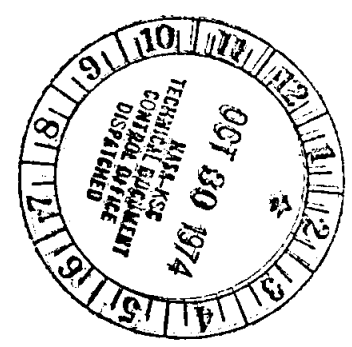


MDO
OFC 3121

ASTP

JSC-09212

BASIC
HP-65
RENDEZVOUS
TARGETING
CHECKLIST



PREPARED BY

CREW TRAINING & PROCEDURES DIVISION



National Aeronautics and Space Administration
LYNDON B. JOHNSON SPACE CENTER
Houston, Texas

OCTOBER 17, 1974

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ASTP

JSC-09212

PA-N6-11160-2

HP-65 RENDEZVOUS TARGETING CHECKLIST

17 OCTOBER 1974

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This document is under the configuration control of the Crew Procedures Control Board (CPCB). All proposed changes should be submitted to the ASTP Flight Data File Manager, T. W. Holloway, CG5, Bldg. 4, Rm 225A, telephone 483-4471.

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ACKNOWLEDGMENT

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TYPING & GRAPHICS	KENTRON HAW. LTD. CREW PROCEDURES DATA GROUP	

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i

HP-65 RENDEZVOUS TARGETING CHECKLIST

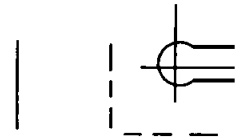
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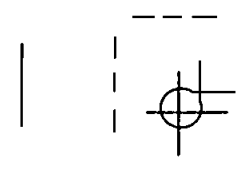
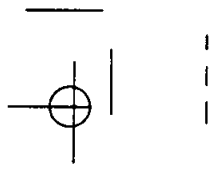
BASIC 10/17/74

PAGE	DATE
i	10/17/74
ii	10/17/74
iii	10/17/74
iv	10/17/74
1	10/17/74
2	10/17/74
3	10/17/74
4	10/17/74
5	10/17/74
6	10/17/74
7	10/17/74
8	10/17/74
9	10/17/74
10	10/17/74
11	10/17/74
12	10/17/74

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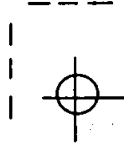
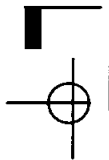
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iii

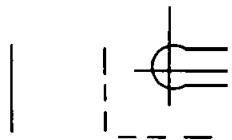
DATE 10/17/74

CONTENTS

	PAGE
CHECKOUT	1
NSR	2
TPI TIG 1	4
TPI	6
TPM1	8
TPM2	8
RECOVERY NOTES	10
DATA SOURCES	12



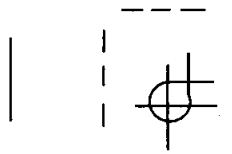
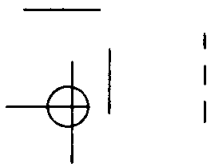
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iv

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1

DATE 10/17/74

CHECKOUT

1. HP65-ON/RUN
2. INSERT "DIAG-1" PROGRAM CARD and STOW
KEY R/S - (Note -8.88888888-88 displayed)
IF NOT - Record value displayed
Turn HP65-OFF; then ON and repeat.
If SITUATION REPEATS - Unstow and
checkout BACKUP HP65.
3. HP65-OFF; then ON
4. INSERT "DIAG-2" PROGRAM CARD and STOW
KEY R/S - (Note -8.88888888-88 displayed)
If NOT - Turn HP65-OFF; then On and repeat.
If SITUATION REPEATS - Unstow and
checkout BACKUP HP65.
5. HP65-OFF; then ON
6. INSERT "DIAG-3" PROGRAM CARD and STOW
KEY R/S - (Note -8.88888888-88 displayed)
If NOT - Turn HP65-OFF; then ON and repeat.
IF SITUATION REPEATS - Unstow and
checkout BACKUP HP65.
7. HP65-OFF
8. IF DIAGNOSTIC TEST FAILED - REPORT RESULTS TO STDN

NSR

1. RECORD NSR INPUT DATA (Range measurements at NSR -28, -24, & -20 minutes) - Reference PAD A
2. HP65-ON/RUN
3. INSERT "NSR-1" PROGRAM CARD and STOW
LOAD INPUT DATA (NCC TIG, TPI TIG and Range measurements from PAD A)
NCC TIG (H.MS)/ **STO** / **1**
TPI TIG (H.MS)/ **STO** / **2**
R28/ **STO** / **3**
R24/ **STO** / **4**
R20/ **STO** / **5**

NOTE: To verify data loaded correctly:
For NCC & TPI TIG; KEY **DSP** / **1** / **4** / **RCL** / (**1** or **2**),
verify, then KEY **DSP** / **1** / **2**
For Range data; KEY **RCL** / (**3**, **4** or **5**)

4. KEY **A** - (Note 222.22 displayed)
INSERT "NSR-2" PROGRAM CARD and STOW
KEY **A** - (Note 333.33 displayed)
INSERT "NSR-3" PROGRAM CARD and STOW
KEY **A** - (Note 444.44 displayed)
X X X X X X X X X X X X X X X X X
X CAUTION: DO NOT turn off HP65 X
X X X X X X X X X X X X X X X X X
5. RECORD NSR INPUT DATA (Range measurement at NSR -16 minutes) - Reference PAD A
6. INSERT "NSR-4" PROGRAM CARD and STOW
LOAD INPUT DATA (Range at NSR -16 minutes) - Reference PAD A
R16/ **STO** / **1**
7. KEY **A** - (Note 555.55 displayed)
8. RECORD NSR INPUT DATA (Range measurement at NSR -12 minutes) - Reference PAD A
9. INSERT "NSR-5" PROGRAM CARD and PLACE IN UPPER "WINDOW" SLOT
LOAD INPUT DATA (Range at NSR -12 minutes) - Reference PAD A
R12/ **STO** / **2**
10. KEY **A** - COPY ΔVX (LV) - (PAD B & RNDZ BOOK)
KEY **B** - COPY ΔVZ (LV) - (PAD B & RNDZ BOOK)
KEY **C** - COPY ΔV Total - (PAD B & RNDZ BOOK)
KEY **D** - COPY ORDEAL Burn Att - (PAD B & RNDZ BOOK)
STOW "NSR-5" PROGRAM CARD
11. HP65-OFF

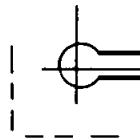
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PAD A (NSR)

GET OF DATA						NSR INPUT DATA						STO
						NCC TIG (N11)						1
NSR TIG (N13)						TPI TIG (N37)						2
-28						R28 (NM)	X				X	3
-24						R24 (NM)	X				X	4
-20						R20 (NM)	X				X	5
-16						R16 (NM)	X				X	1
-12						R12 (NM)	X				X	2

PAD B (NSR)

KEY	NSR RESULTS				
A	ΔV (LV)	$\Delta V X$			
B		$\Delta V Z$			
C	$\Delta V T$ (IN PLANE)	X			
D	ORDEAL BURN ATT	X			



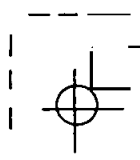
TPI TIG 1

1. RECORD TPI TIG 1 INPUT DATA (Two Ranges one minute apart and GET of second range measurement) - Reference PAD A
 *****OPTIONAL*****
 * CMC or STDN TPI TIG may be used for TPI TIG 1 *

2. HP65-ON/RUN
3. INSERT "TPI TIG 1" PROGRAM CARD and PLACE IN UPPER "WINDOW" SLOT
 LOAD INPUT DATA (Ranges and GET from PAD A)
 R1/ STO / 1
 R2/ STO / 2
 GET2 (H.MS)/ STO / 3
 *****OPTIONAL*****
 * If CMC or STDN TPI TIG is to be used for TPI TIG 1; *
 * LOAD TIG (H.MS)/ STO / 4 *
 * (Note: R1, R2 & GET2 load not required) *

NOTE: To verify data loaded correctly:
 Key RCL / (1 , 2 , 3 or 4)

4. KEY A - COPY TPI TIG 1 (H.M)- (PAD B)
 KEY B - COPY TPI TIG 1 -32 (H.M)- (PAD B)
 KEY C - COPY TPI TIG 1 -28 (H.M)- (PAD B)
 KEY D - COPY TPI TIG 1 -24 (H.M)- (PAD B)
 TPI TIG 1 -23 = TPI TIG 1 -24 plus 1 minute - COPY - (PAD B)
 KEY E - COPY TPI TIG 1 -16 (H.M)- (PAD B)
 STOW "TPI TIG 1" PROGRAM CARD
5. HP65-OFF



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PAD A (TPI)

TPI TIG 1 INPUT DATA							STO
R1	(N1)	X				X	1
R2	(N1)	X				X	2
GET2							3

TPI

1. RECORD TPI INPUT DATA (Range measurements at TPI TIG 1 -32, -28, -24, & -23 minutes) - Reference PAD B

2. HP65-ON/RUN

3. INSERT "TPI-1" PROGRAM CARD and STOW
LOAD INPUT DATA (TPI TIG 1 and Range measurements from PAD B)
TPI TIG 1 (H.MS)/ STO / 1
R32/ STO / 2
R28/ STO / 3
R24/ STO / 4
R23/ STO / 5

NOTE: To verify data loaded correctly:
KEY RC1 / (1 , 2 , 3 , 4 or 5)

4. KEY A - (Note 222.22 displayed)

INSERT "TPI-2" PROGRAM CARD and STOW
KEY A - (NOTE 333.33 displayed)

INSERT "TPI-3" PROGRAM CARD and PLACE IN UPPER "WINDOW" SLOT
*****OPTIONAL*****
* If CMC or STDN TPI TIG is to be used for TPI TIG 2; *
* LOAD TIG (H.MS)/ STO / 2 *

KEY A - COPY TPI TIG 2 (H.MS) - (PAD C & RNDZ BOOK)
KEY B - COPY TIG SLIP (H.MS) - (PAD C & RNDZ BOOK)
KEY C - (Note 444.44 displayed)

* NOTE: Above option may still be exercised at this point, *
* however, Keys A, B & C must then be repeated. *

STOW "TPI-3" PROGRAM CARD

INSERT "TPI-4" PROGRAM CARD and STOW
KEY A - (Note 555.55 displayed)

5. INSERT "TPI-5" PROGRAM CARD and PLACE IN UPPER "WINDOW" SLOT
X X X X X X X X X X X X X X X X X
X CAUTION: DO NOT turn off HP65 X
X X X X X X X X X X X X X X X X X

6. RECORD TPI INPUT DATA (Range measurement at TPI TIG 1 -16 minutes) -
Reference PAD B
LOAD INPUT DATA (Range at TPI TIG 1 -16 from PAD B)
R16/ STO / 1

7. KEY A - COPY ΔVX (LV) - (PAD C & RNDZ BOOK)
KEY B - COPY ΔVZ (LV) - (PAD C & RNDZ BOOK)
KEY C - COPY ΔV Total - (PAD C & RNDZ BOOK)
KEY D - COPY ORDEAL Burn Att - (PAD C & RNDZ BOOK)
STOW "TPI-5" PROGRAM CARD

8. HP65-OFF

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7

DATE 10/17/74

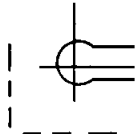
PAD B (TPI)

KEY	GET OF DATA					TPI INPUT DATA					STO	
	TPI TIG 1					TPI TIG 1						
A	TPI TIG 1					TPI TIG 1					0 0	1
B	-32				0 0	R32 (N1)						2
C	-28				0 0	R28 (N1)						3
D	-24				0 0	R24 (N1)						4
	-24 +1 MIN = -23				0 0	R23 (N1)						5
E	TPI TIG 1 -16				0 0	R16 (N1)						1

PAD C (TPI)

KEY	TPI RESULTS						
A	TPI TIG 2						
B	TIG SLIP						

A	ΔV (LV)	$\Delta V X$				
B		$\Delta V Z$				
C	$\Delta V T$ (IN PLANE)					
D	ORDEAL BURN ATT					



TPM1

- RECORD TPM1 INPUT DATA (Range and Angle measurements)-
Reference PAD A

*****FOR X AXIS TRACKING*****
 * Use 57.45° or value obtained during COAS *
 * LOS DETERMINATION for TA4:30 & TA8:30. *

- HP65-ON/RUN

- INSERT "TPM1" PROGRAM CARD and PLACE IN UPPER "WINDOW" SLOT
LOAD INPUT DATA (From PAD A)

04:30 /	STO /	1
TA4:30/	STO /	2
R7:30 /	STO /	3
R8:30 /	STO /	4
08:30 /	STO /	5
TA8:30/	STO /	6

NOTE: To verify data loaded correctly,
KEY **RCL** / (**1** , **2** , **3** , **4** , **5** or **6**)

- KEY **A** - COPY ΔVX (LOS) - (PAD B & RNDZ BOOK)
KEY **B** - COPY ΔVZ (LOS) - (PAD B & RNDZ BOOK)
STOW "TPM1" PROGRAM CARD

- HP65-OFF

TPM2

- RECORD TPM2 INPUT DATA (Range and Angle measurements)-
Reference PAD C

*****FOR X AXIS TRACKING*****
 * USE 57.45° or value obtained during COAS *
 * LOS DETERMINATION FOR TA16:30 & TA20:30. *

- HP65-ON/RUN

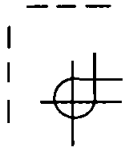
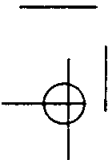
- INSERT "TPM2" PROGRAM CARD and PLACE IN UPPER "WINDOW" SLOT
LOAD INPUT DATA (From PAD C)

016:30 /	STO /	1
TA16:30/	STO /	2
R19:30 /	STO /	3
R20:30 /	STO /	4
020:30 /	STO /	5
TA20:30/	STO /	6

NOTE: To verify data loaded correctly,
KEY **RCL** / (**1** , **2** , **3** , **4** , **5** or **6**)

- KEY **A** - COPY ΔVX (LOS) - (PAD D & RNDZ BOOK)
KEY **B** - COPY ΔVZ (LOS) - (PAD D & RNDZ BOOK)
STOW "TPM2" PROGRAM CARD

- HP65-OFF



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PAD A (TPM 1)

GET OF DATA						TPM1 INPUT DATA				STO	
TPI+4:30						04:30 (DEG)					1
						TA4:30 (DEG)					2
TPI+7:30						R7:30 (NM)					3
TPI+8:30						R8:30 (NM)					4
						08:30 (DEG)					5
						TA8:30 (DEG)					6

PAD B (TPM1)

KEY	TPM1 RESULTS					
A	ΔV (LOS)	$\Delta V X$				
B			$\Delta V Z$			

PAD C (TPM2)

GET OF DATA						TPM2 INPUT DATA				STO	
TPI+16:30						016:30 (DEG)					1
						TA16:30 (DEG)					2
TPI+19:30						R19:30 (NM)					3
TPI+20:30						R20:30 (NM)					4
						020:30 (DEG)					5
						TA20:30 (DEG)					6

PAD D (TPM2)

KEY	TPM2 RESULTS					
A	ΔV (LOS)	$\Delta V X$				
B			$\Delta V Z$			

RECOVERY NOTES

Accidentally key [f], [f-1] or [g]

If one of these are keyed, it should be cancelled before continuing.
To cancel: Key [F], [PREFIX]. If it was not cancelled before keying another key, turn HP-65 OFF and start over at step one.

Accidentally key [STO]

If [STO] is keyed, it should be cancelled before continuing. To cancel: Key [CLX]. If it was not cancelled before keying another key, turn HP-65 OFF and start over at step one.

Accidentally key [CHS] instead of [STO]

This changes the sign on the displayed number. Correct the number by keying [CHS] again.

Multiple Decimal Point Display

Continuous - The battery provides ~3 hours of continuous operation. All decimal points light in the display (super imposed onto the current display) when 2 to 5 minutes of operation time remains.

While reading card - If the decimal points light while reading a card and then go out, the battery is almost discharged. Can expect a continuous display of decimals after additional usage.

Recovery - Turn HP-65 OFF, replace battery pack, and start over at step one.
Power is best conserved by displaying only a decimal (Key [.]) when the HP-65 is ON but not in use.

Blinking Display

After a calculation - due to an improper operation such as $\sqrt{-X}$, $x+0$, etc

Recovery - Turn HP-65 OFF and start at step one.

After loading a card - due to reading a blank card, or bit or word was dropped during reading. Could indicate that card was inserted backwards or upside down, or inserted before turning HP-65 ON

Recovery - First, key [CLX] to stop blinking display. Then, reload the card.
If blinking reoccurs, key [CLX] and load the backup card.

Display of 00.00, 0.00, 0.0, etc after keying [A]

This could be a result of loading the card upside down or backwards.
To recover: key [CLX], reload the card, verify all associated input data: then key [A], etc.

Blank Display

Turn HP-65 OFF and start over at step one. If display still blank, change batteries and start over at step one.

RECOVERY NOTES

00 00 Displayed in Right of Window

The W/PRGM/RUN switch is in the W/PRGM position. Place the switch in the RUN position, reload the last card, verify all input data associated with the last card, and continue with the current step.

Bad Answer Obtained

If a bad answer (garbage) is obtained, a general rule of thumb is to turn the HP-65 OFF and start over at step one. In some situations, the following list of hints might save you some time.

1. For NSR or TPI last card -
 - a. Have to key **A** before results of keying **B**, **C** or **D** are valid.
If **A** was not keyed, go ahead and key **A** now; then continue.
 - b. Verify that last data had been correctly stored. If data not correct, store correct data; then continue.
 - c. For NSR, verify correct R16 data in storage. If data not correct: store correct data, load NSR-4 card, key **A**, load NSR-5 card, key **A**, etc.
 - d. If 555.55 is displayed after keying **A**, this is telling you that the last card had not been loaded. You can still load the last card; key **A**, etc.
2. For TPI TIG 1, TPM1 or TPM2 card -
First, verify stored data. Then -
 - a. If data not correct, store the correct data; then continue.
 - b. If data is correct, do not turn HP-65 OFF before reloading card. This way, the data does not have to be reloaded (stored).

Additional Notes

1. When answers are to be displayed, you always have to key **A** before answer is valid.
2. When answers are not to be displayed, keying **B**, **C**, **D** or **E** will result in proper execution of program.
3. Keying **A** more than once (for any card) will not degrade the answer.
In fact, keying **A**, **B**, **C**, **D** or **E** any number of times will not degrade the answer.
4. If you're not sure you keyed **A**, key **A** again.
5. The numbers (111.11, 222.22, etc) are displayed to tell you which card has to be executed next. Pay attention to these numbers.
If you accidentally fail to load a card, the correct program card number will be displayed after keying **A** (or **C** for TPI-3).

DATA SOURCES

	NSR/TPI	TPM1/TPM2
NOMINAL	Range- EMS (Use V76/N76 Reg 1 for B/U)	Range- EMS θ - FDAI ORDEAL PITCH TA - Trunnion Angle with Soyuz centered in SXT
CMC FAIL	Range- EMS only (NO B/U)	Range- EMS θ - Track Soyuz in COAS Read FDAI ORDEAL PITCH TA - Use Value from COAS LOS DETERMINATION or 57.45°
IMU FAIL	Range- EMS (Use V76/N76 Reg 1 for B/U)	Range- EMS θ - Track Soyuz in COAS Read FDAI ORDEAL PITCH TA - Use Value from COAS LOS DETERMINATION or 57.45°
NO VHF RNG	(HP-65 soln not available)	(HP-65 soln not available)
EMS RNG DISPLAY BLANK	Range- V76E, Load N72, PRO, N76E Read R in R1 For TPI - 23 Use R24 (in R2 of N76) R23 = R24/100 + R24	Range- V76E, load N72 with ZERO's, PRO, N76E Read current R in R1 θ - FDAI ORDEAL PITCH TA - Trunnion Angle with Soyuz centered in SXT
SOYUZ TRACK LITE FAIL	Range- EMS (Use V76/N76 Reg 1 for B/U)	(HP-65 soln not available)
MARK BUTTON FAIL	Range- EMS (Use V76/N76 Reg 1 for B/U)	RANGE- EMS θ - FDAI ORDEAL PITCH TA - Trunnion Angle with Soyuz centered in SXT
OPTICS FROZEN	Range- EMS (Use V76/N76 Reg 1 for B/U)	Range- EMS θ - FDAI ORDEAL PITCH Track Soyuz in SXT with MIC TA - Trunnion Angle with Soyuz centered in SXT
CANNOT SEE THRU OPTICS	Range- EMS (Use V76/N76 Reg 1 for B/U)	Range- EMS θ - Track Soyuz in COAS Read FDAI ORDEAL PITCH TA - Use Value from COAS LOS DETERMINATION or 57.45°

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EP12/H. White
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item.

FE221/R. Powell (8)
FEK/T. Layne
FM13/Data Management Office (5)

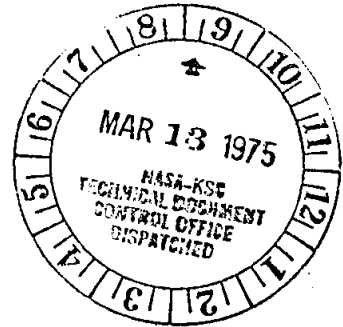
JM5/R. Magin (2)

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JSC-09212

ASTP

REFERENCE



HP-65

RENDEZVOUS TARGETING CHECKLIST

PREPARED BY
CREW TRAINING & PROCEDURES DIVISION



National Aeronautics and Space Administration
LYNDON B. JOHNSON SPACE CENTER
Houston, Texas

MARCH 5, 1975

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ASTP

JSC-09212
PA-N6-11160-2

HP-65 RENDEZVOUS TARGETING CHECKLIST

5 MARCH 1975

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DATE

It is requested that any organization having comments, questions, or suggestions concerning this document contact Duane K. Mosel, Procedures Branch, CG2, Building 4, Room 212, telephone 483-3048.

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Distribution of this document is controlled by Ted A. Guillory, ext. 4471, CG54, Crew Training & Procedures Division.

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ACKNOWLEDGMENT

<u>AREA</u>	<u>NAME/BRANCH</u>	<u>LOCATION</u>
TECHNICAL SUPPORT	FLIGHT OPERATIONS DEPT. McDONNELL DOUGLAS TECHNICAL SERVICES COMPANY (CONTRACT NAS 9-14023)	EXT. 3551 Bldg. 4 Rm. 283
TECHNICAL SUPPORT	EJ6/DISPLAYS & CONTROLS SYSTEMS BRANCH GN&C DISPLAYS SECTION	
TYPING & GRAPHICS	KENTRON HAW. LTD. CREW PROCEDURES DATA GROUP	

CHANGE CONTROL RECORD

APPOLO/SOYUZ TEST PROJECT HP-65 RENDEZVOUS TARGETING CHECKLIST

CONTROL NO.	FDF EDITION INCORPORATED		DISAPPROVED OR OTHER DISPOSITION
	TITLE	DATE	
001	REFERENCE	3/5/75	
002	REFERENCE	3/5/75	

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HP-65 RENDEZVOUS TARGETING CHECKLIST

ASTP

LIST OF EFFECTIVE PAGES

BASIC 10/17/74
REFERENCE 3/5/75

PAGE	DATE
i	3/5/75
ii	3/5/75
iii	3/5/75
iv	3/5/75
1	3/5/75
2	3/5/75
3	3/5/75
4	3/5/75
5	3/5/75
6	3/5/75
7	3/5/75
8	3/5/75
9	3/5/75
10	3/5/75
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12	3/5/75

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iii

DATE 3/5/75

CONTENTS

	PAGE
CHECKOUT	1
NSR	2
TPI TIG 1	4
TPI	6
TPM1	8
TPM2	8
RECOVERY NOTES	10
DATA SOURCES	12

(TRIM FRONT PAGE ON SOLID CROP MARKS: BACK PAGE ON DASH CROP MARKS.)

iv

DATE 3/5/75

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CHECKOUT

1. HP65-ON/RUN

KEY R/S - (Note -8.88888888-88 displayed)
IF NOT - Record value displayed
Turn HP65-OFF; then ON and repeat.
IF SITUATION REPEATS - Unstow and
checkout BACKUP HP65.

3. HP65-OFF; then ON

4. INSERT "DIAG-2" PROGRAM CARD and STOW

KEY R/S - (Note -8.88888888-88 displayed)
IF NOT - Turn HP65-OFF; then On and repeat.
If SITUATION REPEATS - Unstow and
checkout BACKUP HP65.

5. HP65-OFF; then ON

6. INSERT "DIAG-3" PROGRAM CARD and STOW

KEY R/S - (Note -8.88888888-88 displayed)
IF NOT - Turn HP65-OFF; then ON and repeat.
IF SITUATION REPEATS - Unstow and
checkout BACKUP HP65.

7. HP65-OFF

8. IF DIAGNOSTIC TEST FAILED - REPORT RESULTS TO STDN

DATE _____

DATE _____

NSR

1. RECORD NSR INPUT DATA (Range measurements at NSR -28, -24, & -20 minutes) - Reference PAD A
2. HP65-ON/RUN
3. INSERT "NSR-1" PROGRAM CARD and STOW
 LOAD INPUT DATA (NCC TIG, TPI TIG and Range measurements from PAD A)
 NCC TIG (H.MS) / STO / 1
 **TPI TIG (H.MS) / STO / 2
 R28 / STO / 3
 R24 / STO / 4
 R20 / STO / 5

NOTE: To verify data loaded correctly:
 For NCC & TPI TIG; KEY DSP / 1 / 4 / RCL / (1 or 2),
 verify, then KEY DSP / 1 / 2
 For Range data; KEY RCL / (3, 4 or 5)

4. KEY A - (Note 222.22 displayed)*
 INSERT "NSR-2" PROGRAM CARD and STOW
 KEY A - (Note 333.33 displayed)
 INSERT "NSR-3" PROGRAM CARD and STOW
 KEY A - (Note 444.44 displayed)
 X X X X X X X X X X X X X X X X X
 X CAUTION: DO NOT turn off HP65 X
 X X X X X X X X X X X X X X X X X

5. RECORD NSR INPUT DATA (Range measurement at NSR -16 minutes) - Reference PAD A

6. INSERT "NSR-4" PROGRAM CARD and STOW
 LOAD INPUT DATA (Range at NSR -16 minutes) - Reference PAD A
 R16 / STO / 1

7. KEY A - (Note 555.55 displayed)*

8. RECORD NSR INPUT DATA (Range measurement at NSR -12 minutes) - Reference PAD A

9. INSERT "NSR-5" PROGRAM CARD and PLACE IN UPPER "WINDOW" SLOT
 LOAD INPUT DATA (Range at NSR -12 minutes) - Reference PAD A
 R12 / STO / 2

10. KEY A - COPY ΔVX (LV) - (PAD B & RNDZ BOOK Pg 15)
 KEY B - COPY ΔVZ (LV) - (PAD B & RNDZ BOOK Pg 15)
 KEY C - COPY ORDEAL Burn Att - (PAD B & RNDZ BOOK Pg 15) } CMC FAIL
 KEY D - COPY ΔV Total - (PAD B & RNDZ BOOK Pg 15) } ONLY
 STOW "NSR-5" PROGRAM CARD

11. HP65-OFF

*A Blanking 0.00 will be displayed if input data is missing.
 To recover: key CLX, store correct data, key A, etc.
 **TPI TIG used for NCC targeting; recorded on Pg 12 of RNDZ BOOK.

DATE

DATE

PAD A (NSR)

GET OF DATA					NSR INPUT DATA					STO
					NCC TIG (N11)					1
NSR TIG (N13)					TPI TIG (N37)**					2
-28					R28 (NM)	X				3
-24					R24 (NM)	X				4
-20					R20 (NM)	X				5
-16					R16 (NM)	X				1
-12					R12 (NM)	X				2

**TPI TIG used for MCC targeting; recorded on Pg 12 of RNDZ BOOK.

PAD B (NSR)

KEY	NSR RESULTS				
A	ΔV (LV)	ΔVX			
B		ΔVZ			
C	ORDEAL BURN ATT	X			
D	ΔVT (IN PLANE)	X			

DATE

DATE

TPI TIG 1

1. RECORD TPI TIG 1 INPUT DATA at ~TPI-50 (Two Ranges two minutes apart & GET of second range measurement) - Reference PAD A
 *****OPTIONAL*****
 * CMC or STDN TPI TIG may be used for TPI TIG 1 *

2. HP65-ON/RUN

3. INSERT "TPI TIG 1" PROGRAM CARD and PLACE IN UPPER "WINDOW" SLOT
LOAD INPUT DATA (Ranges and GET from PAD A)

R1/ [STO] / [1]

R2/ [STO] / [2]

GET2 (H.MS)/ [STO] / [3]

*****OPTIONAL*****
 * If CMC or STDN TPI TIG is to be used for TPI TIG 1; *
 * LOAD TIG (H.MS)/ [STO] / [4] *
 * (Note: R1, R2 & GET2 load not required) *

NOTE: To verify data loaded correctly:
 Key [RCL] / ([1], [2], [3] or [4])

4. KEY [A] - COPY TPI TIG 1 (H.M)- (PAD B)
 KEY [B] - COPY TPI TIG 1 -32 (H.M)- (PAD B)
 KEY [C] - COPY TPI TIG 1 -24 (H.M)- (PAD B)
 KEY [D] - COPY TPI TIG 1 -16 (H.M)- (PAD B)
 KEY [E] - COPY TPI TIG 1 -14 (H.M)- (PAD B)
 STOW "TPI TIG 1" PROGRAM CARD

5. HP65-OFF

DATE _____

DATE _____

PAD A (TPI)

TPI TIG 1 INPUT DATA							STO
R1	(101)	X				X	1
R2	(101)	X				X	2
GET2							3

DATE _____

DATE _____

TPI

1. RECORD TPI INPUT DATA (NSR TIG (N13) and Range measurements at TPI TIG 1 -32 & -24 minutes) - Reference PAD B
 2. HP65-ON/RUN
 3. INSERT "TPI-1" PROGRAM CARD and STOW
LOAD INPUT DATA (NSR TIG, TPI TIG 1 and Range measurements from PAD B)
NSR TIG (H.MS)/ STO / 1
TPI TIG 1 (H.MS)/ STO / 2
R32/ STO / 3
R24/ STO / 4
- NOTE: To verify data loaded correctly:
KEY CLX / (1 , 2 , 3 or 4)
4. KEY A - (Note 222.22 displayed) *
 5. INSERT "TPI-2" PROGRAM CARD and STOW

```

X X X X X X X X X X X X X X X X X
X CAUTION: DO NOT turn off HP65 X
X X X X X X X X X X X X X X X X X

```
 6. RECORD TPI INPUT DATA (Range measurement at TPI TIG 1 -16 minutes) - Reference PAD B
LOAD INPUT DATA (Range at TPI TIG 1 -16 from PAD B)
R16/ STO / 1
 7. KEY A - (Note 333.33 displayed) *
 8. RECORD TPI INPUT DATA (Range measurement at TPI TIG 1 -14 minutes) - Reference PAD B
 9. INSERT "TPI-3" PROGRAM CARD and PLACE IN UPPER "WINDOW" SLOT
LOAD INPUT DATA (Range at TPI TIG 1 -14 from PAD B)
R14/ STO / 1

```

*****IF R14 NOT AVAILABLE*****
* LOAD TPI TIG 1 (H.M)/ STO / 2 *
*****

```
 10. KEY A - Copy TPI TIG 2 (H.MS) * - (PAD C & RNDZ BOOK Pg 17)
KEY B - Copy TIG SLIP (H.MS) - (PAD C)
KEY C - (Note 444.44 displayed)
STOW "TPI-3" PROGRAM CARD
INSERT "TPI-4" PROGRAM CARD and PLACE IN UPPER "WINDOW" SLOT
KEY A - COPY ΔVX (LV) - (PAD C & RNDZ BOOK Pg 17)
KEY B - COPY ΔVZ (LV) - (PAD C & RNDZ BOOK Pg 17)
KEY C - COPY ORDEAL Burn Att - (PAD C & RNDZ BOOK Pg 17) } CMC FAIL
KEY D - COPY ΔV Total - (PAD C & RNDZ BOOK Pg 17) } ONLY
STOW "TPI-4" PROGRAM CARD
 11. HP65-OFF

DATE

DATE

*A Blanking 0.00 will be displayed if input data is missing.
To recover: key CLX , store correct data, key A , etc.

PAD B (TPI)

KEY	GET OF DATA				TPI INPUT DATA						STO		
					NSR TIG (N13)								
A	TPI TIG 1	→				TPI TIG 1					0	0	2
B	-32				0	0	R32 (NM)	⊗				⊗	3
C	-24				0	0	R24 (NM)	⊗				⊗	4
D	-16				0	0	R16 (NM)	⊗				⊗	1
E	-14				0	0	R14 (NM)	⊗				⊗	1

PAD C (TPI)

KEY	TPI RESULTS										
A	TPI TIG 2										
B	TIG SLIP		⊗	⊗							
A	ΔV (LV)	ΔV_X									
B		ΔV_Z									
C	ORDEAL BURN ATT		⊗								
D	ΔV_T (IN PLANE)		⊗								

DATE

DATE

TPM1

- 1. RECORD TPM1 INPUT DATA (Range and Angle measurements)-
Reference PAD A

*****FOR X AXIS TRACKING*****
 * Use 57.47° or value obtained during COAS *
 * LOS DETERMINATION for TA4:30 & TA8:30. *

- 2. HP65-ON/RUN

- 3. INSERT "TPM1" PROGRAM CARD and PLACE IN UPPER "WINDOW" SLOT
LOAD INPUT DATA (From PAD A)

04:30 /	STO	/	1
TA4:30 /	STO	/	2
R7:30 /	STO	/	3
R8:30 /	STO	/	4
08:30 /	STO	/	5
TA8:30 /	STO	/	6

NOTE: To verify data loaded correctly,
KEY **RCL** / (**1**, **2**, **3**, **4**, **5** or **6**)

- 4. KEY **A** - COPY ΔVX (LOS) - (PAD B & RNDZ BOOK Pg 18)
KEY **B** - COPY ΔVZ (LOS) - (PAD B & RNDZ BOOK Pg 18)
STOW "TPM1" PROGRAM CARD

- 5. HP65-OFF

TPM2

- 1. RECORD TPM2 INPUT DATA (Range and Angle measurements)-
Reference PAD C

*****FOR X AXIS TRACKING*****
 * USE 57.47° or value obtained during COAS *
 * LOS DETERMINATION FOR TA16:30 & TA20:30. *

- 2. HP65-ON/RUN

- 3. INSERT "TPM2" PROGRAM CARD and PLACE IN UPPER "WINDOW" SLOT
LOAD INPUT DATA (From PAD C)

016:30 /	STO	/	1
TA16:30 /	STO	/	2
R19:30 /	STO	/	3
R20:30 /	STO	/	4
020:30 /	STO	/	5
TA20:30 /	STO	/	6

NOTE: To verify data loaded correctly,
KEY **RCL** / (**1**, **2**, **3**, **4**, **5** or **6**)

- 4. KEY **A** - COPY ΔVX (LOS) - (PAD D & RNDZ BOOK Pg 18)
KEY **B** - COPY ΔVZ (LOS) - (PAD D & RNDZ BOOK Pg 18)
STOW "TPM2" PROGRAM CARD

- 5. HP65-OFF

DATE

DATE

PAD A (TPM 1)

GET OF DATA					TPM1 INPUT DATA					STO	
TPI+4:30					04:30	(DEG)					1
					TA4:30	(DEG)					2
TPI+7:30					R7:30	(NM)					3
TPI+8:30					R8:30	(NM)					4
					08:30	(DEG)					5
					TA8:30	(DEG)					6

PAD B (TPM1)

KEY	TPM2 RESULTS				
A	ΔV (LOS)	$\Delta V X$	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B		$\Delta V Z$	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PAD C (TPM2)

GET OF DATA					TPM2 INPUT DATA					STO	
TPI+16:30					016:30	(DEG)					1
					TA16:30	(DEG)					2
TPI+19:30					R19:30	(NM)					3
TPI+20:30					R20:30	(NM)					4
					020:30	(DEG)					5
					TA20:30	(DEG)					6

DATE _____

DATE _____

PAD D (TPM2)

KEY	TPM2 RESULTS				
A	ΔV (LOS)	$\Delta V X$	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B		$\Delta V Z$	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RECOVERY NOTESAccidentally key [F], [F-1] or [G]

If one of these are keyed, it should be cancelled before continuing. To cancel: Key [F], [PREFIX]. If it was not cancelled before keying another key, turn HP-65 OFF and start over at step one.

Accidentally key [STO]

If [STO] is keyed, it should be cancelled before continuing. To cancel: Key [CLX]. If it was not cancelled before keying another key, turn HP-65 OFF and start over at step one.

Accidentally key [CHS] instead of [STO]

This changes the sign on the displayed number. Correct the number by keying [CHS] again.

Multiple Decimal Point Display

Continuous - The battery provides ~3 hours of continuous operation. All decimal points light in the display (superimposed onto the current display) when 2 to 5 minutes of operation time remains.

While reading card - If the decimal points light while reading a card and then go out, the battery is almost discharged. Can expect a continuous display of decimals after additional usage.

Recovery - Turn HP-65 OFF, replace battery pack, and start over at step one.
Power is best conserved by displaying only a decimal (Key [.]) when the HP-65 is ON but not in use.

Blinking Display

Used to indicate that input data is missing in MSR steps 4 & 7 and TPI steps 4, 7 & 10. Key [CLX], store correct data, Key [A], and continue

After a calculation - due to an improper operation such as $\sqrt{-X}$, $x+0$, etc

Recovery - Turn HP-65 OFF and start at step one.

After loading a card - due to reading a blank card, or bit or word was dropped during reading. Could indicate that card was inserted upsidedown or backwards, or inserted before turning HP-65 ON

Recovery - First, key [CLX] to stop blinking display. Then, reload the card. If blinking reoccurs, key [CLX] and load the backup card.

Display of 00.00, 0.00, 0.0, etc after keying [A]

This could be a result of loading the card upside down or backwards. To recover: key [CLX], reload the card, verify all associated input data, then key [A], etc.

Blank Display

Turn HP-65 OFF and start over at step one. If display still blank, change batteries and start over at step one.

DATE

DATE

RECOVERY NOTES00 00 Displayed in Right of Window

The W/PRGM/RUN switch is in the W/PRGM position. Place the switch in the RUN position, reload the last card, verify all input data associated with the last card, and continue with the current step.

Bad Answer Obtained

If a bad answer (garbage) is obtained, a general rule of thumb is to turn the HP-65 OFF and start over at step one. In some situations, the following list of hints might save you some time.

1. For NSR or TPI last card -
 - a. Have to key **A** before results of keying **B**, **C** or **D** are valid.
 - If **A** was not keyed, go ahead and key **A** now; then cont.
 - b. For NSR, verify correct R16 & R12 data in storage.
 - If R12 data not correct, store correct data, then continue.
 - If R16 data not correct, store correct data, load NSR-4 card, key **A**, load NSR-5 card, key **A**, etc.
 - c. If 555.55 is displayed after keying **A**, this is telling you that the last card had not been loaded. You can still load the last card; key **A**, etc.
2. For TPI TIG 1, TPM1 or TPM2 card -
 - First, verify stored data. Then -
 - a. If data not correct, store the correct data; then continue.
 - b. If data is correct, do not turn HP-65 OFF before reloading card. This way, the data does not have to be reloaded (stored).

TPM1 & TPM2 answers are invalid if S/C is tracking heads down, unless θ is corrected, where

$$\theta = \theta + 2*(57.47 - TA)$$

Additional Notes

1. When answers are to be displayed, you always have to key **A** before answer is valid.
2. When answers are not to be displayed, keying **B**, **C**, **D** or **E** will result in proper execution of program.
3. Keying **A** more than once (for any card) will not degrade the answer.
 - In fact, keying **A**, **B**, **C**, **D** or **E** any number of times will not degrade the answer.
4. If you're not sure you keyed **A**, Key **A** again.
5. The numbers (111.11, 222.22, etc) indicate which card has to be executed next. Pay attention to these numbers.
 - If you accidentally fail to load a card, the correct program card number will be displayed after keying **A** (**C** For TPI-3).
6. A blanking 0.00 is displayed if data is missing in NSR steps 4 & 7 and TPI steps 4, 7 & 10.

DATE

DATE

DATA SOURCES

	NSR/TPI	TPM1/TPM2
NOMINAL	Range- EMS (Use V76/N76 Reg 1 for B/U)	Range- EMS θ - FDAI ORDEAL PITCH TA - Trunnion Angle with Soyuz centered in SXT
CMC FAIL	Range- EMS only (NO B/U)	Range- EMS θ - Track Soyuz in COAS Read FDAI ORDEAL PITCH TA - Use Value from COAS LOS DETERMINATION or 57.47°
IMU FAIL	Range- EMS (Use V76/N76 Reg 1 for B/U)	Range- EMS θ - Track Soyuz in COAS Read FDAI ORDEAL PITCH TA - Use Value from COAS LOS DETERMINATION or 57.47°
NO VHF RNG	(HP-65 soln not available)	(HP-65 soln not available)
EMS RNG DISPLAY BLANK	Range- V76E, Load N72, PRO, N76E Read R in R1 For TPI - 14: V76E, load N72 with ZERO's PRO, N76E Read current R in R1	Range- V76E, load N72 with ZERO's, PRO, N76E Read current R in R1 θ - FDAI ORDEAL PITCH TA - Trunnion Angle with Soyuz centered in SXT
SOYUZ TRACK LITE FAIL	Range- EMS (Use V76/N76 Reg 1 for B/U)	(HP-65 soln not available)
MARK BUTTON FAIL	Range- EMS (Use V76/N76 Reg 1 for B/U)	RANGE- EMS θ - FDAI ORDEAL PITCH TA - Trunnion Angle with Soyuz centered in SXT
OPTICS FROZEN	Range- EMS (Use V76/N76 Reg 1 for B/U)	Range- EMS θ - FDAI ORDEAL PITCH Track Soyuz in SXT with MIC TA - Trunnion Angle with Soyuz centered in SXT
CANNOT SEE THRU OPTICS	Range- EMS (Use V76/N76 Reg 1 for B/U)	Range- EMS θ - Track Soyuz in COAS Read FDAI ORDEAL PITCH TA - Use Value from COAS LOS DETERMINATION or 57.47°

DATE

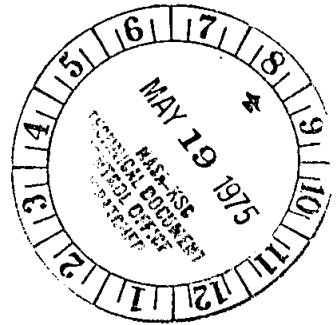
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ASTP

FINAL

HP-65

RENDEZVOUS TARGETING CHECKLIST



PREPARED BY
PROCEDURES BRANCH
CREW TRAINING & PROCEDURES DIVISION



National Aeronautics and Space Administration
LYNDON B. JOHNSON SPACE CENTER
Houston, Texas

MAY 13, 1975

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13 MAY 1975

PREPARED BY: Mason V. Mines

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TYPING & GRAPHICS	KENTRON HAW. LTD. CREW PROCEDURES DATA GROUP	
ATS POINTING PROGRAM	MIKE HOLLARS CG2/FLIGHT PROCEDURES SECTION	EXT. 3048 Bldg. 4 Rm 211

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APOLLO/SOYUZ TEST PROJECT HP-65 RENDEZVOUS TARGETING CHECKLIST

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006	FINAL	5/13/75	

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ii	5/13/75	A-2	5/13/75
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5	5/13/75	A-9	5/13/75
6	5/13/75	A-10	5/13/75
7	5/13/75	A-11	5/13/75
8	5/13/75	A-12	5/13/75
9	5/13/75	A-13	5/13/75
10	5/13/75	A-14	5/13/75
11	5/13/75		
12	5/13/75		

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CONTENTS

	PAGE
CHECKOUT	1
NSR	2
TPI TIG 1	4
TPI	6
TPM1	8
TPM2	8
RECOVERY NOTES	10
DATA SOURCES	12
ATS POINTING	A-1

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CHECKOUT

1. HP65-ON/RUN
2. INSERT "DIAG-1" PROGRAM CARD and STOW
KEY **R/S** - (Note -8.88888888-88 displayed)
IF NOT - Record value displayed
Turn HP65-OFF; then ON and repeat.
IF SITUATION REPEATS - Unstow and
checkout BACKUP HP65.
3. HP65-OFF; then ON
4. INSERT "DIAG-2" PROGRAM CARD and STOW
KEY **R/S** - (Note -8.88888888-88 displayed)
IF NOT - Turn HP65-OFF; then On and repeat.
IF SITUATION REPEATS - Unstow and
checkout BACKUP HP65.
5. HP65-OFF; then ON
6. INSERT "DIAG-3" PROGRAM CARD and STOW
KEY **R/S** - (Note -8.83888888-88 displayed)
IF NOT - Turn HP65-OFF; then ON and repeat.
IF SITUATION REPEATS - Unstow and
checkout BACKUP HP65.
7. HP65-OFF
8. IF DIAGNOSTIC TEST FAILED - REPORT RESULTS TO STDN

NOTE: VERIFY THAT BODY HAS
BEEN GROUNDED PRIOR TO
REMOVING PROGRAM CARDS
FROM CARD HOLDER.

NSR

- 1. RECORD NSR INPUT DATA (Range measurements at NSR -28, -24, & -20 minutes) - Reference PAD A
- 2. HP65-ON/RUN
- 3. INSERT "NSR-1" PROGRAM CARD and STOW
 LOAD INPUT DATA (NCC TIG, TPI TIG and Range measurements from PAD A)
 NCC TIG (H.MS) / STO / 1
 **TPI TIG (H.MS) / STO / 2
 R28 / STO / 3
 R24 / STO / 4
 R20 / STO / 5

NOTE: To verify data loaded correctly:
 For NCC & TPI TIG; KEY DSP / [] / [4] / RCL / ([1] or [2]).
 verify, then KEY DSP / [] / [2]
 For Range data; KEY RCL / ([3], [4] or [5])

- 4. KEY [A] - (Note 222.22 displayed) *
 INSERT "NSR-2" PROGRAM CARD and STOW
 KEY [A] - (Note 333.33 displayed)
 INSERT "NSR-3" PROGRAM CARD and STOW
 KEY [A] - (Note 444.44 displayed)
 X X X X X X X X X X X X X X X X X X
 X CAUTION: DO NOT turn off HP65 X
 X X X X X X X X X X X X X X X X X X
- 5. RECORD NSR INPUT DATA (Range measurement at NSR -16 minutes) - Reference PAD A
- 6. INSERT "NSR-4" PROGRAM CARD and STOW
 LOAD INPUT DATA (Range at NSR -16 minutes) - Reference PAD A
 R16 / STO / 1
- 7. KEY [A] - (Note 555.55 displayed) *
- 8. RECORD NSR INPUT DATA (Range measurement at NSR -12 minutes) - Reference PAD A
- 9. INSERT "NSR-5" PROGRAM CARD and PLACE IN UPPER "WINDOW" SLOT
 LOAD INPUT DATA (Range at NSR -12 minutes) - Reference PAD A
 R12 / STO / 2
- 10. KEY [A] - COPY ΔVX (LV) * - (PAD B & RNDZ BOOK Pg 15)
 KEY [B] - COPY ΔVZ (LV) - (PAD B & RNDZ BOOK Pg 15)
 KEY [C] - COPY ORDEAL Burn Att - (PAD B & RNDZ BOOK Pg 15) } CMC FAIL
 KEY [D] - COPY ΔV Total - (PAD B & RNDZ BOOK Pg 15) } ONLY
 STOW "NSR-5" PROGRAM CARD

11. HP65-OFF

*A Blinking 0.00 will be displayed if input data is missing.
 To recover: key [CLX], store correct data, key [A], etc.
 **TPI TIG used for NCC targeting; recorded on Pg 12 of RNDZ BOOK.

PAD A (NSR)

GET OF DATA					NSR INPUT DATA					STO
					NCC TIG (N11)					1
NSR TIG (N13)					TPI TIG (N37)**					2
-28					R28 (NM)	X				3
-24					R24 (NM)	X				4
-20					R20 (NM)	X				5
-16					R16 (NM)	X				1
-12					R12 (NM)	X				2

**TPI TIG used for NCC targeting; recorded on Pg 12 of RNDZ BOOK.

PAD B (NSR)

KEY	NSR RESULTS				
A	$\Delta V (LV)$	ΔVX			
B		ΔVZ			
C	ORDEAL BURN ATT	X			
D	$\Delta VT (IN PLANE)$	X			

TPI TIG 1

1. RECORD TPI TIG 1 INPUT DATA at TPI-50 (Two Ranges two minutes apart & GET of second range measurement) - Reference PAD A
 *****OPTIONAL*****
 * CMC or STDN TPI TIG may be used for TPI TIG 1 *

2. HP65-ON/RUN

3. INSERT "TPI TIG 1" PROGRAM CARD and PLACE IN UPPER "WINDOW" SLOT
 LOAD INPUT DATA (Ranges and GET from PAD A)

R1/ STO / 1

R2/ STO / 2

GET2 (H.MS)/ STO / 3

*****OPTIONAL*****
 * If CMC or STDN TPI TIG is to be used for TPI TIG 1; *
 * LOAD TIG (H.MS)/ STO / 4 *
 * (Note: R1, R2 & GET2 load not required) *

NOTE: To verify data loaded correctly:
 Key RCL / (1 , 2 , 3 or 4)

4. KEY A - COPY TPI TIG 1 (H.M)- (PAD B)
 KEY B - COPY TPI TIG 1 -32 (H.M)- (PAD B)
 KEY C - COPY TPI TIG 1 -24 (H.M)- (PAD B)
 KEY D - COPY TPI TIG 1 -16 (H.M)- (PAD B)
 KEY E - COPY TPI TIG 1 -14 (H.M)- (PAD B)
 STOW "TPI TIG 1" PROGRAM CARD

5. HP65-OFF

PADA (TPI)

TPI TIG 1 INPUT DATA						STO
R1	(#1)	X			X	1
R2	(#1)	X			X	2
GET2						3

TPI

1. RECORD TPI INPUT DATA (NSR TIG (N13) and Range measurements at TPI TIG 1 -32 & -24 minutes) - Reference PAD B
2. HP65-ON/RUN
3. INSERT "TPI-1" PROGRAM CARD and STOW
LOAD INPUT DATA (NSR TIG, TPI TIG 1 and Range measurements from PAD B)
NSR TIG (H.MS) / STO / 1
TPI TIG 1 (H.M) / STO / 2
R32 / STO / 3
R24 / STO / 4

NOTE: To verify data loaded correctly:
KEY RC / (1 , 2 , 3 or 4)

4. KEY A - (Note 222.22 displayed) *
5. INSERT "TPI-2" PROGRAM CARD and STOW
X X X X X X X X X X X X X X X X X X
X CAUTION: DO NOT turn off HP65 X
X X X X X X X X X X X X X X X X X X
6. RECORD TPI INPUT DATA (Range measurement at TPI TIG 1 -16 minutes) - Reference PAD B
LOAD INPUT DATA (Range at TPI TIG 1 -16 from PAD B)
R16 / STO / 1
7. KEY A - (Note 333.33 displayed) *
8. RECORD TPI INPUT DATA (Range measurement at TPI TIG 1 -14 minutes) - Reference PAD B
9. INSERT "TPI-3" PROGRAM CARD and PLACE IN UPPER "WINDOW" SLOT
LOAD INPUT DATA (Range at TPI TIG 1 -14 from PAD B)
R14 / STO / 1

*****IF R14 NOT AVAILABLE*****
* LOAD TPI TIG 1 (H.M) / STO / 2 *

10. KEY A - Copy TPI TIG 2 (H.MS) * - (PAD C & RNDZ BOOK Pg 17)
KEY B - Copy TIG SLIP (H.MS) - (PAD C)
KEY C - (Note 444.44 displayed)
STOW "TPI-3" PROGRAM CARD

INSERT "TPI-4" PROGRAM CARD and PLACE IN UPPER "WINDOW" SLOT
KEY A - COPY ΔVX (LV) - (PAD C & RNDZ BOOK Pg 17)
KEY B - COPY ΔVZ (LV) - (PAD C & RNDZ BOOK Pg 17)
KEY C - COPY ORDEAL Burn Att - (PAD C & RNDZ BOOK Pg 17) } CMC FAIL
KEY D - COPY ΔV Total - (PAD C & RNDZ BOOK Pg 17) } ONLY
STOW "TPI-4" PROGRAM CARD
11. HP65-OFF

*A Blinking 0.00 will be displayed if input data is missing.
To recover: key CLX , store correct data, key A , etc.

TPM1

- RECORD TPM1 INPUT DATA (Range and Angle measurements)-
Reference PAD A

*****FOR X AXIS TRACKING*****
 * Use 57.47° or value obtained during COAS *
 * LOS DETERMINATION* for TA4:30 & TA8:30. *

- HP65-ON/RUN

- INSERT "TPM1" PROGRAM CARD and PLACE IN UPPER "WINDOW" SLOT
LOAD INPUT DATA (From PAD A)

04:30 / STO / 1
 TA4:30 / STO / 2
 R7:30 / STO / 3
 R8:30 / STO / 4
 08:30 / STO / 5
 TA8:30 / STO / 6

NOTE: To verify data loaded correctly,
 KEY RCL / (1 , 2 , 3 , 4 , 5 or 6)

- KEY A - COPY ΔVX (LOS) - (PAD B & RNDZ BOOK Pg 18)
 KEY B - COPY ΔVZ (LOS) - (PAD B & RNDZ BOOK Pg 18)
 STOW "TPM1" PROGRAM CARD
- HP65-OFF

TPM2

- RECORD TPM2 INPUT DATA (Range and Angle measurements)-
Reference PAD C

*****FOR X AXIS TRACKING*****
 * USE 57.47° or value obtained during COAS *
 * LOS DETERMINATION* for TA16:30 & TA20:30*

- HP65-ON/RUN

- INSERT "TPM2" PROGRAM CARD and PLACE IN UPPER "WINDOW" SLOT
LOAD INPUT DATA (From PAD C)

016:30 / STO / 1
 TA16:30 / STO / 2
 R19:30 / STO / 3
 R20:30 / STO / 4
 020:30 / STO / 5
 TA20:30 / STO / 6

NOTE: To verify data loaded correctly,
 KEY RCL / (1 , 2 , 3 , 4 , 5 or 6)

- KEY A - COPY ΔVX (LOS) - (PAD D & RNDZ BOOK Pg 18)
 KEY B - COPY ΔVZ (LOS) - (PAD D & RNDZ BOOK Pg 18)
 STOW "TPM2" PROGRAM CARD
- HP65-OFF

*COAS LOS DETERMINATION values recorded in RNDZ BOOK Pg 11.

PAD A (TPM 1)

GET OF DATA					TPM1 INPUT DATA				STO
TPI+4:30					04:30 (DEG)				1
					TA4:30 (DEG)				2
TPI+7:30					R7:30 (NM)				3
TPI+8:30					R8:30 (NM)				4
					08:30 (DEG)				5
					TAB:30 (DEG)				6

PAD B (TPM1)

KEY	TPM1 RESULTS				
A	ΔV (LOS)	$\Delta V X$			
B		$\Delta V Z$			

PAD C (TPM2)

GET OF DATA					TPM2 INPUT DATA				STO
TPI+16:30					016:30 (DEG)				1
					TA16:30 (DEG)				2
TPI+19:30					R19:30 (NM)				3
TPI+20:30					R20:30 (NM)				4
					020:30 (DEG)				5
					TA20:30 (DEG)				6

PAD D (TPM2)

KEY	TPM2 RESULTS				
A	ΔV (LOS)	$\Delta V X$			
B		$\Delta V Z$			

RECOVERY NOTESAccidentally key [f], [f-1] or [g]

If one of these are keyed, it should be cancelled before continuing.
To cancel: Key [f], [PREFIX]. If it was not cancelled before keying another key, turn HP-65 OFF and start over at step one.

Accidentally key [STO]

If [STO] is keyed, it should be cancelled before continuing. To cancel: Key [CLX]. If it was not cancelled before keying another key, turn HP-65 OFF and start over at step one.

Accidentally key [CHS] instead of [STO]

This changes the sign on the displayed number. Correct the number by keying [CHS] again.

Multiple Decimal Point Display

Continuous - The battery provides ~3 hours of continuous operation. All decimal points light in the display (superimposed onto the current display) when 2 to 5 minutes of operation time remains.

While reading card - If the decimal points light while reading a card and then go out, the battery is almost discharged. Can expect a continuous display of decimals after additional usage.

Recovery - Turn HP-65 OFF, replace battery pack, and start over at step one.
Power is best conserved by displaying only a decimal (Key [.]) when the HP-65 is ON but not in use.

Blinking Display

Used to indicate that input data is missing in NSR steps 4, 7 & 10 and TPI steps 4, 7 & 10. Key [CLX], store correct data, Key [A], and continue

After a calculation - due to an improper operation such as $\sqrt{-x}$, $x \neq 0$, etc.

Recovery - Turn HP-65 OFF and start at step one.

After loading a card - due to reading a blank card, or bit or word was dropped during reading. Could indicate that card was inserted upside down or backwards, or inserted before turning HP-65 ON.

Recovery - First, key [CLX] to stop blinking display. Then, reload the card. If blinking reoccurs, key [CLX] and load the backup card.

Display of 00.00, 0.00, 0.0, etc after keying [A]

This could be a result of loading the card upside down or backwards. To recover: key [CLX], reload the card, verify all associated input data, then key [A], etc.
If display reoccurs, key [CLX] and load the backup card.

Blank Display

Turn HP-65 OFF and start over at step one. If display still blank, change batteries and start over at step one.

RECOVERY NOTES00 00 Displayed in Right of Window

The W/PRGM/RUN switch is in the W/PRGM position. Place the switch in the RUN position, reload the last card, verify all input data associated with the last card, and continue with the current step.

Bad Answer Obtained

If a bad answer (garbage) is obtained, a general rule of thumb is to turn the HP-65 OFF and start over at step one. In some situations, the following list of hints might save you some time.

1. For NSR or TPI last card -
 - a. Have to key A before results of keying B, C or D are valid.
If A was not keyed, go ahead and key A now; then cont.
 - b. For NSR, verify correct R16 & R12 data in storage.
If R12 data not correct, store correct data, then continue.
If R16 data not correct, store correct data, load NSR-4 card, key A, load NSR-5 card, key A, etc.
 - c. If 555.55 (444.44 for TPI) is displayed after keying A, this is telling you that the last ("NSR-5" or "TPI-4") card had not been loaded. You can still load the last card; key A, etc.
2. For TPI TIG 1, TPM1 or TPM2 card -
First, verify stored data. Then -
 - a. If data not correct, store the correct data; then continue.
 - b. If data is correct, do not turn HP-65 OFF before reloading card. This way, the data does not have to be reloaded (stored).

TPM1 & TPM2 answers are invalid if S/C is tracking

heads down, unless θ is corrected, where

$$\theta = \theta + 2*(57.47 - TA)$$

Additional Notes

1. When answers are to be displayed, you always have to key A before answer is valid.
2. When answers are not to be displayed, keying B, C, D or E will result in proper execution of program.
3. Keying A more than once (for any card) will not degrade the answer.
In fact, keying A, B, C, D or E any number of times will not degrade the answer.
4. If you're not sure you keyed A, Key A again.
5. The numbers (111.11, 222.22, etc) indicate which card has to be executed next. Pay attention to these numbers.
If you accidentally fail to load a card, the correct program card number will be displayed after keying A (C For TPI-3).
6. A blinking 0.00 is displayed if data is missing in NSR steps 4, 7 & 10 and TPI steps 4, 7 & 10.

DATA SOURCES

	NSR/TPI	TPM1/TPM2
NOMINAL	Range- EMS (For B/U, use V76/N76 Reg 1)	Range- EMS θ - FDAI ORDEAL PITCH TA - Trunnion Angle with Soyuz centered in SXT
CMC FAIL	Range- EMS only (NO B/U)	Range- EMS θ - Track Soyuz in COAS Read FDAI ORDEAL PITCH TA - Use value from COAS LOS DETERMINATION* or 57.47°
IMU FAIL	Range- EMS (For B/U, use V76/N76 Reg 1)	Range- EMS θ - Track Soyuz in COAS Read FDAI ORDEAL PITCH TA - Use value from COAS LOS DETERMINATION* or 57.47°
NO VHF RING	(HP-65 soln not available)	(HP-65 soln not available)
EMS RNG DISPLAY BLANK	Range- V76E, Load N72, PRO, N76E Read R in R1 For TPI - 14: V76E, load N72 with ZERO's PRO, N76E Read current R in R1	Range- V76E, load N72 with ZERO's, PRO, N76E Read current R in R1 θ - FDAI ORDEAL PITCH TA - Trunnion Angle with Soyuz centered in SXT
SOYUZ TRACK LITE FAIL	Range- EMS (For B/U, use V76/N76 Reg 1)	(HP-65 soln not available)
MARK BUTTON FAIL	Range- EMS (For B/U, use V76/N76 Reg 1)	RANGE- EMS θ - FDAI ORDEAL PITCH TA - Trunnion Angle with Soyuz centered in SXT
OPTICS FROZEN	Range- EMS (For B/U, use V76/N76 Reg 1)	Range- EMS θ - FDAI ORDEAL PITCH Track Soyuz in SXT with MIC TA - Trunnion Angle with Soyuz centered in SXT
CANNOT SEE THRU OPTICS	Range- EMS (For B/U, use V76/N76 Reg 1)	Range- EMS θ - Track Soyuz in COAS Read FDAI ORDEAL PITCH TA - Use value from COAS LOS DETERMINATION* or 57.47°

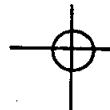
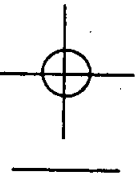
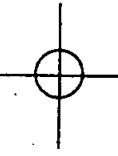
*COAS LOS DETERMINATION values recorded in RNDZ BOOK Pg 11.

A-1

DATE 5/13/75

ATS POINTING

ATS POINTING



ATS

ASSUMPTIONS:

- Longitude of Ascending Node and Time of Ascending Node are updated at least daily and after major trajectory changes, including NC1, NC2 and DOCKING. Orbital Period will only be updated as required. (Pre-launch nominal and update nominal data provided on page A-3. Use nominal data if update not provided.)
- Time of Ascending Node and Time of ATS Acquisition are referenced to the same time base.
- Spacecraft attitude is referenced to LVLH and IMU is aligned to a nominal in-plane REFSMMAT.
- Yaw = 0. [HP-65 results OK for small yaw angles (± 30 deg.); for larger yaw angles: maneuver spacecraft to yaw = 0 prior to comp.]
- Pitch angle obtained from V83 or Ordeal FDAI.
- Pitch angle read as close as possible to Time of ATS Acquisition.
- Program executed ASAP such that Time of ATS Acquisition = present time.

1. RECORD ATS INPUT DATA (Reference PAD A):

- Ω (Longitude of Ascending Node)
- T_{Ω} (Time of Ascending Node)
- τ (Orbital Period)
- T_{ACQ} (Time of ATS Acquisition)
- R_{LVLH} (Roll-LVLH) - FROM FDAI
- P_{LVLH} (Pitch-LVLH) - FROM V83

*****FOR CMC FAIL*****
 * Set Ordeal and obtain P_{LVLH} *
 * from Ordeal FDAI. *

2. HP65-ON/RUN

3. INSERT "ATS-1" PROGRAM CARD and STOW
 LOAD INPUT DATA (Reference PAD A):

- Ω (Deg., East positive) / $\text{STO} / \text{[1]}$
- T_{Ω} (H.M) / $\text{STO} / \text{[2]}$
- τ (H.H) / $\text{STO} / \text{[3]}$
- T_{ACQ} (H.M) / $\text{STO} / \text{[4]}$
- R_{LVLH} (Deg.) / $\text{STO} / \text{[5]}$
- P_{LVLH} (Deg.) / $\text{STO} / \text{[6]}$

NOTE: To verify data loaded correctly,
 KEY [RC] / ([1] , [2] , [3] , [4] , [5] or [6])

KEY [A] - (Note 2.22 displayed)

4. INSERT "ATS-2" PROGRAM CARD and STOW
 KEY [A] - (Note 3.33 displayed)

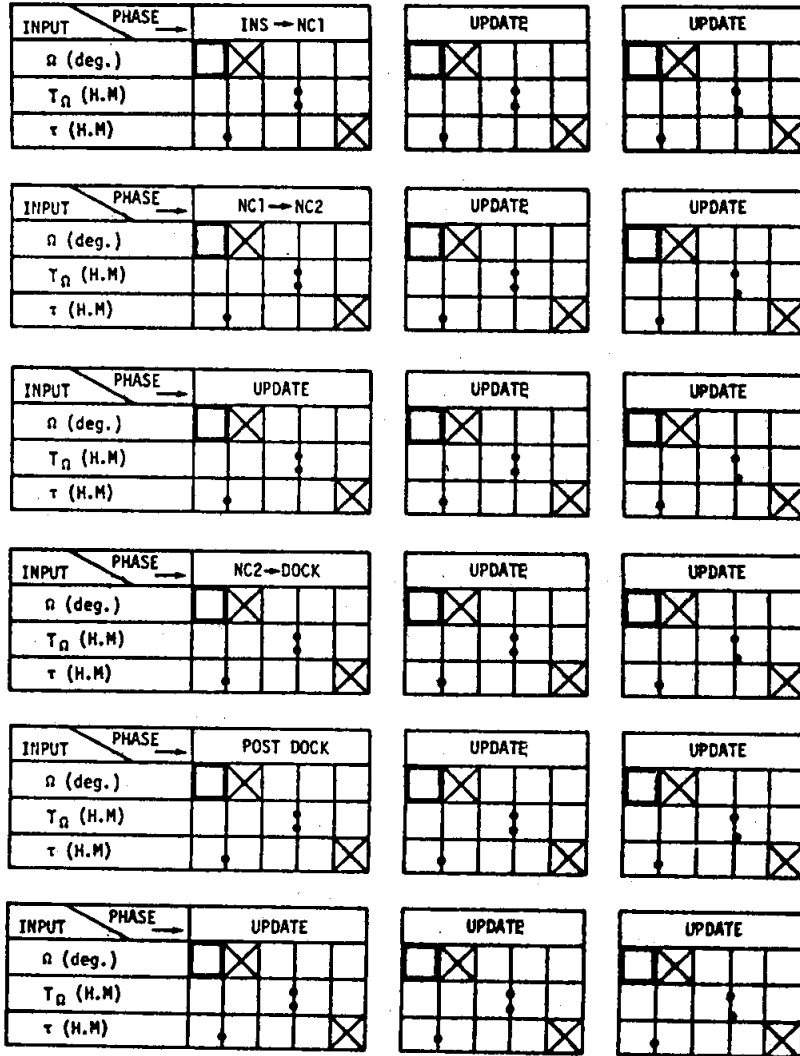
5. INSERT "ATS-3" PROGRAM CARD and STOW
 KEY [A] - (Note 4.44 displayed)

6. INSERT "ATS-4" PROGRAM CARD and PLACE IN UPPER "WINDOW" SLOT
 KEY [A] - COPY P (Antenna PITCH) - (PAD B)
 KEY [B] - COPY Y (Antenna YAW) - (PAD B)
 STOW "ATS-4" PROGRAM CARD

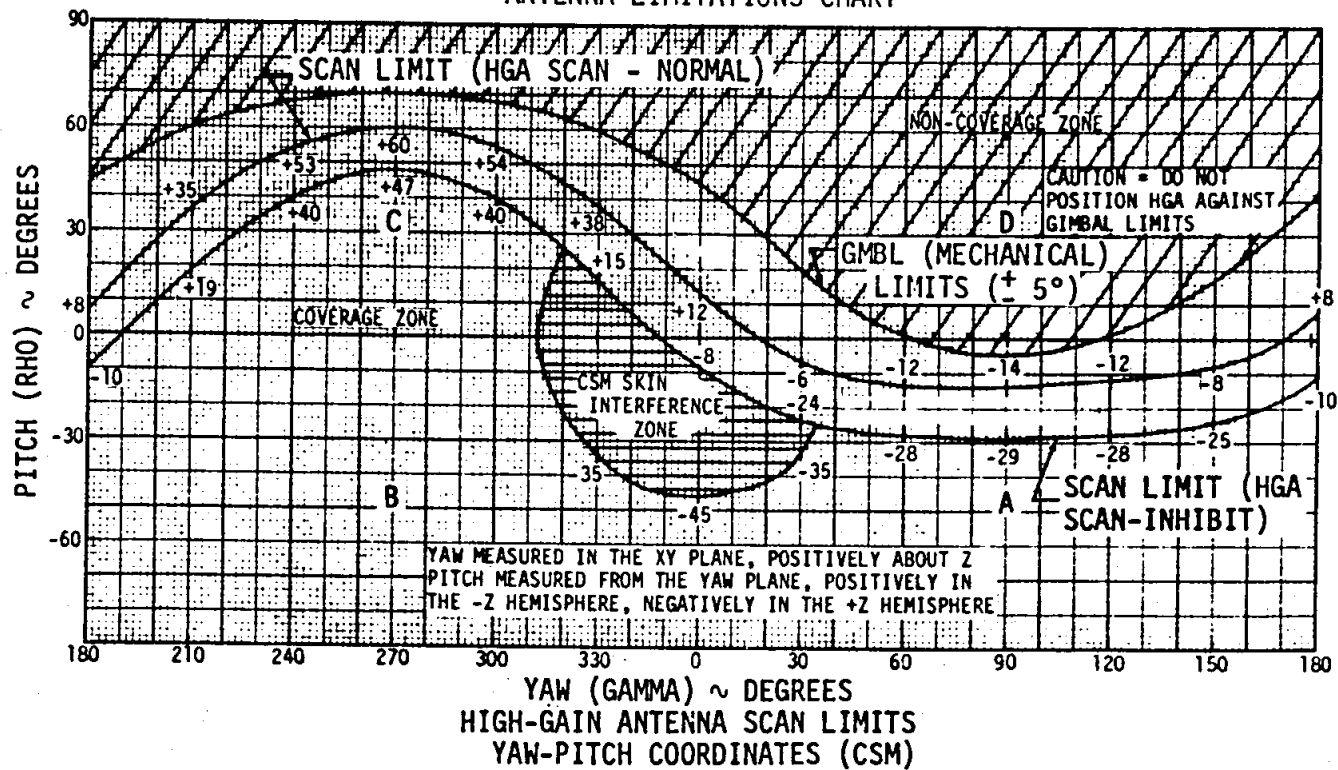
7. HP65-OFF

8. Compare computed P(Pitch) and Y(Yaw) Antenna Positioning Angles with the Antenna Limitations Chart on page A-4:
 If in acceptable zone: ACQUIRE ATS HGA: MAN, WIDE; DIAL COMPUTED P and Y; REACQ, NARROW.
 If in "no coverage" zone: ROLL spacecraft 180 deg and GO TO STEP 1.

ATS NOMINAL DATA



ANTENNA LIMITATIONS CHART



PAD A (ATS)

INPUT	DATA	DATA	DATA	STO
α (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1
T_{Ω} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2
τ (H.H)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS	RESULTS	RESULTS
A	P (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

PAD A (ATS)

INPUT	DATA	DATA	DATA	STO
α (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1
T_{Ω} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2
τ (H.H)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS	RESULTS	RESULTS
A	P (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

PAD A (ATS)

INPUT	DATA	DATA	DATA	STO
α (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1
T_{Ω} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2
τ (H.H)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS	RESULTS	RESULTS
A	P (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

PAD A (ATS)

INPUT	DATA			
n (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T_R (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
τ (H.H)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DATA			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DATA	STO
<input checked="" type="checkbox"/>	1
<input type="checkbox"/>	2
<input checked="" type="checkbox"/>	3
<input type="checkbox"/>	4
<input checked="" type="checkbox"/>	5
<input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS			
A	P (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RESULTS			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RESULTS			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PAD A (ATS)

INPUT	DATA			
n (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T_R (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
τ (H.H)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DATA			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DATA	STO
<input checked="" type="checkbox"/>	1
<input type="checkbox"/>	2
<input checked="" type="checkbox"/>	3
<input type="checkbox"/>	4
<input checked="" type="checkbox"/>	5
<input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS			
A	P (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RESULTS			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RESULTS			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PAD A (ATS)

INPUT	DATA			
n (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
T_R (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
τ (H.H)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DATA			
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

DATA	STO
<input checked="" type="checkbox"/>	1
<input type="checkbox"/>	2
<input checked="" type="checkbox"/>	3
<input type="checkbox"/>	4
<input checked="" type="checkbox"/>	5
<input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS			
A	P (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RESULTS			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RESULTS			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PAD A (AIS)

INPUT	DATA					
α (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		1
T_{α} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2
τ (H.H)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS			
A	P (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PAD A (ATS)

INPUT	DATA					
α (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		1
T_{α} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2
τ (H.H)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS			
A	P (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PAD A (ATS)

INPUT	DATA					
α (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		1
T_{α} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2
τ (H.H)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS			
A	P (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PAD A (ATS)

INPUT	DATA
α (deg.)	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
T_{Ω} (H.M)	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
τ (H.H)	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
T_{ACQ} (H.M)	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
R_{LVLH} (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
P_{LVLH} (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

DATA
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<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
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<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

DATA	STO
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	2
<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	3
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	4
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	5
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS
A	P (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

RESULTS
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

RESULTS
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

PAD A (ATS)

INPUT	DATA
α (deg.)	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
T_{Ω} (H.M)	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
τ (H.H)	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
T_{ACQ} (H.M)	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
R_{LVLH} (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
P_{LVLH} (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

DATA
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<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
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DATA	STO
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	2
<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	3
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	4
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	5
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS
A	P (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

RESULTS
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

RESULTS
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

PAD A (ATS)

INPUT	DATA
α (deg.)	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
T_{Ω} (H.M)	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
τ (H.H)	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
T_{ACQ} (H.M)	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
R_{LVLH} (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
P_{LVLH} (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

DATA
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
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<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

DATA	STO
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	2
<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	3
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	4
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	5
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS
A	P (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

RESULTS
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

RESULTS
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

PAD A (ATS)

INPUT	DATA					
α (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
T_{Ω} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
τ (H.H)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		

DATA					
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		

DATA				STO
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS			
A	P (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RESULTS			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RESULTS			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PAD A (ATS)

INPUT	DATA					
α (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
T_{Ω} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
τ (H.H)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		

DATA					
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		

DATA				STO
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS			
A	P (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RESULTS			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RESULTS			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PAD A (ATS)

INPUT	DATA					
α (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
T_{Ω} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
τ (H.H)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		

DATA					
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		

DATA				STO
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS			
A	P (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RESULTS			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

RESULTS			
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PAD A (ATS)

INPUT	DATA				DATA	DATA	DATA	STO
α (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1
T_{Ω} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2
τ (H.H)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS				RESULTS	RESULTS
A	P (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

PAD A (ATS)

INPUT	DATA				DATA	DATA	DATA	STO
α (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1
T_{Ω} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2
τ (H.H)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS				RESULTS	RESULTS
A	P (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

PAD A (ATS)

INPUT	DATA				DATA	DATA	DATA	STO
α (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1
T_{Ω} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2
τ (H.H)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	5
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS				RESULTS	RESULTS
A	P (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

PAD A (ATS)

INPUT	DATA					STO
n (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		1
T_{Ω} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		2
τ (H.H)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		3
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		4
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		5
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		6

PAD B (ATS)

KEY	OUTPUT	RESULTS			
A	P (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

PAD A (ATS)

INPUT	DATA					STO
n (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		1
T_{Ω} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		2
τ (H.H)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		3
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		4
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		5
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		6

PAD B (ATS)

KEY	OUTPUT	RESULTS			
A	P (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

PAD A (ATS)

INPUT	DATA					STO
n (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		1
T_{Ω} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		2
τ (H.H)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		3
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		4
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		5
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		6

PAD B (ATS)

KEY	OUTPUT	RESULTS			
A	P (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

PAD A (ATS)

INPUT	DATA					
α (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1
T_{α} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2
τ (H.H)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS			
A	P (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PAD A (ATS)

INPUT	DATA					
α (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1
T_{α} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2
τ (H.H)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS			
A	P (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PAD A (ATS)

INPUT	DATA					
α (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1
T_{α} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2
τ (H.H)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS			
A	P (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PAD A (ATS)

INPUT	DATA
α (deg.)	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
T_{Ω} (H.M)	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
τ (H.H)	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
T_{ACQ} (H.M)	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
R_{LVLH} (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
P_{LVLH} (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

DATA
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DATA	STO
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	2
<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	3
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	4
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	5
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS
A	P (deg.)	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

RESULTS
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
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<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
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RESULTS
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<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
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<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

PAD A (ATS)

INPUT	DATA
α (deg.)	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
T_{Ω} (H.M)	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
τ (H.H)	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
T_{ACQ} (H.M)	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
R_{LVLH} (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
P_{LVLH} (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

DATA
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
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<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
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DATA	STO
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	2
<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	3
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	4
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	5
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS
A	P (deg.)	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

RESULTS
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
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<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

RESULTS
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
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<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

PAD A (ATS)

INPUT	DATA
α (deg.)	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
T_{Ω} (H.M)	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
τ (H.H)	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
T_{ACQ} (H.M)	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
R_{LVLH} (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
P_{LVLH} (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

DATA
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
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<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
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DATA	STO
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	2
<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	3
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>	4
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	5
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS
A	P (deg.)	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

RESULTS
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

RESULTS
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
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<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

PAD A (ATS)

INPUT	DATA	DATA	DATA	STO
n (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1
T_n (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2
τ (H.H)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS	RESULTS	RESULTS
A	P (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

PAD A (ATS)

INPUT	DATA	DATA	DATA	STO
n (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1
T_n (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2
τ (H.H)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS	RESULTS	RESULTS
A	P (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

PAD A (ATS)

INPUT	DATA	DATA	DATA	STO
n (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1
T_n (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2
τ (H.H)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3
T_{ACQ} (H.M)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4
R_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	5
P_{LVLH} (deg.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6

PAD B (ATS)

KEY	OUTPUT	RESULTS	RESULTS	RESULTS
A	P (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
B	Y (deg.)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

ASTP

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SYSTEMS C/L+

JOINT OPS C/L+

DM C/L+

EXPERIMENTS C/L+

ENTRY C/L+

PHOTO OPS BOOK+

TV OPS BOOK+

SYSTEMS DATA

MALFUNCTION PROCS

CUE CARDS+

CREW PROCS DECALS+

ALT/CONT FLIGHT PLANS+

CG2/D. Schultz

CG22/D. Warren

CG221/G. Knori (2)

CG23/J. Wegener

CG24/J. Smith

CG25/R. Zedekar

CG5/T. Holloway

J. Doyle, Kentron (17)

CG51/W. Todd, RI (10)

KSC/LSTMP-3/R. DeCamp (12)

KSC/WSK/A. Morse (2)

NS2/O. Lindsey

PH/S. Blackmer

A. Dennett (2)

WB5/L. Brubaker (4)

WC6/M. Collins

DD4/J. Hordinsky (2)

CSDL/MS23/R. Larson

J. Dunbar

EC2/R. Grafe

EC3/D. Hughes

ED/J. Harris

ED8/H. Kuehnel

EE4/R. Dietz

EG2/G. Johnson

EG8/R. Wilson

EP12/H. White

ES12/D. Smith

HA62/Boeing/E. Bouford

HS01/Boeing

Headquarters/MAO/J. Holcomb

CB/A. Forostenko

BLDG 1720/BOB MOORE (2)

FE221/R. Powell (8)

+ Extra distribution on this item.

FM13/Data Management Office (5)

JM5/R. Magin

STD 91

SPEC _____

EXTRA _____

TOTAL _____

M 128

040

3121

JSC-09212

ASTP

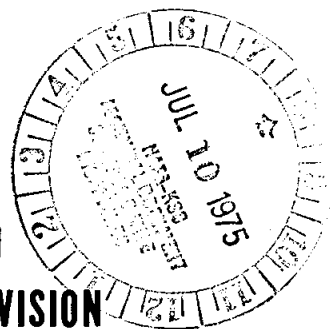
FINAL

PCN-1

NOTE: This is a PAGE CHANGE NOTICE to be incorporated into the previous edition. DISCARD ONLY the changed out pages.

HP-65 RENDEZVOUS TARGETING CHECKLIST

PREPARED BY
PROCEDURES BRANCH
CREW TRAINING & PROCEDURES DIVISION



National Aeronautics and Space Administration
LYNDON B. JOHNSON SPACE CENTER
Houston, Texas

JUNE 25, 1975

ASTP

JSC-09212
PA-N6-11160-2

FINAL
PCN-1

HP-65 RENDEZVOUS TARGETING CHECKLIST

25 JUNE 1975

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McDONNELL DOUGLAS
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It is requested that any organization having comments, questions, or suggestions concerning this document contact Duane K. Mosel, Procedures Branch, CG2, Building 4, Room 212, telephone 483-3048.

This document is under the configuration control of the Crew Procedures Control Board (CPCB). All proposed changes should be submitted to the ASTP Flight Data File Manager, T. W. Holloway, CG5, Bldg. 4, Rm 225A, telephone 483-4471.

Distribution of this document is controlled by Ted A. Guillory, ext. 4471, CG54, Crew Training & Procedures Division.

ACKNOWLEDGMENT

<u>AREA</u>	<u>NAME/BRANCH</u>	<u>LOCATION</u>
TECHNICAL SUPPORT	FLIGHT CREW OPERATIONS McDONNELL DOUGLAS TECHNICAL SERVICES COMPANY (CONTRACT NAS 9-14023)	EXT. 3551 Bldg. 4 Rm 272
TECHNICAL SUPPORT	EJ6/DISPLAYS & CONTROLS SYSTEMS BRANCH GN&C DISPLAYS SECTION	
TYPING & GRAPHICS	KENTRON HAW. LTD. CREW PROCEDURES DATA GROUP	
ATS POINTING PROGRAM	MIKE HOLLARS CG2/FLIGHT PROCEDURES SECTION	EXT. 3048 Bldg. 4 Rm 211

CHANGE CONTROL RECORD

APOLLO/SOYUZ TEST PROJECT HP-65 RENDEZVOUS TARGETING CHECKLIST

CONTROL NO.	FDF EDITION INCORPORATED		DISAPPROVED OR OTHER DISPOSITION
	TITLE	DATE	
001	REFERENCE	3/5/75	
002	REFERENCE	3/5/75	
003	FINAL	5/13/75	
004	FINAL	5/13/75	
005	FINAL	5/13/75	
006	FINAL	5/13/75	
007	PCN-1	6/25/75	
008	PCN-1	6/25/75	

HP-65 RENDEZVOUS TARGETING CHECKLIST

ASTP

LIST OF EFFECTIVE PAGES

BASIC	10/17/75
REFERENCE	3/5/75
FINAL	6/13/75
PCN-1	6/25/75

PAGE	DATE	PAGE	DATE
*i	6/25/75	A-1	5/13/75
ii	5/13/75	A-2	5/13/75
iii	5/13/75	*A-3	6/25/75
iv	5/13/75	A-4	5/13/75
1	5/13/75	A-5	5/13/75
2	5/13/75	A-6	5/13/75
3	5/13/75	A-7	5/13/75
4	5/13/75	A-8	5/13/75
5	5/13/75	A-9	5/13/75
6	5/13/75	A-10	5/13/75
7	5/13/75	A-11	5/13/75
8	5/13/75	A-12	5/13/75
9	5/13/75	A-13	5/13/75
10	5/13/75	A-14	5/13/75
11	5/13/75		
*12	6/25/75		

* Indicates current change

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RECOVERY NOTES00 00 Displayed in Right of Window

The W/PRGM/RUN switch is in the W/PRGM position. Place the switch in the RUN position, reload the last card, verify all input data associated with the last card, and continue with the current step.

Bad Answer Obtained

If a bad answer (garbage) is obtained, a general rule of thumb is to turn the HP-65 OFF and start over at step one. In some situations, the following list of hints might save you some time.

1. For NSR or TPI last card -
 - a. Have to key A before results of keying B, C or D are valid.
 - If A was not keyed, go ahead and key A now; then cont.
 - b. For NSR, verify correct R16 & R12 data in storage.
 - If R12 data not correct, store correct data, then continue.
 - If R16 data not correct, store correct data, load NSR-4 card, key A, load NSR-5 card, key A, etc.
 - c. If 555.55 (444.44 for TPI) is displayed after keying A, this is telling you that the last ("NSR-5" or "TPI-4") card had not been loaded. You can still load the last card; key A, etc.
2. For TPI TIG 1, TPM1 or TPM2 card -
 - First, verify stored data. Then -
 - a. If data not correct, store the correct data; then continue.
 - b. If data is correct, do not turn HP-65 OFF before reloading card. This way, the data does not have to be reloaded (stored).

TPM1 & TPM2 answers are invalid if S/C is tracking

heads down, unless θ is corrected, where

$$\theta = \theta + 2*(57.47 - TA)$$

Additional Notes

1. When answers are to be displayed, you always have to key A before answer is valid.
2. When answers are not to be displayed, keying B, C, D or E will result in proper execution of program.
3. Keying A more than once (for any card) will not degrade the answer.
 - In fact, keying A, B, C, D or E any number of times will not degrade the answer.
4. If you're not sure you keyed A, Key A again.
5. The numbers (111.11, 222.22, etc) indicate which card has to be executed next. Pay attention to these numbers.
 - If you accidentally fail to load a card, the correct program card number will be displayed after keying A (C for TPI-3).
6. A blinking 0.00 is displayed if data is missing in NSR steps 4, 7 & 10 and TPI steps 4, 7 & 10.

DATA SOURCES

	NSR/TPI	TPM1/TPM2
NOMINAL	Range- EMS (For B/U, use V76/N76 Reg 1)	Range- EMS θ - FDAI ORDEAL PITCH TA - Trunnion Angle with Soyuz centered in SXT
CMC FAIL	Range- EMS only (NO B/U)	Range- EMS θ - Track Soyuz in COAS Read FDAI ORDEAL PITCH TA - Use value from COAS LOS DETERMINATION* or 57.47°
IMU FAIL	Range- EMS (For B/U, use V76/N76 Reg 1)	Range- EMS θ - Track Soyuz in COAS Read FDAI ORDEAL PITCH TA - Use value from COAS LOS DETERMINATION* or 57.47°
NO VHF RNG	(HP-65 soln not available)	(HP-65 soln not available)
EMS RNG DISPLAY BLANK	Range- V76E, load N72, PRO, N76E Read R in R1 For TPI - 14: V76E, load N72 with ZERO's PRO, N76E Read current R in R1	Range- V76E, load N72 with ZERO's, PRO, N76E Read current R in R1 θ - FDAI ORDEAL PITCH TA - Trunnion Angle with Soyuz centered in SXT
SOYUZ TRACK LITE FAIL	Range- EMS (For B/U, use V76/N76 Reg 1)	(HP-65 soln not available)
MARK BUTTON FAIL	Range- EMS (For B/U, use V76/N76 Reg 1)	RANGE- EMS θ - FDAI ORDEAL PITCH TA - Trunnion Angle with Soyuz centered in SXT
OPTICS** FROZEN	Range- EMS (For B/U, use V76/N76 Reg 1)	Range- EMS θ - FDAI ORDEAL PITCH Track Soyuz in SXT with MIC TA*** - Trunnion Angle with Soyuz centered in SXT
CANNOT SEE THRU OPTICS	Range- EMS (For B/U, use V76/N76 Reg 1)	Range- EMS θ - Track Soyuz in COAS Read FDAI ORDEAL PITCH TA - Use value from COAS LOS DETERMINATION* or 57.47°

*COAS LOS DETERMINATION values recorded in RNDZ BOOK Pg 11.

**HP-65 solution is NO-GO for optics frozen at large shaft angle (≥ 10 deg).

***For negative TA (i.e. TPAC = 350° to 360°): TA = TPAC - 360°.

ATS NOMINAL DATA

INPUT \ PHASE	INS → NC1	UPDATE	UPDATE
Ω (deg.)	- X 1 2 5	[] X [] [] []	[] X [] [] []
T_{Ω} (H.M)	0 0 1 2 4	[] [] [] [] []	[] [] [] [] []
τ (H.H)	1 4 6 1 X	[] [] [] X []	[] [] [] X []

INPUT \ PHASE	NC1 → NC2	UPDATE	UPDATE
Ω (deg.)	+ X 1 6 7	[] X [] [] []	[] X [] [] []
T_{Ω} (H.M)	0 1 3 1 7	[] [] [] [] []	[] [] [] [] []
τ (H.H)	1 4 7 5 X	[] [] [] X []	[] [] [] X []

INPUT \ PHASE	UPDATE	UPDATE	UPDATE
Ω (deg.)	- X 1 2 5	[] X [] [] []	[] X [] [] []
T_{Ω} (H.M)	0 3 2 3 7	[] [] [] [] []	[] [] [] [] []
τ (H.H)	1 4 7 5 X	[] [] [] X []	[] [] [] X []

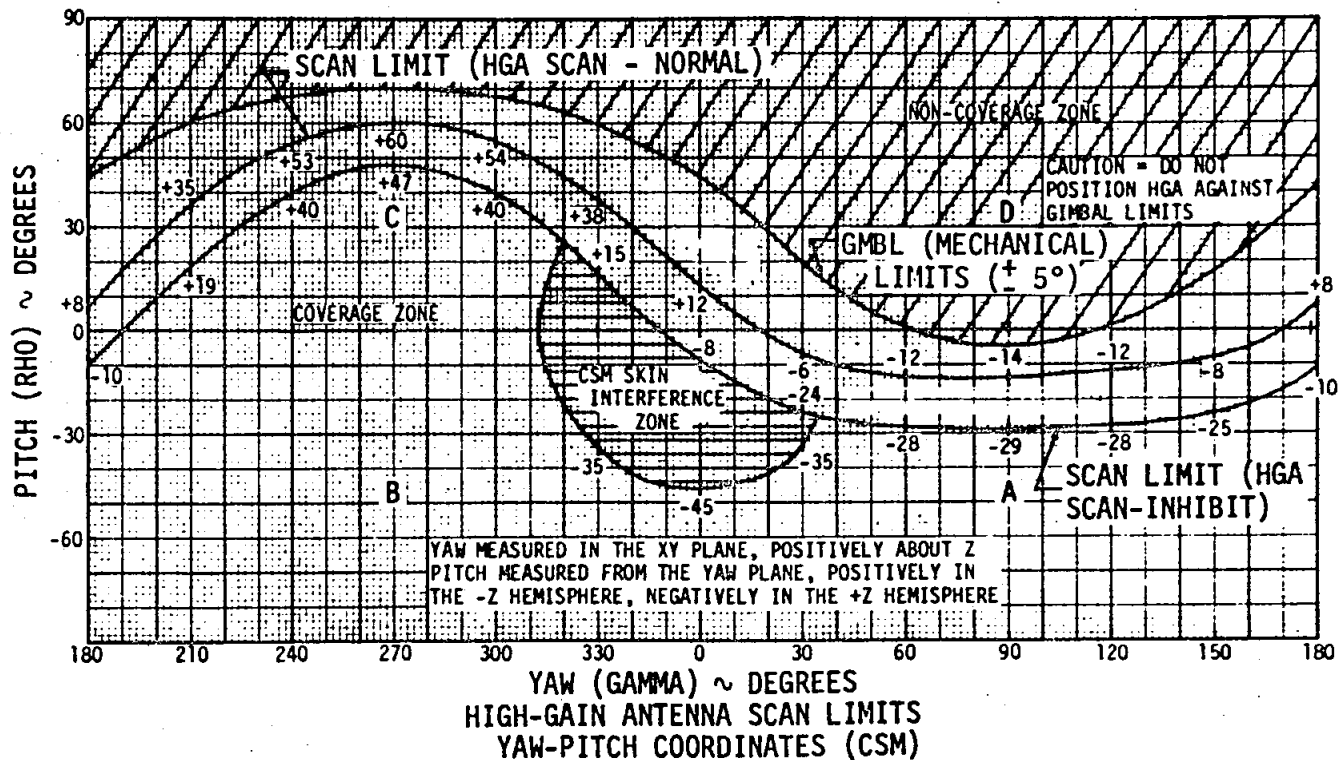
INPUT \ PHASE	NC2 → DOCK	UPDATE	UPDATE
Ω (deg.)	- X 0 1 2	[] X [] [] []	[] X [] [] []
T_{Ω} (H.M)	0 4 8 3 8	[] [] [] [] []	[] [] [] [] []
τ (H.H)	1 4 6 8 X	[] [] [] X []	[] [] [] X []

INPUT \ PHASE	POST DOCK	UPDATE	UPDATE
Ω (deg.)	- X 0 8 0	[] X [] [] []	[] X [] [] []
T_{Ω} (H.M)	0 5 3 0 4	[] [] [] [] []	[] [] [] [] []
τ (H.H)	1 4 8 2 X	[] [] [] X []	[] [] [] X []

INPUT \ PHASE	UPDATE	UPDATE	UPDATE
Ω (deg.)	[] X [] [] []	- X 1 3 2	[] X [] [] []
T_{Ω} (H.M)	[] [] [] [] []	1 5 0 4 6	[] [] [] [] []
τ (H.H)	[] [] [] X []	1 4 8 0 X	[] [] [] X []

*Apollo GET; all others Soyuz GET.

ANTENNA LIMITATIONS CHART



A-4

DATE 5/13/75