JSC-09139

## ASTP

## REVISION A

# CSM RENDEZVOUS BOOK

PREPARED BY

PROCEDURES BRANCH
CREW TRAINING & PROCEDURES DIVISION


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

**JUNE 1, 1975**


48

## CHANGE CONTROL RECORD

APOLLO/SOYUZ TEST PROJECT RENDEZVOUS BOOK CHECKLIST-

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



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# CHANGE CONTROL RECORD

APOLLO/SOYUZ TEST PROJECT RENDEZVOUS BOOK CHECKLIST

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



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CSM RENDEZVOUS BOOK

ASTP

# LIST OF EFFECTIVE PAGES

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

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

| PAGE | DATE |
|---|---|
| 2-15 | 6/1/75 |
| 2-16 | 6/1/75 |
| 2-17 | 6/1/75 |
| 2-18 | 6/1/75 |
| 2-19 | 6/1/75 |
| 3-a | 6/1/75 |
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| 3-c | 6/1/75 |
| 3-1 | 6/1/75 |
| 3-2 | 6/1/75 |
| 3-3 | 6/1/75 |
| 3-4 | 6/1/75 |
| 3-5 | 6/1/75 |
| 3-6 | 6/1/75 |
| 3-7 | 6/1/75 |
| 3-8 | 6/1/75 |
| 3-9 | 6/1/75 |
| 3-10 | 6/1/75 |
| 3-11 | 6/1/75 |
| 3-12 | 6/1/75 |
| 3-13 | 6/1/75 |
| 3-14 | 6/1/75 |
| 3-15 | 6/1/75 |
| 3-16 | 6/1/75 |
| 3-17 | 6/1/75 |
| 3-18 | 6/1/75 |
| 3-19 | 6/1/75 |
| 4-1 | 6/1/75 |
| 4-2 | 6/1/75 |
| 4-3 | 6/1/75 |
| 4-4 | 6/1/75 |
| 5-1 | 6/1/75 |
| 5-2 | 6/1/75 |
| 5-3 | 6/1/75 |
| 5-4 | 6/1/75 |
| 6-a | 6/1/75 |
| 6-1 | 6/1/75 |
| 6-2 | 6/1/75 |
| 6-3 | 6/1/75 |
| 6-4 | 6/1/75 |
| 6-5 | 6/1/75 |
| 7-a | 6/1/75 |
| 7-b | 6/1/75 |
| 7-c | 6/1/75 |
| 7-1 | 6/1/75 |

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

CONTENTS

LAUNCH → GET ~7+30

GET ~7+30 → DOCK

## BACKUP GDC ALIGN PAD

**A** NOMINAL LAUNCH

| | | | | | | |
|---|---|---|---|---|---|---|
| 0°/R STARS | 3 | 3 | / | 3 | 7 | X |
| ASCP tw R | X | X | 2 | 4 | 9 | .6 |
| P | X | X | 2 | 7 | 7 | .5 |
| Y | X | X | 3 | 3 | 7 | .9 |

**B** POST INS UPDATE

| | | | | | | |
|---|---|---|---|---|---|---|
| 0°/R STARS | | | / | | | X |
| ASCP tw R | X | X | | | | . |
| P | X | X | | | | . |
| Y | X | X | | | | . |

**C** NOMINAL RNDZ

| | | | | | | |
|---|---|---|---|---|---|---|
| 0°/R STARS | 3 | 3 | / | 3 | 7 | X |
| ASCP tw R | X | X | 2 | 4 | 6 | .3 |
| P | X | X | 0 | 6 | 8 | .2 |
| Y | X | X | 3 | 3 | 2 | .5 |

**D** RNDZ UPDATE

| | | | | | | |
|---|---|---|---|---|---|---|
| 0°/R STARS | | | / | | | X |
| ASCP tw R | X | X | | | | . |
| P | X | X | | | | . |
| Y | X | X | | | | . |

## STAR ACQUISITION PAD

**A** (ACM ATT) NOMINAL LAUNCH

| | | | | | | |
|---|---|---|---|---|---|---|
| N22 R | + | 1 | 7 | 9 | .0 | 0 |
| P | + | 2 | 1 | 3 | .0 | 0 |
| Y | + | 0 | 0 | 1 | .0 | 0 |
| N71 1ST STAR | X | X | X | X | 3 | 7 |
| TPAC ANGLES SA | X | 2 | 3 | 5 | .2 | 0 |
| TA | X | 0 | 4 | 1 | .3 | 0 |
| N71 2ND STAR | X | X | X | X | 4 | 5 |
| TPAC ANGLES SA | X | 0 | 3 | 4 | .5 | 0 |
| TA | X | 0 | 1 | 2 | .3 | 0 |
| N71 3RD STAR | X | X | X | X | 4 | 2 |

**B** (ACM ATT) POST INS UPDATE

| | | | | | | |
|---|---|---|---|---|---|---|
| N22 R | + | | | | .0 | 0 |
| P | + | | | | .0 | 0 |
| Y | + | | | | .0 | 0 |
| N71 1ST STAR | X | X | X | X | | |
| TPAC ANGLES SA | X | | | | . | 0 |
| TA | X | 0 | | | . | 0 |
| N71 2ND STAR | X | X | X | X | | |
| TPAC ANGLES SA | X | | | | . | 0 |
| TA | X | 0 | | | . | 0 |
| N71 3RD STAR | X | X | X | X | | |

**C** (SI +X FWD) NOMINAL RNDZ

| | | | | | | |
|---|---|---|---|---|---|---|
| N22 R | + | 0 | 1 | 8 | .0 | 0 |
| P | + | 1 | 7 | 0 | .0 | 0 |
| Y | + | 3 | 3 | 0 | .0 | 0 |
| N71 1ST STAR | X | X | X | X | 4 | 0 |
| TPAC ANGLES SA | X | 0 | 8 | 6 | .6 | 0 |
| TA | X | 0 | 2 | 5 | .8 | 0 |
| N71 2ND STAR | X | X | X | X | 4 | 3 |
| TPAC ANGLES SA | X | 0 | 0 | 0 | .8 | 0 |
| TA | X | 0 | 3 | 1 | .0 | 0 |
| N71 3RD STAR | X | X | X | X | 0 | 1 |

**D** RNDZ UPDATE

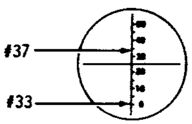
| | | | | | | |
|---|---|---|---|---|---|---|
| N22 R | + | | | | .0 | 0 |
| P | + | | | | .0 | 0 |
| Y | + | | | | .0 | 0 |
| N71 1ST STAR | X | X | X | X | | |
| TPAC ANGLES SA | X | | | | . | 0 |
| TA | X | 0 | | | . | 0 |
| N71 2ND STAR | X | X | X | X | | |
| TPAC ANGLES SA | X | | | | . | 0 |
| TA | X | 0 | | | . | 0 |
| N71 3RD STAR | X | X | X | X | | |

DEFINITIONS

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

STAR AVAILABILITY

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




SHAFT = 0°
TRUN = 352.5°

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

| Time | Comm/Stations | Event |
|---|---|---|
| 0+00 | TV, MIL | APOLLO LIFT-OFF |
| | BDA | |
| | MFL, ATS | APOLLO INSERTION |
| 0+20 | | SIVB MNVRS TO RLH |
| | USR | |
| | | P52 (OPT 3) (RECORD) |
| | | P00 |
| 0+40 | | EMS $\Delta V$ TEST & NULL BIAS CHECK |
| | | SIVB MNVRS TO SEP ATT |
| 1+00 | | |

P52 (OPTION 3)

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

EMS $\Delta V$ TEST & NULL BIAS CHECK CHECKLIST

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

EMS MODE-STBY
EMS FUNC-$\Delta V$ SET/VHF RNG
SET $\Delta V$ ind to (-100.0) fps
EMS FUNC-$\Delta V$ (wait 5 sec)
EMS MODE-NORMAL (for 1 min 40 sec)
EMS MODE-STBY
If $\Delta V<1$ fps, do not bias
If $\Delta V\geq 1$ fps but $\leq 10$ fps,
STDN provide bias in pad $\Delta VC$
If $\Delta V>10$ fps, EMS is NO-GO

NOMINAL



1+00
(11103)
(01111)

VTR

VAN

(11102)
(01111)

1+20

CSM/SIVB SEP ——— START TD&E ———

DOCKING

0:00

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

HGA SWITCH LIST

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

1+40

HFL

ATS

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

*****IF OHA REQ'D*****
* OHA PRELIMINARY PAD (COPY Pg 1-3) *
* ACM PRELIMINARY PAD (COPY Pg 1-4) *
* P52 (OPT 3) (RECORD) *
* P00; CMC MODE-AUTO *
*****

MAD

******IF BMAG 2>10°/HR/AXIS******
* START SCS DRIFT CHECK (BMAG 1) *
* ALIGN GDC *
* BMAG MODE(3)-RATE 1 *
* RESET AND START DET COUNTING UP *
*****

30:00

END SCS DRIFT CHECK (BMAG 2)
(REF GDC/IMU COMPARISON C/L)

2+00

GDC/IMU COMPARISON CHECKLIST

V16N20E
FDAI SELECT-1
FDAI SOURCE-ATT SET
ATT SET-GDC
ZERO FDAI 1 err needles with ASCP tw
Key VERB when ZERO
RECORD N20 values
RECORD ASCP tw values
RECORD DET
FDAI SELECT-1/2

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

HGA SWITCH LIST

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

BMAG 2 GDC/IMU COMPARISON RESULTS

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| N20 | IMU | R | + | | | | | | |
| | | P | + | | | | | | |
| | | Y | + | | | | | | |
| ASCP tw | GDC | R | | | | | | | |
| | | P | | | | | | | |
| | | Y | | | | | | | |
| DET (30:00) | | ΔT | | | | | | | |

BMAG 1 GDC/IMU COMPARISON RESULTS

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| N20 | IMU | R | + | | | | | | |
| | | P | + | | | | | | |
| | | Y | + | | | | | | |
| ASCP tw | GDC | R | | | | | | | |
| | | P | | | | | | | |
| | | Y | | | | | | | |
| DET (30:00) | | ΔT | | | | | | | |

P52 (OPTION 3)

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

2+00
(11102)
(01111)

ATS

TV

T-A-N

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

2+20

SIVB MNVRS TO EXTRACTION ATT

V48E, LOAD N47 REG 1 = CSM/DM WT

+30:00

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

VTR

0:00

P30
P41
CSM/DM EXTRACTION ——— END TD&E
AEM
P00
TV(2)/VTR POWER(3)-OFF
DSE:(LBR/RCD/FWD/CMD RESET)

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

2+40

UNSTOW CUE CARDS (DATA CARD KIT-R3)

PSM ACTIVATION (AFTER VAN AOS)
TRANSMIT EXTRACTION &
AEM STATUS

VAN

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

SNACK PERIOD

```
*****IF OHA REQ'D******************
* STDN UPLINK (P27) (CSM S.V. &   *
*   OHA TARGET LOAD)              *
* OHA FINAL PAD (COPY)            *
* (IF REQ'D)COPY PIPA BIAS UPDATE *
*                                 *
* TRANSMIT GYRO TORQUE ANGLES AND *
*   TIME (Pg 1-2)                 *
* V48E (LOAD 2 JET) (11002)       *
*      (LOAD WT, PT & YT IF REQ'D)*
* P30(VERIFY N33 & N81 PAD VALUES)*
* P00                             *
* V49 & V41N91 TO PAD DATA        *
* IF STAR NOT IN SXT FOV-G&N NO GO*
*   PERFORM GDC HORIZ CK          *
*   IF HORIZ >5° OF MK-DO NOT BURN*
* GO TO SPS BURN CUE CARD         *
*   (BANK A)                      *
* P40                             *
```

3+00

## OHA PAD DATA

| | | NOMINAL | PRELIMINARY | FINAL |
|---|---|---|---|---|
| N33 | HR | + | + | + |
| TIG OHA | MIN | + | + | + |
| | SEC | + | + | + |
| N81 | $\Delta V_X$ | | | |
| $\Delta V_{CHA}$ | $\Delta V_Y$ | + 0 0 0 0 | | |
| | $\Delta V_Z$ | | | |
| N22 | R | + 0 0 | + 0 0 | + 0 0 |
| OHA | P | + 0 0 | + 0 0 | + 0 0 |
| | Y | + 0 0 | + 0 0 | + 0 0 |
| | $\Delta V_C$ | | | |
| | BT | | | |

| WT + | PT | YT |
|---|---|---|

### BURN ATT CHECK

| STAR | |
|---|---|
| SA | + 0 |
| TA | + 0 0 |

### BURN ATT CHECK UPDATE

| STAR | |
|---|---|
| SA | + 0 |
| TA | + 0 0 |

HORIZON CK DATA: TIG MINUS ____MIN, WINDOW MK ____DEG

### PSM ACTIVATION SWITCH LIST

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

### PIPA BIAS UPDATE PAD

| | ADDRESS | DATA |
|---|---|---|
| X | 1452 | |
| Y | 1454 | |
| Z | 1456 | |

### SPS BURN STATUS

| | | |
|---|---|---|
| $\Delta$TIG | | |
| AFTER TRIM | | |
| $\Delta$VC | | |
| FDAI (IF ATTITUDE NOT NOMINAL) | R | + |
| | P | + |
| | Y | + |
| N85 (IF VG >.2) | VGX | 0 0 |
| | VGY | 0 0 |
| | VGZ | 0 0 |

NOMINAL

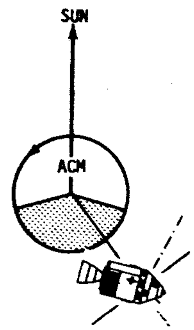
| | | |
|---|---|---|
| 3+00 | | |
| (11102) (01111) | GDS | STDN UPLINK (P27) (CSM & SOYUZ S.V.'s & PIPA BIAS UPDATE) |
| | | ACM PRELIMINARY PAD (COPY) |
| | | ACQUIRE ATS HGA: MAN, WIDE P -78, Y 34 S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW |
| | NFL / ATS | BACKUP GDC ALIGN PAD & STAR ACQUISITION PAD (COPY Pg 1-a) |
| 3+20 | | P52 (OPT 3) (RECORD) |
| | HAD | STDN UPLINK (P27) (ACM TARGET LOAD) |
| | | ACM FINAL PAD (COPY) |
| | | TRANSMIT GYRO TORQUE ANGLES AND TIME |
| | | P00; CMC MODE-AUTO |
| | | IF IMU DRIFT (P52 N93 ) > 1.5°/HR-G&N NO GO PERFORM SCS BURN |
| (11002) (01111) | | V48E (LOAD 2 JET) (LOAD WT, PT & YT IF REQ'D) |
| -12:00 | | P30 (VERIFY N33 & N81 PAD VALUES) |
| | | GO TO SPS BURN CUE CARD (BANK A) |
| 3+40 | | P40 |
| 0:00 | | ACM (179,34/213,1) (TRIM VGX +0.2) RECORD BURN STATUS TRANSMIT BURN STATUS P00 |
| | | PGA DOFFING (Pg 1-5) |
| 4+00 | | |

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

**************************************

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

**************************************




## ACM PAD DATA

| | | NOMINAL | PRELIMINARY | FINAL |
|---|---|---|---|---|
| N33 TIG ACM | HR | + X X 0 0 3 | + X X | + X X |
| | MIN | + X X X 4 5 | + X X X | + X X X |
| | SEC | + X 0 0 . 0 0 | + X . | + X . |
| N81 $\Delta V_{ACM}$ | $\Delta V_X$ | + X 0 1 6 . 7 | X . | X . |
| | $\Delta V_Y$ | + X 0 0 0 . 0 | X . | X . |
| | $\Delta V_Z$ | - X 0 1 2 . 1 | X . | X . |
| N22 ACM | R | + 1 7 9 . 0 0 | + . 0 0 | + . 0 0 |
| | P | + 2 1 3 . 0 0 | + . 0 0 | + . 0 0 |
| | Y | + 0 0 1 . 0 0 | + . 0 0 | + . 0 0 |
| | $\Delta V_C$ | X X 0 0 8 . 1 | X X . | X X . |
| | BT | X X 0 0 : 0 1 | X X : | X X : |
| ΔVC AT IGN | | + X X X . | + X X X . | + X X X . |
| ΔVC TAILOFF | | - X X . | - X X . | - X X . |

| WT | + | PT | | YT | |
|---|---|---|---|---|---|

### BURN ATT CHECK

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STAR | X | X | X | X | | | |
| SA | + | | | | . | 0 |
| TA | + | | | . | 0 | 0 |

### BURN ATT CHECK UPDATE

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| STAR | X | X | X | X | | | |
| SA | + | | | | . | 0 |
| TA | + | | | . | 0 | 0 |

### P52 (OPTION 3)

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

### SPS BURN STATUS

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

4+00
(11002)
(01111)

ATS

ORR

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

4+20

HAW

STDN UPLINK (P27) (CSM S.V. & GYRO COMP UPDATE)
NC1 PRELIMINARY PAD (COPY Pg 1-6)
NPC ADVISORY

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

4+40

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

HFL

ATS

NC1 FINAL PAD (COPY Pg 1-6)
NPC PRELIMINARY PAD (COPY Pg 1-7)

V48E (LOAD WT)
TRANSMIT DM/CM $\Delta$P (1ST OPP ONLY)

STDN UPLINK (P27) (NC1 TARGET LOAD)

BIOSTACK-ON (MA 107) (R1)
RECORD GET & INDICATOR STATUS (Pg 1-5)

5+00

PGA DOFFING

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

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

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

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

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

Doff PGA - discon elect and urine
connections inside PGA

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

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

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

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

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

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

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

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

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

BIOSTACK PAD

| GET | HR | | | | IND LT ON | |
|---|---|---|---|---|---|---|
| | MIN | | | | OFF | |

# NOMINAL



5+00
(11002)
(01111)

A T S

ZFF PHOTOS (J/10-1)

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

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

5+20

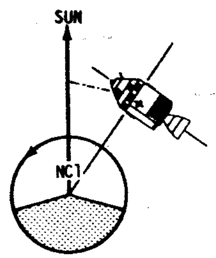
MNVR TO STDN NC1 BURN (PITCH) ATT

-12:00

P30 (VERIFY N33 & N81 PAD VALUES)

GO TO SPS BURN CUE CARD
  (BANK B)

P40




ORR

5+40
0:00

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

P00

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

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

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

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

HAW

TRANSMIT NC1 BURN STATUS
TRANSMIT GYRO TORQUE ANGLES
  AND TIME
CSM ALONE WT (COPY Pg 1-7)

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

6+00

## NC1 PAD DATA

| | | NOMINAL | PRELIMINARY | FINAL |
|---|---|---|---|---|
| N33 | HR | + 005 | + | + |
| TIG NC1 | MIN | + 41 | + | + |
| | SEC | + 28.10 | + . | + . |
| N81 | $\Delta V_X$ | + 066.3 | . | . |
| $\Delta V_{NC1}$ | $\Delta V_Y$ | + 000.0 | . | . |
| | $\Delta V_Z$ | + 000.2 | . | . |
| N22 | R | + 181.00 | + .00 | + .00 |
| NC1 | P | + 059.00 | + .00 | + .00 |
| | Y | + 000.00 | + .00 | + .00 |
| | $\Delta V_C$ | 053.7 | . | . |
| | BT | 0:03 | : | : |

| WT | + | | PT | . | YT | . |
|---|---|---|---|---|---|---|

BURN ATT CHECK

| | | | | | | |
|---|---|---|---|---|---|---|
| STAR | | | | | | |
| SA | + | | | . | | 0 |
| TA | + | | . | | 0 | 0 |

BURN ATT CHECK UPDATE

| | | | | | | |
|---|---|---|---|---|---|---|
| STAR | | | | | | |
| SA | + | | | . | | 0 |
| TA | + | | . | | 0 | 0 |

P52 (OPTION 3)

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

SPS BURN STATUS

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

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

| | | | |
|---|---|---|---|
| GET HR | | | |
| MIN | | | |

6+00
(11002)
(01111)

NFL BDA

ATS

6+20

(61011)
(01111)

ACN

6+40

(61011)
(01111)

7+00

IF NPC NOT REQ'D

SET HGA: MAN P -54, Y 265
S-BD ANT IND > 1/3 SCALE
HGA: REACQ, NARROW

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

P52(OPT 1: COARSE ALIGN)(RECORD)

P00; CMC MODE-AUTO
ALIGN GDC TO IMU
VERIFY SI +X FWD ATT(18,170,330)
V48E (LOAD LM ASCENT DAP,
5°DB & 0.2°/SEC RATE)
LOAD N47 REG 1 = CSM WT
(REF PAD Pg 1-7)
REG 2 = +04460
CMC MODE-FREE
V46E
CMC MODE-AUTO
TRANSMIT GYRO TORQUE ANGLES
AND TIME (OPT's 3 & 1)

START EAT PERIOD

IF NPC REQ'D

SET HGA: MAN P -51, Y 96
S-BD ANT IND > 1/3 SCALE
HGA: REACQ, NARROW

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

V48E (LOAD 2°/SEC) (11003)
(LOAD WT)

ENTER P38 (G/5-10) 20 MIN
PRIOR TO TIG
BYPASS AUTO MNVR

VERIFY P38 ATT (180,160,0)
LOAD N33 & N81 PAD VALUES
SET DET

GO TO SPS BURN CUE CARD
(BANK A)

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

V48E (LOAD LM ASCENT DAP,
5°DB & 0.2°/SEC RATE)
LOAD N47 REG 1 = CSM WT
(REF PAD Pg 1-7)
REG 2 = +04460
CMC MODE-FREE
V46E
CMC MODE-AUTO

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

## NPC PAD DATA

| | | PRELIMINARY | FINAL |
|---|---|---|---|
| N33 TIG NPC | HR | + | + |
| | MIN | + | + |
| | SEC | + | + |
| N81 $\Delta V_{NPC}$ | $\Delta V_X$ | | |
| | $\Delta V_Y$ | | |
| | $\Delta V_Z$ | | |
| N22 NPC | R | + 0 0 | + 0 0 |
| | P | + 0 0 | + 0 0 |
| | Y | + 0 0 | + 0 0 |
| | $\Delta V_C$ | | |
| | BT | | |

| | | | | | |
|---|---|---|---|---|---|
| WT | + | PT | | YT | |

### BURN ATT CHECK

| | |
|---|---|
| STAR | |
| SA | + 0 |
| TA | + 0 0 |

### BURN ATT CHECK UPDATE

| | |
|---|---|
| STAR | |
| SA | + 0 |
| TA | + 0 0 |

### LM ASCENT DAP DATA

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

### P52 (OPTION 3)

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

### P52 (OPTION 1)

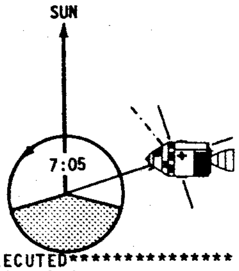
| | | |
|---|---|---|
| N71 1ST STAR | | 0 0 0 |
| N71 2ND STAR | | 0 0 0 |
| N05(R1) ∮ ERR | | |
| N93 GYRO TORQUING ANGLES | X | |
| | Y | |
| | Z | |
| TIME OF GYRO TORQUE | HR | + 0 0 |
| | MIN | + 0 0 0 |
| | SEC | |

NOMINAL

7+00
(61011)
(01111)

ATS

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




GWM

7+20

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

7+40

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

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

ROS BDA MIL

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

* POO; CMC MODE-AUTO *
* ALIGN GDC TO IMU *
STDN UPLINK(P27)(LIFT-OFF TIME)* VERIFY SI +X FWD ATT(18,170,330)*
SYNC MISSION TIMER TO CMC * TRANSMIT GYRO TORQUE ANGLES *
  CLOCK (V16N65) UPON STDN CUE *   AND TIME *
STDN UPLINK (P27)(JET ON ************************************
  MONITOR LOADS)
STDN UPLINK (P27) (ATS S.V. &
  HGA EMP) (1ST OPP ONLY)

ATS

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

15+30

GO TO FLIGHT PLAN (Pg 4.1-6)

SPS BURN STATUS

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

P52 (OPTION 1)

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

PWR DOWN CHECKLIST

BMAG PWR #1-OFF
OHC-DRIVE TRUN <10 DEG
OPTICS ZERO-ZERO
G/N PWR OPTICS-OFF

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

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

6:50

46+30 (61011) (01111)

V A N

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

*****IF REFSMMAT REALIGN REQ'D******
* STDN UPLINK (P27)(RNDZ REFSMMAT) *
* BACKUP GDC ALIGN PAD & *
*   STAR ACQUISITION PAD *
*   (COPY Pg 1-a) *
* RNDZ/RNDZ REALIGN PAD *
*   (COPY Pg 2-a) *
* OPTICS PWR UP CHECKLIST (Pg 1-9) *
* P52 (OPT 3) (RECORD) *
* P52(OPT 1: COARSE ALIGN)(RECORD) *
* P00; CMC MODE-AUTO *
* ALIGN GDC TO IMU *
************************************

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

7:00

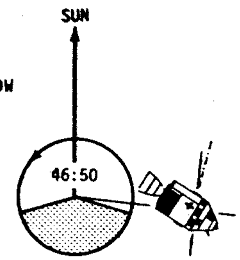
46+40

P00; CMC MODE-AUTO

46+50

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

A T S




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

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

7:20

47+00

OPTICS PWR UP CHECKLIST

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

P52 (OPTION 3)

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

P52 (OPTION 1)

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

NOMINAL

7:20
47+00
(61011)
(01111)
ATS

TV CHFCKLIST (Pg 1-10)

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

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

7:30
47+10
TV

TV- GRD CMD
47+10 - 47+37

*****FOR M=14 RNDZ*****************
* BIOSTACK-OFF (MA 107) (R1)
* RECORD GET & INDICATOR STATUS

| GET HR | | | | IND LT ON | |
|---|---|---|---|---|---|
| MIN | | | | OFF | |

**********************************

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

7:40
47+20
USR

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

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

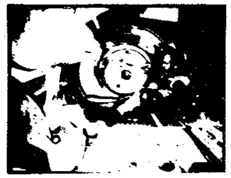
ZFF PHOTOS (J/10-1)

7:50
47+30

TV CHECKLIST

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


CM CAMR 1


DM CAMR 1


DM CAMR 2

50

47+30 (61911) (01111) U S R A T S T V

BMAG PWR #1-WARMUP

H2 PURGE LINE HTR-ON(up)

8:00

47+40

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

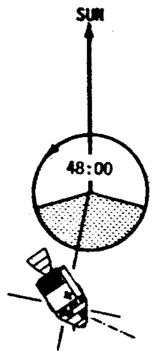
P32 (RECYCLE: RECORD Pg 1-12)

P00
CMC MODE-FREE
(11002) (01111) V48E (LOAD CSM ONLY DAP,
0.5°DB & 0.5°/SEC RATE)
LOAD N47 REG 1 = CSM/DM WT (REF NC2 PAD Pg 1-12)
REG 2 = +0
V46E
CMC MODE-AUTO

8:10

47+50

P52 (OPT 3) (RECORD)




P00; CMC MODE-AUTO
COAS LOS DETERMINATION CHECKLIST

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

WASTE WATER DUMP CHECKLIST

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

8:20

48+00

P00

P52 (OPTION 3)

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

COAS LOS DETERMINATION CHECKLIST

1. COAS PWR-ON(up)
MNVR TO BORESIGHT ATTITUDE
CMC MODE-FREE
V37E52E
F 04 06 R1 00001
R2 00003
PRO
F 50 25 00015
ENTER
F 01 70 000DE STAR CODE
LOAD BORESIGHT STAR CODE
OPT MODE-CMC(verify)
OPT ZERO-OFF
PRO
06 92 SHAFT,TRUN

2. BORESIGHT ON STAR AND
MARK with VERB key
RECORD SHAFT,TRUN
(NOMINAL = 0°,+57.470°)
TO VERIFY: KEY RLSE
AND REPEAT STEP 2

3. V37E00E
CMC MODE-AUTO
OPT MODE-MAN
OHC-Drive trun<10°
OPT ZERO-ZERO

COAS LOS DETERMINATION

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| N92 | SA | + | | | | | | |
| | TA | + | | | | | | |

WASTE WATER DUMP CHECKLIST

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

NOMINAL

8:20

48+00 (11002) (01111) VAN

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

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

8:30

48+10

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

MNVR TO NC2 FINAL PAD ATT

BMAG PWR #1-ON

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

8:40

48+20

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

| P | | | | Y | | | |
|---|---|---|---|---|---|---|---|

-12:00

P32 (FINAL COMP: RECORD)

ATS

GO TO SPS BURN CUE CARD
(BANK A)

P40

48+30

## NC2 PAD DATA

| | | NOMINAL | PRELIMINARY | FINAL |
|---|---|---|---|---|
| N28 | HR | + 0 4 8 | + | + |
| TIG NC2 | MIN | + 3 4 | + | + |
| | SEC | + 0 4 1 0 | + | + |
| N81 | $\Delta V_X$ | - 0 3 6 4 | | |
| $\Delta V_{NC2}$ | $\Delta V_Y$ | + 0 0 0 0 | | |
| | $\Delta V_Z$ | + 0 0 0 0 | | |
| N22 | R | + 0 0 0 0 0 | + 0 0 | + 0 0 |
| NC2 | P | + 0 3 4 0 0 | + 0 0 | + 0 0 |
| | Y | + 0 0 0 0 0 | + 0 0 | + 0 0 |
| | $\Delta V_C$ | 0 2 3 7 | | |
| | BT | 0 0 0 2 | | |

| WT | + | | | | | |
|---|---|---|---|---|---|---|

| PT | | | | |
|---|---|---|---|---|

| YT | | | | |
|---|---|---|---|---|

BURN ATT CHECK

| | | | | | | |
|---|---|---|---|---|---|---|
| STAR | | | | | | |
| SA | + | | | | | 0 |
| TA | + | | | | 0 | 0 |

BURN ATT CHECK UPDATE

| | | | | | | |
|---|---|---|---|---|---|---|
| STAR | | | | | | |
| SA | + | | | | | 0 |
| TA | + | | | | 0 | 0 |

| TPI TIG | N37 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|

## NC2 ONBOARD DATA

| | | P32 RECYCLE | P32 FINAL COMP |
|---|---|---|---|
| N84 | $\Delta V_{NCC}$ | + 0 | + 0 |
| | $\Delta H_{NCC}$ | + 0 0 | + 0 0 |
| | $\Delta V_{NSR}$ | + 0 0 | + 0 0 |
| N81 | $\Delta V_X$ | 0 | 0 |
| $\Delta V_{NC2}$ | $\Delta V_Y$ | + 0 0 0 0 0 | + 0 0 0 0 0 |
| | $\Delta V_Z$ | + 0 0 0 0 0 | + 0 0 0 0 0 |

SPS BURN STATUS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $\Delta$TIG | | | | | | | |
| AFTER TRIM | | | | | | | |
| $\Delta$VC | | | | | | | |
| FDAI (IF ATTITUDE NOT NOMINAL) | R | + | | | | | |
| | P | + | | | | | |
| | Y | + | | | | | |
| N85 (IF VG >.2) | VGX | | 0 | 0 | | | |
| | VGY | | 0 | 0 | | | |
| | VGZ | | 0 | 0 | | | |

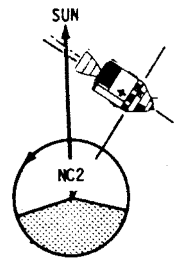
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
X N81 COMP LIMITS NA X
X X
X STDN SOLN PRIME X
X IF STDN SOLN NOT AVAILABLE X
X DO NOT BURN NC2 X
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

8:50

48+30
(11002)
(01111)

ATS

SOYUZ MNVRS TO ORBITAL ATTITUDE RATE




00:00 ACN

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

P33

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

9:00

48+40

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

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

SET DET

SXT

9:10

48+50

TV

USR

TV- GRD CMD
48+50 - 49+00

9:20

49+00

DP PERFORM VHF AM COMM CK

VHF AM SPEC RANGE
= 196 NM

VHF AM AND FM COMM

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

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

◄This is Apollo. Я АПОЛЛОН.
◄How do you read? КАК ВЫ СЛЫШИТЕ?

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

VHF AM COMM CHECK 48+59

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

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

VHF FM COMM CHECK 49+08

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

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

VHF RANGING COMM CHECK 49+23

◄Turn on VHF ranging. ВКЛЮЧИТЕ ИЗМЕРЕНИЕ ДАЛЬНОСТИ.

VHF AM A-OFF(ctr)
VHF AM B-DUPLEX
VHF RANGING-ON(up)
VHF ANTENNA-RIGHT(verify)
EMS FUNC-ΔV SET/VHF RNG
EMS MODE-BACKUP/VHF RNG
VHF RNG-RESET
◄Ranging lockup established. РЕЖИМ ИЗМЕРЕНИЯ ДАЛЬНОСТИ УСТАНОВЛЕН.
◄Range _____ miles. ДАЛЬНОСТЬ _____ МИЛЬ.
VHF FM-OFF(6)
VHF AM-T/R
◄This is Apollo on VHF ranging. Я АПОЛЛОН НА РЕЖИМЕ ИЗМЕРЕНИЯ ДАЛЬНОСТИ.

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

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

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

# NOMINAL

9:20 am

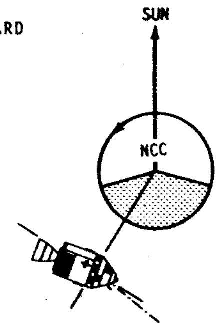
| | | |
|---|---|---|
| 49+00 | USR, SXT | NCC FINAL PAD (COPY)<br>NSR FINAL PAD (COPY Pg 1-15) |
| (11002)<br>(01111) | | |
| (10102)<br>(01111) | | V48E (LOAD B/D TRANS)<br>(LOAD WT) |
| -12:00 | 24 | P33 (FINAL COMP: RECORD) |
| | | DP PERFORM VHF FM COMM CK |
| 49+10 | | GO TO SPS BURN CUE CARD<br>(BANK A) |
| | | P40 |
| | GWM | |
| 00:00 | | $\boxed{\text{NCC}}$ (180,349/21,359) (R=145.5 NM)<br>(TRIM VG's ±0.2)<br>RECORD BURN STATUS<br>P34, V32E (P34 RECYCLE: RECORD CMC MATCHED PAIR)(Pg 1-15)<br>REPORT COMM CHECK RESULTS<br>TRANSMIT NCC BURN STATUS |
| 49+20 | | V76E (LOAD N72 WITH TIG NSR-28)<br>SET DET<br>◄NCC completed. NCC ВЫПОЛНЕН.<br>DP PERFORM VHF RANGING VOICE CHECK WITH SOYUZ |
| | VHF | V87E (START VHF MARKING) |
| -28:00 | | R HP-65 DATA FOR NSR-28 |
| 49+30 | | |

9:30 am

9:40 am

9:50 am

VHF FM SPEC RANGE = 162 NM




VHF RANGING SPEC RANGE = 144 NM

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

## NCC PAD DATA

| | | NOMINAL | PRELIMINARY | FINAL |
|---|---|---|---|---|
| NCC TIG | HR | + X X 0 4 9 | + X X | + X X |
| | MIN | + X X X 1 8 | + X X X | + X X X |
| | SEC | + X 0 3 4 0 | + X | + X |
| N81 $\Delta V_{NCC}$ | $\Delta V_X$ | + X 0 3 9 6 | X | X |
| | $\Delta V_Y$ | - X 0 0 0 6 | X | X |
| | $\Delta V_Z$ | + X 0 0 6 4 | X | X |
| N22 NCC | R | + 1 8 0 0 0 | + 0 0 | + 0 0 |
| | P | + 0 2 1 0 0 | + 0 0 | + 0 0 |
| | Y | + 3 5 9 0 0 | + 0 0 | + 0 0 |
| | $\Delta V_C$ | X X 0 2 7 4 | X X | X X |
| | BT | X X 0 0 0 2 | X X | X X |

| WT | + | PT | | YT | |
|---|---|---|---|---|---|

### BURN ATT CHECK

| STAR | X X X X | |
|---|---|---|
| SA | + | 0 |
| TA | + | 0 0 |

### BURN ATT CHECK UPDATE

| STAR | X X X X | |
|---|---|---|
| SA | + | 0 |
| TA | + | 0 0 |

## NCC ONBOARD DATA

### SPS BURN STATUS

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

### P33 FINAL COMP

| | | |
|---|---|---|
| N82 $\Delta V_{NSR}$ | $\Delta V_X$ | 0 |
| | $\Delta V_Y$ | 0 |
| | $\Delta V_Z$ | 0 |
| N81 $\Delta V_{NCC}$ | $\Delta V_X$ | 0 |
| | $\Delta V_Y$ | 0 |
| | $\Delta V_Z$ | 0 |

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

| | |
|---|---|
| N13 (TIG NSR) | |
| | 2 8 |
| N72 | |

Kh

9:55 am

| 49+30 | | |
|---|---|---|
| -24:00 | VHF | R HP-65 DATA FOR NSR-24 |
| (10102) (01111) | | |
| -20:00 | | R HP-65 DATA FOR NSR-20 |
| | | V48E (LOAD WT) |
| -16:00 | | R HP-65 DATA FOR NSR-16 |

10:00 am

49+40

18

| | |
|---|---|
| -12:00 | R HP-65 DATA FOR NSR-12<br>V88E (TERMINATE VHF MARKING)<br>V77E (TERMINATE VHF RANGE RATE PROCESSING ROUTINE)<br>P34 (FINAL COMP: RECORD) |
| | GO TO SPS BURN CUE CARD (BANK A) |
| | P40 |

10:10 am

49+50

AGO

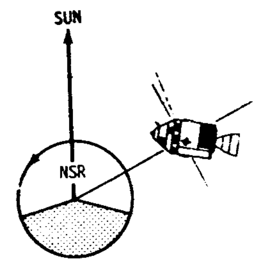
AGO

ATS

00:00

$\boxed{NSR}$ (176,307/188,357) (R=81.0 NM)
(TRIM $\overline{VG}$'s ±0.2)
RECORD BURN STATUS
P35
TRANSMIT NSR BURN STATUS
◄NSR completed. NSR ~~[illegible]~~.

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




| P | | | | Y | | | |
|---|---|---|---|---|---|---|---|

10:20 am

50+00

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

## NSR PAD DATA

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

| | | NOMINAL | PRELIMINARY | FINAL |
|---|---|---|---|---|
| N81 $\Delta V_{NSR}$ | $\Delta V_X$ | + 017.0 | | |
| | $\Delta V_Y$ | - 001.4 | | |
| | $\Delta V_Z$ | + 021.2 | | |
| N22 NSR | R | + 176.00 | + .00 | + .00 |
| | P | + 188.00 | + .00 | + .00 |
| | Y | + 357.00 | + .00 | + .00 |
| | $\Delta V_C$ | 014.5 | | |
| | BT | 00:01 | | |
| ΔVC AT IGN | | + | + | + |
| ΔVC TAILOFF | | - | - | - |

| WT + | PT | YT |
|---|---|---|
| | | |

| BURN ATT CHECK | | BURN ATT CHECK UPDATE | |
|---|---|---|---|
| STAR | | STAR | |
| SA | + 0 | SA | + 0 |
| TA | + 00 | TA | + 00 |

## NSR ONBOARD DATA

| | | P34 RECYCLE | P34 FINAL COMP |
|---|---|---|---|
| N75 | $\Delta H_{NSR}$ | + 00 | + 00 |
| | ΔT(NSR/TPI) | + B | + B |
| | ΔT(TPI/TPI) | B | B |
| N81 $\Delta V_{NSR}$ | $\Delta V_X$ | 0 | 0 |
| | $\Delta V_Y$ | 0 | 0 |
| | $\Delta V_Z$ | 0 | 0 |

NSR HP-65 SOLN

| | |
|---|---|
| $\Delta V_X$ | |
| $\Delta V_Y$ | |
| $\Delta V_Z$ | |

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

SPS BURN STATUS

| | | |
|---|---|---|
| ΔTIG | | |
| AFTER TRIM | | |
| ΔVC | | |
| FDAI (IF ATTITUDE NOT NOMINAL) | R | + |
| | P | + |
| | Y | + |
| N85 (IF VG >.2) | VGX | 00 |
| | VGY | 00 |
| | VGZ | 00 |
| TRANSMIT N81 APPLIED | | |

NOMINAL

NOMINAL

10:20 am

50+00
(10102)
(01111)
-53:00

A
T
S

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

S
X
T

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

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

REMOVE POLAR PLOT

SNACK PERIOD

10:30 am

50+10

T
V

TV- GRD CND
50+12 - 50+22

M
A
D

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

50+20

S
X
T

10:40 am

-32:00

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

U
S
R

10:50 am

50+30

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

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| HP-65 TPI TIG 1 | | | | | | | | | |
| - | | | | 3 | 2 | | | | |
| N72 | | | | | | | | | |

TPI TIG (N37)

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

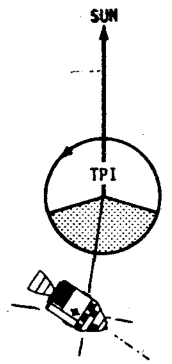
| | | 1ST P35 RECYCLE | | | | | | 2ND P35 RECYCLE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N37 TIG TPI | HR | + | 0 | 0 | | | | + | 0 | 0 | | | |
| | MIN | + | 0 | 0 | 0 | | | + | 0 | 0 | 0 | | |
| | SEC | + | 0 | | | | | + | 0 | | | | |
| N58 | $\Delta V_{TPI}$ | + | 0 | 0 | | | | + | 0 | 0 | | | |
| | $\Delta V_{TPF}$ | + | 0 | 0 | | | | + | 0 | 0 | | | |
| | ΔT(TPI/TPI) | | | | B | | | | | | B | | |
| N81 $\Delta V_{TPI}$ | $\Delta V_X$ | | 0 | 0 | | | | | 0 | 0 | | | |
| | $\Delta V_Y$ | | 0 | 0 | | | | | 0 | 0 | | | |
| | $\Delta V_Z$ | | 0 | 0 | | | | | 0 | 0 | | | |
| V16N59 $\Delta V_{(LOS)}$ | $\Delta V_F$ | | 0 | 0 | | | | | 0 | 0 | | | |
| | $\Delta V_R$ | | 0 | 0 | | | | | 0 | 0 | | | |
| | $\Delta V_D$ | | 0 | 0 | | | | | 0 | 0 | | | |

7:50 am

| GET | Time to TPI | Procedure |
|---|---|---|
| 50+30 | -24:00 | R HP-65 DATA FOR TPI-24 (GET) |
| | | XXXXXXXXXXXXXXXXXXXXXX<br>X UNREASONABLE UPDATE X<br>X 0.50 NM, 3.0 FPS X<br>XXXXXXXXXXXXXXXXXXXXXX |
| | (10102)<br>(01111) | V32E (2ND P35 RECYCLE: RECORD),(RECORD N37)(Pg 1-16) |
| | | TPI FINAL PAD (COPY) |
| | (11103)<br>(01111) | V48E (LOAD 4 JET, 2°/SEC)<br>(LOAD WT) |
| | -16:00 | R HP-65 DATA FOR TPI-16 (GET)<br>V77E (TERMINATE VHF RANGE RATE PROCESSING ROUTINE)<br>V83E, SET ORDEAL (FDAI 1) |
| | | H=118 |
| 50+40 | -14:00 | R HP-65 DATA FOR TPI-14 (GET)<br>SET HDSUPFLG (V25N7E, 106E, 2000E, 1E) |
| | -12:00 | LOAD N78 REG 3 = ZERO (V23N78E, +E)<br>P35 (FINAL COMP: RECORD)<br>PRO, N59E (RECORD)<br>RHC-MNVR TO ZERO ROLL (ROLL RIGHT) |
| | | IGNORE ATT ERROR NEEDLES & UPLINK ACTIVITY LIGHT |
| | | GO TO SPS BURN CUE CARD<br>ULLAGE AT -15 SEC<br>(BANK A) |
| | | P40 |
| 50+50 | | |
| | 00:00 | TPI (359,29/29,2) (R=21.2 NM)<br>(TRIM $\overline{VG}$'s +0.2)<br>P36 (VERIFY TRACK ROLL ATT ~ ZERO DEG)<br>◄TPI completed. TPI ВЫПОЛНЕН.<br>REACQUIRE VHF RANGING (R=18 NM)<br>V87E (START VHF MARKING)<br>FDAI 1-ORB RATE |
| | +3:00 | CENTER SOYUZ IN SXT WHEN READING HP-65 DATA θ AND TA |
| | +4:30 | θ AND TA HP-65 DATA FOR TPI+4:30 |
| 51+00 | | XXXXXXXXXXXXXXXXXXXXXX<br>X UNREASONABLE UPDATE X<br>X 0.50 NM, 3.0 FPS X<br>XXXXXXXXXXXXXXXXXXXXXX |

USR
SXT
41
SXT/VHF

11:00




## TPI PAD DATA

| | | NOMINAL | PRELIMINARY | FINAL |
|---|---|---|---|---|
| N37 TIG TPI | HR | + 050 | + | + |
| | MIN | + 54 | + | + |
| | SEC | + 25.10 | + | + |
| N81 $\Delta V_{TPI}$ | $\Delta V_X$ | + 19.5 | | |
| | $\Delta V_Y$ | + 00.7 | | |
| | $\Delta V_Z$ | - 10.0 | | |
| N59 $\Delta V$ (RCS) (LOS) | $\Delta V_F$/BT | + 219/55 | / | / |
| | $\Delta V_R$/BT | + 007/04 | / | / |
| | $\Delta V_D$/BT | + 000/00 | / | / |
| | $\Delta V_C$ | 009.2 | | |
| | BT | 00:01 | | |
| N22 (SPS USING N81) | R | + 359.00 | + 00 | + 00 |
| | P | + 029.00 | + 00 | + 00 |
| | Y | + 002.00 | + 00 | + 00 |
| $\Delta$VC AT IGN | | + | + | + |
| $\Delta$VC TAILOFF | | - | - | - |

| WT | PT | YT |
|---|---|---|
| + | | |

### BURN ATT CHECK

| STAR | |
|---|---|
| SA | + 0 |
| TA | + 00 |

### BURN ATT CHECK UPDATE

| STAR | |
|---|---|
| SA | + 0 |
| TA | + 00 |

## TPI ONBOARD DATA

### TPI HP-65 SOLN

| | |
|---|---|
| TIG | |
| $\Delta V_X$ | |
| $\Delta V_Y$ | |
| $\Delta V_Z$ | |

### P35 FINAL COMP

| | | |
|---|---|---|
| N37 TIG TPI | HR | + 00 |
| | MIN | + 000 |
| | SEC | + 0 |
| N58 | $\Delta V_{TPI}$ | + 00 |
| | $\Delta V_{TPF}$ | + 00 |
| | $\Delta T(TPI/TPI)$ | |
| N81 $\Delta V_{TPI}$ | $\Delta V_X$ | 00 |
| | $\Delta V_Y$ | 00 |
| | $\Delta V_Z$ | 00 |
| V16N59E $\Delta V_{(LOS)}$ | $\Delta V_F$ | 00 |
| | $\Delta V_R$ | 00 |
| | $\Delta V_D$ | 00 |

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

NOMINAL

NOMINAL

51+00 (11103) (01111)

S
X
T
/
V
H
F
|
7

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

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

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

+8:30 R, θ AND TA HP-65 DATA FOR TPI+8:30

+9:00 PRO (P36 FINAL COMP: RECORD)

P41

+12:00

TPM1

P36
V25N33E (LOAD TPI TIG)

+15:00

51+10

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

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

S
X
T
/
V
H
F
|
7

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

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

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

+21:00 PRO (P36 FINAL COMP: RECORD)

P41

+24:00

TPM2

51+20

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

V
H
F

(11102) (01111)

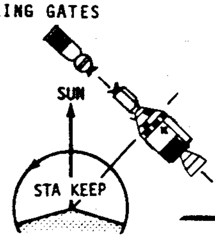
PRO (P48) (N77 = R,Ṙ,θ) (R,Ṙ FROM R27 VHF RANGING FILTER)
V48E (LOAD 0.5°/SEC)
VTR/DAC SWITCH LIST (Pg 1-18)
NULL LOS RATES AND ADJUST RANGE RATE TO BRAKING GATES
N83 (ΔVX,ΔVY,ΔVZ CONT) (OPTIONAL)

V
T
R

A
G
O

51+30

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




## TPM1 ONBOARD DATA

| | | P36 FINAL COMP | TPM1 HP-65 SOLN |
|---|---|---|---|
| N59 ΔV(LOS) | $\Delta V_F$ | 0 0 | |
| | $\Delta V_R$ | 0 0 | |
| | $\Delta V_D$ | 0 0 | |

## TPM2 ONBOARD DATA

| | | P36 FINAL COMP | TPM2 HP-65 SOLN |
|---|---|---|---|
| N59 ΔV(LOS) | $\Delta V_F$ | 0 0 | |
| | $\Delta V_R$ | 0 0 | |
| | $\Delta V_D$ | 0 0 | |

PRE-BRAKING SWITCH LIST

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

VTR/DAC SWITCH LIST

VTR POWER(3)-ON(UP)
HEAD WHEEL DRIVE MOTOR-ON (MOTOR ON LT-ON)
MODE-RECORD (RECORD LT-ON)

DAC-ON
(If desired)HDC CX06

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

CM CAMR 2

11:50 am

VTR

51+30

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

ATS

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

(11111)
(00146)
(00000)
-------
(05000)
(00500)

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

12:00 am

51+40

ACTIVE DOCKING PREPARATION CHECKLIST (Pg 1-20)

MONITOR SOYUZ MNVR ON SOYUZ +X AXIS

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

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

TV - GRD CMD
51+48 - 52+09

TV

51+50

MAD

CSM/SOYUZ INTERFACE SEAL COMPRESSED

USR

52+00

SUNSET
AT 52:05

## DOCKING ATTITUDE

| | | NOMINAL | UPDATE |
|---|---|---|---|
| N22 | R | + 3 0 0 . 0 0 | + _ _ _ . 0 0 |
| | P | + 1 5 7 . 0 0 | + _ _ _ . 0 0 |
| | Y | + 0 0 0 . 0 0 | + _ _ _ . 0 0 |

VTR/TV SWITCH LIST

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

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

NOMINAL

ACTIVE DOCKING PREPARATION CHECKLIST

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

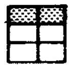
PNL

NOTE

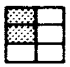
3 MONITOR FC 1 OR 2(SYSTEM A) OR FC 3
(SYSTEM B) CURRENT WHEN OPERATING
STRUCT LATCH, GUIDE RING, OR BACKUP
PASSIVE MOTORS.

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

DOCKING SYSTEM PREPARATION:
DOCKING SYSTEM A:
274 CB IND LOGIC MNA-CLOSE
CB IND PWR AC1-CLOSE
CB CONTROL BAT A-CLOSE
CB MOTORS AC1(3)-CLOSE
CB DM POWER (2)-CLOSE(VERIFY)
DOCKING SYSTEM B:
274 CB IND LOGIC MNB-CLOSE
CB IND PWR AC2-CLOSE
CB CONTROL BAT B-CLOSE
CB MOTORS AC2(3)-CLOSE



2 STRUCT LATCH OPEN LT-ON(VERIFY)
PASSIVE LT-ON(VERIFY)
* IF NO COMM: *
* DSE: (HBR/RCD/FWD/CMD RESET) *
230 * UP TEL-RELAY *
2 GUIDE RING A-EXTD(~40 SEC)(MAY CAUSE
JET FIRINGS)

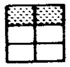


PASSIVE LT-OUT
GUIDE RING EXTD LT-ON

GUIDE RING A-OFF(CTR)
* IF NO COMM: *
* DSE: (LBR/RCD/FWD/CMD RESET) *

CONTINGENCY DOCKING SYSTEM EXTENSION VERIFICATION

PNL
-30:00 CM4/NK(B2)/300MM-EYEPIECE(A5)
LENS BRKT(A5)/DAC MOUNT(U1)



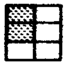
2 STRUCT LATCH OPEN LT-ON (VERIFY)
PASSIVE LT-ON (VERIFY)

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

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

MCC WILL ADIVSE WHEN TO EXTEND
AND RETRACT GUIDE RING.

0:00 GUIDE RING A-EXTEND (~40 SEC)
(MAY CAUSE JET FIRINGS)



2 PASSIVE LT-OUT
GUIDE RING EXTD LT-ON

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

| RANGE AT EXTENSION ________ |
|---|
| RANGE AT RETRACTION ________ |
| DISTANCES EXTENDED ________ |

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

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

GUIDE RING A-OFF (CTR)

RESTOW CAMERA ASSEMBLY COMPONENTS

**APOLLO ACTIVE DOCKING:**

PNL ◄ INFORM SOYUZ : READY FOR DOCKING.
ARE YOU READY?

| INFORM APOLLO : READY FOR DOCKING. |
|---|

◄ INFORM SOYUZ : APPROACHING SOYUZ.

TO INITIATE APPROACH:
* IF NO COMM BETWEEN SPACECRAFT AND *
* SOYUZ WISHES TO TERMINATE APOLLO *
* APPROACH: SOYUZ WILL TURN ON BEACON *
* LTS FOR 10 SEC, THEN OFF (TWICE) *

VERIFY DOCKING ATTITUDE
1 EMS MODE-NORMAL
-05:00 THC-THRUST +X (4 JET)($\Delta$VC=-100.5FPS)
THC/RHC-MAINTAIN RELATIVE ALIGNMENT
(CLOSING $\Delta$V=0.5 FPS)

CHANGE DAC = 12FPS
* IF NO COMM: *
* DSE: (HBR/RCD/FWD/CMD RESET) *
230 * UP TEL-RELAY *
* *
181 * TV STA SEL CM-CM(UP) *
* TV STA SEL CMT-CM2(DN) *
* *
400 * VTR HEAD WHEEL DRIVE MOTOR-ON (MOTOR ON LT-ON) *
* MODE-RECORD (RECORD LT-ON) *

AT CONTACT:

◄ INFORM SOYUZ : CONTACT.

| INFORM APOLLO : CONTACT. |
|---|

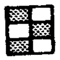
00:00 THC-THRUST +X (4 JET) AT CONTACT FOR 5 SEC MAX
2 GUIDE RING CAPTURE LT-ON(CAPTURE LT MAY BLINK)
OR WHEN SOYUZ REPORTS CAPTURE. (IF NEG. THC-X 1 SEC)
* IF SCS CONTROL REQD: *
* MAN ATT(3)-MIN IMP *
* (<2 SEC AFTER CAPTURE) *
* AUTO RCS SELECT : A3,C4,B3,D4-OFF *
* : B/D ROLL(4)-OFF *
* DBD/RATE-MIN/HI *
* BMAG MODE(3)-ATT 1/RATE 2 *
* MAN ATT(3)-RATE CMD *
* SC CONT-SCS *
1 SC CONT-CMC/FREE (<2 SEC AFTER CAPTURE)
8 AUTO RCS SELECT: A3,C4,B3,D4-OFF
1 SC CONT-CMC/AUTO

◄ INFORM SOYUZ : CAPTURE.

| INFORM APOLLO : CAPTURE. |
|---|

WAIT FOR SPACECRAFT TO STABILIZE(2 MIN)

◄ INFORM SOYUZ : INITIATING RETRACTION.



TO RETRACT:
2 GUIDE RING A-RETRACT(~40 SEC)
GUIDE RING EXTD LT-OUT
STRUCT RING CONTACT LT-ON
(WAIT 2 SEC)
GUIDE RING A-OFF(CTR)

TO PRELOAD STRUCTURAL LATCHES:
2 STRUCT LATCH A-CLOSE(~8 SEC)
STRUCT LATCH OPEN LT-OUT
STRUCT LATCH CLOSE LT-ON(LT MAY FLICKER)
STRUCT LATCH A-OFF(CTR)

◄ INFORM SOYUZ : DOCKING COMPLETED.

| INFORM APOLLO : INTERFACE SEAL COMPRESSED.<br>SOYUZ SYSTEM CHECK |
|---|

DAC/TV-OFF
PERFORM STANDARD APOLLO DOCKED CONFIGURATION(Pg 1-22)

**Активная стыковка "Аполлона"**

№ панели ◄ СООБЩИТЬ на "Союз": Готов к стыковке.
Вы готовы?

| - СООБЩИТЬ на "Аполлон": Готов к стыковке. |
|---|

◄ СООБЩИТЬ на "Союз": Подхожу к "Союзу".

Начало подхода:

+ В случае отсутствия связи между кораблями при решении +
+ "Союза" остановить подход. "Союз" включит на 10 сек. +
+ и выключит маяки /дважды/ +

- ПРОВЕРИТЬ ориентацию для стыковки
1 - РЕЖИМ СИСТ. КОНТРОЛЯ ВХОДА В АТМОС. - НОРМАЛЬНЫЙ
-05:00 - С помощью РУ* перемещением ПОДАТЬ импульс +X
/4 двигателя/ /$\Delta$V = -100,5 фут./сек./
- С помощью РУ вращением и перемещением ОБЕСПЕЧИТЬ
согласование положения с "Союзом"
/Заключительное $\Delta$V = 0,5 фут. в сек./

- При зависании УСТАНОВИТЬ на камере "ДАК"
12 кадр./сек.

В момент касания:

◄ СООБЩИТЬ на "Союз": Есть касание.

| - СООБЩИТЬ на "Аполлон": Есть касание. |
|---|

00:00 - При контакте с помощью РУ перемещением ПОДАТЬ
импульс +X /4 двигателя/ на 5 сек. макс.
2 - Тр-т ЗАХВАТ КОЛЬЦА горит /Возможно мигание/
или "Союз" сообщил о сцепке
+ Если требуется управление кораблем с помощью системы +
+ управления стабилизацией: +
+ - РУЧНОЕ УПРАВЛ. ОРИЕНТ. /3/ - МИНИМАЛЬНЫЙ +
+ ИМПУЛЬС /<2 сек. после сцепки/ +
+ - ВЫБОР АВТ. РЕЖИМА РСУ: A3,C4,B3,D4 - ВЫКЛ +
+ : КРЕН B/D /4/ - ВЫКЛ +
+ - ЗОНА НЕЧУВСТВИТЕЛЬНОСТИ/СКОРОСТЬ - МИНИМУМ/ВЫСОКАЯ +
+ - РЕЖИМ ГИРОПЛАТФОРМ /3/ - ОРИЕНТ. 1/СКОРОСТЬ 2 +
+ - РУЧНОЕ УПРАВЛ. ОРИЕНТ. /3/ - УПРАВЛ. СКОРОСТЬЮ +
+ - УПРАВЛ. КОРАБЛЕМ - СИСТЕМА УПРАВЛ. СТАБИЛИЗАЦИЕЙ +

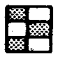
1 - УПРАВЛ. КОРАБЛЕМ - ЭВМ/НЕСТАБИЛ. /<2 сек. после сцепки/
8 - ВЫБОР АВТ. РЕЖИМА РСУ A3,C4,B3,D4 - ВЫКЛ
1 - УПРАВЛ. КОРАБЛЕМ - ЭВМ/АВТ.

◄ СООБЩИТЬ на "Союз": Есть сцепка.

| - СООБЩИТЬ на "Аполлон": Есть сцепка. |
|---|

- ОЖИДАТЬ стабилизации кораблей /2 мин./

◄ СООБЩИТЬ на "Союз": Начинаю стягивание.



Стягивание:
2 - КОЛЬЦО С НАПРАВЛЯЮЩИМИ А - ВТЯНУТЬ /~40 сек./
- Тр-т КОЛЬЦО ВЫДВИНУТО гаснет
- Тр-т КАСАНИЕ ШПАНГОУТА загорается
/ЖДАТЬ 2 сек./
- КОЛЬЦО С НАПРАВЛЯЮЩИМИ А - ВЫКЛ /Среднее положение/

Предварительная нагрузка активных крюков:
2 - АКТИВНЫЕ КРЮКИ А - ЗАКР /~8 сек./
- Тр-т АКТИВНЫЕ КРЮКИ ОТКРЫТЫ гаснет
- Тр-т АКТИВНЫЕ КРЮКИ ЗАКРЫТЫ загорается
/Возможно мигание/
- АКТИВНЫЕ КРЮКИ А - ВЫКЛ /Среднее положение/

◄ СООБЩИТЬ на "Союз": Стыковка выполнена.

| - СООБЩИТЬ на "Аполлон": Стык обжат.<br>Проверка систем "Союза" |
|---|

- "ДАК"/ТВ - ВЫКЛ
- Далее СМОТРИ инструкцию по штатному управлению
"Аполлоном" в состыкованном состоянии /Стр. 1-22/

*Ручка управления

STANDARD APOLLO DOCKED CONFIGURATION

PNL

P00
V93
* IF NOT PREVIOUSLY PERFORMED: *
* V44E N87 R1 11111 *
* R2 00146 *
* R3 00000 *
* N89 R1 +05000(RATE 0.5 DEG/SEC) *
* R2 +00500(DBD 5.0 DEG) *

V45E(ACTIVE DOCKED DAP)

RHC(BOTH)-LOCKED
THC-LOCKED

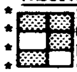
1 EMS FUNC/MODE-OFF/STBY
FDAI SCALE-5/1
FDAI SELECT-1/2
FDAI SOURCE-ATT SET
ATT SET-GDC
LIMIT CYCLE-OFF
DBD/RATE-MIN/HI
THC PWR-OFF
RHC PWR NORMAL(2)-OFF
RHC PWR DIRECT(2)-OFF

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

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

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


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

* PASSIVE DOCKING SYSTEM: *

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

PNL
5 MAIN BUS TIE(2)-OFF

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

13 FDAI(2)-INRTL

15 COAS PWR-OFF

122 OPTICS ZERO-ZERO

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

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

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

◄ INFORM SOYUZ : DOCKING SYSTEM POWER OFF.

VHF RANGE BIAS CHECK:
* IF VHF RANGING OFF: *
* ◄TURN ON VHF RANGING *
* VHF AM A-OFF(CTR) *
* VHF AM B-DUPLEX *
* VHF RANGING-ON(UP) *
P25
LOAD N72 ALL ZEROS
PRO
9 VHF RNG-RESET(12 SEC)

REPORT : TIME WHEN VHF BIAS
CHECK WAS INITIATED.

MCC-H ADVISE APOLLO WHEN TO TERMINATE P25.

P00

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

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

GO TO DM CHECKLIST (D/2-1)

APOLLO CONTINGENCY UNDOCKING

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

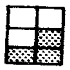
PNL
1 EMS FUNC/MODE-ΔV SET/STBY
SET ΔVC=+100.0 FPS
EMS FUNC-ΔV

◄INFORM SOYUZ : PREPARING FOR UNDOCKING.

DOCKING SYSTEM PREPARATION:
DOCKING SYSTEM A:
274 CB IND LOGIC MNA-CLOSE
CB IND PWR AC1-CLOSE
CB CONTROL BAT A-CLOSE
CB MOTORS AC1(3)-CLOSE

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

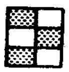
DOCKING STATUS LIGHTS:



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

* IF SOYUZ CLOSED ACTIVE HOOKS: *
* *
*◄INFORM SOYUZ : OPEN YOUR ACTIVE HOOKS. *
* *
* | INFORM APOLLO : ACTIVE HOOKS OPEN. | *

◄INFORM SOYUZ : OPENING ACTIVE HOOKS



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

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

STRUCT LATCH A-OFF(CTR)

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

| INFORM APOLLO : READY FOR UNDOCKING. |

РАССТЫКОВКА АПОЛЛОНА В НЕШТАТНОЙ СИТУАЦИИ

- ВВЕСТИ глагол 48 /61102, 11111/ /ЦАП не включать/

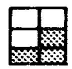
№ панели
1
- СИСТ. КОНТРОЛЯ ВХОДА В АТМОС. - переключатель ФУНКЦИЯ/РЕЖИМ УСТАНОВИТЬ в положения УСТАВКА ΔV/РЕЖИМ ГОТОВНОСТИ
- УСТАНОВИТЬ на счетчике ΔV +100,0 фут./сек.
- СИСТ. КОНТРОЛЯ ВХОДА В АТМОС. - переключатель ФУНКЦИЯ УСТАНОВИТЬ в положение ΔV

◄ СООБЩИТЬ на "Союз": Готовлюсь к расстыковке.

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

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

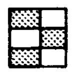
Транспаранты состояния стыковки



2
- Тр-т ЗАХВАТ КОЛЬЦА горит /Проверить/
- Тр-т КАСАНИЕ ШПАНГОУТА горит /Проверить/
- Тр-т АКТИВНЫЕ КРЮКИ ЗАКРЫТЫ горит /Проверить/

\+ Если активные крюки "Союза" закрыты: +
\+◄ СООБЩИТЬ на "Союз": Откройте ваши активные крюки. +
\+ +
\+ | - СООБЩИТЬ на "Аполлон": Активные крюки открыты. | +

◄ СООБЩИТЬ на "Союз": Открываю активные крюки.



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

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

- АКТИВНЫЕ КРЮКИ А - ВЫКЛ /Среднее положение/

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

| - СООБЩИТЬ на "Аполлон": Готов к расстыковке. |

PNL

TO INITIATE ACTIVE UNDOCKING:

1 EMS MODE-NORMAL

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

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

00:00 MONITOR UNDOCKING $\Delta$VC=+100.2 FPS

8 AUTO RCS SELECT(16)-MNA/MNB
1 BMAG MODE(3)-ATT 1/RATE 2
MAN ATT(3)-RATE CMD
SC CONT-SCS
EMS FUNC/MODE-OFF/STBY
V46E(ACTIVATE APOLLO DAP)

◄ INFORM SOYUZ : UNDOCKING COMPLETED.

| INFORM APOLLO : UNDOCKING COMPLETED. |
|---|

DOCKING SYSTEM A:

274 CB IND LOGIC MNA-OPEN
CB IND PWR AC1-OPEN
CB CONTROL BAT A-OPEN
CB MOTORS AC1(3)-OPEN

DOCKING SYSTEM B:

CB IND LOGIC MNB-OPEN
CB IND PWR AC2-OPEN
CB CONTROL BAT B-OPEN
CB MOTORS AC2(3)-OPEN

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

№ панели

Начало активной расстыковки:

1 - РЕЖИМ СИСТ. КОНТРОЛЯ ВХОДА В АТМОС. - НОРМАЛЬНЫЙ

◄ СООБЩИТЬ на "Союз": Начинаю расстыковку
5,4,3,2,1 МАРК.

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

00:00 - КОНТРОЛИРОВАТЬ по счетчику: $\Delta$V при расстыковке =
+100,2 фут./сек.

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

◄ СООБЩИТЬ на "Союз": Расстыковка выполнена.

| - СООБЩИТЬ на "Аполлон": Расстыковка выполнена. |
|---|

Стыковочная система А:

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

Стыковочная система В:

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

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

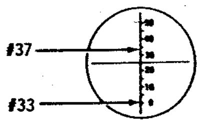
WHEN CMC FAILURE OCCURS

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

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

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

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




SHAFT = 0°
TRUN = 352.5°

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

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

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

## LAUNCH / RNDZ REALIGN PAD

NOMINAL LAUNCH

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ASCP tw | R | X | X | 0 | 0 | 5 | 0 |
| | P | X | X | 1 | 5 | 2 | 2 |
| | Y | X | X | 3 | 5 | 6 | 4 |

POST INS UPDATE

| | | | | | |
|---|---|---|---|---|---|
| X | X | | | | |
| X | X | | | | |
| X | X | | | | |

LAUNCH → GET ~ 7+30

## RNDZ/RNDZ REALIGN PAD

RNDZ UPDATE

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ASCP tw | R | X | X | | | | |
| | P | X | X | | | | |
| | Y | X | X | | | | |

GET ~ 7+30 → DOCK

## BACKUP GDC ALIGN PAD

NOMINAL LAUNCH A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0°/R STARS | | 3 | 3 | / | 3 | 7 | X |
| ASCP tw | R | X | X | 2 | 4 | 9 | 6 |
| | P | X | X | 2 | 7 | 7 | 5 |
| | Y | X | X | 3 | 3 | 7 | 9 |

POST INS UPDATE B

| | | | | | |
|---|---|---|---|---|---|
| | | / | | | X |
| X | X | | | | |
| X | X | | | | |
| X | X | | | | |

NOMINAL RNDZ C

| | | | | | |
|---|---|---|---|---|---|
| 3 | 3 | / | 3 | 7 | X |
| X | X | 2 | 4 | 6 | 3 |
| X | X | 0 | 6 | 8 | 2 |
| X | X | 3 | 3 | 2 | 5 |

RNDZ UPDATE D

| | | | | | |
|---|---|---|---|---|---|
| | | / | | | X |
| X | X | | | | |
| X | X | | | | |
| X | X | | | | |

## STAR ACQUISITION PAD

(ACM ATT)
NOMINAL LAUNCH A

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ASCP tw | R | + | 1 | 7 | 9 | 0 | 0 |
| | P | + | 2 | 1 | 3 | 0 | 0 |
| | Y | + | 0 | 0 | 1 | 0 | 0 |
| 1ST STAR | | X | X | X | X | 3 | 7 |
| TPAC | SA | X | 2 | 3 | 5 | 2 | 0 |
| ANGLES | TA | X | 0 | 4 | 1 | 3 | 0 |
| 2ND STAR | | X | X | X | X | 4 | 5 |
| TPAC | SA | X | 0 | 3 | 4 | 5 | 0 |
| ANGLES | TA | X | 0 | 1 | 2 | 3 | 0 |
| 3RD STAR | | X | X | X | X | 4 | 2 |

(ACM ATT)
POST INS UPDATE B

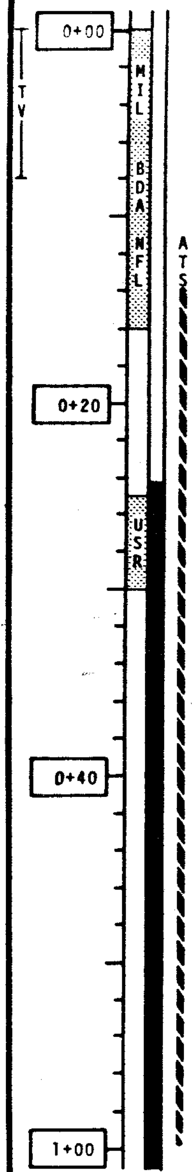
| | | | | | |
|---|---|---|---|---|---|
| + | | | | 0 | 0 |
| + | | | | 0 | 0 |
| + | | | | 0 | 0 |
| X | X | X | X | | |
| X | | | | | 0 |
| X | 0 | | | | 0 |
| X | X | X | X | | |
| X | | | | | 0 |
| X | 0 | | | | 0 |
| X | X | X | X | | |

(SI +X FWD)
NOMINAL RNDZ C

| | | | | | |
|---|---|---|---|---|---|
| + | 0 | 1 | 8 | 0 | 0 |
| + | 1 | 7 | 0 | 0 | 0 |
| + | 3 | 3 | 0 | 0 | 0 |
| X | X | X | X | 4 | 0 |
| X | 0 | 8 | 6 | 6 | 0 |
| X | 0 | 2 | 5 | 8 | 0 |
| X | X | X | X | 4 | 3 |
| X | 0 | 0 | 0 | 8 | 0 |
| X | 0 | 3 | 1 | 0 | 0 |
| X | X | X | X | 0 | 1 |

RNDZ UPDATE D

| | | | | | |
|---|---|---|---|---|---|
| + | | | | 0 | 0 |
| + | | | | 0 | 0 |
| + | | | | 0 | 0 |
| X | X | X | X | | |
| X | | | | | 0 |
| X | 0 | | | | 0 |
| X | X | X | X | | |
| X | | | | | 0 |
| X | 0 | | | | 0 |
| X | X | X | X | | |




APOLLO LIFT-OFF

APOLLO INSERTION

SIVB MNVRS TO RLH

EMS ΔV TEST & NULL BIAS CHECK

SIVB MNVRS TO SEP ATT

EMS ΔV TEST & NULL BIAS CHECK CHECKLIST

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

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

1+00

VTR

VAN

CSM/SIVB SEP —— START TD&E ——

1+20

DOCKING

HGA SWITCH LIST

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

1+40

NFL

TRANSMIT SEP AND
SLA PANEL JET STATUS
TRANSMIT EMS ΔV TEST RESULTS

*****IF OHA REQ'D*******************
* OHA PRELIMINARY PAD (COPY Pg 2-3) *
* AMC PRELIMINARY PAD (COPY Pg 2-4) *
***************************************

ATS

MAD

2+00

HGA SWITCH LIST

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

2+00

ATS

TV

TAN

2+20

SIVB MNVRS TO EXTRACTION ATT

RECORD IMU & GDC ATT

ALIGN GDC

VTR

0:00

CSM/DM EXTRACTION
AEM
—— END TD&E

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

*****FOR M=14 RNDZ*****************
* DP START PGA DOFFING (Pg 2-5), *
*   THEN CP *
* AC START SNACK PERIOD, DOFF *
*   AFTER ACM *
***********************************

2+40

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

VAN

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

SNACK PERIOD

*****IF OHA REQ'D*******************
* OHA FINAL PAD (COPY) *
* *
* *
* SET DET *
* SET ASCP tw TO OHA BURN ATT *
* *
* MNVR & DRIVE SXT TO PAD DATA *
* IF STAR NOT IN SXT FOV-USE HORIZ *
* CK(±5°)TO DETERMINE IF IMU OR *
* GDC IS GO *
* GO TO SPS BURN CUE CARD(SCS Δ) *
*   (BANK A) *
* *
* *
* *

3+00

## OHA PAD DATA

| | | NOMINAL | PRELIMINARY | FINAL |
|---|---|---|---|---|
| N33 | HR | + | + | + |
| TIG OHA | MIN | + | + | + |
| | SEC | + | + | + |
| N81 | $\Delta V_X$ | | | |
| $\Delta V_{OHA}$ | $\Delta V_Y$ | + 0 0 0 0 | | |
| | $\Delta V_Z$ | | | |
| N22 | R | + 0 0 | + 0 0 | + 0 0 |
| OHA | P | + 0 0 | + 0 0 | + 0 0 |
| | Y | + 0 0 | + 0 0 | + 0 0 |
| | $\Delta V_C$ | | | |
| | BT | | | |

| WT | + | PT | | YT | |
|---|---|---|---|---|---|

BURN ATT CHECK

| STAR | |
|---|---|
| SA | + 0 |
| TA | + 0 0 |

BURN ATT CHECK UPDATE

| STAR | |
|---|---|
| SA | + 0 |
| TA | + 0 0 |

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

IMU & GDC ATT

| | | |
|---|---|---|
| IMU ASCP tw | R | |
| | P | |
| | Y | |
| GDC ASCP tw | R | |
| | P | |
| | Y | |

SPS BURN STATUS

| | |
|---|---|
| ΔTIG | |
| AFTER TRIM | |
| ΔVC | |

PSM ACTIVATION SWITCH LIST

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

3+00

G D S

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

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

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

N F L

A T S

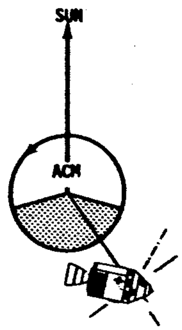
MNVR TO STAR ACQ PAD "B" ATT
RECORD IMU & GDC ATT
OHC-SET IN TPAC ANGLES
OF 1ST PAD STAR
IF STAR >5° FROM CTR OF SCT
PERFORM BACKUP GDC & IMU
ALIGNMENT (G/3-12), THEN
REPEAT STAR CK TO VERIFY
ACM FINAL PAD (COPY)
TRANSMIT IMU & GDC ATT

3+20

M A D

SET DET

-12:00 SET ASCP tw TO ACM BURN ATT




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

3+40

0:00 ACM (179,34/213,1)

RECORD BURN STATUS
TRANSMIT ACM BURN STATUS

PGA DOFFING (Pg 2-5)

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

4+00

## ACM PAD DATA

| | | NOMINAL | PRELIMINARY | FINAL |
|---|---|---|---|---|
| N33 TIG ACM | HR | + 003 | + | + |
| | MIN | + 45 | + | + |
| | SEC | + 00. | + ___. | + ___. |
| N81 ΔV ACM | $\Delta V_X$ | + 016.7 | ___. | ___. |
| | $\Delta V_Y$ | + 000.0 | ___. | ___. |
| | $\Delta V_Z$ | - 012.1 | ___. | ___. |
| N22 ACM | R | + 179.00 | + ___.00 | + ___.00 |
| | P | + 213.00 | + ___.00 | + ___.00 |
| | Y | + 001.00 | + ___.00 | + ___.00 |
| | $\Delta V_C$ | 008.1 | ___. | ___. |
| | BT | 00:01 | ___:___ | ___:___ |
| ΔVC AT IGN | | + ___. | + ___. | + ___. |
| ΔVC TAILOFF | | - ___. | - ___. | - ___. |

| WT | + | | | | | |
|---|---|---|---|---|---|---|

| PT | | ___. | | |
|---|---|---|---|---|

| YT | | ___. | | |
|---|---|---|---|---|

BURN ATT CHECK

| STAR | | | |
|---|---|---|---|
| SA | + | ___. | 0 |
| TA | + | ___. | 0 0 |

BURN ATT CHECK UPDATE

| STAR | | | |
|---|---|---|---|
| SA | + | ___. | 0 |
| TA | + | ___. | 0 0 |

IMU & GDC ATT

| | | |
|---|---|---|
| IMU ASCP tw | R | ___. |
| | P | ___. |
| | Y | ___. |
| GDC ASCP tw | R | ___. |
| | P | ___. |
| | Y | ___. |

SPS BURN STATUS

| | |
|---|---|
| ΔTIG | ___:___ |
| AFTER TRIM | |
| ΔVC | ___. |

4+00

ATS

ORR

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

4+20

HAW

NC1 PRELIMINARY PAD (COPY Pg 2-6)
NPC ADVISORY

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

4+40

NFL

ATS

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

NC1 FINAL PAD (COPY Pg 2-6)
NPC PRELIMINARY PAD (COPY Pg 2-7)

TRANSMIT DM/CM $\Delta$P (1ST OPP ONLY)

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

5+00

PGA DOFFING

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

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

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

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

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

Doff PGA - discon elect and urine
connections inside PGA

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

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

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

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

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

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

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

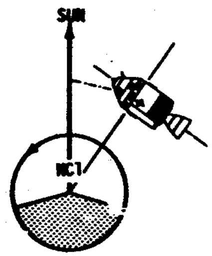
For SPEAKER Box use (Pnl 98):
POWER-ON
SPK/HDST-SPEAKER
VOL tw-as desired

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

BIOSTACK PAD

| | | | | | |
|---|---|---|---|---|---|
| GET HR | | | | IND LT ON | |
| MIN | | | | OFF | |

| GET | Station | Activity |
|---|---|---|
| 5+00 | ATS | ZFF PHOTOS (J/10-1) |
| | | SET DET |
| | | MNVR TO STAR ACQ PAD "B" ATT<br>RECORD IMU & GDC ATT<br>OHC-SET IN TPAC ANGLES<br>OF 1ST PAD STAR<br>IF STAR >5° FROM CTR OF SCT<br>PERFORM BACKUP GDC & IMU<br>ALIGNMENT (G/3-12), THEN<br>REPEAT STAR CK TO VERIFY |
| 5+20 | | |
| | | MNVR TO STDN NC1 BURN (PITCH) ATT |
| -12:00 | | SET ASCP tw TO NC1 BURN ATT |
| | | GO TO SPS BURN CUE CARD(SCS Δ)<br>(BANK B) |
| | ORR | |
| 5+40<br>0:00 | | NC1 (181,358/59,0)<br>RECORD BURN STATUS |
| | | IF NPC NOT REQ'D<br>MNVR TO SI +X FWD ATT<br>(ATT = 12,14,332) |
| | | CP CM HEIGHT & LEG VOLUME<br>MEASUREMENTS (1ST OPP ONLY)<br>AC & DP (IF TIME PERMITS)<br>RECORD (EXP C/L Pgs 1-59/51) |
| | HAW | TRANSMIT NC1 BURN STATUS<br>TRANSMIT IMU & GDC ATT |
| 6+00 | | |




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

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

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

## NC1 PAD DATA

| | | NOMINAL | PRELIMINARY | FINAL |
|---|---|---|---|---|
| N33 TIG NC1 | HR | + 005 | + | + |
| | MIN | + 41 | + | + |
| | SEC | + 28 | + | + |
| N81 $\Delta V_{NC1}$ | $\Delta V_X$ | + 066.3 | | |
| | $\Delta V_Y$ | + 000.0 | | |
| | $\Delta V_Z$ | + 000.2 | | |
| N22 NC1 | R | + 181.00 | + .00 | + .00 |
| | P | + 059.00 | + .00 | + .00 |
| | Y | + 000.00 | + .00 | + .00 |
| | $\Delta V_C$ | 053.7 | | |
| | BT | 00:03 | | |

| WT | + | PT | | YT | |
|---|---|---|---|---|---|

### BURN ATT CHECK

| STAR | |
|---|---|
| SA | + 0 |
| TA | + 00 |

### BURN ATT CHECK UPDATE

| STAR | |
|---|---|
| SA | + 0 |
| TA | + 00 |

### IMU & GDC ATT

| | | |
|---|---|---|
| IMU ASCP tw | R | |
| | P | |
| | Y | |
| GDC ASCP tw | R | |
| | P | |
| | Y | |

### SPS BURN STATUS

| | |
|---|---|
| ΔTIG | |
| AFTER TRIM | |
| ΔVC | |

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

| | |
|---|---|
| GET HR | |
| MIN | |

6+00

NFL BDA

ATS

6+20

IF NPC NOT REQ'D

SET HGA: MAN P -54, Y 265
  S-BD ANT IND > 1/3 SCALE
  HGA: REACQ, NARROW

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

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

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

ACN

6+40

START EAT PERIOD

7+00

*****IF NPC REQ'D*****************

SET HGA: MAN P -51, Y 96
  S-BD ANT IND > 1/3 SCALE
  HGA: REACQ, NARROW

NPC FINAL PAD (COPY)

SET DET

SET ASCP tw TO NPC BURN ATT
MNVR TO BURN ATT(IMU)
NOTE: IMU/GDC OUT-OF-PLANE
  REALIGN NOT REQ'D FOR NPC.
OHC-SET IN TPAC ANGLES OF BURN
  ATT CHECK PAD STAR.
IF STAR >5° FROM CTR OF SCT-
  PERFORM BACKUP GDC & IMU
  ALIGNMENT (G/3-12), THEN
  REPEAT STAR CK TO VERIFY.

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

$\boxed{\text{NPC}}$

RECORD BURN STATUS (Pg 2-8)

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

**********************************

## NPC PAD DATA

| | | PRELIMINARY | FINAL |
|---|---|---|---|
| N33 TIG NPC | HR | + | + |
| | MIN | + | + |
| | SEC | + | + |
| N81 $\Delta V_{NPC}$ | $\Delta V_X$ | | |
| | $\Delta V_Y$ | | |
| | $\Delta V_Z$ | | |
| N22 NPC | R | + 0 0 | + 0 0 |
| | P | + 0 0 | + 0 0 |
| | Y | + 0 0 | + 0 0 |
| | $\Delta V_C$ | | |
| | BT | | |

| WT | + | PT | | YT | |
|---|---|---|---|---|---|

BURN ATT CHECK

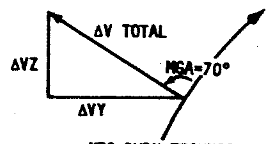
| STAR | |
|---|---|
| SA | + 0 |
| TA | + 0 0 |

BURN ATT CHECK UPDATE

| STAR | |
|---|---|
| SA | + 0 |
| TA | + 0 0 |

IMU DRIFT CHECK

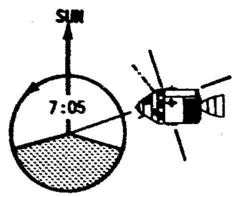
| | | |
|---|---|---|
| ASCP tw | R | |
| | P | |
| | Y | |
| 1ST STAR | | |
| TPAC ANGLES | SA | |
| | TA | |
| 2ND STAR | | |
| TPAC ANGLES | SA | |
| | TA | |
| TIME OF DRIFT CHECK | HR | + 0 0 |
| | MIN | + 0 0 0 |
| | SEC | + 0 |




NPC BURN TECHNIQUE

| | |
|---|---|
| 7+00 | ATS |
| 7+20 | GWM |
| 7+40 | |
| | ROSS BDA MIL |
| 15+30 | ATS |

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




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

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

SET HGA: MAN P -29, Y 259
HGA: REACQ, NARROW
PWR DOWN CHECKLIST (Pg 2-8)
DIRECT O2 VLV-CLOSE(cw)

PRESLEEP (S/1-49)

* MNVR TO STAR ACQ PAD "C" ATT *
* IMU DRIFT CHECK(RATE-LOW) *
* RECORD SA'S AND TA'S *
* REQUIRED TO CENTER STARS *
* IN SXT (40,43) *
* RECORD GET WHEN FINISHED *
* TRANSMIT IMU DRIFT CHECK DATA *
* VERIFY SI +X FWD ATT(18,170,330)
*********************************

SYNCHRONIZE MISSION TIMER TO
SOYUZ GET UPON STDN CUE

*****FOR M=14 RNDZ**************
* UVA LAMPS SHUT DOWN (Pg 2-8) *
* TERMINATE BATT A CHARGE (UPON *
* STDN CUE) THEN CHARGE BATT B*
*********************************

GO TO FLIGHT PLAN (Pg 4.1-6)

SPS BURN STATUS

| | | | | | | |
|---|---|---|---|---|---|---|
| ΔTIG | | | | | | |
| AFTER TRIM | | | | | | |
| ΔVC | | | | | | |

GDC & IMU LAUNCH/RNDZ REALIGN CHECKLIST

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

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

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

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

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

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

IMU DRIFT CHECK

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

PWR DOWN CHECKLIST

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

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

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

46+30

V
A
N

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

OPTICS PWR UP CHECKLIST (Pg 2-9)

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

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

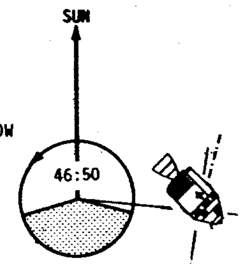
46+40

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

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

46+50

A
T
S




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

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

47+00

OPTICS PWR UP CHECKLIST

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

GDC & IMU RNDZ/RNDZ REALIGN CHECKLIST

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

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

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

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

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

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

IMU DRIFT CHECK

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

47+00

ATS

TV CHECKLIST (Pg 2-10)

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

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

47+10

TV

TV- GRD CMD
47+10 - 47+37

*****FOR M=14 RNDZ*****************
* BIOSTACK-OFF (MA 107) (R1) *
* RECORD GET & INDICATOR STATUS *

| | | | | | | |
|---|---|---|---|---|---|---|
| GET | HR | | | | IND LT ON | |
| | MIN | | | | OFF | |

***********************************

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

47+20

USR

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

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

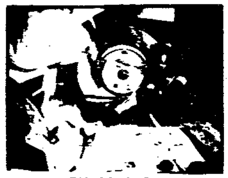
ZFF PHOTOS (J/10-1)

47+30

TV CHECKLIST

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


CM CAMR 1


DM CAMR 1


DM CAMR 2

47+30

U S B

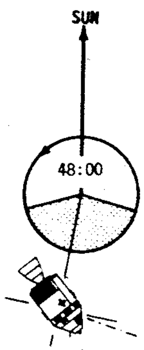
A T S

H2 PURGE LINE HTR-ON(up)

47+40

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

47+50




H2/02 FUEL CELL PURGE (S/1-6) (20 MIN AFTER LINE HTR-ON)

WASTE WATER DUMP CHECKLIST

48+00

IMU DRIFT CHECK

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

WASTE WATER DUMP CHECKLIST

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

| | |
|---|---|
| 48+00 | NC2 FINAL PAD (COPY) |
| | NCC PRELIMINARY PAD (COPY Pg 2-14) |
| | NSR PRELIMINARY PAD (COPY Pg 2-15) |
| | TRANSMIT IMU DRIFT CHECK DATA (Pg's 2-9 & 2-11) |
| | H2 PURGE LINE HTR-OFF (10 MIN AFTER PURGE) |
| 48+10 | UNSTOW HP-65 KIT(U1) & CHECKLIST(R1) |
| | VELCRO (HOOK) FROM U3 (IN PIN STRAIGHTENING KIT) |
| | HP-65 CHECKOUT (Pg 1) |
| | MNVR TO NC2 FINAL PAD ATT |
| | SET DET — P ___ Y ___ |
| 48+20 | ACQUIRE ATS HGA: MAN, WIDE P -35, Y 144 |
| | S-BD ANT IND > 1/3 SCALE, HGA: REACQ, NARROW |
| -12:00 | SET ASCP tw TO NC2 BURN ATT |
| | GO TO SPS BURN CUE CARD(SCS Δ) (BANK A) |
| 48+30 | |

V A N

A T S

## NC2 PAD DATA

| | | NOMINAL | PRELIMINARY | FINAL |
|---|---|---|---|---|
| N28 | HR | + 048 | + | + |
| TIG NC2 | MIN | + 34 | + | + |
| | SEC | + 04. | + . | + . |
| N81 | $\Delta V_X$ | - 036.4 | . | . |
| $\Delta V_{NC2}$ | $\Delta V_Y$ | + 000.0 | . | . |
| | $\Delta V_Z$ | - 000.1 | . | . |
| N22 | R | + 000.00 | + .00 | + .00 |
| NC2 | P | + 034.00 | + .00 | + .00 |
| | Y | + 000.00 | + .00 | + .00 |
| | $\Delta V_C$ | 023.7 | . | . |
| | BT | 00:00 | : | : |

| WT | + | PT | . | YT | . |
|---|---|---|---|---|---|

BURN ATT CHECK

| STAR | |
|---|---|
| SA | + . 0 |
| TA | + . 00 |

BURN ATT CHECK UPDATE

| STAR | |
|---|---|
| SA | + . 0 |
| TA | + . 00 |

| TPI TIG | N37 | : : . |
|---|---|---|

SPS BURN STATUS

| | |
|---|---|
| ΔTIG | : |
| AFTER TRIM | |
| ΔVC | . |

DATE 6/1/75

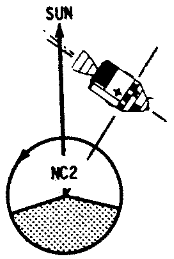


CMC FAILURE CMC FAILURE CMC FAILURE CMC FAILURE CMC FAILURE CMC FAILURE CMC FAILURE

48+30

A T S

SOYUZ MNVRS TO ORBITAL ATTITUDE RATE




0:00 ACN

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

RECORD BURN STATUS
TRANSMIT NC2 BURN STATUS

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

48+40

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

SET DET

48+50

TV

USR

TV- GRD CMD
48+50 - 49+00

DP PERFORM VHF AM COMM CK

VHF AM SPEC RANGE = 196 NM

49+00

VHF AM AND FM COMM

VHF FM-T/R (6)
VHF AM-T/R
VHF FM-T/R (9)
VHF AM-T/R
VHF AM A-SIMPLEX (3)
VHF AM SQUELCH A tw-noise + 1
VHF ANTENNA-RIGHT
MODE-VOX (10)
VOX SENS tw-8
VHF FM-RCV

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

◄This is Apollo. Я АПОЛЛОН.
◄How do you read? КАК ВЫ СЛЫШИТЕ?

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

VHF AM COMM CHECK 48+59

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

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

VHF FM COMM CHECK 49+08

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

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

VHF RANGING COMM CHECK 49+23

◄Turn on VHF ranging. ВКЛЮЧИТЕ ИЗМЕРЕНИЕ ДАЛЬНОСТИ.

VHF AM A-OFF(ctr)
VHF AM B-DUPLEX
VHF RANGING-ON(up)
VHF ANTENNA-RIGHT(verify)
EMS FUNC-ΔV SET/VHF RNG
EMS MODE-BACKUP/VHF RNG
VHF RNG-RESET
◄Ranging lockup established. РЕЖИМ ИЗМЕРЕНИЯ ДАЛЬНОСТИ УСТАНОВЛЕН.
◄Range _____ miles. ДАЛЬНОСТЬ _____ МИЛЬ.
VHF FM-OFF(6)
VHF AM-T/R
◄This is Apollo on VHF ranging. Я АПОЛЛОН НА РЕЖИМЕ ИЗМЕРЕНИЯ ДАЛЬНОСТИ.

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

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

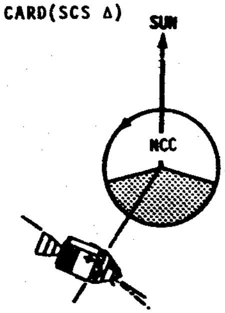
* If ranging lockup is lost, *
* ◄Your voice degrading ranging lockup. ГОЛОС УХУДШАЕТ РЕЖИМ ИЗМЕРЕНИЯ ДАЛЬНОСТИ. *
* VHF RNG-RESET (1) *
* ◄Ranging lockup established. РЕЖИМ ИЗМЕРЕНИЯ ДАЛЬНОСТИ УСТАНОВЛЕН. *

| | | |
|---|---|---|
| 49+00 | NCC FINAL PAD (COPY)<br>NSR FINAL PAD (COPY Pg 2-15) | |
| -12:00 | SET ASCP tw TO NCC BURN ATT | |
| | DP PERFORM VHF FM COMM CK | VHF FM SPEC RANGE = 162 NM |
| 49+10 | GO TO SPS BURN CUE CARD(SCS Δ)<br>(BANK A) | |
| 0:00 | $\boxed{\text{NCC}}$ (180,349/21,359) (R=145.5 NM) | |
| 49+20 | RECORD BURN STATUS<br>REPORT COMM CHECK RESULTS<br>TRANSMIT NCC BURN STATUS<br>PITCH UP TO TRACK HORIZON | |
| | SET DET<br>◄NCC completed. НСС ВЫПОЛНЕН.<br>DP PERFORM VHF RANGING VOICE CHECK WITH SOYUZ | VHF RANGING SPEC RANGE = 144 NM |
| -28:00 | R HP-65 DATA FOR NSR-28 | |
| 49+30 | | |

U S R

A T S

G W M




## NCC PAD DATA

| | | NOMINAL | PRELIMINARY | FINAL |
|---|---|---|---|---|
| N11 TIG NCC | HR | + 049 | + | + |
| | MIN | + 18 | + | + |
| | SEC | + 03 | + | + |
| N81 $\Delta V_{NCC}$ | $\Delta V_X$ | + 039.6 | | |
| | $\Delta V_Y$ | - 000.6 | | |
| | $\Delta V_Z$ | + 006.4 | | |
| N22 NCC | R | + 180.00 | + 00 | + 00 |
| | P | + 021.00 | + 00 | + 00 |
| | Y | + 359.00 | + 00 | + 00 |
| | $\Delta V_C$ | 027.4 | | |
| | BT | 00:02 | | |
| WT | | + | PT | YT |

| BURN ATT CHECK | | BURN ATT CHECK UPDATE | |
|---|---|---|---|
| STAR | | STAR | |
| SA | + 0 | SA | + 0 |
| TA | + 00 | TA | + 00 |

SPS BURN STATUS

| | |
|---|---|
| ΔTIG | |
| AFTER TRIM | |
| ΔVC | |

| | |
|---|---|
| N11 (TIG NCC) | |
| + | 09 |
| NSR-28 | |

49+30

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

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

θD=346, H=111

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

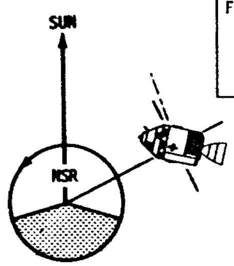
49+40

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

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

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

49+50




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

GO

AGO

0:00 NSR (176,307/188,357) (R=81.0 NM)

RECORD BURN STATUS
TRANSMIT NSR BURN STATUS
◄NSR completed. NSR ВЫПОЛНЕН.

| P | | | | Y | | | |
|---|---|---|---|---|---|---|---|

ATS

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

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

50+00

## NSR PAD DATA

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

| | | NOMINAL | PRELIMINARY | FINAL |
|---|---|---|---|---|
| N81 ΔV NSR | $\Delta V_X$ | + 017.0 | . | . |
| | $\Delta V_Y$ | - 001.4 | . | . |
| | $\Delta V_Z$ | + 021.2 | . | . |
| N22 NSR | R | + 176.00 | + .00 | + .00 |
| | P | + 188.00 | + .00 | + .00 |
| | Y | + 357.00 | + .00 | + .00 |
| | $\Delta V_C$ | 014.5 | . | . |
| | BT | 00:01 | : | : |
| ΔVC AT IGN | | + . | + . | + . |
| ΔVC TAILOFF | | - . | - . | - . |

| WT | + | PT | . | YT | . |
|---|---|---|---|---|---|

| BURN ATT CHECK | | | BURN ATT CHECK UPDATE | | |
|---|---|---|---|---|---|
| STAR | | | STAR | | |
| SA | + | . 0 | SA | + | . 0 |
| TA | + | . 00 | TA | + | . 00 |

## NSR ONBOARD DATA

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
X N81 COMP LIMITS NA X
X USE STDN ΔVY IN ALL CASES X
X IF NCC EXECUTION IS QUESTIONABLE-THE ORDER X
X OF PRIORITIES ARE: X
X HP-65 X
X STDN UNMATCHED X
X DO NOT BURN NSR X
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

| NSR HP-65 SOLN | |
|---|---|
| $\Delta V_X$ | . |
| $\Delta V_Y$ | * S T D N * |
| $\Delta V_Z$ | . |

SPS BURN STATUS

| | | |
|---|---|---|
| ΔTIG | | . |
| FDAI (INTRL) (FOR HP-65 BURN ONLY) | R | |
| | P | |
| | Y | |
| AFTER TRIM | | |
| $\Delta V_C$ | | . |
| TRANSMIT ΔVC LOADED | | |

| | | |
|---|---|---|
| ORDEAL BURN ATT | | . |
| ΔVT (IN PLANE) | + | . |
| ΔV TAIL OFF | - | 13.0 |
| $\Delta V_C$ | + | . |
| $\Delta V_Y$ BT | | |

| 50+00 | | 
|---|---|
| | REACQUIRE VHF RANGING (R=74 NM) FOR HP-65 DATA<br>R HP-65 DATA FOR TPI TIG 1 |
| | R HP-65 DATA FOR TPI TIG 1 |
| | SET DET<br>REMOVE POLAR PLOT |
| | SNACK PERIOD |
| 50+10 | |
| | TV- GRD CMD<br>50+12 - 50+22 |
| MAD | TPI PRELIMINARY PAD (COPY Pg 2-17)<br>DOCKING ATTITUDE PAD (COPY Pg 2-19) |
| 50+20 | |
| -32:00 | R HP-65 DATA FOR TPI-32 (GET) |
| USR | |
| 50+30 | |

TV

ATS

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