

50+30
-24:00

U
S
R

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

TPI FINAL PAD (COPY)

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

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

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

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

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

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

TPI

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

TPI completed. TPI ~~END~~ OTHER.
REACQUIRE VHF RANGING (R=18 NM)

HP-65 DATA FOR TPI+4:30

0D=345, H=118

SUN

TPI

CENTER SOYUZ IN COAS WHEN
READING HP-65 DATA 0

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	$\Delta V_F/BT$	+ 2 1 9 5 5		
(RCS)	$\Delta V_R/BT$	+ 0 0 7 0 4		
(LOS)	$\Delta V_D/BT$	+ 0 0 0 0 0		
	ΔV_C	+ 0 0 9 2		
	BT	+ 0 0 0 1		
N22	R	+ 3 5 9 0 0		
(SPS USING N81)	P	+ 0 2 9 0 0		
	Y	+ 0 0 2 0 0		
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

TPI ONBOARD DATA

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

TPI HP-65 SOLN

TIG					
ΔV_X					
ΔV_Y					
ΔV_Z					

ORDEAL BURN ATT

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

CM CAMR 2

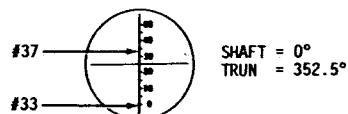
V T R	51+30	LOAD ASCP tw WITH DOCKING ATT (Pg 2-19) Initiating orientation of Apollo. НАЧИНАЮ ОРИЕНТАЦИЮ АПОЛЛОНА. MNVR TO DOCKING ROLL ATT (-60° CCW) (REF ATT SET ERROR NEEDLES) VTR/TV SWITCH LIST (Pg 2-19)	DOCKING ATTITUDE																																																									
		Orientation established. ОРИЕНТАЦИЯ УСТАНОВЛЕНА. Initiate docking orientation as programmed. НАЧНИТЕ ОРИЕНТАЦИЮ СТЫКОВКИ ПО ПРОГРАММЕ.	NOMINAL	UPDATE																																																								
		ACQUIRE ATS HGA: MAN, WIDE P -36, Y 44 S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW	<table border="1"> <tr> <td>ASCP</td> <td>R</td> <td></td><td></td><td></td><td>3</td><td>0</td><td>0</td> </tr> <tr> <td>tw</td> <td>P</td> <td></td><td></td><td></td><td>1</td><td>5</td><td>7</td> </tr> <tr> <td></td> <td>Y</td> <td></td><td></td><td></td><td>0</td><td>0</td><td>0</td> </tr> </table>	ASCP	R				3	0	0	tw	P				1	5	7		Y				0	0	0	<table border="1"> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>																																
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51+40	EMS FUNC/MODE-ΔV SET/STBY SET ΔVC = -100.0 FPS EMS FUNC-ΔV ACTIVE DOCKING PREPARATION CHECKLIST (Pg 1-20)	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																																																										
A T S	51+50	MONITOR SOYUZ MNVR ON SOYUZ +X AXIS ACTIVE DOCKING CHECKLIST (Pg 1-21)	SOYUZ MNVRS TO DOCKING ATT 51+44:25 - 51+47:00																																																									
			TV - GRD CMD 51+48 - 52+09																																																									
	52+00	CSM/SOYUZ INTERFACE SEAL COMPRESSED	SUNSET AT 52:05																																																									

WHEN IMU FAILURE OCCURS

- 1.) PERFORM IMU FAILURE SWITCH LIST
SC CONT-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 V37E00E; V25N7E, 77E, 10000E, 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

BD = 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 V33 CALC OF THETA.
- 2.) LOAD N81 DURING FINAL COMP TO AGREE WITH ΔV'S TO BE BURNED; LOAD N59 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 (N03) INTO RESULTANT ACTUAL CDU ANGLES (N22) AND SETS N20=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																							
ASCP	tw	R	3	3	/	3	7	6				3	3	/	3	7	6						
		P				2	4	9	6						2	4	6	3					
		Y				2	7	7	5						0	6	8	2					
						3	3	7	9						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	1	8	0	0						
	P	+	2	1	3	0	0					+	1	7	0	0	0						
	Y	+	0	0	1	0	0					+	3	3	0	0	0						
N71 1ST STAR						3	7									4	0						
TPAC	SA		2	3	5	2	0						0	8	6	6	0						
ANGLES	TA		0	4	1	3	0						0	2	5	8	0						
N71 2ND STAR						4	5									4	3						
TPAC	SA		0	3	4	5	0						0	0	0	8	0						
ANGLES	TA		0	1	2	3	0						0	3	1	0	0						
N71 3RD STAR						4	2									0	1						

IMU FAILURE

IMU FAILURE

IMU FAILURE

IMU FAILURE

IMU FAILURE

IMU FAILURE

IMU FAILURE

IMU FAILURE

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		
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:

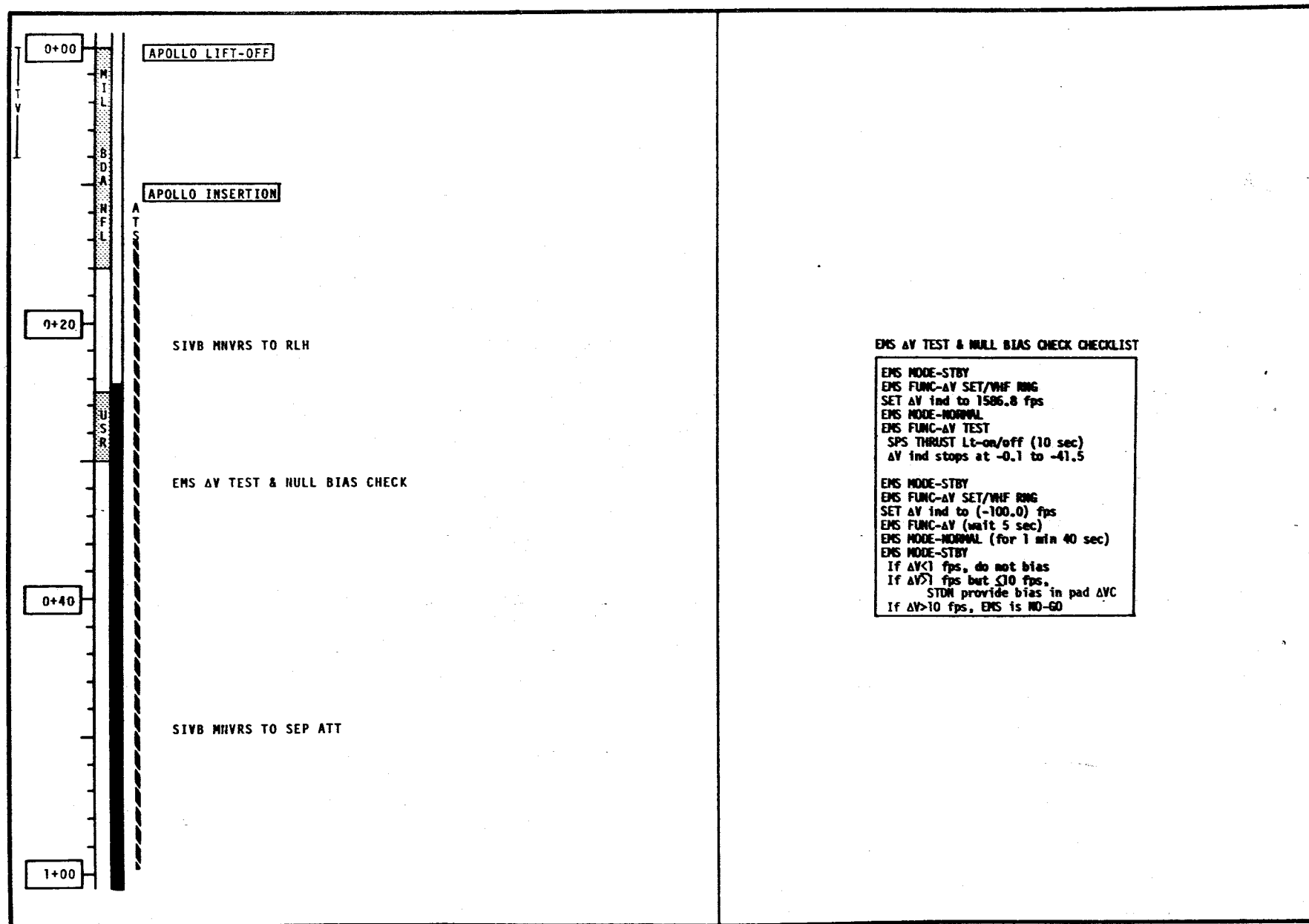
V21E1E

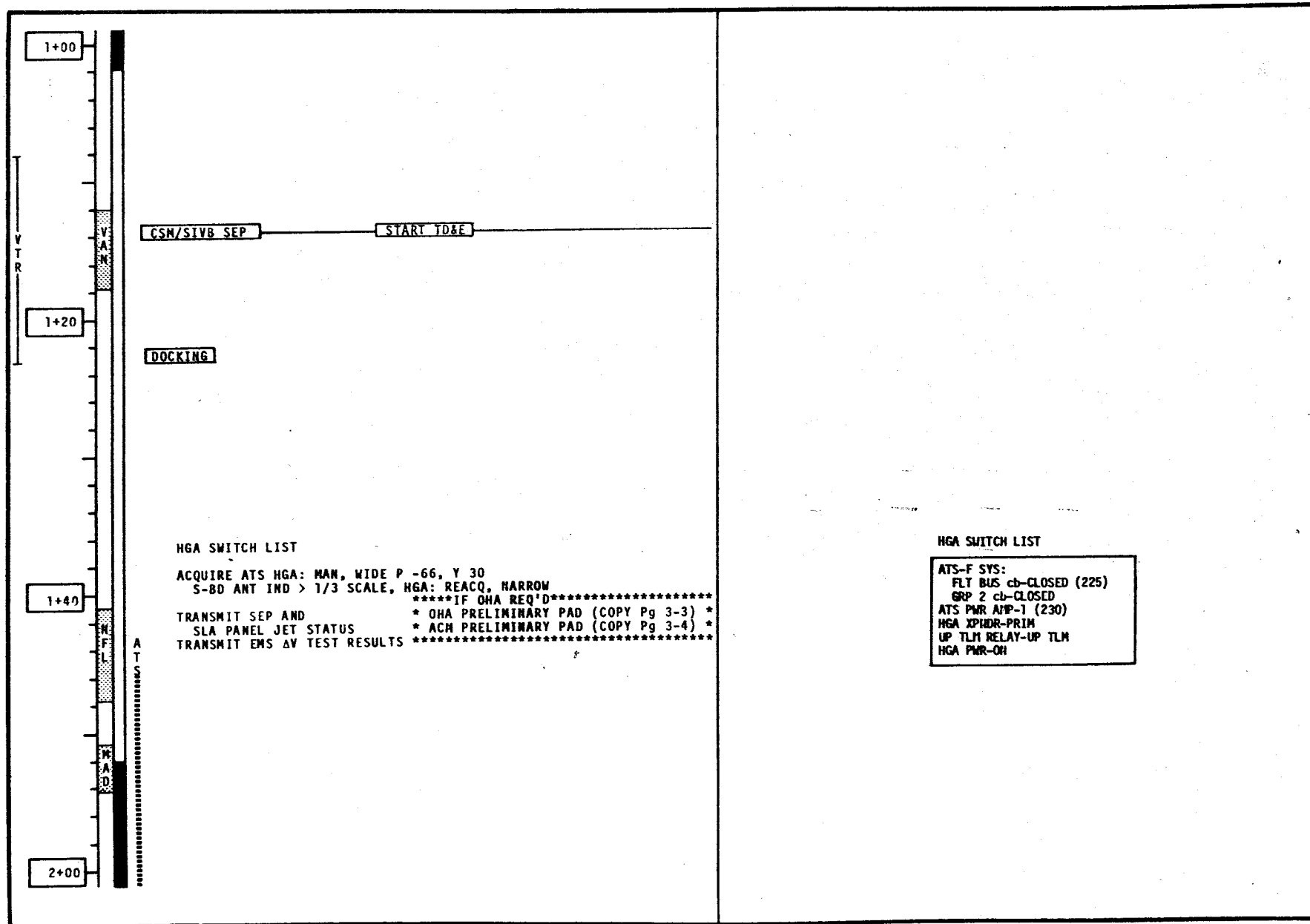
Load Recorded Address, ENTER

Load Correct Value, ENTER

Key ENTER For Additional Corrections &

Load Address & Value.

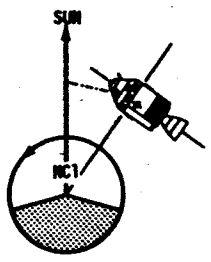




2+00 2+20 0:00 2+40 3+00	ATTENTION SIVB MNVRS TO EXTRACTION ATT RECORD GDC ATT ALIGN GDC P00 CSM/DH EXTRACTION END TD&E TV(2)/VTR POWER(3)-OFF DSE:(LBR/RCD/FWD/CMD RESET) UNSTOW CUE CARDS (DATA CARD KIT-R3) PSM ACTIVATION (AFTER VAN AOS) TRANSMIT EXTRACTION & AEM STATUS TRANSMIT GDC ATT MNVR TO ACM NOMINAL 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 1) * * (BANK A) * *****	OHA PAD DATA <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <thead> <tr> <th colspan="2"></th> <th>NOMINAL</th> <th>PRELIMINARY</th> <th>FINAL</th> </tr> </thead> <tbody> <tr> <td>N33</td> <td>HR</td> <td>+</td> <td>+</td> <td>+</td> </tr> <tr> <td>TIG</td> <td>OHA MIN</td> <td>+</td> <td>+</td> <td>+</td> </tr> <tr> <td></td> <td>SEC</td> <td>+</td> <td>+</td> <td>+</td> </tr> <tr> <td>N81</td> <td>ΔV_X</td> <td></td> <td></td> <td></td> </tr> <tr> <td>ΔV_{OHA}</td> <td>ΔV_Y</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td></td> <td>ΔV_Z</td> <td></td> <td></td> <td></td> </tr> <tr> <td>N22</td> <td>R</td> <td>+</td> <td>+</td> <td>+</td> </tr> <tr> <td>OHA</td> <td>P</td> <td>+</td> <td>+</td> <td>+</td> </tr> <tr> <td></td> <td>Y</td> <td>+</td> <td>+</td> <td>+</td> </tr> <tr> <td></td> <td>ΔV_C</td> <td></td> <td></td> <td></td> </tr> <tr> <td>BT</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> WT + PT YT BURN ATT CHECK <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>STAR</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>SA</td><td>+</td><td></td><td></td><td></td><td>0</td></tr> <tr><td>TA</td><td>+</td><td></td><td></td><td></td><td>0</td></tr> </table> BURN ATT CHECK UPDATE <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>STAR</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>SA</td><td>+</td><td></td><td></td><td></td><td>0</td></tr> <tr><td>TA</td><td>+</td><td></td><td></td><td></td><td>0</td></tr> </table> HORIZON CK DATA: TIG MINUS _____ MIN, WINDOW MK _____ DEG GDC ATT <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr><td>GDC</td><td>R</td><td></td><td></td><td></td><td></td></tr> <tr><td>ASCP</td><td>P</td><td></td><td></td><td></td><td></td></tr> <tr><td>tw</td><td>Y</td><td></td><td></td><td></td><td></td></tr> </table> SPS BURN STATUS <table border="1" style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr><td>ΔTIG</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td colspan="6" style="text-align: center;">AFTER TRIM</td></tr> <tr><td>ΔVC</td><td></td><td></td><td></td><td></td><td></td></tr> </table> 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			NOMINAL	PRELIMINARY	FINAL	N33	HR	+	+	+	TIG	OHA MIN	+	+	+		SEC	+	+	+	N81	ΔV_X				ΔV_{OHA}	ΔV_Y	0	0	0		ΔV_Z				N22	R	+	+	+	OHA	P	+	+	+		Y	+	+	+		ΔV_C				BT					STAR						SA	+				0	TA	+				0	STAR						SA	+				0	TA	+				0	GDC	R					ASCP	P					tw	Y					ΔTIG						AFTER TRIM						ΔVC					
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3+00 3+20 -12:00 3+40 0:00 4+00	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) [ACM] (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 <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2"></th> <th colspan="5">NOMINAL</th> <th colspan="5">PRELIMINARY</th> <th colspan="5">FINAL</th> </tr> </thead> <tbody> <tr> <td>N33</td> <td>HR</td> <td>+</td> <td></td> <td></td> <td>0</td> <td>0</td> <td>3</td> <td>+</td> <td></td> <td></td> <td></td> <td></td> <td>+</td> <td></td> <td></td> <td></td> </tr> <tr> <td>TIG</td> <td>ACM MIN</td> <td>+</td> <td></td> <td></td> <td></td> <td>4</td> <td>5</td> <td>+</td> <td></td> <td></td> <td></td> <td></td> <td>+</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>SEC</td> <td>+</td> <td></td> <td>0</td> <td>0</td> <td></td> <td></td> <td>+</td> <td></td> <td></td> <td></td> <td></td> <td>+</td> <td></td> <td></td> <td></td> </tr> <tr> <td>N81</td> <td>ΔV_X</td> <td>+</td> <td></td> <td>0</td> <td>1</td> <td>6</td> <td>7</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>ΔV_Y</td> <td>+</td> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>ΔV_Z</td> <td>-</td> <td></td> <td>0</td> <td>1</td> <td>2</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>N22</td> <td>R</td> <td>+</td> <td>1</td> <td>7</td> <td>9</td> <td>0</td> <td>0</td> <td>+</td> <td></td> <td></td> <td>0</td> <td>0</td> <td>+</td> <td></td> <td></td> <td>0</td> </tr> <tr> <td></td> <td>P</td> <td>+</td> <td>2</td> <td>1</td> <td>3</td> <td>0</td> <td>0</td> <td>+</td> <td></td> <td></td> <td>0</td> <td>0</td> <td>+</td> <td></td> <td></td> <td>0</td> </tr> <tr> <td></td> <td>Y</td> <td>+</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>+</td> <td></td> <td></td> <td>0</td> <td>0</td> <td>+</td> <td></td> <td></td> <td>0</td> </tr> <tr> <td></td> <td>ΔV_C</td> <td></td> <td></td> <td></td> <td>0</td> <td>0</td> <td>8</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>BT</td> <td></td> <td></td> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>ΔVC AT IGN</td> <td>+</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>ΔVC TAILOFF</td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>WT</td> <td></td> <td>+</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>PT</td> <td></td> <td></td> <td></td> <td></td> <td>YT</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <table border="1" style="width: 45%; 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4+00	T S		PGA DOFFING										
ORR			POWER - OFF (6,9,10) AUDIO COM1 - NORM (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 V1vs (3) - SUIT FILL FLOW(verify)										
4+20		*****FOR M=14 RNDZ***** * PRE-DOCKING DM CHECKOUT (D/I-1) * * STEP 1 THRU STEP 7 * *****	UCTA doffing: If unused, doff UCTA, discard cuff If used, doff UCTA, install clamp (R11), drain per S/I-27 Stow UCTAs in accessory bags Stow PGAs in PGA bags(U2) Stow PG's: AC under left couch (A3), CP under left couch (A3), CP head of center couch under side hatch										
HAW		STDN UPLINK (P27) (CSM S.V.) NC1 PRELIMINARY PAD (COPY Pg 3-6) NPC ADVISORY	Unstow 3 02 hose screen caps and 3 PGA elect connector covers (A5) Install screen caps on CM return hoses(red) Install elect connector caps on PGAs										
4+40		*****FOR M=14 RNDZ***** * DOCKING SYSTEM CHECKOUT (J/I-1) * *****	Don inflight clothing (U2 or TSB) Obtain loose pkt items as required (TSB) 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/HOST-HEADSET (98) (verify)										
NFI		ACQUIRE ATS HGA: MAN, WIDE P -55, Y 45 S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW	Stow life vests in F1 Stow loose shoulder and leg pkt items as desired in TSD top pkt Stow wristlets and comfort gloves in PGA zipper kit Do off PGA - discon elect and urine connections inside PGA										
5+00		NC1 FINAL PAD (COPY Pg 3-6) NPC PRELIMINARY PAD (COPY Pg 3-7)	Secure PGA elect harness at neckring Install helmets & gloves on PGA Install helmet bags on helmets Secure accessory bags to helmet bags										
	AT	TRANSMIT DM/CM ΔP (1ST OPP ONLY)	For SPEAKER Box use (Pn1 98): POWER-ON SPK/HOST-SPEAKER VOL tw-as desired										
		STDN UPLINK (P27) (NC1 TARGET LOAD)	OBS doffing: Discon connector from sig conditioners Remove electrodes from chest Discard tape disks and tape rings										
		BIOSTACK-ON (MA 107) (R1) RECORD GET & INDICATOR STATUS (Pg 3-5)	Clean electrodes with tissue (A2) Stow harness and biobelt in accy bags										
			BIOSTACK PAD <table border="1"> <tr> <td>GET</td> <td>HR</td> <td></td> <td></td> <td>IND LT ON</td> </tr> <tr> <td>MIN</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	A T S	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 TO NC1 BURN ATT GO TO SPS BURN CUE CARD(SCS A) (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 <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2"></th> <th colspan="5">NOMINAL</th> <th colspan="5">PRELIMINARY</th> <th colspan="5">FINAL</th> </tr> </thead> <tbody> <tr> <td>N33</td> <td>HR</td> <td>+</td> <td></td> <td></td> <td></td> <td>0</td> <td>0</td> <td>5</td> <td>+</td> <td></td> <td></td> <td></td> <td></td> <td>+</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>TIG NC1</td> <td>MIN</td> <td>+</td> <td></td> <td></td> <td></td> <td></td> <td>4</td> <td>1</td> <td>+</td> <td></td> <td></td> <td></td> <td></td> <td>+</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>SEC</td> <td>+</td> <td></td> <td></td> <td></td> <td>2</td> <td>8</td> <td></td> <td>+</td> <td></td> <td></td> <td></td> <td></td> <td>+</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>N81</td> <td>ΔV_X</td> <td>+</td> <td></td> <td></td> <td></td> <td>0</td> <td>6</td> <td>6</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>ΔV_{NC1}</td> <td>ΔV_Y</td> <td>+</td> <td></td> <td></td> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>ΔV_Z</td> <td>+</td> <td></td> <td></td> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>2</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>N22</td> <td>R</td> <td>+</td> <td></td> <td></td> <td></td> <td>1</td> <td>8</td> <td>1</td> <td>0</td> <td>0</td> <td></td> <td></td> <td></td> <td>+</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>NC1</td> <td>P</td> <td>+</td> <td></td> <td></td> <td></td> <td>0</td> <td>5</td> <td>9</td> <td>0</td> <td>0</td> <td></td> <td></td> <td></td> <td>+</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Y</td> <td>+</td> <td></td> <td></td> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td></td> <td></td> <td></td> <td>+</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>ΔV_C</td> <td></td> <td></td> <td></td> <td></td> <td>0</td> <td>5</td> <td>3</td> <td>7</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>BT</td> <td></td> <td></td> <td></td> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>3</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> WT <table border="1" style="display: inline-table;"><tr><td>+</td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> PT <table border="1" style="display: inline-table;"><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> YT <table border="1" style="display: inline-table;"><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> BURN ATT CHECK <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>STAR</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>SA</td> <td>+</td> <td></td> <td></td> <td></td> <td></td> <td>0</td> </tr> <tr> <td>TA</td> <td>+</td> <td></td> <td></td> <td></td> <td></td> <td>0 0</td> </tr> </table> BURN ATT CHECK UPDATE <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>STAR</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>SA</td> <td>+</td> <td></td> <td></td> <td></td> <td></td> <td>0</td> </tr> <tr> <td>TA</td> <td>+</td> <td></td> <td></td> <td></td> <td></td> <td>0 0</td> </tr> </table>			NOMINAL					PRELIMINARY					FINAL					N33	HR	+				0	0	5	+					+					TIG NC1	MIN	+					4	1	+					+						SEC	+				2	8		+					+					N81	ΔV_X	+				0	6	6	3										ΔV_{NC1}	ΔV_Y	+				0	0	0	0											ΔV_Z	+				0	0	0	2										N22	R	+				1	8	1	0	0				+					NC1	P	+				0	5	9	0	0				+						Y	+				0	0	0	0	0				+						ΔV_C					0	5	3	7											BT					0	0	0	3										+																			STAR							SA	+					0	TA	+					0 0	STAR							SA	+					0	TA	+					0 0
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NPC PAD DATA

		PRELIMINARY				FINAL			
N33	HR	+				+			
TIG NPC MIN		+				+			
SEC		+				+			
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 + ☐ ☐ ☐ ☐ ☐ ☐ PT ☐ ☐ ☐ ☐ ☐ ☐ YT ☐ ☐ ☐ ☐ ☐ ☐ ☐

BURN ATT CHECK

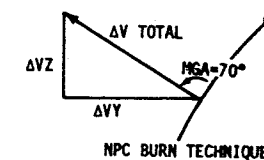
STAR						
SA	+					0
TA	+				0	0

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) δ ERR						
N93	X					
GYRO	Y					
TORQUING	Z					
ANGLES						
HR	+	0	0			
TIME OF	MIN	+	0	0	0	
GDC	SEC	+	0			
ALIGN						



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)

P00
 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)

P00

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);P00

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

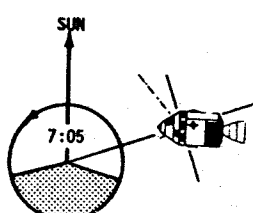
START EAT PERIOD

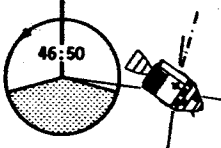
5+00

6+20

6+40

7+00

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 02 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) *****FOR M=14 RNDZ***** * UVA LAMPS SHUT DOWN (Pg 3-8) * TERMINATE BATT A CHARGE (UPC * STDN CUE) THEN CHARGE BATT B *****	SPS BURN STATUS <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">ATIG</td> <td style="width: 10%;">☒</td> <td style="width: 10%;">☒</td> <td style="width: 10%;">☒</td> <td style="width: 10%;">☒</td> <td style="width: 10%;">☒</td> <td style="width: 10%;">☒</td> <td style="width: 10%;">☒</td> </tr> <tr> <td colspan="8" style="text-align: center;">AFTER TRIM</td> </tr> <tr> <td>AVC</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> </tr> </table> P52 (OPTION 3) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">N71 1ST STAR</td> <td style="width: 10%;">☒</td> <td style="width: 10%;">☒</td> <td style="width: 10%;">☒</td> <td style="width: 10%;">☒</td> <td style="width: 10%;">☒</td> <td style="width: 10%;">☒</td> <td style="width: 10%;">☒</td> </tr> <tr> <td>N71 2ND STAR</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> </tr> <tr> <td>N05(R1) } ERR</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> <td>☒</td> </tr> <tr> <td>N93</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GYRO</td> <td>Y</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>TORQUING</td> <td>Z</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>ANGLES</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>TIME OF</td> <td>HR</td> <td>+</td> <td>0</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>GDC</td> <td>MIN</td> <td>+</td> <td>0</td> <td>0</td> <td>0</td> <td></td> <td></td> </tr> <tr> <td>ALIGN</td> <td>SEC</td> <td>+</td> <td>0</td> <td></td> <td></td> <td></td> <td></td> </tr> </table> 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)	ATIG	☒	☒	☒	☒	☒	☒	☒	AFTER TRIM								AVC	☒	☒	☒	☒	☒	☒	☒	N71 1ST STAR	☒	☒	☒	☒	☒	☒	☒	N71 2ND STAR	☒	☒	☒	☒	☒	☒	☒	N05(R1) } ERR	☒	☒	☒	☒	☒	☒	☒	N93	X							GYRO	Y							TORQUING	Z							ANGLES								TIME OF	HR	+	0	0				GDC	MIN	+	0	0	0			ALIGN	SEC	+	0				
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GDC	MIN	+	0	0	0																																																																																																					
ALIGN	SEC	+	0																																																																																																							

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) OPTICS PWR UP CHECKLIST (Pg 3-9) P52 (OPT 3) (REF Pg 3-b) (RECORD)	*****IF REFSMHAT 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) * * P52 (OPT 3) (REF Pg 3-b) (RECORD) * *****	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) <table border="1"> <tr> <td>N71 1ST STAR</td> <td>X</td> <td>0</td> <td>0</td> <td>0</td> <td></td> <td></td> </tr> <tr> <td>N71 2ND STAR</td> <td>X</td> <td>0</td> <td>0</td> <td>0</td> <td></td> <td></td> </tr> <tr> <td>N05(R1) & ERR</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>N93</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GYRO TORQUING ANGLES</td> <td>Y</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Z</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>HR</td> <td>+</td> <td>0</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>TIME OF GDC ALIGN</td> <td>MIN</td> <td>+</td> <td>0</td> <td>0</td> <td>0</td> <td></td> </tr> <tr> <td></td> <td>SEC</td> <td>+</td> <td>0</td> <td></td> <td></td> <td></td> </tr> </table>	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 GDC ALIGN	MIN	+	0	0	0			SEC	+	0			
N71 1ST STAR	X	0	0	0																																																																
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	Z																																																																			
HR	+	0	0																																																																	
TIME OF GDC ALIGN	MIN	+	0	0	0																																																															
	SEC	+	0																																																																	
46+40		P00	* P52 (OPT 1: COARSE ALIGN) * * (REF Pg 3-b) *																																																																	
46+50	A T C	ACQUIRE ATS HGA: MAN, WIDE P 13, Y 230 S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW	SUN 																																																																	
47+00		L10H CANISTER CHANGE (6 INTO B, STOW 4 IN A4)	*****FOR M=14 RNDZ***** * STON 2 IN A4) * *****																																																																	

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 MIN IND LT ON 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

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
MNR 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 T

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}	ΔV _Y	+				0 0 0 0										
	ΔV _Z	-				0 0 0 1										
N22	R	+	0	0	0	0 0	+			0	0	+			0	0
NC2	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										
	BT					0 0 0 2										

MT	+															
PT																
YT																

		BURN ATT CHECK					BURN ATT CHECK UPDATE				
STAR							STAR				
SA	+					0	SA	+			0
TA	+					0 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}	ΔV _Y	+	0	0	0	0 0	+	0	0	0	0
	ΔV _Z	+	0	0	0	0 0	+	0	0	0	0

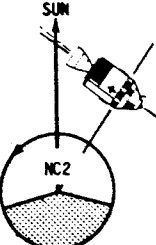
WASTE WATER DUMP CHECKLIST

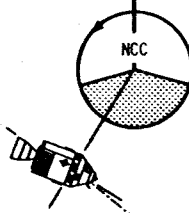
BAT VENT VLV-CLOSED (252)
H2O QTY IND-WASTE (Panel 2)
WATER CONT PRESS REL VLV-DUMP A (352)
Monitor WASTE H2O QTY IND-decreasing
(~5% Per Min)
When WASTE H2O QTY IND-60%
WATER CONT PRESS REL VLV-2
BAT VENT VLV-VENT (252)

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

ATIG									
AFTER TRIM									
ΔVC									

48+30	A	SOYUZ MNVRS TO ORBITAL ATTITUDE RATE		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-3 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
0:00	A	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) DP ESTABLISH VHF AM & FM COMM WITH SOYUZ (PERFORM CHECKS FROM PANEL 6 ONLY) SET DET		◀This is Apollo. Я АПОЛЛОН. ◀How do you read? РАК БИ СТЕПЕНЬ?	* If no comm, repeat * * statements until comm * * established. If still * * no comm by (TBD) GET, * * inform MCC.	
48+40	A			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.
48+50	A		TV- GRD CMD 48+50 - 49+00	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.
49+00	A	DP PERFORM VHF AM COMM CK	VHF AM SPEC RANGE = 196 NM	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. ПОДСОЗНАВАЕМО РЕЖИМ * * VHF RNG-RESET (1) ИЗМЕРЕНИЯ ДАЛЬНОСТИ. * * ◀Ranging lockup established. РЕЖИМ ИЗМЕРЕНИЯ ДАЛЬНОСТИ УСТАНОВЛЕН.	

49+00	U S R	NCC FINAL PAD (COPY) NSR FINAL PAD (COPY Pg 3-15)	
-12:00		P33 (FINAL COMP: RECORD) (LOAD STDN SOLUTION)	
49+10		DP PERFORM VHF FM COMM CK	VHF FM SPEC RANGE = 162 NM
		P40, P00 GO TO SPS BURN CUE CARD(SCS Δ) (BANK A)	
			
0:00		NCC (180,349/21,359) (R=145.5 NM) RECORD BURN STATUS P77 (LOAD CMC COMPUTED ΔVY) P34, V32E(RECYCLE : RECORD)(Pg 3-15) PITCH UP TO TRACK HORIZON REPORT COMM CHECK RESULTS TRANSMIT NCC BURN STATUS V76E (LOAD N72 WITH TIG NSR-28) V67E; LOAD N99 WITH +10000, +100, +1; PRO SET DET NCC completed. NCC BURNING. DP PERFORM VHF RANGING VOICE CHECK WITH SOYUZ	VHF RANGING SPEC RANGE = 144 NM
49+20			
-28:00		V87E (START VHF MARKING) R HP-65 DATA FOR NSR-28	
49+30	V H F		

NCC PAD DATA														
NOMINAL					PRELIMINARY					FINAL				
N11	HR	+	0	4	9	+				+				
TIG NCC MIN		+		1	8	+				+				
	SEC	+	0	3		+				+				
N81	ΔV _X	+	0	3	9	6								
ΔV _{NCC}	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		0	0	0	2								
WT		+								PT				
BURN ATT CHECK					BURN ATT CHECK UPDATE									
STAR					STAR									
SA	+			0	SA	+		0						
TA	+			0	TA	+		0						

NCC ONBOARD DATA									
XXXXXXXXXXXXXXXXXXXXXXXXXXXXX									
X N81 COMP LIMITS IIA X									
X X									
X STON SOLN PRIME X									
X IF STDN SOLN NOT AVAILABLE X									
X DO NOT BURN NCC X									
XXXXXXXXXXXXXXXXXXXXXXXXXXXXX									
SPS BURN STATUS									
ATIG					AFTER TRIM				
AVC									
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							
N13 (TIG NSR)					2		8		
N72									

NSR PAD DATA

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

NOMINAL				PRELIMINARY				FINAL			
N1	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					
ΔV_C AT IGN	+							+			
ΔV_C TAILOFF	-							-			
WT	+							PT			
								YT			

BURN ATT CHECK

STAR							
SA	+						0
TA	+						0

BURN ATT CHECK UPDATE

STAR							
SA	+						0
TA	+						0

NSR ONBOARD DATA

P34 RECYCLE

N75	ΔH_{NSR}	+	0	0			
$\Delta T(NSR/TPI)$	+			B			
$\Delta T(TPI/TPI)$				B			
N81	ΔV_X	0					
ΔV_{NSR}	ΔV_Y	0					
	ΔV_Z	0					

P34 FINAL COMP

+	0	0					
+			B				
			B				
0							
* S T D N *							
0							

NSR HP-65 SOLN

ΔV_X							
ΔV_Y	*	S	T	D	N	*	
ΔV_Z							

SPS BURN STATUS

ΔTIG							
AFTER TRIM							
ΔV_C							
TRANSMIT BURN ATT & ΔV_C LOADED							

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

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)

R HP-65 DATA FOR NSR-20

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

R HP-65 DATA FOR NSR-16

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

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

N18	R						
BURN	P						
ATT	Y						
N40	ΔV_T	+					
ΔV TAIL OFF	-				1	3	0
ΔV_C	+						

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

RECORD BURN STATUS
 P77 (LOAD CMC COMPUTED RECYCLE ΔV_Y)
 TRANSMIT NSR BURN STATUS
 NSR completed. NSR BURN STATUS
 ACQUIRE ATS HGA: MAN, WIDE P -19, Y 308
 S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW
 P35
 V22N78E,+E; V16N22E (+X-AXIS TRACK ATT)
 TRACK SOYUZ IN BOTTOM OF CDR WINDOW (ATT ~ 180,212,0)

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

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

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

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

REMOVE POLAR PLOT

SNACK PERIOD

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, STON PREL PAD)

* COMPARES CLOSEST WITH HP-65 TPI TIG 2.

P52 (OPTION 3)

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

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

2ND P35 RECYCLE

		+	0	0			
		+	0	0	0		
		+	0				
		+	0	0			
		+	0	0			
				B			
			0	0			
		*	S	T	D	N	*
			0	0			
			0	0			
			0	0			
			0	0			

IMU FAILURE IMU FAILURE IMU FAILURE IMU FAILURE IMU FAILURE IMU FAILURE IMU FAILURE

50+30
-24:00

50+40
-14:00

50+50

0:00

+3:00

+4:30
51+00

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

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)

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)

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

P00

(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 *

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

BD=345, H=118

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	$\Delta V_F/BT$	+ 2 1 9 5 5		
(RCS)	$\Delta V_R/BT$	+ 0 0 7 0 4		
(LOS)	$\Delta V_D/BT$	+ 0 0 0 0 0		
ΔV_C		0 0 9 2		
BT		0 0 0 1		
N22	R	+ 3 5 9 0 0		
(SPS USING N81)	P	+ 0 2 9 0 0		
Y		+ 0 0 2 0 0		
ΔV_C AT IGN				
ΔV_C TAILOFF				

WT + PT YT

BURN ATT CHECK

STAR	SA	TA
	+ 0	0 0

BURN ATT CHECK UPDATE

STAR	SA	TA
	+ 0	0 0

TPI ONBOARD DATA

TPI HP-65 SOLN

TIG	ΔV_X	ΔV_Y	ΔV_Z	ΔV_F	ΔV_R	ΔV_D
	* S T D N *					
	* S T D N *					

TO OBTAIN LOS ΔV_F & ΔV_D :
OVERWRITE N81 ΔV_X & ΔV_Z PRO, N59E, RECORD

XXXXXXXXXXXXXXXXXXXXX

X N81 COMP LIMITS ± 1.5 NA, ± 3.0 FPS X

X USE STDN ΔV_Y IN ALL CASES X

X CMC/HP-65 WITHIN LIMITS GO CMC X

X IF NOT CMC/STN WITHIN LIMITS GO CMC X

X IF NOT HP-65/STN WITHIN LIMITS GO HP-65 X

X NO AGREEMENT GO STDN X

X FOR HP-65/STN-USE CMC TIG OPTION: X

X RECALL P35, PRO TO N37, LOAD HP-65/STN TIG; X

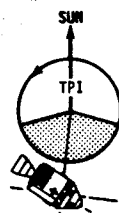
X PRO TO N55, SPECIFY TIG OPTION (V22E,+E), X

X PRO TO N81, LOAD ΔV 's. X

XXXXXXXXXXXXXXXXXXXXX

P35 FINAL COMP

N37	HR	ΔV_X	ΔV_Y	ΔV_Z	ΔV_F	ΔV_R	ΔV_D
TIG TPI	MIN	+ 0 0 0					
SEC		+ 0					
N58	ΔV_{TPI}	+ 0 0					
ΔV_{TPI}		+ 0 0					
$\Delta T(TPI/TPI)$							
N81	ΔV_X	0 0					
ΔV_{TPI}	ΔV_Y	* S T D N *					
ΔV_Z		0 0					
V16N59	ΔV_F	0 0					
$\Delta V(LOS)$	ΔV_R	0 0					
ΔV_D		0 0					



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 8

XXXXXXXXXXXXXXXXXXXXX

X UNREASONABLE UPDATE X

X 0.50 NM, 3.0 FPS X

XXXXXXXXXXXXXXXXXXXXX

51+00	SM RCS QUAD HTRS(4)-OFF(ctr)(274)	XXXXXXXXXXXXXXXXXXXXX X UNREASONABLE UPDATE X X 0.50 NM, 3.0 FPS X XXXXXXXXXXXXXXXXXXXXX	TPM1 ONBOARD DATA	
+7:30	R HP-65 DATA FOR TPI+7:30		P36 FINAL COMP	TPM1 HP-65 SOLN
+8:30	R AND 0 HP-65 DATA FOR TPI+8:30		N59 ΔV_F	ΔV_{BT}
+9:00	PRO (P36 FINAL COMP: RECORD) (LOAD N59 R2 WITH +ZERO)		ΔV_R	
	P41; P00; THC PWR-ON(up)		ΔV_D	
	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)	RCS X AXIS 1 FPS=2.50 SEC RCS Y&Z AXIS 1 FPS=5.00 SEC	TPM2 ONBOARD DATA	
+15:00	Turn on your orientation lights. ВКЛЮЧИТЕ БАТН ОРИЕНТАЦИИ. V87E (START VHF MARKING)	CENTER SOYUZ IN COAS WHEN READING HP-65 DATA 0	P36 FINAL COMP	TPM2 HP-65 SOLN
51+10	0 HP-65 DATA FOR TPI+16:30		N59 ΔV_F	ΔV_{BT}
+16:30			ΔV_R	
			ΔV_D	
+19:30	R HP-65 DATA FOR TPI+19:30		PRE-BRAKING SWITCH LIST	
+20:30	R AND 0 HP-65 DATA FOR TPI+20:30		MAN ATT(3)-RATE CMD LIMIT CYCLE-OFF DBD/RATE-MIN/LOW BMAG MODE(3)-ATT 1/RATE 2 SC CONT-SCS FDAI SCALE-5/1 FDAI SELECT-1 FDAI SOURCE-ATT SET	
+21:00	PRO (P36 FINAL COMP: RECORD)(HP-65 SOLN PRIME) (LOAD N59 R2 WITH +ZERO)(LOAD R1 & R3 WITH HP-65 SOLN)		ATT SET-GDC THC PWR-PWR RHC PWR NORMAL #2-AC/DC RHC PWR DIRECT #2-MNA/MNB AUTO RCS SELECT(16)-MNA/MNB THC-ARMED RHC #2-ARMED	
	P00; THC PWR-ON(up)		VTR/DAC SWITCH LIST	
	BURN WITH SOYUZ BORESIGHTED IN COAS (ΔV_F RCS WITH EMS) (ΔV_D TIMED RCS)		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	
+24:00	TPM2 P77 REACQUIRE VHF RANGING (R=2 NM)	RCS X AXIS 1 FPS=2.50 SEC RCS Y&Z AXIS 1 FPS=5.00 SEC	BRAKING GATES	
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)		0(DEG)	
	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)		R(NM)	R(FPS)
			R(FT)	SOLAR PANEL
				BODY
			1.00	30
			.50	20
			.25	10
			.08	5
			.05	300
			.03	200
			.02	130
			.01	60
			0.5	
			1.0	
			3.1	1.0
			5.2	1.7
			7.9	2.6
				3.9
				8.4
51+30	STATION KEEP ON SOYUZ +X AXIS (R=150 FT) Apollo stationkeeping. ПОСЛЕ ЗАВЕРШЕНИЯ АПОЛЛОНА.		CM CAMR 2	

V T R	51+30	LOAD ASCP tw WITH DOCKING ATT (Pg 3-19) Initiating orientation of Apollo. НАВИГАЦИЯ ОРИЕНТАЦИИ АПОЛЛОНА. MNVR TO DOCKING ROLL ATT (-60° CCW) (REF ATT SET ERROR NEEDLES) VTR/TV SWITCH LIST (Pg 3-19)	DOCKING ATTITUDE <table border="1"> <thead> <tr> <th colspan="3">NOMINAL</th> <th colspan="3">UPDATE</th> </tr> </thead> <tbody> <tr> <td>ASCP</td> <td>R</td> <td></td> <td>3</td> <td>0</td> <td>0</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>tw</td> <td>P</td> <td></td> <td>1</td> <td>5</td> <td>7</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Y</td> <td></td> <td>0</td> <td>0</td> <td>0</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	NOMINAL			UPDATE			ASCP	R		3	0	0					tw	P		1	5	7						Y		0	0	0				
	NOMINAL			UPDATE																																			
	ASCP	R			3	0	0																																
	tw	P			1	5	7																																
	Y		0	0	0																																		
	Orientation established. ОРИЕНТАЦИЯ УСТАНОВЛЕНА. Initiate docking orientation as programmed. НАЧАТЬ 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)																																						
	51+40																																						
		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																																						
		CSM/SOYUZ INTERFACE SEAL COMPRESSED																																					
	52+00		SUNSET AT 52:05																																				

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 N13 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.

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 Hxx ENTER. V16NxxE Is Permissible.

Read 0 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.

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).

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

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 Hxx 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 (lcs 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

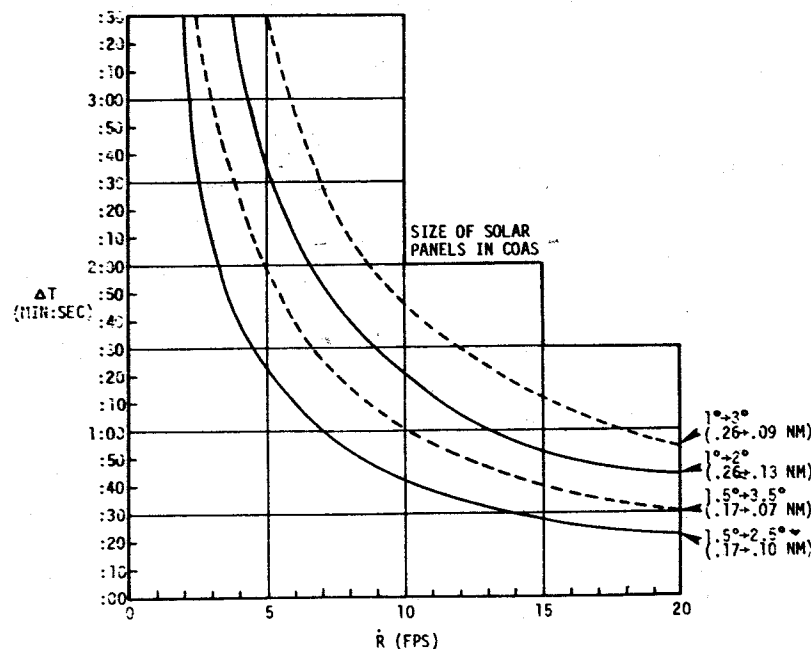
- For SCS Burns- EMS FUNC-OFF (Make Timed Burns)
SPS THRUST-DIRECT ON (To Initiate Burn)
ΔV THRUST-OFF (To Terminate Burn)
SPS THRUST-NORMAL
For Hp-65 Data: Pre NSR- V76E (Use VHF Range Rate Processing Routine)
V25E, Load N72 With GET Of Next Data Point.
PRO
N76E (To Read Range)
TPI TIG- V76E, V25E, +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 N47 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 Sec 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 Mnvr To -X Burn Att Using N17 Error Needles.
3. At TIG, Translate -X RCS & Trim N85 Residuals.

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

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

+X RCS / SPS

1. Use P40 & Auto Mnvr 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 Mnvr 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 Mnvr To -X Burn Att Using N17 Error Needles)
8. Load EMS = $-\Delta V_{XRCS}$
9. Translate -X RCS & Trim N85 Residuals.

52+00	INFORM SOYUZ : APOLLO DOCKING DELAYED. СТЫКОВКА АПОЛЛОНА ОТКЛАДЫВАЕТСЯ. INFORM SOYUZ : IS YOUR ORIENTATION SYSTEM ACTIVATED? ВАША СИСТЕМА ОРИЕНТАЦИИ ВКЛЮЧЕНА? * IF YES: * INFORM SOYUZ : APOLLO WILL ATTEMPT DOCKING AT 52+42. * АПОЛЛОН ПОВТОРИТ ПОПЫТКУ СТЫКОВКИ В 52+42. * IF NO: * INFORM SOYUZ : APOLLO WILL ATTEMPT DOCKING AT 53+23. * АПОЛЛОН ПОВТОРИТ ПОПЫТКУ СТЫКОВКИ В 53+23. EXTERIOR LIGHTS RUN/EVA-RUN/EVA * IF NO COMM: * DSE: (LBR/RCD/FWD/CMD RESET) * VTR HEAD WHEEL DRIVE MOTOR-OFF (MOTOR ON LT-OFF) DAC-OFF SC CONT/MODE-CMC/AUTO INFORM SOYUZ : TURN ON VHF SIMPLEX A. ВКЛЮЧИТЕ УКВ СИМПЛЕКС А. VHF RANGING-OFF VHF AM A-SIMPLEX VHF AM B-OFF * IF SOYUZ ORIENTATION SYSTEM REMAINED ACTIVATED AFTER * NOMINAL DOCKING ATTEMPT: * EMS FUNC/MODE-ΔV SET/STBY * SET ΔVC=-100.0 FPS * EMS FUNC-ΔV DAC-ON (IF DESIRED) HDC/CX06 SC CONT/MODE-SCS/FREE ACTIVE DOCKING CHECKLIST (Pg 1-21) DOCK(AT SR) 52+42 EXTERIOR LIGHTS RUN/EVA-OFF * 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	53+00 VERIFY STATIONKEEPING ON SOYUZ +X AXIS(R=150 FT) EMS FUNC/MODE-ΔV SET/STBY SET ΔVC=-100.0 FPS EMS FUNC-ΔV ACQ ATS HGA: MAN, WIDE P -43, Y 16 S-BD ANT IND > 1/3 SCALE HGA: REACQ, NARROW DAC-ON (IF DESIRED) HDC/CX06 SC CONT/MODE-SCS/FREE ACTIVE DOCKING CHECKLIST (Pg 1-21) DOCK(ONE REV LATE) 53+23 * IF NO DOCKING: CONTINUE * VTR HEAD WHEEL DRIVE MOTOR-OFF (MOTOR ON LT-OFF) DAC-OFF SC CONT/MODE-CMC/AUTO EXTERIOR LIGHTS RUN/EVA-RUN/EVA INFORM SOYUZ : APOLLO DOCKING DELAYED. СТЫКОВКА АПОЛЛОНА ОТКЛАДЫВАЕТСЯ. INFORM SOYUZ : APOLLO WILL ATTEMPT DOCKING AT 54+52. АПОЛЛОН ПОВТОРИТ ПОПЫТКУ СТЫКОВКИ В 54+52. GUIDE RING A-RETRACT (~40 SEC) GUIDE RING EXTEND LT-OUT PASSIVE LT-ON GUIDE RING A-OFF(CTR) DSE: (LBR/RCD/FWD/CMD RESET)
52+20		53+20
52+40		53+40
53+00		54+00

DELAYED DOCKING

DELAYED DOCKING

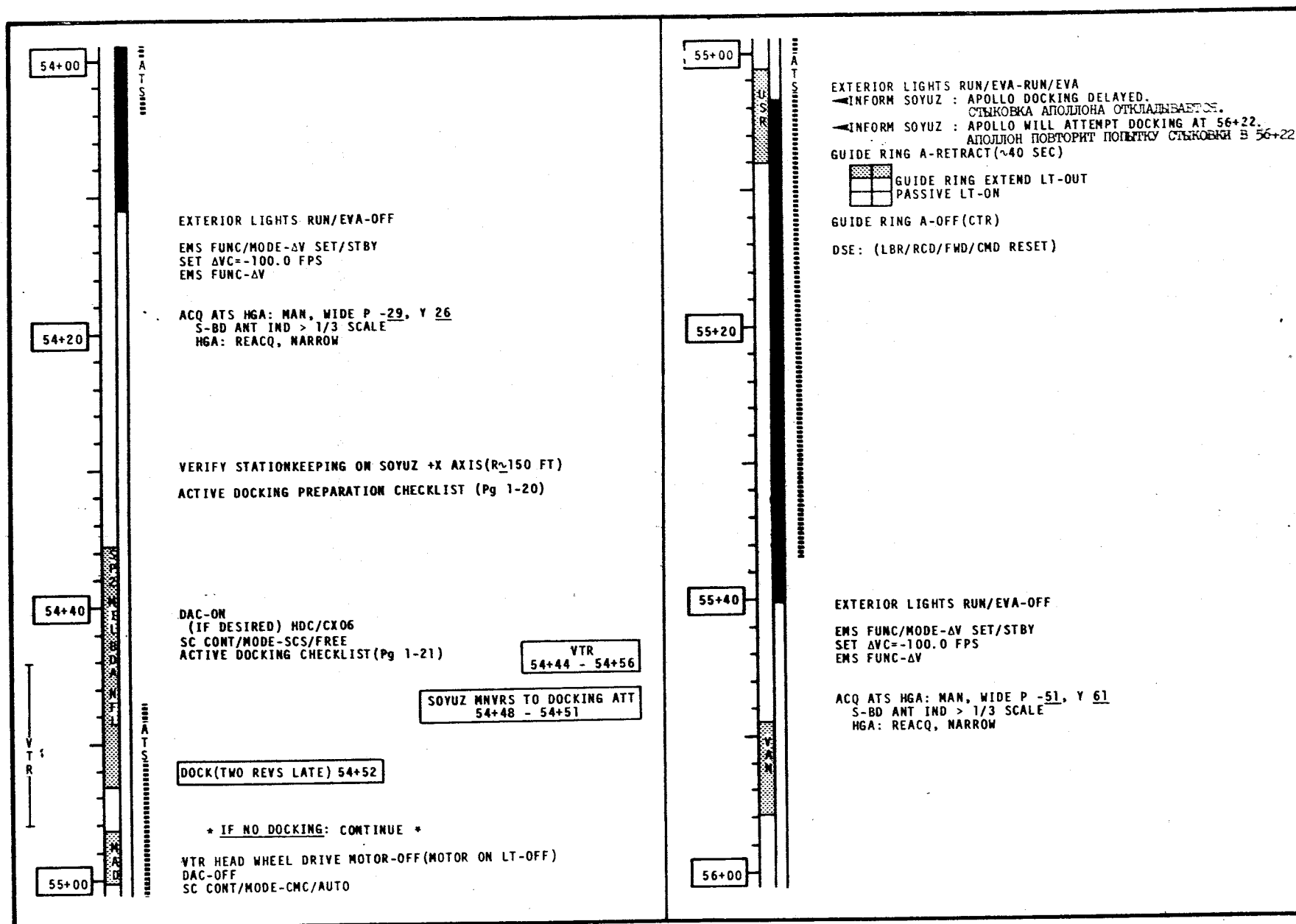
DELAYED DOCKING

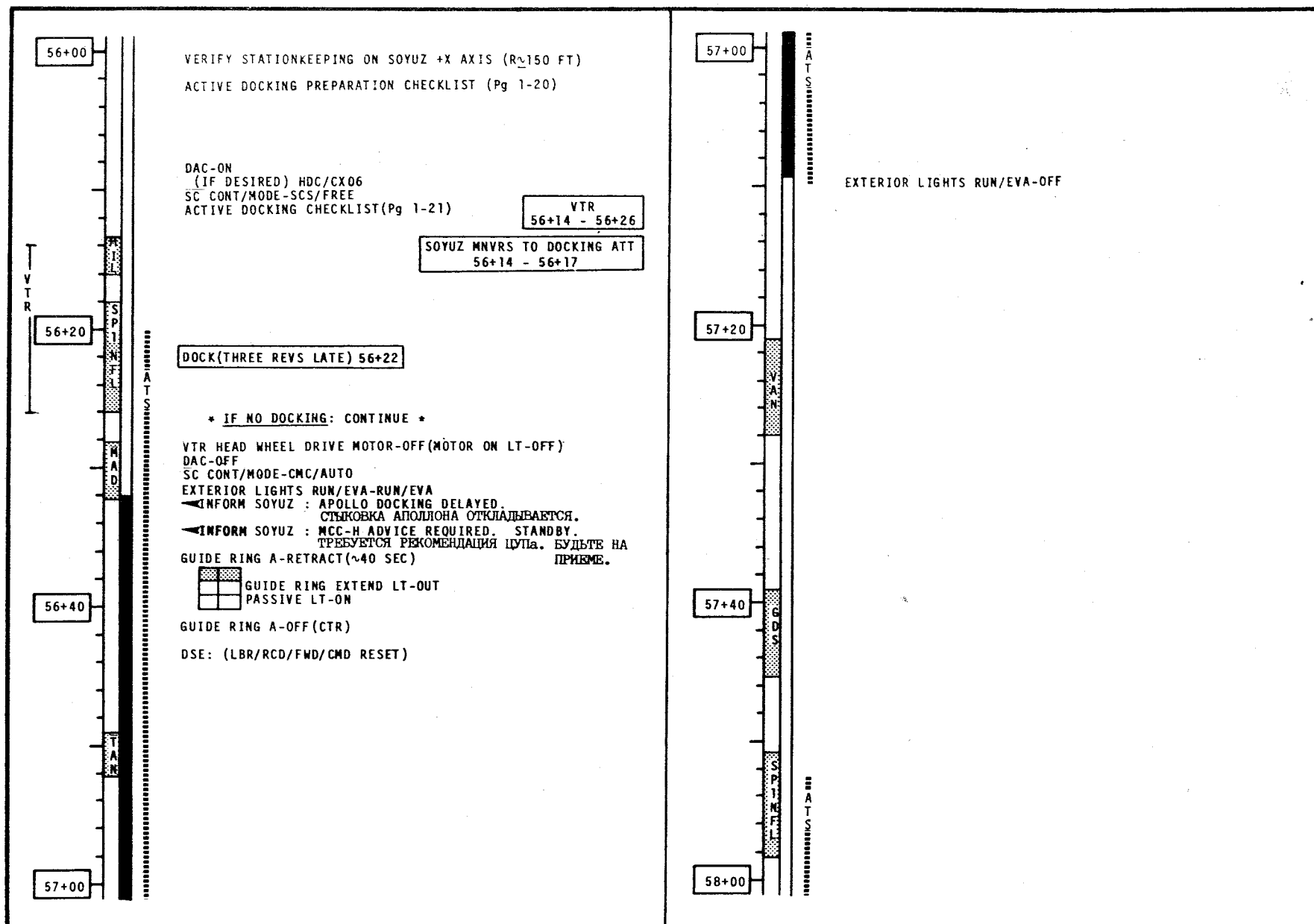
DELAYED DOCKING

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 ΔH = 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, ΔH = 10 ± 2 NM, Elev = 27°, WT = 130°)
- 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

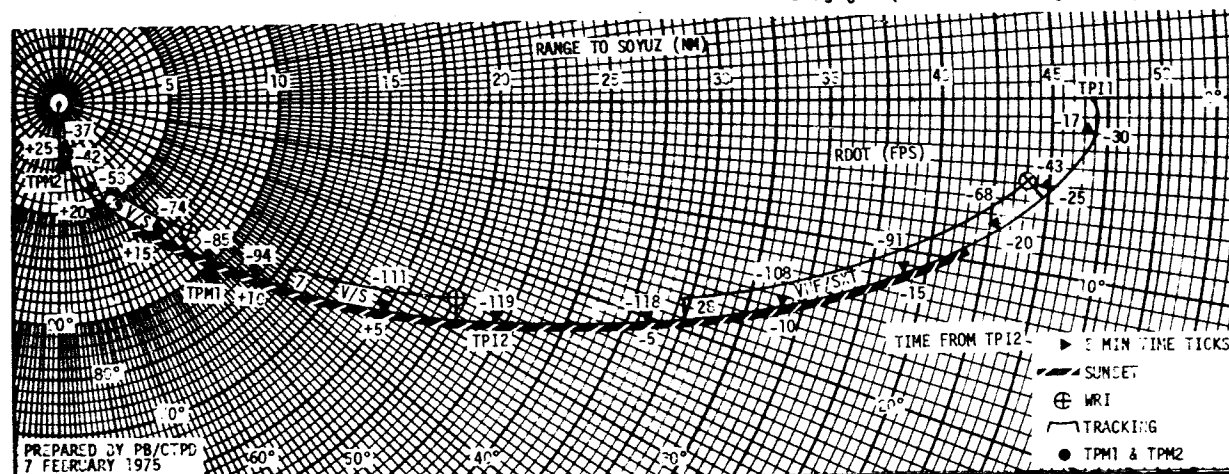
- (Pre C/L) o State vectors (CSM & Soyuz)
- (Pre C/L) o REFSMMAT
- o State vectors (CSM & Soyuz)
- o TPI1 Target Load

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

-33:00

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

ISXT/VHF

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

(11103)
(01111)

S
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/
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F

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-MNVR TO ZERO ROLL (ROLL RIGHT)

P41

TPI2 (R = 21 NM)

(TRIM VG's ± 0.2)

P36 (VERIFY TRACK ROLL ATT ~ ZERO DEG)

—TP12 completed. TP12 ВЫПОЛНЕН.

REACQUIRE VHF RANGING (R = 18 NM)

FDAI 1-ORB RATE

0 AND TA HP-65 DATA FOR TPI2+4:30

```

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

```

TP12 PAD DATA

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

TP12 ONBOARD DATA

P35 RECYCLE										P35 FINAL COMP									
N55	REG 2	ELEV	☒							☒									
N58	ΔV_{TPI}	ΔV_{TPI}	+	0	0						+	0	0						
		ΔV_{TPF}	+	0	0						+	0	0						
		$\Delta T(TPI/TPI)$	+	0	0	B	0	0			+	0	0	B	0				
N81	ΔV_{TPI}	ΔV_X		0	0							0	0						
		ΔV_Y		0	0							0	0						
		ΔV_Z		0	0							0	0						
N59	$\Delta V_{(LOS)}$	ΔV_F		0	0							0	0						
		ΔV_R		0	0							0	0						
		ΔV_D		0	0							0	0						

S
X
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/ V
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(11103)
(01111)
+ 7:30

+ 8:30
+ 9:00

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 (ΔV_X , ΔV_Y , ΔV_Z CONT OPTIONAL)

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

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

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 ОПИЕНТАЦИЮ АПОЛЛО.

MNR TO DOCKING ROLL ATT

V62E (REF ERROR NEEDLES)

VTR/TV SWITCH LIST (Pg 6-5)

Orientation established. ОПИЕНТАЦИЯ УСТАНОВЛЕНА.

Initiate docking orientation as programmed. НАЧИНАЮ ОПИЕНТАЦИЮ
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 MNR ON SOYUZ +X AXIS

SOYUZ MNRVS 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

BASIC ASSUMPTIONS

- o HGA will be deployed ASAP after SEPARATION MNUVR
- 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 Δt = 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

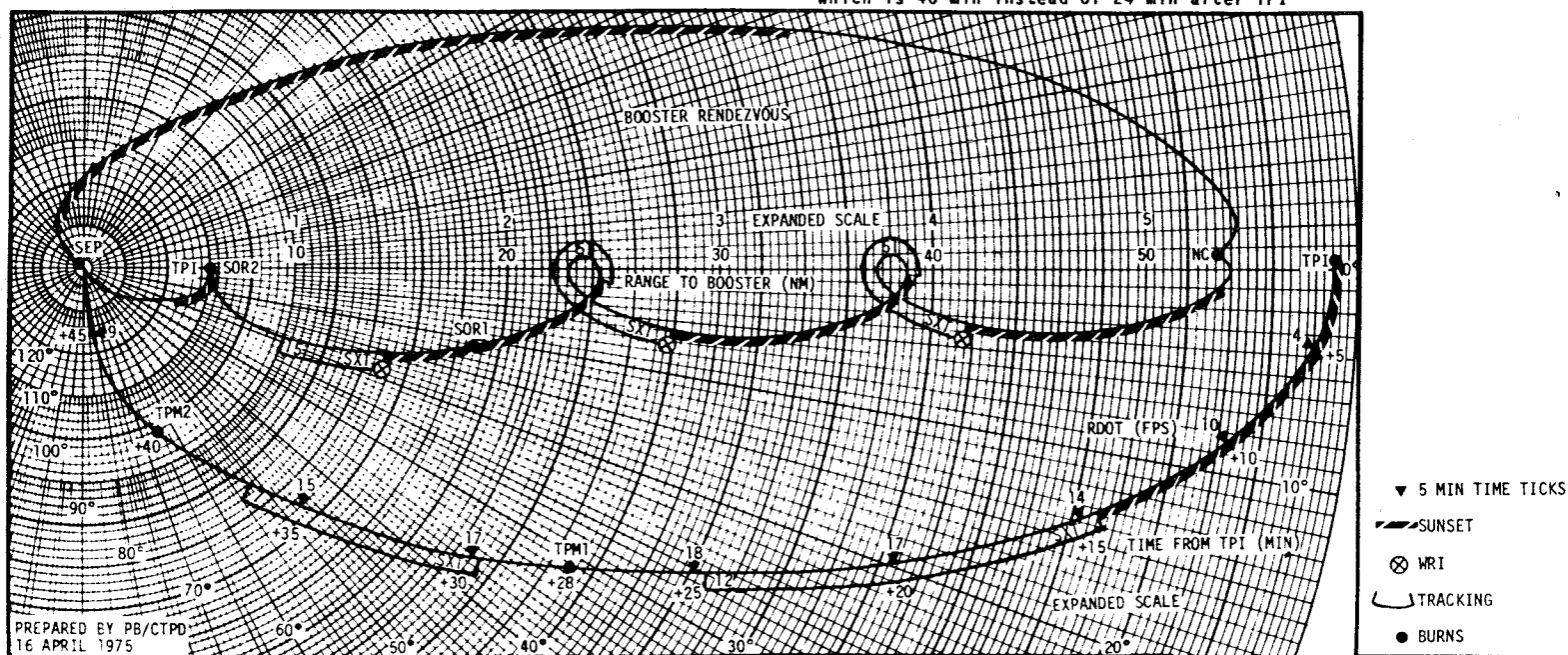
- o Uplinked after NC
- o SXT marks during each day period following NC
- o Nav programs- P20 OPT 4 used pre-SOR2, P36 used post-SOR2
- o W-Matrix initialization- Load with 2000/2 before first mark.
Force initialization (V93E) to occur with first mark of each of the 3 pre-SOR2 marking periods.
No initialization desired (bypass MINKEY) during the post-SOR2 marking periods.

MANEUVER SOLUTIONS

- o NC, 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

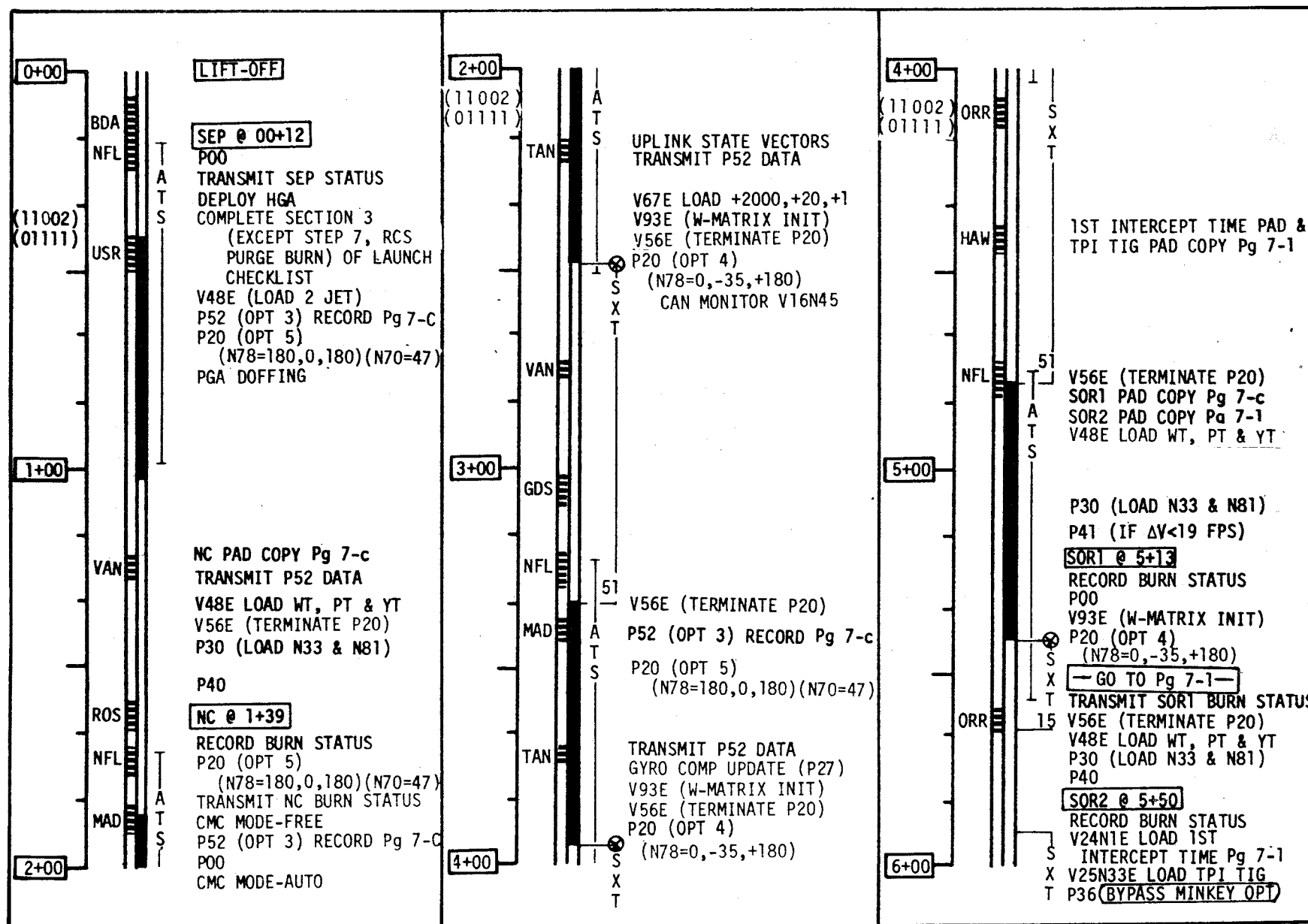
BOOSTER RNDZ

BOOSTER RNDZ

BOOSTER RNDZ

BOOSTER RNDZ

BOOSTER RNDZ



5+30

(11002)

(01111)

-12:00

5+40

0:00

5+50

6+00

A

T

S

X

TRANSMIT SORI BURN STATUS (Pg 7-c)

V56E (TERMINATE P20)

V48E (LOAD WT, PT & YT)

P30

LOAD N33 & N81 PAD VALUES

P40

SOR2

(TRIM VG's +0.2)

RECORD BURN STATUS

V21N55E, +0E (NO. OF TARGET OFFSETS)

V24N1E (LOAD 1ST INTERCEPT TIME) (Pg 7-1)

V25N33E (LOAD TPI TIG) (Pg 7-1)

P36 (BYPASS MINKEY OPTION)

XXXXXXXXXXXXXXXXXXXXX

X UNREASONABLE UPDATE X

X 0.50 NM, 3.0 FPS X

XXXXXXXXXXXXXXXXXXXXX

SOR2 PAD DATA

		NOMINAL					FINAL					
N33	HR	+			0	0	5	+				
	TIG	MIN	+				5	0	+			
	SEC	+			0	0	0	0	+			
N81	ΔV_X	+			0	0	3	7				
	ΔV_{SOR2}	ΔV_Y	+			0	0	0	0			
	ΔV_Z	+			0	1	7	9				
N22	R	+	1	7	8	0	0		+		0	0
	SOR2	P	+	3	0	5	0	0	+		0	0
	Y	+	2	5	9	0	0		+		0	0
	ΔV_C				0	1	8	3				
	BT											

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	

WT	+				
PT					
YT					

BURN ATT CHECK

STAR					
SA	+				0
TA	+				0

1ST INTERCEPT TIME PAD
(TPI IS 36 MIN PRIOR TO SUNSET)

		NOMINAL					UPDATE				
N1	ADDR		0	3	6	3	3				
	R1		0	0	2	3	4				
	R2		1	0	3	1	0				

TPI TIG PAD

		NOMINAL					UPDATE				
N33	HR	+			0	0	6	+			
	MIN	+				3	8	+			
	SEC	+			0	0	0	0	+		

```

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

```

2ND INTERCEPT TIME PAD (TPF IS 16 MIN PRIOR TO SUNSET)										
NOMINAL						UPDATE				
N1	ADDR	X	0	3	6	3	3	X		
	R1	X	0	0	2	4	3	X		
	R2	X	2	2	6	1	0	X		

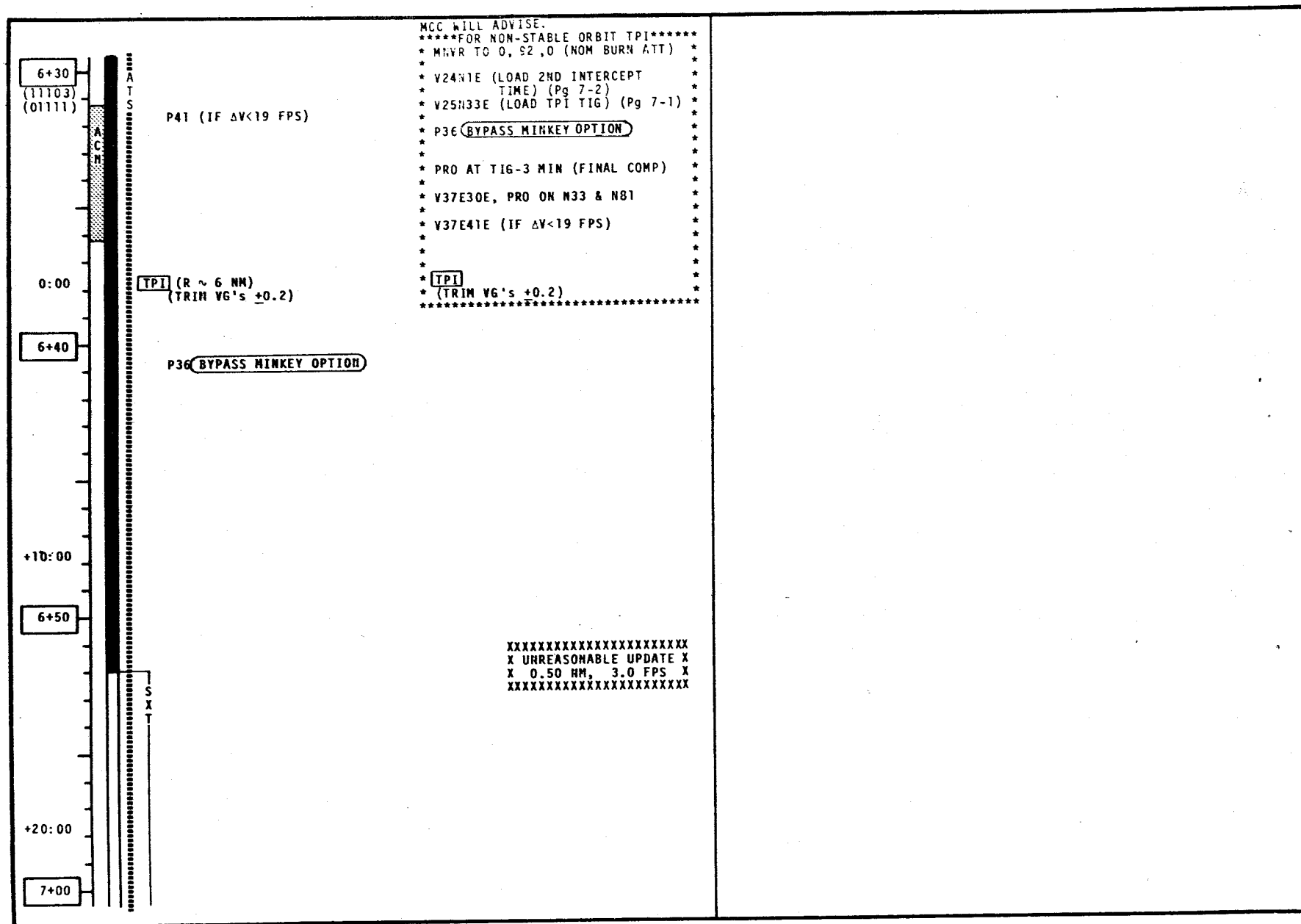
TPI ONBOARD DATA

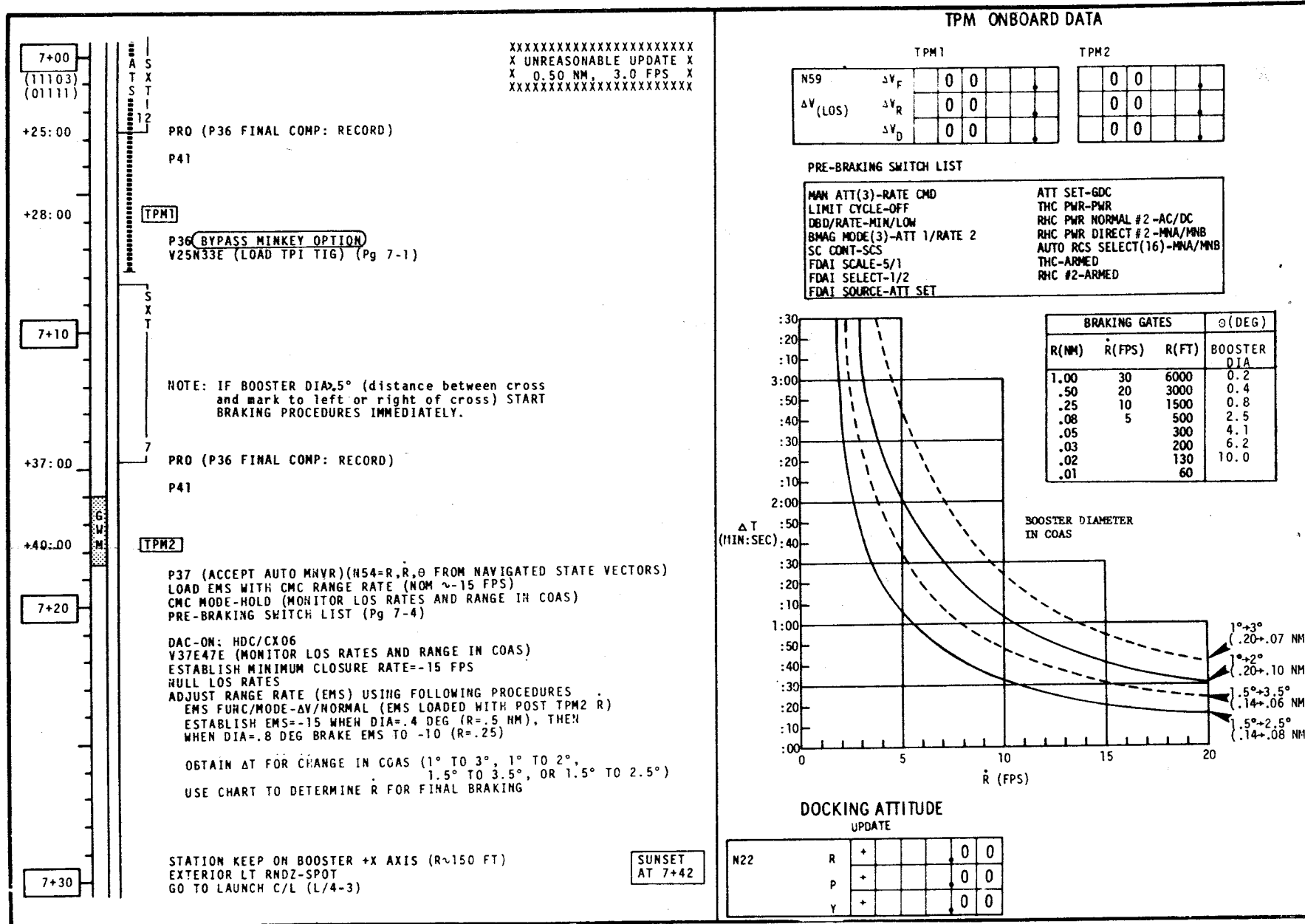
NOMINAL

P36 FINAL COMP

N59	ΔV_F	-	0	0	0	0	9
$\Delta V_{(LOS)}$	ΔV_R	+	0	0	0	0	0
	ΔV_D	+	0	0	0	9	1
V16NB1E	ΔV_X	-	0	0	0	0	9
$\Delta V_{(LV)}$	ΔV_Y	+	0	0	0	0	0
	ΔV_Z	+	0	0	0	9	1

	0	0					
	0	0					
	0	0					
	0	0					
+	0	0	0	0	0	0	0
	0	0					





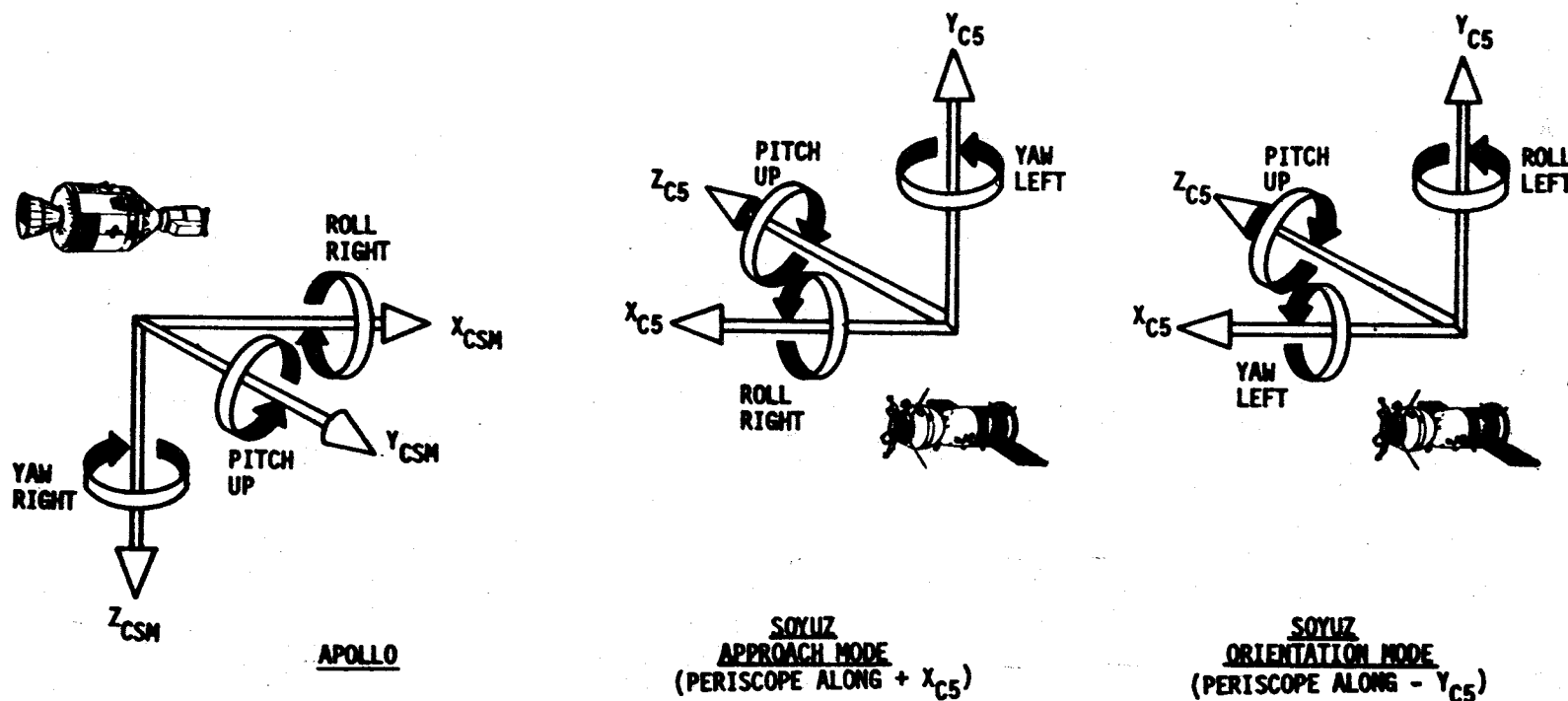
GENERAL COMMUNICATIONS
ОБЩАЯ СВЯЗЬ

- | | |
|---|---|
| 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 | ОТОЙДИТЕ НАЗАД |
| 8. STAND BY | БУДЬТЕ НА ПРИЕМЕ |
| 9. CONTINUING NORMAL OPERATIONS | ПРОДОЛЖАЕМ НОРМАЛЬНЫЕ ОПЕРАЦИИ |
| 10. MCC WILL REPORT ABOUT THE PROBLEM | ЦУП СООБЩИТ 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 | МАРШЕВОЙ 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 НОРМАЛЬНЫЕ 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 СЕДЛЕНИЯ _____ |
| 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 |



SOYUZ ATTITUDE MNVR INSTRUCTIONS (UNDocked)

DESIRED SOYUZ ATTITUDE MNVR	SOYUZ ATTITUDE MNVR INSTRUCTION		SOYUZ AXES
	APPROACH MODE	ORIENTATION MODE	
ROLL RIGHT (LEFT)	ROLL RIGHT	YAW LEFT	X_{C5}
PITCH UP (DN)	PITCH UP	PITCH UP	Z_{C5}
YAW RIGHT (LEFT)	YAW RIGHT	ROLL RIGHT	Y_{C5}

SOYUZ ATTITUDE MNVR INSTRUCTIONS (DOCKED)

DESIRED APOLLO ATTITUDE MNVR	SOYUZ ATTITUDE MNVR INSTRUCTION		SOYUZ AXES	C S M
	APPROACH MODE	ORIENTATION MODE		
ROLL RIGHT (LEFT)	ROLL LEFT	YAW RIGHT	X_{C5}	X
PITCH UP (DN)	PITCH DN	PITCH DN	Z_{C5}	Y
YAW RIGHT (LEFT)	YAW RIGHT	ROLL RIGHT	Y_{C5}	Z

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