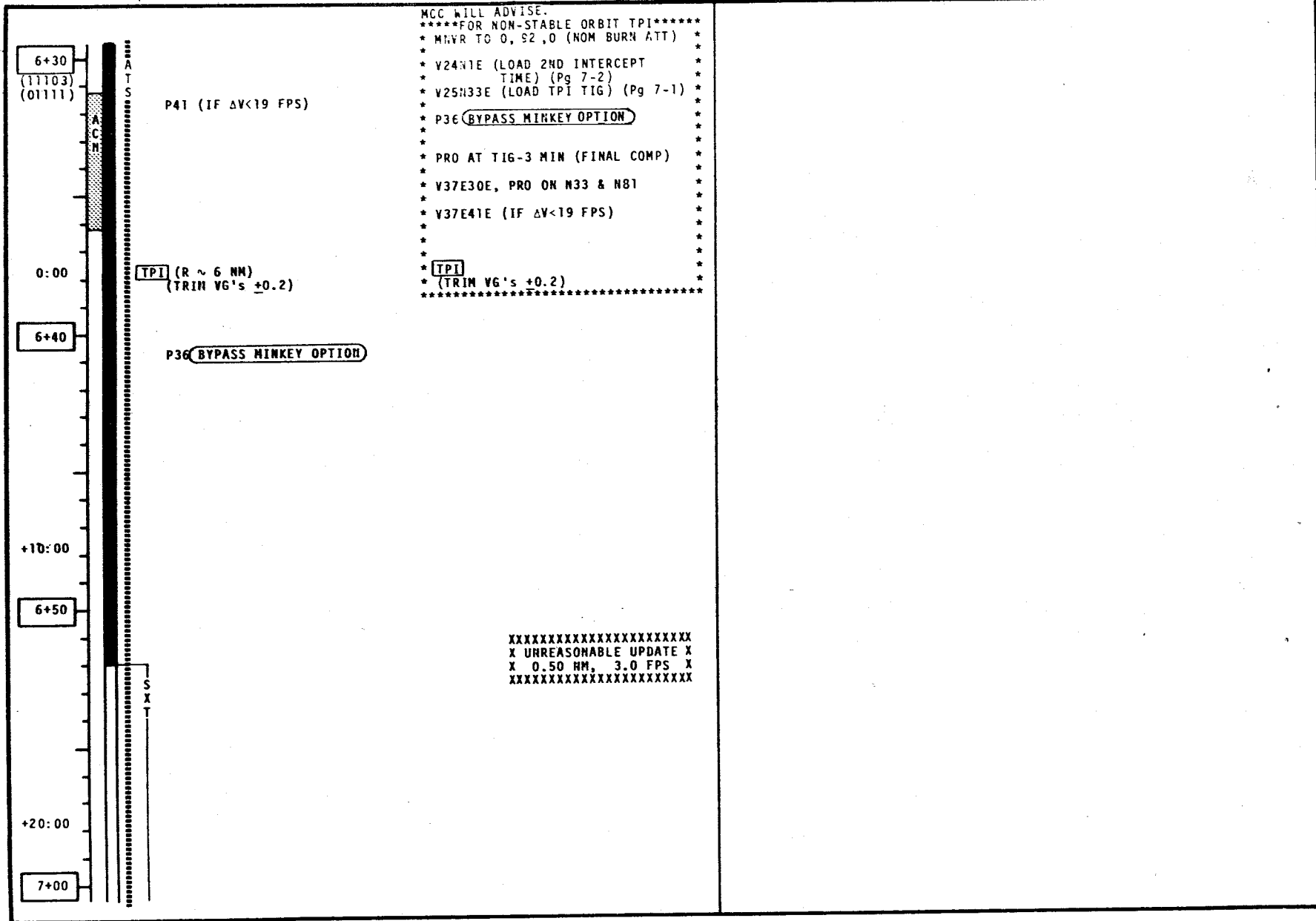
6+30

2ND INTERCEPT TIME PAD
 (TPF IS 16 MIN PRIOR TO SUNSET)

		NOMINAL					UPDATE				
N1	ADDR	0	3	6	3	3					
	R1	0	0	2	4	3					
	R2	2	2	6	1	0					

TPI ONBOARD DATA

		NOMINAL					P36 FINAL COMP					
N59 ΔV (LOS)	ΔV _F	-	0	0	0	0	9	0	0			
	ΔV _R	+	0	0	0	0	0	0	0			
	ΔV _D	+	0	0	0	9	1	0	0			
Y16N81E ΔV (LV)	ΔV _X	-	0	0	0	0	9	0	0			
	ΔV _Y	+	0	0	0	0	0	+	0	0	0	0
	ΔV _Z	+	0	0	0	9	1	0	0			



7+00
(11103)
(01111)

+25:00

+28:00

7+10

+37:00

+40:00

7+20

7+30

XXXXXXXXXXXXXXXXXXXXX
X UNREASONABLE UPDATE X
X 0.50 NM, 3.0 FPS X
XXXXXXXXXXXXXXXXXXXXX

ATT 12

PRO (P36 FINAL COMP: RECORD)
P41

TPM1

P36 BYPASS MINKEY OPTION
V25N33E (LOAD TPI TIG) (Pg 7-1)

NOTE: IF BOOSTER DIA>5° (distance between cross and mark to left or right of cross) START BRAKING PROCEDURES IMMEDIATELY.

PRO (P36 FINAL COMP: RECORD)
P41

TPM2

P37 (ACCEPT AUTO MNVR)(N54=R,R,θ FROM NAVIGATED STATE VECTORS)
LOAD EMS WITH CMC RANGE RATE (NOM ~-15 FPS)
CMC MODE-HOLD (MONITOR LOS RATES AND RANGE IN COAS)
PRE-BRAKING SWITCH LIST (Pg 7-4)

DAC-OM: HDC/CX06
V37E47E (MONITOR LOS RATES AND RANGE IN COAS)
ESTABLISH MINIMUM CLOSURE RATE=-15 FPS
HULL LOS RATES
ADJUST RANGE RATE (EMS) USING FOLLOWING PROCEDURES
EMS FUNC/MODE-ΔV/NORMAL (EMS LOADED WITH POST TPM2 R)
ESTABLISH EMS=-15 WHEN DIA=.4 DEG (R=.5 NM), THEN
WHEN DIA=.8 DEG BRAKE EMS TO -10 (R=.25)

OBTAIN ΔT FOR CHANGE IN COAS (1° TO 3°, 1° TO 2°,
1.5° TO 3.5°, OR 1.5° TO 2.5°)
USE CHART TO DETERMINE R FOR FINAL BRAKING

STATION KEEP ON BOOSTER +X AXIS (R~150 FT)
EXTERIOR LT RNDZ-SPOT
GO TO LAUNCH C/L (L/4-3)

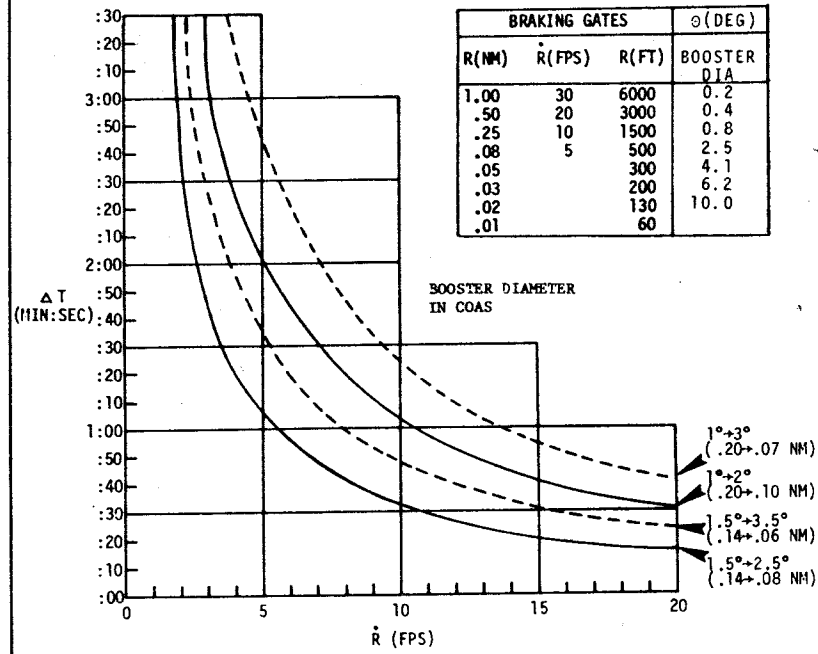
SUNSET
AT 7+42

TPM ONBOARD DATA

		TPM1				TPM2			
N59	ΔV _F	0	0		0	0			
ΔV (LOS)	ΔV _R	0	0		0	0			
	ΔV _D	0	0		0	0			

PRE-BRAKING SWITCH LIST

MAN ATT(3)-RATE CMD	ATT SET-GDC
LIMIT CYCLE-OFF	THC PWR-PWR
DBD/RATE-MIN/LOW	RHC PWR NORMAL #2-AC/DC
BMAG MODE(3)-ATT 1/RATE 2	RHC PWR DIRECT #2-MNA/MNB
SC CONT-SCS	AUTO RCS SELECT(16)-MNA/MNB
FDAI SCALE-5/1	THC-ARMED
FDAI SELECT-1/2	RHC #2-ARMED
FDAI SOURCE-ATT SET	



DOCKING ATTITUDE
UPDATE

N22	R	+			0	0
	P	+			0	0
	Y	+			0	0

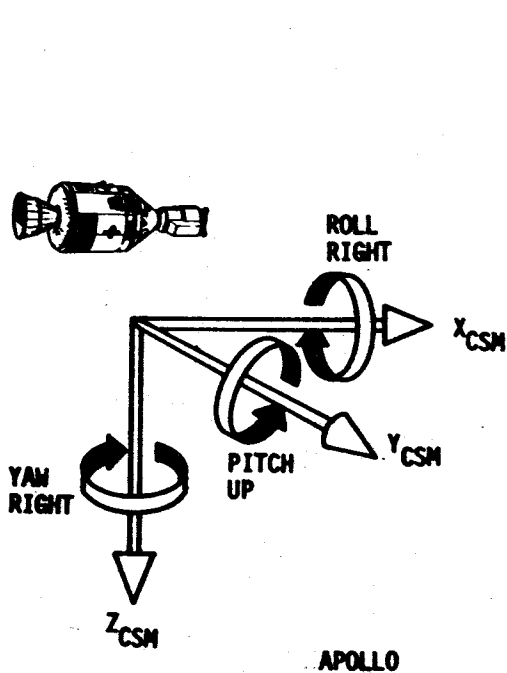
GENERAL COMMUNICATIONS
ОБЩАЯ СВЯЗЬ

- | | |
|---|---|
| 1. SAY AGAIN SLOWLY | ПОВТОРИТЕ МЕДЛЕННО |
| 2. HE WILL COMPLY | БУДЕТ СДЕЛАНО |
| 3. GO BACK TO STEP NO. _____ | ВОЗВРАЩАЙТЕСЬ К ПУНКТУ № _____ |
| 4. PITCH UP (DOWN) | ТАНГАХ ВВЕРХ / ВНИЗ / |
| 5. ROLL LEFT (RIGHT) | КРЕН ВЛЕВО / ВПРАВО / |
| 6. YAW LEFT (RIGHT) | РЫСКАНИЕ ВЛЕВО / ВПРАВО / |
| 7. BACK AWAY | ОТСОДИТЕ НАЗАД |
| 8. STAND BY | БУДЬТЕ НА ПРИЕМЕ |
| 9. CONTINUING NORMAL OPERATIONS | ПРОДОЛЖАЕМ ОБЫЧНЫЕ ОПЕРАЦИИ |
| 10. MCC WILL REPORT ABOUT THE PROBLEM | ЦУП СООБДИТ О НЕИСПРАВНОСТИ |
| 11. PROBLEM IS: | НЕИСПРАВНОСТЬ В: |
| CONTROL SYSTEM | СИСТЕМЕ УПРАВЛЕНИЯ |
| ELECTRICAL POWER SYSTEM | СИСТЕМЕ ЭЛЕКТРОПИТАНИЯ |
| ENVIRONMENTAL CONTROL SYSTEM | СИСТЕМЕ ЖИЗНЕОБЕСПЕЧЕНИЯ |
| COMMUNICATIONS SYSTEM | СИСТЕМЕ СВЯЗИ |
| SERVICE PROPULSION SYSTEM | НАРЯДОВОЙ ДВИГАТЕЛЬНОЙ УСТАНОВКЕ |
| GUIDANCE AND NAVIGATION | СИСТЕМЕ НАВЕДЕНИЯ И НАВИГАЦИИ |
| 12. CHECKING OUR SYSTEM | ПРОВЕРЯЮ НАШУ СИСТЕМУ |
| 13. CHECK YOUR SYSTEM | ПРОВЕРЬТЕ ВАШУ СИСТЕМУ |
| 14. WE HAVE A DELAY BUT CONTINUING NORMAL OPERATIONS | У НАС БЫЛА ЗАДЕРЖКА НО ПРОДОЛЖАЕМ ОБЫЧНЫЕ ОПЕРАЦИИ |
| 15. DO NOT INITIATE (ORIENTATION FOR DOCKING, INERTIAL ORIENTATION) | НЕ НАЧИНАЙТЕ /ОРИЕНТАЦИЮ ДЛЯ СТЫКОВКИ, ИНЕРЦИАЛЬНУЮ ОРИЕНТАЦИЮ/ |
| 16. I MADE A MISTAKE | Я ОШИБСЯ |
| 17. GIVING A CORRECTION | ДАЮ ПОПРАВКУ |
| 18. MOSCOW GIVES PERMISSION TO SOYUZ FOR: | Москва дает разрешение Союзу на: |
| DOCKING | стыковку |
| TRANSFER | переход |
| UNDOCKING | расстыковку |

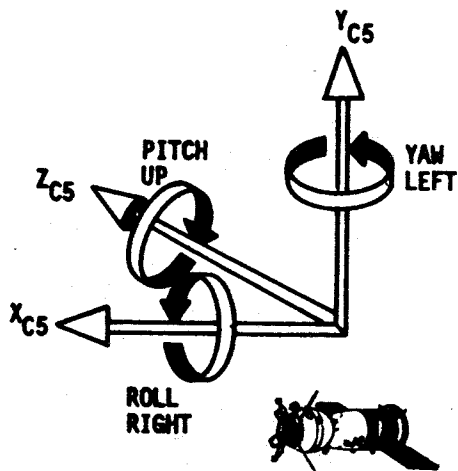
ADDITIONAL RENDEZVOUS PHRASES

ДОПОЛНИТЕЛЬНЫЕ ФРАЗЫ ДЛЯ СВЯЗИ ПРИ ВСТРЕЧЕ

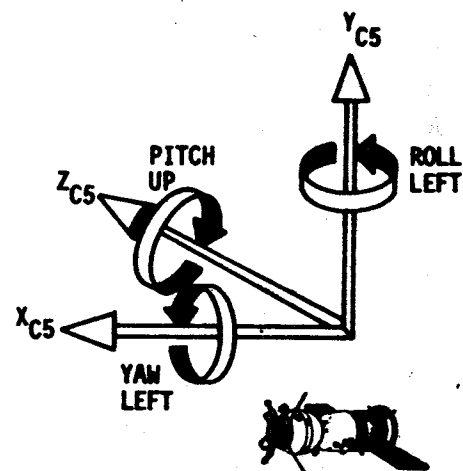
- | | |
|--|--|
| 19. CANNOT (RECEIVE, TRANSMIT) ON VHF (AM, FM) | НЕ МОГУ /ПРИНИМАТЬ/ПЕРЕДАВАТЬ/ ПО УКВ /АМ, ЧМ/ |
| 20. VHF (AM, FM) COMMUNICATIONS ARE (WEAK, INTERMITTENT) | СВЯЗЬ ПО УКВ /АМ, ЧМ/, /СЛАБАЯ, ПРЕРЫВАЕТСЯ/. |
| 21. GO OVER TO VHF (AM, FM) FOR COMMUNICATIONS | ПЕРЕЙДИТЕ НА УКВ /АМ, ЧМ/ ДЛЯ СВЯЗИ |
| 22. WILL TRY (VHF AM, VHF FM, RANGING) AT CLOSER RANGE | ПОПРОБУЮ СВЯЗАТЬСЯ /ПО УКВ АМ, ЧМ, ПРИ ИЗМЕРЕНИИ ДАЛЬНОСТИ/ НА БОЛЕЕ БЛИЗКОМ РАССТОЯНИИ |
| 23. RANGING LOCKUP NOT ESTABLISHED | РЕЖИМ ИЗМЕРЕНИЯ ДАЛЬНОСТИ НЕ УСТАНОВЛЕН. |
| 24. APOLLO CANNOT SIMULTANEOUSLY MAINTAIN BOTH RANGING LOCKUP AND VOICE COMMUNICATIONS | "АПОЛЛОН" НЕ МОЖЕТ ПОДДЕРЖИВАТЬ ОДНОВРЕМЕННО И ИЗМЕРЕНИЕ ДАЛЬНОСТИ И ЗВУКОВУЮ СВЯЗЬ |
| 25. MCC NOT COMPLETED | НСС НЕ ВЫПОЛНЕН |
| 26. APOLLO CANNOT PERFORM _____ | "АПОЛЛОН" НЕ МОЖЕТ ВЫПОЛНИТЬ _____ |
| 27. DOCKING WILL BE DELAYED AT LEAST TWO ORBITS | СТЫКОВКА БУДЕТ ОТЛОЖЕНА ПО КРАЙНЕЙ МЕРЕ НА ДВА ОБОРОТА |
| 28. STATIONKEEPING NOT ESTABLISHED | ЗАВИСАНИЕ НЕ УСТАНОВЛЕНО |
| 29. RANGE _____ | ДАЛЬНОСТЬ _____ МИЛЬ |
| 30. RANGE RATE | СКОРОСТЬ СБЛИЖЕНИЯ _____ |
| 31. CAN SOYUZ MAINTAIN (ORIENTATION FOR DOCKING INERTIAL ORIENTATION ORBITAL ORIENTATION)? | МОЖЕТ ЛИ "СОЮЗ" ПОДДЕРЖИВАТЬ /ОРИЕНТАЦИЮ ДЛЯ СТЫКОВКИ ИНЕРЦИАЛЬНУЮ ОРИЕНТАЦИЮ ОРБИТАЛЬНУЮ ОРИЕНТАЦИЮ/? |
| 32. DO NOT INITIATE _____ | НЕ НАЧИНАЙТЕ _____ |
| 33. DO NOT SEE YOUR (BEACON, ORIENTATION LIGHTS) | НЕ ВИЖУ ВАШЕГО /МАЯКА, ОГНЕЙ ОРИЕНТАЦИИ/ |
| 34. TURNING ON FLOODLIGHTS | ВКЛЮЧАЮ ПРОЖЕКТОРЫ |



APOLLO



SOYUZ
APPROACH MODE
(PERISCOPE ALONG + X_{C5})



SOYUZ
ORIENTATION MODE
(PERISCOPE ALONG - Y_{C5})

SOYUZ ATTITUDE MNVR INSTRUCTIONS (UNDOCKED)

SOYUZ ATTITUDE MNVR INSTRUCTIONS (DOCKED)

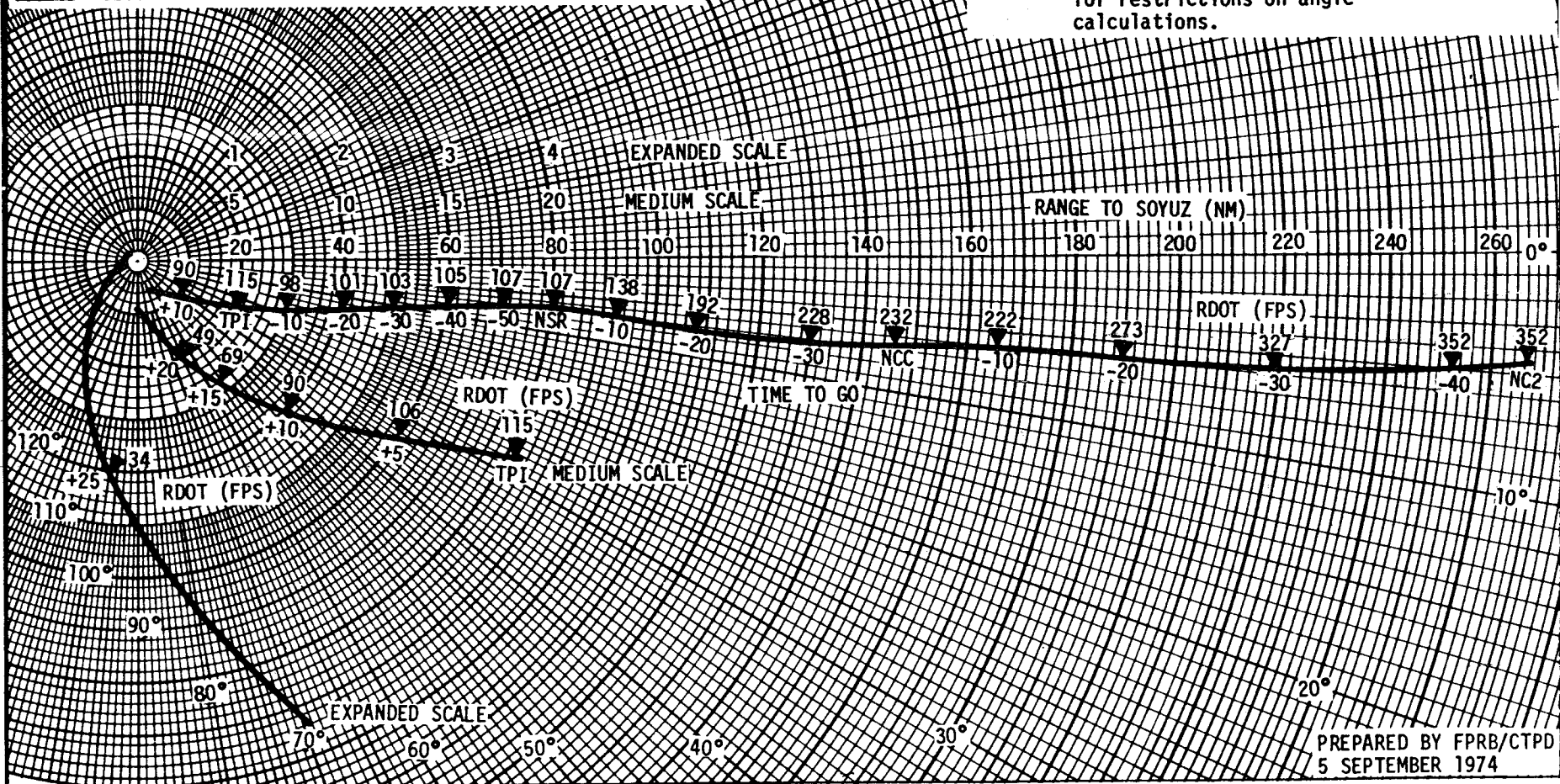
DESIRED SOYUZ ATTITUDE MNVR	SOYUZ ATTITUDE MNVR INSTRUCTION		SOYUZ AXES	DESIRED APOLLO ATTITUDE MNVR	SOYUZ ATTITUDE MNVR INSTRUCTION		SOYUZ AXES	C S M
	APPROACH MODE	ORIENTATION MODE			APPROACH MODE	ORIENTATION MODE		
ROLL RIGHT (LEFT)	ROLL RIGHT	YAW LEFT	X_{C5}	ROLL RIGHT (LEFT)	ROLL LEFT	YAW RIGHT	X_{C5}	X
PITCH UP (DN)	PITCH UP	PITCH UP	Z_{C5}	PITCH UP (DN)	PITCH DN	PITCH DN	Z_{C5}	Y
YAW RIGHT (LEFT)	YAW RIGHT	ROLL RIGHT	Y_{C5}	YAW RIGHT (LEFT)	YAW RIGHT	ROLL RIGHT	Y_{C5}	Z

POLAR PLOT							
T	R	RDOT	θ/θ	T	R	RDOT	θ/θ

FOR SXT TRACKING, RECORD θ : V76/N77*
 V85/N53

FOR COAS TRACKING, RECORD θ : FDAI ORDEAL PITCH
 V83/N54
 P37/N54
 P48/N77*

*NOTE: If data selected while running
 V76 in the optimizing mode,
 reference G&C C/L (G/4-7)
 for restrictions on angle
 calculations.



PREPARED BY FPRB/CTPD
 5 SEPTEMBER 1974

POLAR PLOTS

NASA-JSC

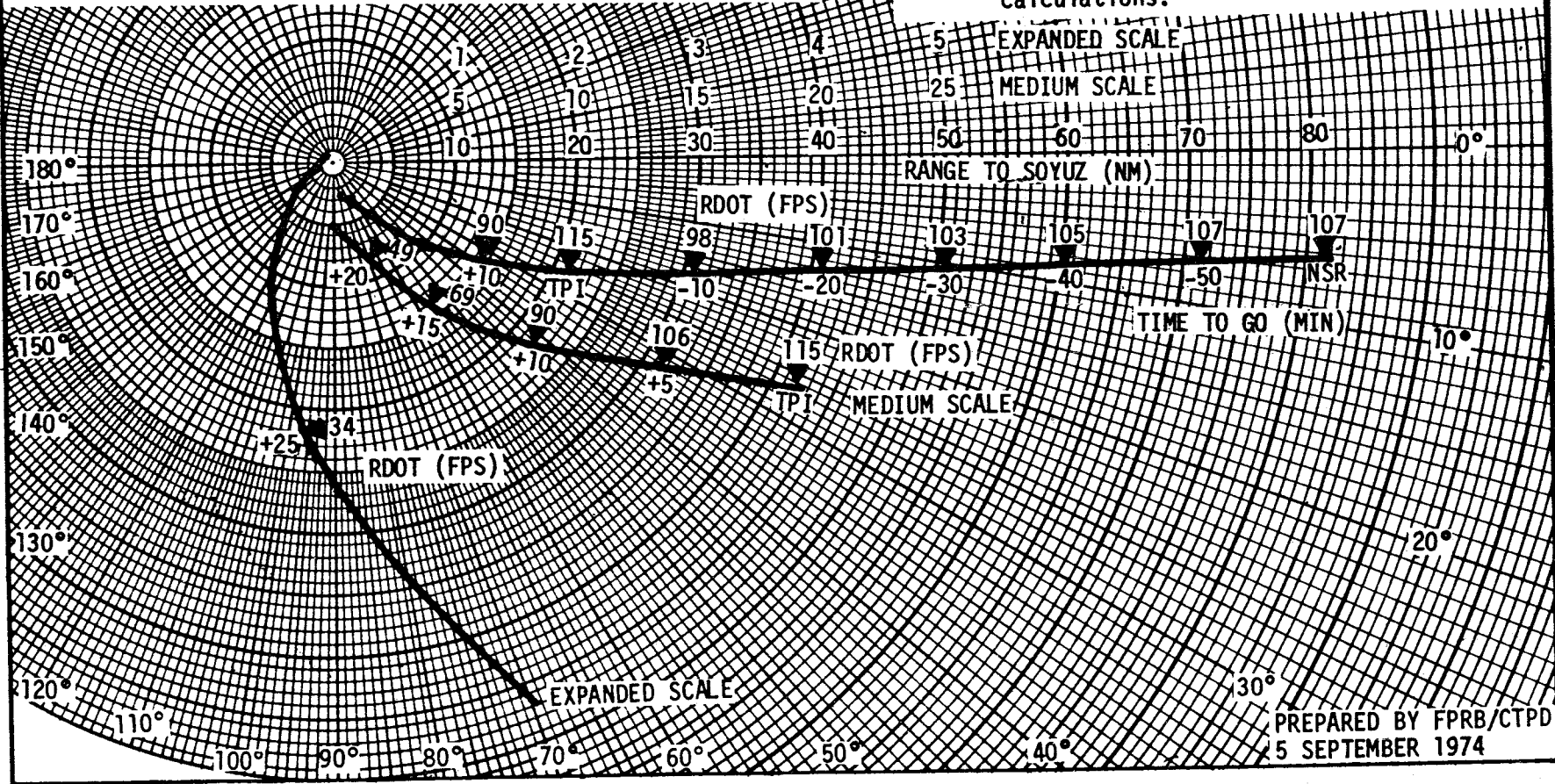
POLAR PLOT

FOR SXT TRACKING, RECORD θ : V76/N77*
V85/N53

FOR COAS TRACKING, RECORD θ : FDAI ORDEAL PITCH
V82/N54
P37/N54
P48/N77*

*NOTE: If data selected while running V76 in the optimizing mode, reference G&C C/L (G/4-7) for restrictions on angle calculations.

T	R	RDOT	θ/θ	T	R	RDOT	θ/θ



PREPARED BY FPRB/CTPD
5 SEPTEMBER 1974