

Flight Plan

STS-77

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(FRR Cycle Trajectory)

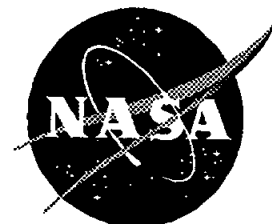
Mission Operations Directorate Operations Division

Final April 2, 1996

| <u>EVENT</u> | <u>CDT</u> | | |
|-------------------|------------|----------|--------|
| Launch | 05:32 | Thursday | May 16 |
| Spartan Release | 06:31 | Friday | May 17 |
| Spartan Grapple | 09:57 | Saturday | May 18 |
| PAMS STU Ejection | 04:20 | Sunday | May 19 |
| KSC Landing | 06:09 | Sunday | May 26 |

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas




MISSION OPERATIONS DIRECTORATE

STS-77 FLIGHT PLAN


FINAL
April 2, 1996

PREPARED BY:




Tracy Calhoun
Book Manager

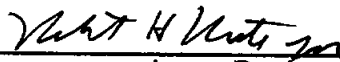
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| | FLT PLN-1803 | FLT PLN-1807 | MULTI-1253 | MULTI-1259 |
| | FLT PLN-1804 | FLT PLN-1808 | MULTI-1254 | |
| | FLT PLN-1805 | | MULTI-1257 | |

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| Book Manager/Lead FAO | DO4/T. Calhoun | 244-1129 |
| Lead Timeliner | DO4/D. Gray | 244-1144 |
| Lead Pointer | DO4/J. Kirinich | 244-5752 |

FLIGHT PLAN
STS-77

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| DAP A | 7-3 | FLT PLN-2a/77/O/A |
| DAP A1 | 7-3 | FLT PLN-2b/77/O/A |
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| DAP B9 | 7-13 | FLT PLN-22b/77/O/B |
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INTRODUCTION

The STS-77 Flight Plan is the Flight Data File article that contains the on-orbit timeline. It does not contain the detailed timelines that are covered in the Ascent, Post Insertion, Rendezvous, Deorbit Prep, and Entry Checklists. The detailed rendezvous timelines and procedures for Spartan-207 are contained in the Rendezvous Checklist, Volume A. The detailed rendezvous and deploy timelines and procedures for PAM STU are in the Rendezvous Checklist, Volume B. For continuity, the summary level timeline includes the entire flight.

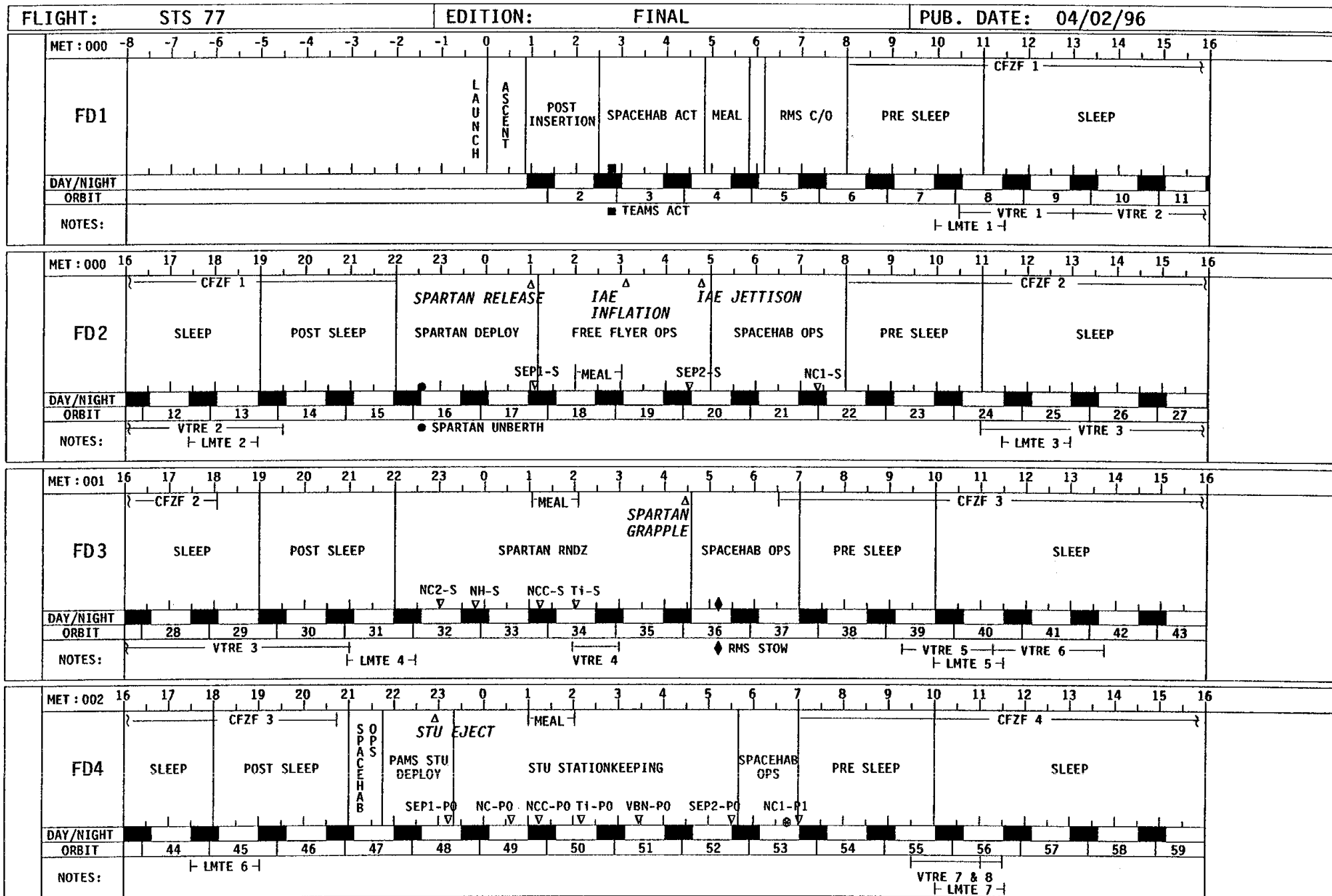
This on-orbit timeline satisfies the objectives specified in the Flight Definition and Requirements Directive, and the requirements of the STS-77 Flight Requirements Document. The Flight Plan, as part of the Flight Data File, meets the specifications of the STS-77 Flight Initialization Data Pack.

The STS-77 FRR Cycle was used for the timeline trajectory. The flight profile used in this Flight Plan is for a launch date of May 16, 1996 at 10:32 GMT. Orbiter inertial attitudes are expressed relative to a Mean of 1950 (M50) reference frame.

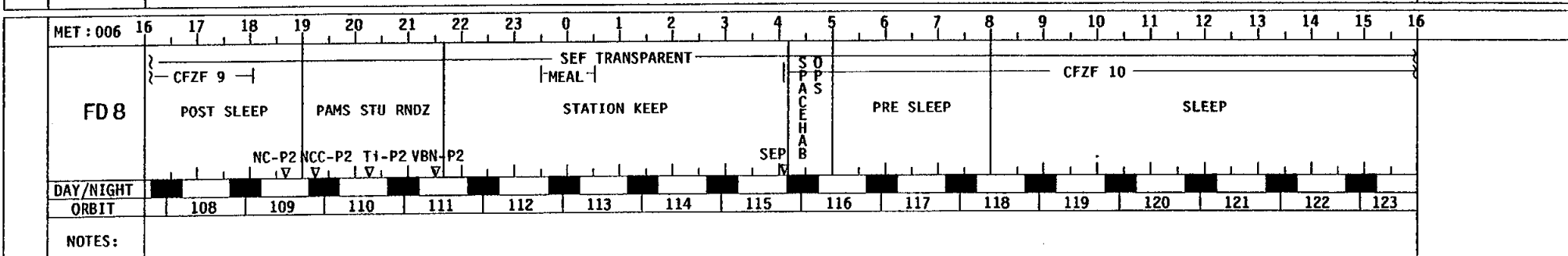
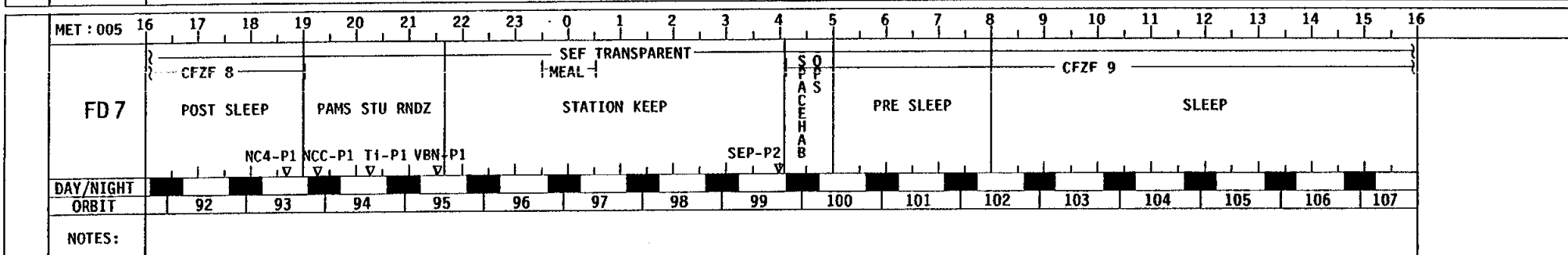
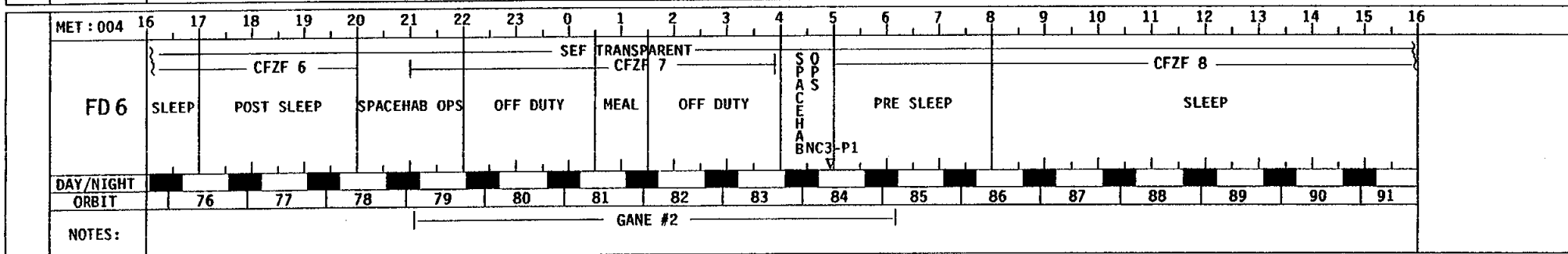
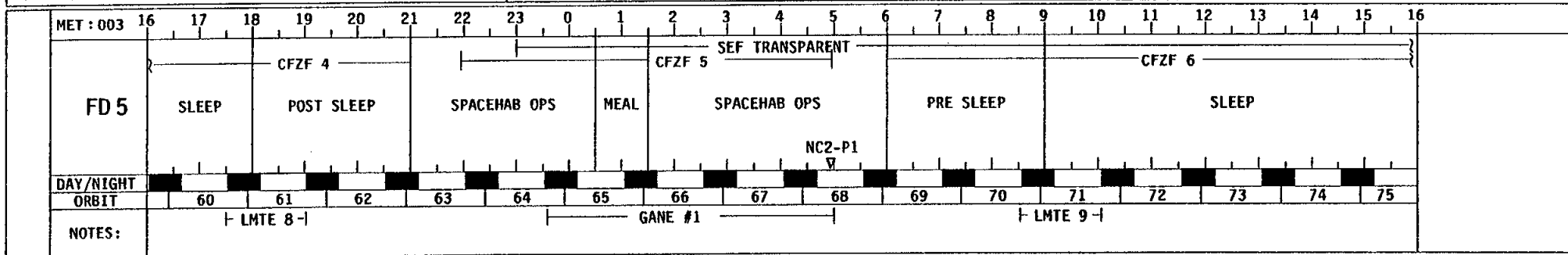
The Flight Plan assumes onorbit acquisition of the energy dependent extension day. The nominal timelines reflect a 10 day mission. An overview of a 9 day mission is included to assist planning in the event that a mission extension is not possible.

JSC-22359, Crew Scheduling Constraints (Appendix K, CPMP), Basic, Rev B, January 1992, has been used to build the timelines contained in this Flight Plan.

STS-77 OVERVIEW



FLIGHT: STS 77 EDITION: FINAL PUB. DATE: 04/02/96



FLIGHT:

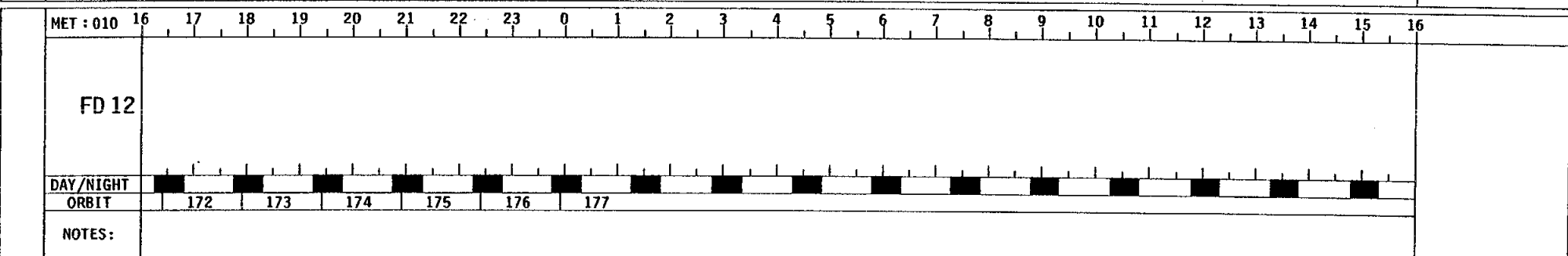
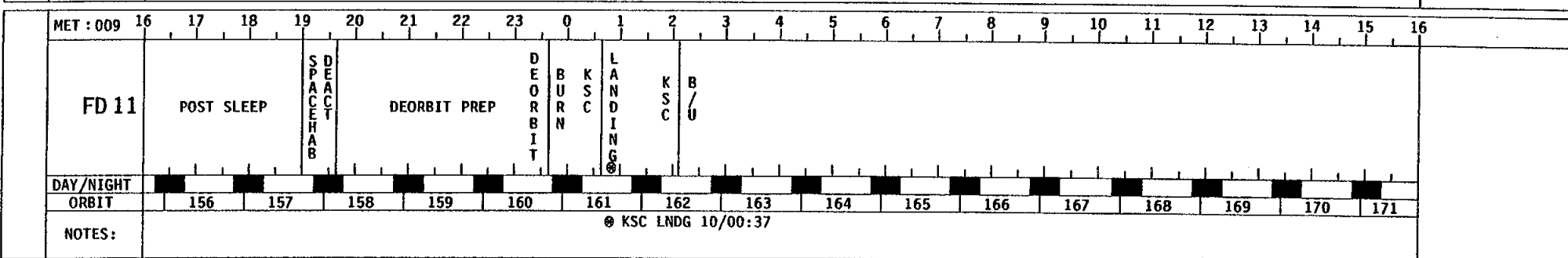
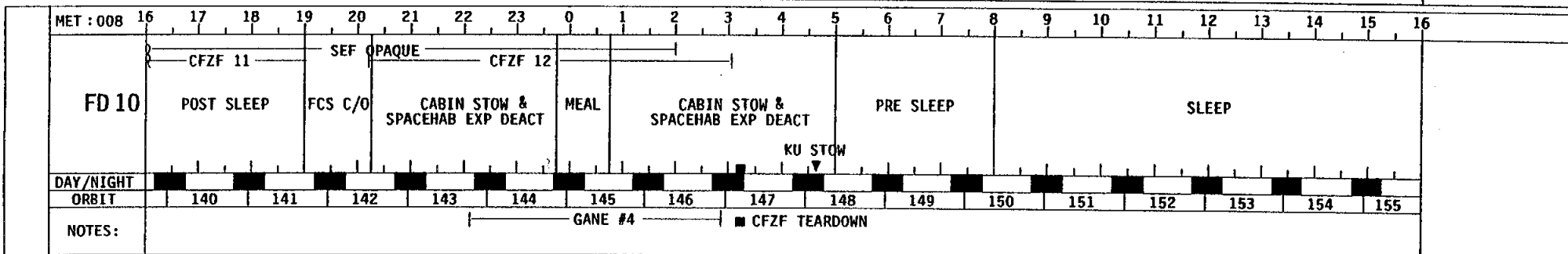
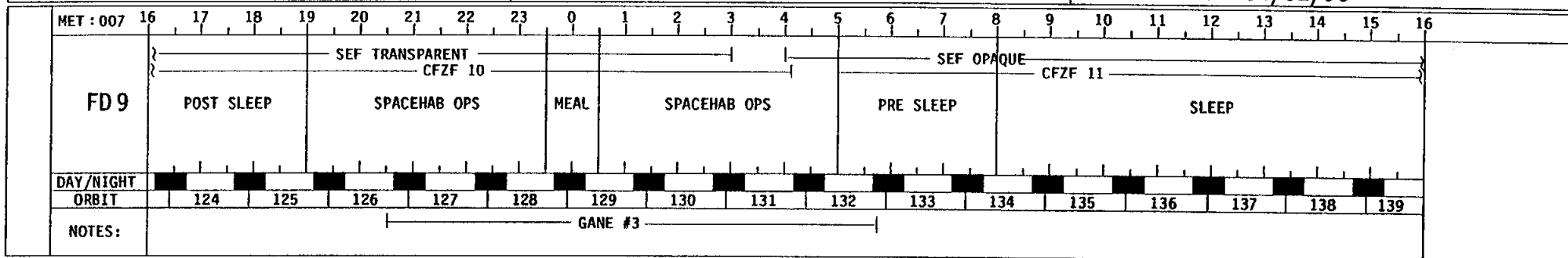
STS 77

EDITION:

FINAL

PUB. DATE:

04/02/96



SUMMARY TIMELINE

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| GMT (D:H:M) | MET (D:H:M) | CDT (D:H:M) | FD/DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | | | | |
|--------------------------------|--|-----------------------|-----------------|-------------------|----------------|-------------------|--------------------|--------------------|--------------------------|-----------------|-------------|-----------|-----------|-------|
| 138:10:32 / 138:22:32 | 001:00:00 / 001:12:00 | 138:05:32 / 138:17:32 | 02 / 138 CDT | -2.1 | | MAY 17, 1996 | STS 77 | FINAL | 04/02/96 | | | | | |
| CDT :138 FD :02 MET :001 | | | | | | | | | | | | | | |
| CDR | D1 VBAR SEP-1 | | FLYAROUND -RBAR | IAE INFLATION | SEP-2 IAE JETT | PG EWR SRP | FGBA OPS | P/TV SETUP CRW D/L | NC1-S MULT AXIS RCS BURN | CREW CHOICE D/L | RNDZ REVIEW | PRE SLEEP | PRE SLEEP | SLEEP |
| PLT | SPARTAN DEPLOY | | MEAL | PG WRR DB DOWN | EXERCISE | DTO 623 | MULT AXIS RCS BURN | FGBA OPS | RNDZ REVIEW | PRE SLEEP | PRE SLEEP | YLV | SLEEP | |
| MS1 | SPARTAN DEPLOY | | MEAL | HH-DTC ACT | CGBA INIT | MOD ST CK | FGBA P/TV01 | FGBA OPS | PRE SLEEP | SLEEP | | | | |
| MS2 | SPARTAN DEPLOY | | MEAL | FGBA P/TV02 | FGBA OPS | EXERCISE | RNDZ REVIEW | PRE SLEEP | SLEEP | | | | | |
| MS3 | SPARTAN DEPLOY | | MEAL | P/TV SETUP (PLBK) | VTR ACT | P/TV SETUP (PLBK) | FGBA OPS | CREW CHOICE D/L | FILTER CLEANING | PRE SLEEP | SLEEP | | | |
| MS4 | SPARTAN DEPLOY | | MEAL | FGBA CC SETUP | FGBA OPS | EXERCISE | CFZFS AMP POS | PRE SLEEP | 100% Ku No Exercise | SLEEP | | | | |
| DAY/NIGHT | | | | | | | | | | | | | | |
| ORBIT | | | | | | | | | | | | | | |
| SAA | --MIL | | | | | | | | | | | | | |
| GSTDN COVERAGE | --MIL --GDS | | | | | | | | | | | | | |
| TDRS | | | | | | | | | | | | | | |
| ATTITUDE | DEPLOY TARGET TRACK -ZLV -XVV TDRS -YLV +ZVV | | | | | | | | | | | | | |
| CFZF | RUN 2 (C-1A) | | | | | | | | | | | | | |
| SEF | | | | | | | | | | | | | | |
| LMTE | LMTE 3 | | | | | | | | | | | | | |
| VTRE | VTRE 3 | | | | | | | | | | | | | |
| NOTES: | ◆ ARF USI STOW ▼ VTR DEACT ◎ DTO 623 CAB AIR MON ◎ -YLV, +ZVV | | | | | | | | | | | | | |

| GMT (D:H:M) | MET (D:H:M) | CDT (D:H:M) | FD/DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE |
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| 138:22:32 / 139:10:32 | 001:12:00 / 002:00:00 | 138:17:32 / 139:05:32 | 02 / 138 CDT | -0.0 | ● | MAY 17, 1996 | STS 77 | FINAL | 04/02/96 |
| CDT :138 FD :02 MET :001 | 12 18 19 20 21 22 23 | 13 14 15 16 17 18 | 19 F003 | 20 21 22 23 | 0 CDT:139 | 1 2 3 4 5 | 6 7 8 9 10 | 11 12 13 14 15 16 17 18 19 20 21 22 23 | 0 MET:002 |
| CDR | SLEEP | | | | DSO 493 | POST SLEEP | POST SLEEP | PG WR RP UB P | ▲ NC2 SPARTAN RETRIEVE |
| PLT | SLEEP | | | | DSO 493 | POST SLEEP | POST SLEEP | PG WR RP UB P | ▲ NH SPARTAN RETRIEVE |
| MS1 | SLEEP | | | | | POST SLEEP | | SHAB MOD ST DCK S T B R I E F | H I D E - D E T C |
| MS2 | SLEEP | | | | DSO 493 | POST SLEEP | POST SLEEP | | SPARTAN RETRIEVE |
| MS3 | SLEEP | | | | | POST SLEEP | | VTR ACT V T R A C T P L A Y B A C K C G B A T E R M | EXERCISE |
| MS4 | SLEEP | | | | DSO 493 | POST SLEEP | POST SLEEP | CFZF LAMP POS | GGGG ARAR SPSP E G T R M S H T R M R M S H T R M R M S H T R M |
| DAY/NIGHT | [Day/Night Cycle: 25-32] | | | | | | | | |
| ORBIT | 25 26 27 28 29 30 31 32 | | | | | | | | |
| GSTDN | -MIL | | | | | | | | |
| COVERAGE | -MIL | | | | | | | | |
| TDRS | [TDRS Coverage: E W] | | | | | | | | |
| ATTITUDE | -YLV +ZVV | | | | | | | | |
| CFZF | RUN 2 (C-1A) | | | | | | | | |
| SEF | BIAS -ZLV -YVV | | | | | | | | |
| LMTE | LMTE 3 | | | | | | | | |
| VTRE | VTRE 3 | | | | | | | | |
| NOTES: | ◎DSO 493 MON LATENT VIRUS REACT ◎BIASED -ZLV, -YVV ○ SIMO DUMP INIT ○ SIMO DUMP TERM ∇ VTR DEACT ◎RMS HTR ACT/MCIU FILTER CK | | | | | | | | |

| GMT (D:H:M) | MET (D:H:M) | CDT (D:H:M) | FD/DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | | | | | |
|--------------------------------|---|-----------------------|-------------------|-----------|--------------------------|-----------------|---------------------|-----------|------------------------|-----------|-----------|-------|-------|--|--|
| 139:10:32 / 139:22:32 | 002:00:00 / 002:12:00 | 139:05:32 / 139:17:32 | 03/139 CDT | 2.1 | ● | MAY 18, 1996 | STS 77 | FINAL | 04/02/96 | | | | | | |
| CDT :139 FD :03 MET :002 | 0 6 1 7 2 8 3 9 4 10 5 11 6 12 7 13 8 14 9 15 10 16 11 17 12 | | | | | | | | | | | | | | |
| CDR | NCC ▲ SPARTAN RETRIEVE | | TI ▲ GRAPPLE ▲ | | PGWRP DOWN PGWRP DOWN | | DTON RNDZ REVIEW | | PRE SLEEP PRE SLEEP | | PRE SLEEP | | SLEEP | | |
| PLT | SPARTAN RETRIEVE | | | | PGWRP DOWN PGWRP DOWN | | RNDZ REVIEW | | PRE SLEEP | | PRE SLEEP | | SLEEP | | |
| MS1 | EXERCISE | MEAL | SPARTAN RETRIEVE | | SRP POWSETRY | | EXCHANGE MDDCK | | MODSTCK SHIBRIEF | | PRE SLEEP | | SLEEP | | |
| MS2 | SPARTAN RETRIEVE | | | | EXERCISE | | RNDZ REVIEW | | PRE SLEEP | | SLEEP | | | | |
| MS3 | P/TV10 SETUP | MEAL | SPARTAN RETRIEVE | | SPERTH AN | | PMS PGSC ACT | | PRE SLEEP | | PRE SLEEP | | SLEEP | | |
| MS4 | MEAL | SPARTAN RETRIEVE | | SPERTH AN | | PMS PGSC ACT | | PRE SLEEP | | PRE SLEEP | | SLEEP | | | |
| DAY/NIGHT | [Day/Night Cycle] | | | | | | | | | | | | | | |
| ORBIT | 33 34 35 36 37 38 39 40 | | | | | | | | | | | | | | |
| GSTDN COVERAGE | -MIL -GDS -MIL -GDS -MIL -GDS -MIL -GDS -GDS | | | | | | | | | | | | | | |
| TDRS | [TDRS Coverage] | | | | | | | | | | | | | | |
| ATTITUDE | SPARTAN RNDZ -ZLV -XVV TDRS -YLV +ZVV | | | | | | | | | | | | | | |
| CFZF | RUN 3 (C-2A) | | | | | | | | | | | | | | |
| SEF | | | | | | | | | | | | | | | |
| LMTE | LMTE 5 | | | | | | | | | | | | | | |
| VTRE | VTRE 4 VTRE 5 VTRE 6 | | | | | | | | | | | | | | |
| NOTES: | ◆ SPARTAN UNGRAPPLE ◎ -ZLV -XVV ◎ DTO 623 CAB AIR MON ◎ -YLV, +ZVV PAMS STU C/O (GND) | | | | | | | | | | | | | | |

| GMT (D:H:M) | MET (D:H:M) | CDT (D:H:M) | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | | | | | |
|----------------------|---|----------------------|-------------|------|------|--------------|------------|------------|-----------------|------------|--|--------------------|------------------------------------|-------------------|---------|
| 139:22:32/ 140:10:32 | 002:12:00/ 003:00:00 | 139:17:32/ 140:05:32 | 03 /139 CDT | 4.4 | 0 | MAY 18, 1996 | STS 77 | FINAL | 04/02/96 | | | | | | |
| CDT :139 | 18 | 19 | 20 | 21 | 22 | 23 | 18 FD04 | 19 | 20 | 21 | 22 | 23 | 5 | 0 | MET:003 |
| FD :03 | 12 | 13 | 14 | 15 | 16 | 17 | | | | | | | | | |
| MET :002 | | | | | | | | | | | | | | | |
| CDR | SLEEP | | | | | | DSO 493 | POST SLEEP | | | | PG WR RP UB P | EJECT SEP1-PO PAMS STU EJECTION | | |
| PLT | SLEEP | | | | | | DSO 493 | POST SLEEP | | | | PG WR RP UB P | PAMS STU EJECTION | | |
| MS1 | SLEEP | | | | | | POST SLEEP | | | | SH MOD M SH CGBA H A B ST D D B R A C K C K C I E B T A T E R M | PAMS STU EJECTION | SEF TRAN CC S/U | | |
| MS2 | SLEEP | | | | | | DSO 493 | POST SLEEP | K S C E T A U P | POST SLEEP | | | | PAMS STU EJECTION | |
| MS3 | SLEEP | | | | | | POST SLEEP | | | | P/TV11 SETUP | PA/C O T T V I L I | PAMS STU EJECTION | | |
| MS4 | SLEEP | | | | | | DSO 493 | POST SLEEP | | | | CFZF AMP CHNG | PAMS STU EJECTION | EXERCISE | |
| DAY/NIGHT | [Day/Night Cycle] | | | | | | | | | | | | | | |
| ORBIT | 41 42 43 44 45 46 47 48 | | | | | | | | | | | | | | |
| GSTDN COVERAGE | -MIL -MIL | | | | | | | | | | | | | | |
| TDRS | [TDRS Coverage] | | | | | | | | | | | | | | |
| ATTITUDE | -YLV +ZVV PAMS STU DPY | | | | | | | | | | | | | | |
| CFZF | RUN 3 (C-2A) | | | | | | | | | | | | | | |
| SEF | | | | | | | | | | | | | | | |
| LMTE | LMTE 6 | | | | | | | | | | | | | | |
| VTRE | VTRE 6 | | | | | | | | | | | | | | |
| NOTES: | @DSO 493 MON LATENT VIRUS REACT @P/TV SETUP PAMS DPY | | | | | | | | | | | | | | |

| GMT (D:H:M) | MET (D:H:M) | CDT (D:H:M) | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | |
|--------------------------------|--|----------------------|---------------------------------|---------------------------------|-------------------------------|---------------------------------|---|---|--------------------------------------|-----------|-------|
| 140:10:32/ 140:22:32 | 003:00:00/ 003:12:00 | 140:05:32/ 140:17:32 | 04 /140 CDT | 6.6 | ● | MAY 19, 1996 | STS 77 | FINAL | 04/02/96 | | |
| CDT :140 FD :04 MET :003 | 0 6 1 7 2 8 3 9 4 10 5 11 6 12 7 13 8 14 9 15 10 16 11 17 12 | | | | | | | | | | |
| CDR | PEJ A M E C T I O N S T I O N | ▲ NC-PO | ▲ NCC-PO | ▲ TI-PO | ▲ VBN-PO | ▲ SEP2-PO | ▲ NC1- P1 MULT AXIS RCS BURN | PRE SLEEP | PRE SLEEP | SLEEP | |
| PLT | PEJ A M E C T I O N S T I O N | ▲ NC-PO | ▲ NCC-PO | ▲ TI-PO | ▲ VBN-PO | ▲ SEP2-PO | ▲ MULT AXIS RCS BURN | PRE SLEEP | PRE SLEEP | PRE SLEEP | |
| MS1 | SEF T R A N S A C T | MEAL | H V I D E O | EXERCISE | SV E I D C K | P E A V E N T | M O D S T C K | PRE SLEEP | SLEEP | | |
| MS2 | PEJ A M E C T I O N S T I O N | ▲ NC-PO | ▲ NCC-PO | ▲ TI-PO | ▲ VBN-PO | ▲ SEP2-PO | ▲ MULT AXIS RCS BURN | PRE SLEEP | PRE SLEEP | SLEEP | |
| MS3 | P/TV12 S E T U P | MEAL | EXERCISE | I C K M U N E | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | SLEEP | | |
| MS4 | E X E R C I S E | MEAL | P/TV07 S E T U P | P E A V E N T | CFZF A M P O S | PS R L E E P | V T R A C T | V P L A Y B A C K | V D T E R A C T | PRE SLEEP | SLEEP |
| DAY/NIGHT | 49 50 51 52 53 54 55 56 | | | | | | | | | | |
| ORBIT | -GDS | | | | | | | | | | |
| GSTDN | -MIL | | | | | | | | | | |
| COVERAGE | -MIL | | | | | | | | | | |
| TDRS | E W | | | | | | | | | | |
| ATTITUDE | PAMS STU RNDZ TGT TRACK -ZLV -XVV TDRS -YLV +ZVV | | | | | | | | | | |
| CFZF | RUN 4 (US-1B) | | | | | | | | | | |
| SEF | | | | | | | | | | | |
| LMTE | LMTE 7 | | | | | | | | | | |
| VTRE | VTRE 7 & 8 | | | | | | | | | | |
| NOTES: | ◆ MCIU FLTR CHECK ⊙ DTO 623 CAB AIR MON ⊙ -YLV, +ZVV ⊙ -ZLV, -XVV | | | | | | | | | | |

| GMT (D:H:M) | MET (D:H:M) | CDT (D:H:M) | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | | | | | | | |
|----------------------|--|----------------------|------------|------|------|--------------|---------|------------|------------|------------|----|---|----------------|-----------------------------|------------------------|--------------------|--|
| 140:22:32/ 141:10:32 | 003:12:00/ 004:00:00 | 140:17:32/ 141:05:32 | 04/140 CDT | 8.9 | | MAY 19, 1996 | STS 77 | FINAL | 04/02/96 | | | | | | | | |
| CDT :140 | | | | | | | | | | | | | | | | | |
| FD :04 | | | | | | | | | | | | | | | | | |
| MET :003 | | | | | | | | | | | | | | | | | |
| | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 0 | | |
| | | | | | | | 18 FD05 | 19 | 20 | 21 | 22 | 23 | | | MET:004 | | |
| CDR | SLEEP | | | | | | DSO 493 | POST SLEEP | | | | EXERCISE | GANESLM | GANESLM | GANESLM | | |
| | | | | | | | | | | | | | | 100% Ku No Exercise | | | |
| PLT | SLEEP | | | | | | DSO 493 | POST SLEEP | | | | ORBIT CHECK RCS CHECK PCH COTO SNRN FLIG RCS FRIS AUTOR | GANESLM | +ZLV | MNVR | | |
| MS1 | SLEEP | | | | | | | POST SLEEP | | | | SHAB | SEF TRANS INIT | | | | |
| MS2 | SLEEP | | | | | | DSO 493 | POST SLEEP | KSET UP | POST SLEEP | | | | MDCK STCK MOD STCK | FGBA OPS | FILTER CLEANING | |
| MS3 | SLEEP | | | | | | | POST SLEEP | | | | CGBA TERM | GBACK UP | GANESLM H/D CHANGE | FGBA OPS | | |
| MS4 | SLEEP | | | | | | DSO 493 | POST SLEEP | | | | CFZF AMP CHNG/POS | | | CM FOZ FIT OR | | |
| DAY/NIGHT | [Day/Night Cycle] | | | | | | | | | | | | | | | | |
| ORBIT | 57 58 59 60 61 62 63 64 | | | | | | | | | | | | | | | | |
| GSTDN COVERAGE | -MIL -MIL | | | | | | | | | | | | | | | | |
| TDRS | [TDRS Coverage] | | | | | | | | | | | | | | | | |
| ATTITUDE | -YLV +ZVV +ZLV -XVV | | | | | | | | | | | | | | | | |
| CFZF | RUN 4 (US-1B) RUN 5 (C-3A) | | | | | | | | | | | | | | | | |
| SEF | TRANSPARENT RUN | | | | | | | | | | | | | | | | |
| LMTE | LMTE 8 | | | | | | | | | | | | | | | | |
| VTRE | | | | | | | | | | | | | | | | | |
| NOTES: | @DSO 493 MON LATENT VIRUS REACT ▽ NON-PRI CLOSEOUT ▽ DATA COLLECT @BIASED +ZLV -XVV ▽ GPS STATUS ■ P/TV SETUP CRW D/L ▽ P/TV SETUP CRW D/L | | | | | | | | | | | | | | | | |

| GMT (D:H:M) | MET (D:H:M) | CDT (D:H:M) | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE |
|--|---|-----------------------|------------------|---------------------------------------|-----------------------------|----------------------|---------------------|-----------------------|-----------|
| 141:10:32 / 141:22:32 | 004:00:00 / 004:12:00 | 141:05:32 / 141:17:32 | 05 / 141 CDT | 11.3 | ● | MAY 20, 1996 | STS 77 | FINAL | 04/02/96 |
| CDT :141 FD :05 MET :004 | 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 | | | | | | | | |
| CDR | MEAL | PAVENT #1 | FGBA OPS | NC2-P1 MULT AXIS RCS BURN | GANESLM | PRONIV MED | PRIV FAM CONF | PRE SLEEP | SLEEP |
| PLT | MEAL | PAVENT | EXERCISE | FGBA OPS | MULT AXIS RCS BURN | AMUN TOR | GANESLM | PRE SLEEP | PRE SLEEP |
| MS1 | MEAL | SEFOBS PAVENT | HVIDE DTC | FGBA OPS | EXERCISE | MST DCK | MOD STCK | SEFOBS SH BRIEF | PRE SLEEP |
| MS2 | MEAL | PAVENT | PAVENT | IMMUNE H2O | EXERCISE | | | PRE SLEEP | SLEEP |
| MS3 | MEAL | PSETUP PAVENT | PSETUP PAVENT | PSETUP PAVENT | EXERCISE | PA/CT V06 | PA/CT V06 | PRE SLEEP | SLEEP |
| MS4 | MEAL | | PAVENT | EXERCISE | FGBA OPS | CFZF AMP CHNG/POS | | PRE SLEEP | SLEEP |
| <div style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block;">100% Ku No Ex</div> <div style="margin-left: 200px;"> <div style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block;">100% Ku No Exercise</div> </div> | | | | | | | | | |
| DAY/NIGHT | [Day/Night Cycle] | | | | | | | | |
| ORBIT | 65 66 67 68 69 70 71 72 | | | | | | | | |
| GSTDN COVERAGE | -GDS -MIL -GDS -MIL -GDS -MIL -GDS -MIL -GDS | | | | | | | | |
| TDRS | [TDRS Coverage] | | | | | | | | |
| ATTITUDE | +ZLV -XVV GANESLM -YLV +ZVV | | | | | | | | |
| CFZF | RUN 5 (C-3A) TRANSPARENT RUN RUN 6 (US-2A) | | | | | | | | |
| SEF | LMTE 9 | | | | | | | | |
| LMTE | | | | | | | | | |
| VTRE | | | | | | | | | |
| NOTES: | ■ CREW CHOICE D/L ⊙ DTO 623 CAB AIR MON ▽ GPS STATUS ⊖ -YLV, +ZVV ▽ CREW CHOICE D/L | | | | | | | | |

| GMT (D:H:M) | MET (D:H:M) | CDT (D:H:M) | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE |
|--------------------------------|--|----------------------|-----------------|----------------------|--------|--------------|--------|----------|-----------|
| 141:22:32/ 142:10:32 | 004:12:00/ 005:00:00 | 141:17:32/ 142:05:32 | 05/141 CDT | 13.7 | ● | MAY 20, 1996 | STS 77 | FINAL | 04/02/96 |
| CDT :141 FD :05 MET :004 | 12 18 13 19 14 20 15 21 16 22 | 17 FD06 | 23 18 0 CDT:142 | 1 2 21 3 22 4 23 5 0 | | | | | MET:005 |
| CDR | SLEEP | DSO 493 | POST SLEEP | GANESLM | PAVENT | GANESLM | PAVENT | OFF DUTY | GANESLM |
| PLT | SLEEP | DSO 493 | POST SLEEP | GANESLM | PAVENT | GANESLM | PAVENT | OFF DUTY | GANESLM |
| MS1 | SLEEP | | POST SLEEP | GANESLM | PAVENT | GANESLM | PAVENT | OFF DUTY | GANESLM |
| MS2 | SLEEP | DSO 493 | POST SLEEP | GANESLM | PAVENT | GANESLM | PAVENT | OFF DUTY | GANESLM |
| MS3 | SLEEP | | POST SLEEP | GANESLM | PAVENT | GANESLM | PAVENT | OFF DUTY | GANESLM |
| MS4 | SLEEP | DSO 493 | POST SLEEP | GANESLM | PAVENT | GANESLM | PAVENT | OFF DUTY | GANESLM |
| DAY/NIGHT | [Day/Night Cycle Diagram] | | | | | | | | |
| ORBIT | 73 74 75 76 77 78 79 80 | | | | | | | | |
| GSTDN COVERAGE | -MIL -MIL -MIL | | | | | | | | |
| TDRS | [TDRS Coverage Diagram] | | | | | | | | |
| ATTITUDE | -YLV +ZVV BIAS +ZLV -XVV | | | | | | | | |
| CFZF | RUN 6 (US-2A) TRANSPARENT RUN RUN 7 (US-2C) | | | | | | | | |
| SEF | | | | | | | | | |
| LMTE | | | | | | | | | |
| VTRE | | | | | | | | | |
| NOTES: | @DSO 493 MON LATENT VIRUS REACT ∇ IRU SW RESTART ∇ DATA COLLECT @BIASED +ZLV -XVV ∇ GPS STATUS @BIASED +ZLV, -XVV ∇ CREW CHOICE D/L ◆ CREW CHOICE D/L | | | | | | | | |

| GMT (D:H:M) | MET (D:H:M) | CDT (D:H:M) | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | | | | | | |
|--------------------------------|--|----------------------|---------------|------|-----------------|--|--|-----------|------------------------|-----------|----------------------|--|----|--|----|--|
| 142:10:32/ 142:22:32 | 005:00:00/ 005:12:00 | 142:05:32/ 142:17:32 | 06 /142 CDT | 16.1 | | MAY 21, 1996 | STS 77 | FINAL | 04/02/96 | | | | | | | |
| CDT :142 FD :06 MET :005 | 0 6 1 7 2 8 3 9 4 10 5 11 6 12 7 13 8 14 9 15 10 16 11 17 12 | | | | | | | | | | | | | | | |
| CDR | OFF DUTY | MEAL | OFF DUTY | | PA EVENT | NC3-PL1 MULT AXIS RCS BURN | PRIV FAM CONF | PRE SLEEP | GAME SLM | PRE SLEEP | SLEEP | | | | | |
| PLT | OFF DUTY | MEAL | OFF DUTY | | OFF DUTY | PA EVENT | NC3-PL1 MULT AXIS RCS BURN | PRE SLEEP | GAME SLM | PRE SLEEP | SLEEP | | | | | |
| MS1 | OFF DUTY | MEAL | OFF DUTY | | PA EVENT | MOD STCK | SEF OBS | PRE SLEEP | | | SLEEP | | | | | |
| MS2 | OFF DUTY | MEAL | OFF DUTY | | PA EVENT | IMMUNE | | PRE SLEEP | 100% Ku No Exercise | | SLEEP | | | | | |
| MS3 | OFF DUTY | MEAL | OFF DUTY | | PA EVENT | | PRE SLEEP | PRE SLEEP | PRE SLEEP | SLEEP | | | | | | |
| MS4 | OFF DUTY | MEAL | OFF DUTY | | P/TV07 SETUP | PA EVENT | CFZF AMP CHNG/POS | PRE SLEEP | PRE SLEEP | SLEEP | | | | | | |
| DAY/NIGHT | | | | | | | | | | | | | | | | |
| ORBIT | 81 | | 82 | | 83 | | 84 | | 85 | | 86 | | 87 | | 88 | |
| GSTDN COVERAGE | -GDS --MIL | | -GDS --MIL | | -GDS --MIL | | -GDS --MIL | | -GDS | | | | | | | |
| TDRS | | | | | | | | | | | | | | | | |
| ATTITUDE | BIAS +ZLV -XVV | | | | | | | | GAME SLM | | -YLV +ZVV | | | | | |
| CFZF | RUN 7 (US-2C) | | | | TRANSPARENT RUN | | | | RUN 8 (US-2B) | | | | | | | |
| SEF | | | | | | | | | | | | | | | | |
| LMTE | | | | | | | | | | | | | | | | |
| VTRF | | | | | | | | | | | | | | | | |
| NOTES: | ■ SIMO DUMP INIT ■ SIMO DUMP TERM | | | | | | | | | | ◎-YLV, +ZVV | | | | | |
| | | | | | | | | | | | ◎DTO 623 CAB AIR MON | | | | | |
| | | | | | | | | | | | ▽ MCIU FLTR CHECK | | | | | |
| | | | | | | | | | | | ▽ GPS STATUS | | | | | |

| GMT (D:H:M) | MET (D:H:M) | CDT (D:H:M) | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | | | | | | | |
|----------------------|----------------------|----------------------|---------------|------------------|------|-----------------|---------|-----------|-----------|------------|---------------------|----------|------------------------|------------------------|------------------------|------------------------|---|
| 142:22:32/ 143:10:32 | 005:12:00/ 006:00:00 | 142:17:32/ 143:05:32 | 06 /142 CDT | 18.6 | | MAY 21, 1996 | STS 77 | FINAL | 04/02/96 | | | | | | | | |
| CDT :142 | | | | | | | | | | | | | | | | | |
| FD :06 | | | | | | | | | | | | | | | | | |
| MET :005 | | | | | | | | | | | | | | | | | |
| | | | 16 FD07 | | | | | | | | | | | | | | |
| CDR | SLEEP | DSO 493 | POST SLEEP | PG WR RP UB P | | NC4-P1 | NCC-P1 | Ti-P1 | VBN-P1 | STU RNDZ | STU STATIONKEEPING | MEAL | | | | | |
| PLT | SLEEP | DSO 493 | POST SLEEP | PG WR RP UB P | | | | | | STU RNDZ | EXERCISE | MEAL | | | | | |
| MS1 | SLEEP | | POST SLEEP | | | SHAR | SEF OBS | MOD ST CK | MOD K | ST CK | HYDRO | VIDEO | CFZFA | TERRM | SEF OBS | MEAL | |
| MS2 | SLEEP | DSO 493 | POST SLEEP | | | | | | | STU RNDZ | STU STATIONKEEPING | MEAL | | | | | |
| MS3 | SLEEP | | POST SLEEP | | | P/TV12 SETUP | | | | STU RNDZ | | MEAL | | | | | |
| MS4 | SLEEP | DSO 493 | POST SLEEP | KC A SETUP | | | | | | POST SLEEP | CFZF LAMP POS | EXERCISE | PCF TL SEQ DL | PCF TL SEQ DL | PCF TL SEQ DL | PCF TL SEQ DL | MEAL |
| DAY/NIGHT | | | | | | | | | | | | | | | | | |
| ORBIT | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | | | | | | | | | |
| GSTDN COVERAGE | | | | | | | | | | | -MIL | | -MIL | | | | -GDS -MIL |
| TDRS | E | | | | | | | | | | | | | | | | |
| ATTITUDE | | | -YLV +ZVV | | | | | | | | STU RNDZ #1 | | | | | | STU STATIONKEEP |
| CFZF | | | RUN 8 (US-2B) | | | | | | | | | | | | | | |
| SEF | | | | | | | | | | | TRANSPARENT RUN | | | | | | |
| LMTE | | | | | | | | | | | | | | | | | |
| VTRE | | | | | | | | | | | | | | | | | |
| NOTES: | | | | | | | | | | | | | | | | | @DSO 493 MON LATENT VIRUS REACT ■ STU STATIONKEEPING ■ STU STATIONKEEPING |

| GMT (D:H:M) | MET (D:H:M) | CDT (D:H:M) | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE |
|--------------------------------|---|----------------------|------------|------------------|-----------|------------------|-----------|---------|-----------|
| 143:10:32/ 143:22:32 | 006:00:00/ 006:12:00 | 143:05:32/ 143:17:32 | 07/143 CDT | 21.0 | | MAY 22, 1996 | STS 77 | FINAL | 04/02/96 |
| CDT :143 FD :07 MET :006 | | | | | | | | | |
| CDR | STU STATIONKEEPING | EXERCISE | SEP1-PI | PC WR RP DOWN | PRE SLEEP | PC WR RP DOWN | PRE SLEEP | SLEEP | |
| PLT | STU STATIONKEEPING | | | PC WR RP DOWN | PRE SLEEP | PC WR RP DOWN | PRE SLEEP | SLEEP | |
| MS1 | MEAL | EXERCISE | | PC WR RP DOWN | PRE SLEEP | PC WR RP DOWN | PRE SLEEP | SLEEP | |
| MS2 | STU STATIONKEEPING | | | PC WR RP DOWN | PRE SLEEP | PC WR RP DOWN | PRE SLEEP | SLEEP | |
| MS3 | MEAL | EXERCISE | | PC WR RP DOWN | PRE SLEEP | PC WR RP DOWN | PRE SLEEP | SLEEP | |
| MS4 | MEAL | | | PC WR RP DOWN | PRE SLEEP | PC WR RP DOWN | PRE SLEEP | SLEEP | |
| DAY/NIGHT | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | |
| ORBIT | -GDS | -GDS | -GDS | -GDS | -GDS | | | | |
| GSTDN | --MIL | --MIL | --MIL | --MIL | | | | | |
| COVERGE | | | | | | | | | |
| TDRS | | | | | | | | | |
| ATTITUDE | STU STATIONKEEP | | | | | | | | |
| CFZF | | | | | | | | | |
| SEF | | | | | | | | | |
| LMTE | | | | | | | | | |
| VTRE | | | | | | | | | |
| NOTES: | <p>o STU STATIONKEEPING ⊙ -YLV, +ZVV ◆ MCIU FLTR CHECK ⊙ DTO 623 CAB AIR MON</p> | | | | | | | | |

| GMT (D:H:M) | MET (D:H:M) | CDT (D:H:M) | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | | | | | | |
|----------------------|----------------------|----------------------|--------------|---------------|-------|--------------|---------------------------------|-----------|-------------|--------------------|----------------------|----------|---------|------|---|----------------------|
| 143:22:32/ 144:10:32 | 006:12:00/ 007:00:00 | 143:17:32/ 144:05:32 | 07 /143 CDT | 23.5 | | MAY 22, 1996 | STS 77 | FINAL | 04/02/96 | | | | | | | |
| CDT :143 | | | | | | | | | | | | | | | | |
| FD :07 | | | | | | | | | | | | | | | | |
| MET :006 | | | | | | | | | | | | | | | | |
| | | | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 0 | MET:007 |
| CDR | SLEEP | DSO 493 | POST SLEEP | PG WR RP UB P | NC-P2 | NCC-P2 | Ti-P2 | VBN-P2 | STU RNDZ | STU STATIONKEEPING | MEAL | | | | | |
| PLT | SLEEP | DSO 493 | POST SLEEP | PG WR RP UB P | | | | | STU RNDZ | EXERCISE | MEAL | | | | | |
| MS1 | SLEEP | | POST SLEEP | | | SHAB | SEP OBS | MOD ST CK | WDDK | STC | HYD ETC | EXERCISE | SEP OBS | MEAL | | |
| MS2 | SLEEP | DSO 493 | POST SLEEP | | | | | | STU RNDZ | STU STATIONKEEPING | MEAL | | | | | |
| MS3 | SLEEP | | POST SLEEP | | | P/TV12 SETUP | | | STU RNDZ | CGA TERM | MEAL | | | | | |
| MS4 | SLEEP | DSO 493 | POST SLEEP | KCA SETUP P | | POST SLEEP | CFZF AMP CHNG | ARPE CD | EXERCISE | | MEAL | | | | | |
| DAY/NIGHT | | | | | | | | | | | | | | | | |
| ORBIT | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | | | | | | | | |
| GSTDN COVERAGE | | | | | | | -MIL | -MIL | | -MIL | -GDS | | | | | |
| TDRS | E | | | | | | | | | | | | | | | |
| ATTITUDE | | | -YLV +ZVV | | | | | | STU RNDZ #2 | | STU STATIONKEEP | | | | | |
| CFZF | | | RUN 9 (C-2B) | | | | | | | | | | | | | |
| SEF | | | | | | | TRANSPARENT RUN | | | | | | | | | |
| LMTE | | | | | | | | | | | | | | | | |
| VTRE | | | | | | | | | | | | | | | | |
| NOTES: | | | | | | | ⊗DSO 493 MON LATENT VIRUS REACT | | | | ■ STU STATIONKEEPING | | | | | ■ STU STATIONKEEPING |

| GMT (D:H:M) | MET (D:H:M) | CDT (D:H:M) | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE |
|--------------------------------|--|----------------------|-------------------------------|-----------------------|---------------|--------------|------------------|-----------|-----------|
| 144:10:32/ 144:22:32 | 007:00:00/ 007:12:00 | 144:05:32/ 144:17:32 | 08/144 CDT | 26.0 | | MAY 23, 1996 | STS 77 | FINAL | 04/02/96 |
| CDT :144 FD :08 MET :007 | 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 | | | | | | | | |
| CDR | STU STATIONKEEPING | EXERCISE | SEP1-P2 STU STATIONKEEPING | PG WR RP DB OWN | | PRE SLEEP | PC RIV MED | PRE SLEEP | SLEEP |
| PLT | STU STATIONKEEPING | | | PG WR RP DB OWN | DT O 6 2 3 | PRE SLEEP | PC RIV MED | PRE SLEEP | SLEEP |
| MS1 | MEAL | | | PG WR RP DB OWN | DT O 6 2 3 | | | PRE SLEEP | SLEEP |
| MS2 | STU STATIONKEEPING | | | PG WR RP DB OWN | DT O 6 2 3 | | | PRE SLEEP | SLEEP |
| MS3 | MEAL | | EXERCISE | PG WR RP DB OWN | DT O 6 2 3 | | | PRE SLEEP | SLEEP |
| MS4 | MEAL | | | PG WR RP DB OWN | DT O 6 2 3 | | | PRE SLEEP | SLEEP |
| DAY/NIGHT | [Day/Night Cycle] | | | | | | | | |
| ORBIT | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | |
| GSTDN COVERAGE | -GDS -MIL | -GDS -MIL | -GDS -MIL | -GDS | | | | | |
| TDRS | [TDRS Coverage] | | | | | | | | |
| ATTITUDE | STU STATIONKEEP | | | | | | | | |
| CFZF | RUN 10 (C-1B) | | | | | | | | |
| SEF | TRANSPARENT RUN | | | | | | | | |
| LMTE | | | | | | | | | |
| VTRE | | | | | | | | | |
| NOTES: | ▽ NON-PRI CLOSEOUT @-YLV, +ZVV ◆ CREW CHOICE D/L ▶ CREW CHOICE D/L ◎ DTO 623 CAB AIR MON ◆ MCIU FLTR CHECK | | | | | | | | |


| GMT (D:H:M) | MET (D:H:M) | CDT (D:H:M) | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | | | | | | | | | | |
|-----------------------|-----------------------|-----------------------|--------------|------------------|-------------------|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 145:10:32 / 145:22:32 | 008:00:00 / 008:12:00 | 145:05:32 / 145:17:32 | 09 / 145 CDT | 30.9 | | MAY 24, 1996 | STS 77 | FINAL | 04/02/96 | | | | | | | | | | | |
| CDT :145 | | | | | | | | | | | | | | | | | | | | |
| FD :09 | | | | | | | | | | | | | | | | | | | | |
| MET :008 | | | | | | | | | | | | | | | | | | | | |
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | |
| CDR | MEAL | CREW CONF | PHOTO | FGBA OPS | EXERCISE | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP |
| PLT | MEAL | CREW CONF | PHOTO | DSO 802 | FGBA OPS | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP |
| MS1 | MEAL | CREW CONF | PHOTO | SEF TRANS DEACT | OPAQ ACT | P/TV SETUP CRW D/L | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP |
| MS2 | MEAL | CREW CONF | PHOTO | EXERCISE | FGBA OPS | MOD STCK | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP |
| MS3 | MEAL | P/TV07 SETUP | CREW CONF | PHOTO | IMMUNE H2O | P/TV SETUP CRW D/L | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP |
| MS4 | MEAL | CREW CONF | PHOTO | DSO 802 | CFZF AMP CHNG/POS | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP | PRE SLEEP |
| DAY/NIGHT | | | | | | | | | | | | | | | | | | | | |
| ORBIT | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | | | | | | | | | | | | |
| GSTDN | -GDS | -GDS | -GDS | -GDS | | | | | | | | | | | | | | | | |
| COVERAGE | -MIL | -MIL | -MIL | -MIL | | | | | | | | | | | | | | | | |
| TDRS | E | | | | | | | | | | | | | | | | | | | |
| ATTITUDE | | | | BIASED +ZLV -XVV | | | | | | | | | | | | | | | | |
| CFZF | | | | | | | | | | | | | | | | | | | | |
| SEF | | | | | | | | | | | | | | | | | | | | |
| LMTE | | | | | | | | | | | | | | | | | | | | |
| VTR | | | | | | | | | | | | | | | | | | | | |
| NOTES: | | | | | | | | | | | | | | | | | | | | |

▲ CREW CHOICE D/L
 ▼ CREW CHOICE D/L
 ◎ DTO 623 CAB AIR MON
 ∇ GPS STATUS

◎ -YLV, +ZVV

| GMT (D:H:M) | MET (D:H:M) | CDT (D:H:M) | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE | | | | |
|--------------------------------|--|-----------------------|-------------------|---|---|----------------------------------|---|---|-----------|-----------|---------------------------------------|-----------|-------|
| 146:10:32 / 146:22:32 | 009:00:00 / 009:12:00 | 146:05:32 / 146:17:32 | 10 / 146 CDT | 35.9 | | MAY 25, 1996 | STS 77 | FINAL | 04/02/96 | | | | |
| CDT :146 FD :10 MET :009 | 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 | | | | | | | | | | | | |
| CDR | MEAL | CABIN STOW | EXERCISE | CABIN STOW | AIR MON UNTOR | GANESLM | ZLV MNV R | CABIN STOW | D/O BRIEF | PRE SLEEP | PC R I V E M E D | PRE SLEEP | SLEEP |
| PLT | MEAL | CABIN STOW | CABIN STOW | DTO 623 | EXERCISE | ERGOMTR | STOW | D/O BRIEF | PRE SLEEP | SLEEP | | | |
| MS1 | MEAL | CABIN STOW | SEF OPAQ DEACT | CABIN STOW | M D D C K | S T C K | S H B R I E F | S T E A R M O D O W N | D/O BRIEF | PRE SLEEP | SLEEP | | |
| MS2 | MEAL | CABIN STOW | CABIN STOW | GANESLM | CABIN STOW | NE M H T R Y E | C K | D/O BRIEF | PRE SLEEP | SLEEP | | | |
| MS3 | MEAL | CABIN STOW | CABIN STOW | G P S S T A T U S | D T O | G A N E H U P | D O | D/O BRIEF | PRE SLEEP | SLEEP | | | |
| MS4 | MEAL | FAN CLAMP REP | GAS GRP H | EXERCISE | K S U T - O B M D | CFZF FACILITY TRDN | S T E A R M O D O W N | D/O BRIEF | PRE SLEEP | SLEEP | | | |
| DAY/NIGHT | [Day/Night Cycle Diagram] | | | | | | | | | | | | |
| ORBIT | 145 146 147 148 149 150 151 152 | | | | | | | | | | | | |
| GSTDN COVERAGE | -GDS -MIL -GDS -MIL -GDS -MIL -GDS | | | | | | | | | | | | |
| TDRS | E W [Timeline] | | | | | | | | | | | | |
| ATTITUDE | +ZLV +YVV +GANESLM-1 -ZLV -XVV | | | | | | | | | | | | |
| CFZF | RUN 12 (C-3B) | | | | | | | | | | | | |
| SEF | OPAQUE RUN | | | | | | | | | | | | |
| LMTE | | | | | | | | | | | | | |
| VTRE | | | | | | | | | | | | | |
| NOTES: | ■ SIMO DUMP TERM ∇ NON-PRI CLOSEOUT ⊙ DTO 623 CAB AIR MON ∇ GPS STATUS ⊙ -ZLV, -XVV ▶ FGBA TEARDOWN | | | | | | | | | | | | |

| GMT (D:H:M) | MET (D:H:M) | CDT (D:H:M) | FD/ DOY | BETA | MOON | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE |
|----------------------|--|----------------------|------------|------------|---------|--------------|--|----------------------|--------------|
| 146:22:32/ 147:10:32 | 009:12:00/ 010:00:00 | 146:17:32/ 147:05:32 | 10/146 CDT | 38.3 | | MAY 25, 1996 | STS 77 | FINAL | 04/02/96 |
| CDT :146 | | | | | | CDT:147 | | | |
| FD :10 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| MET :009 | | | | | FD11 | | | | |
| CDR | SLEEP | | | POST SLEEP | DSO 493 | POST SLEEP | OCACRPS STOW UBI P | PGWR-M N SV R | DEORBIT PREP |
| PLT | SLEEP | | | POST SLEEP | DSO 493 | | | DSO 331 | DEORBIT PREP |
| MS1 | SLEEP | | | POST SLEEP | | | SPACCT H A B | POST SLEEP | DEORBIT PREP |
| MS2 | SLEEP | | | POST SLEEP | DSO 493 | POST SLEEP | EXCHANG E A D S E P | DEACT C V D A C T | DEORBIT PREP |
| MS3 | SLEEP | | | POST SLEEP | | POST SLEEP | PGSC STOW S T I C K P S C O M M U N E S T I C K | | DEORBIT PREP |
| MS4 | SLEEP | | | POST SLEEP | DSO 493 | POST SLEEP | SHAB G D P A M C T S H A R D O W N S P A C C T H A B | DSO 331 | DEORBIT PREP |
| DAY/NIGHT | | | | | | | | | |
| ORBIT | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 | |
| GSTDN COVERAGE | -MIL | | | | | | | | |
| TDRS | -MIL | | | | | | | | |
| ATTITUDE | -ZLV -XV | | | | | | | | |
| CFZF | | | | | | | | | |
| SEF | | | | | | | | | |
| LMTE | | | | | | | | | |
| VTRE | | | | | | | | | |
| NOTES: | <p>⊙ DSO 493 MON LATENT VIRUS REACT ⊙ TEAMS DEACT</p> <p>⊙ AUTO FC PURGE</p> <p>◆ PGBA LANDING</p> <p>⊙ DSO 331 EGRESS LOCOMOTION</p> <div style="border: 1px solid black; padding: 2px; display: inline-block;">DEORBIT BURN 9/23:37</div> | | | | | | | | |

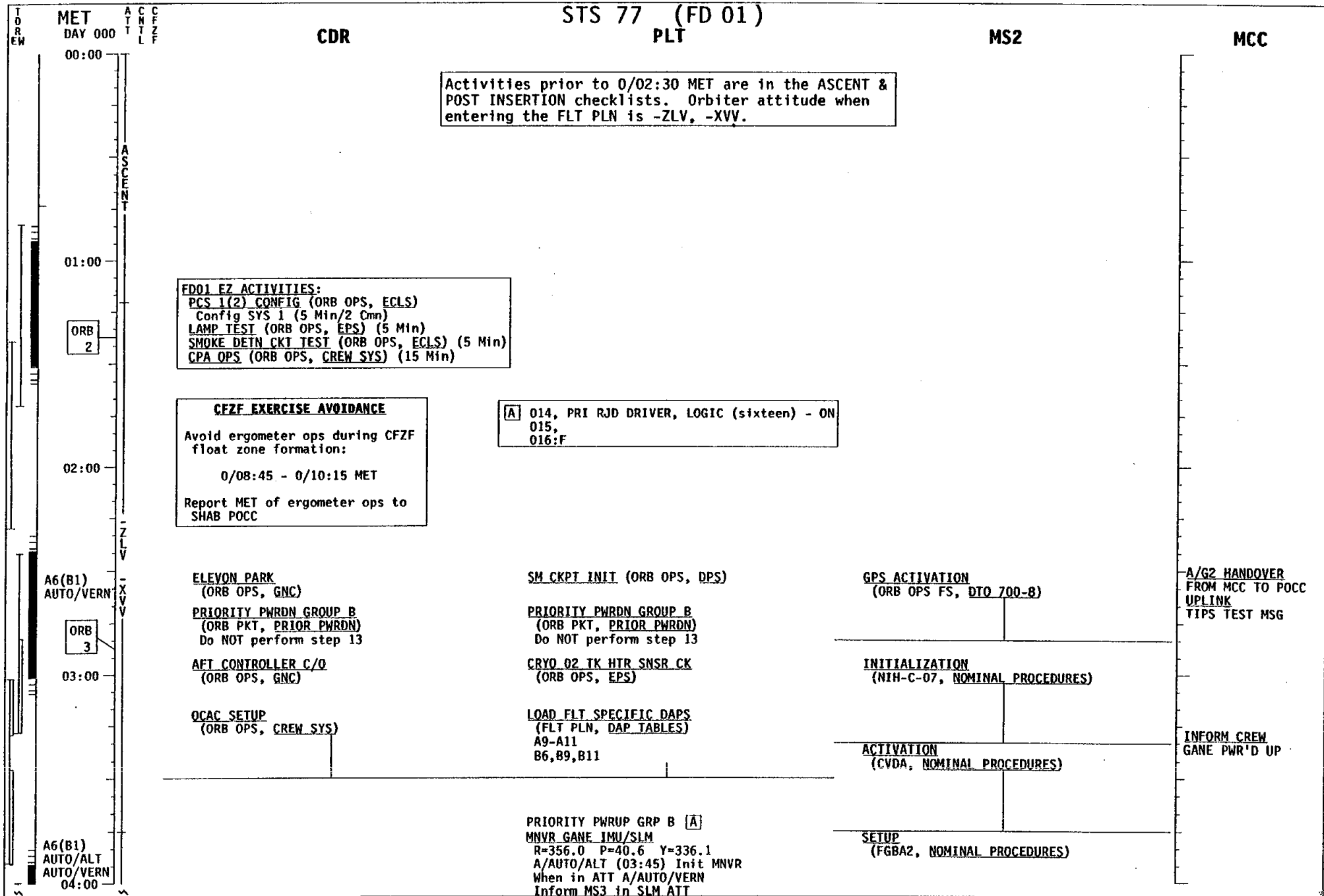
| GMT (D:H:M) | MET (D:H:M) | CDT (D:H:M) | FD/ DOY | BETA | MOON  | HOUSTON DATE | FLIGHT | EDITION | PUB. DATE |
|----------------------|--------------------------------------|----------------------|------------|------|--|--------------|--------|---------|-----------|
| 147:10:32/ 147:22:32 | 010:00:00/ 010:12:00 | 147:05:32/ 147:17:32 | 11/147 CDT | 40.7 | | MAY 26, 1996 | STS 77 | FINAL | 04/02/96 |
| CDT :147 | FD :11 | MET :010 | | | | | | | |
| CDR | | | | | | | | | |
| PLT | K S C | | | | | | | | |
| MS1 | L A N D I N G * | | | | | | | | |
| MS2 | | | | | | | | | |
| MS3 | | | | | | | | | |
| MS4 | | | | | | | | | |
| DAY/NIGHT | | | | | | | | | |
| ORBIT | 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | |
| GSTDN | -GDS | -GDS | -GDS | | | | | | |
| COVERAGE | -MIL | -MIL | | | | | | | |
| TDRS | | | | | | | | | |
| ATTITUDE | ENTRY → | | | | | | | | |
| CFZF | | | | | | | | | |
| SEF | | | | | | | | | |
| LMTE | | | | | | | | | |
| VTRE | | | | | | | | | |
| NOTES: | * KSC LANDING 10/00:37 | | | | | | | | |

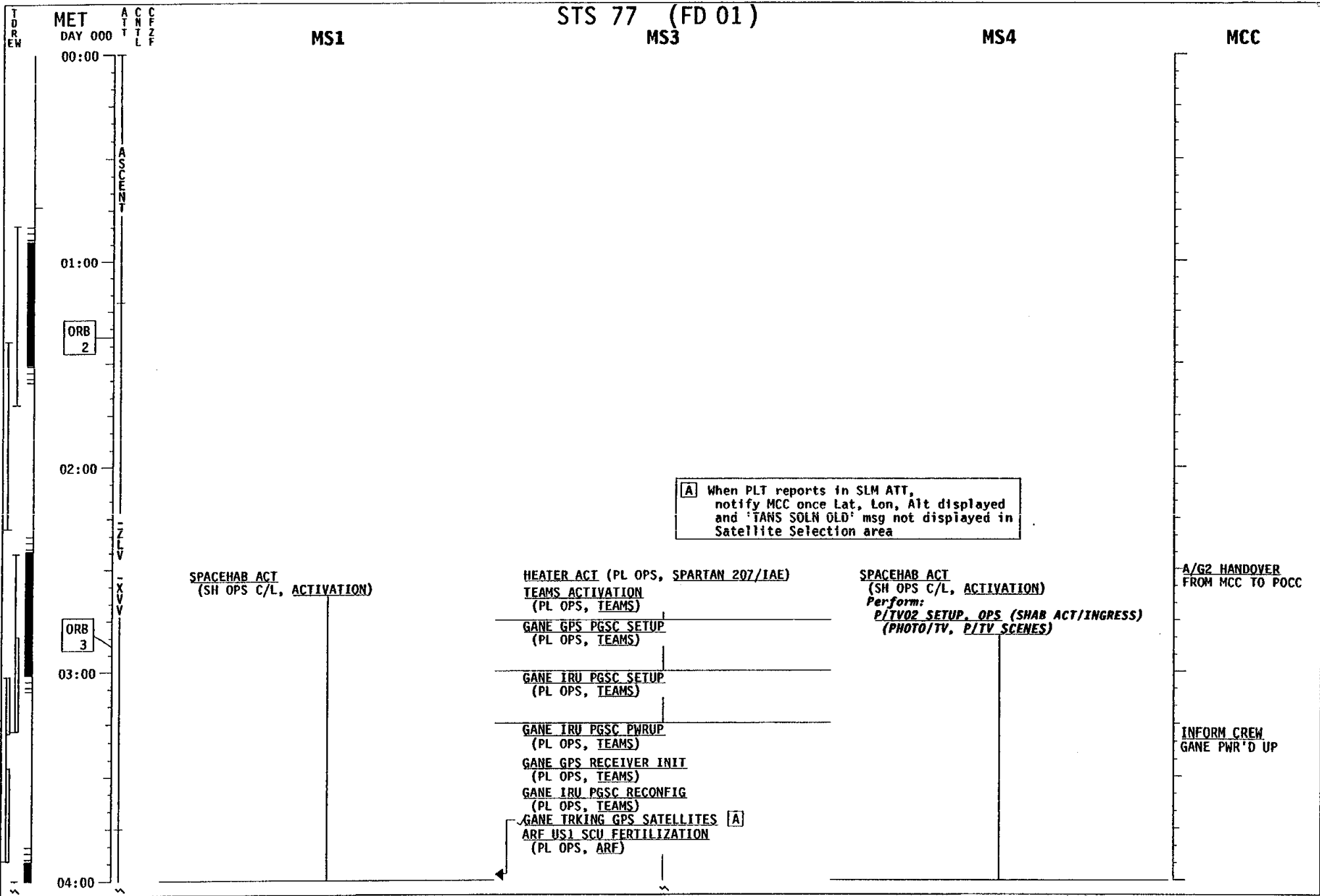
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DETAILED TIMELINE

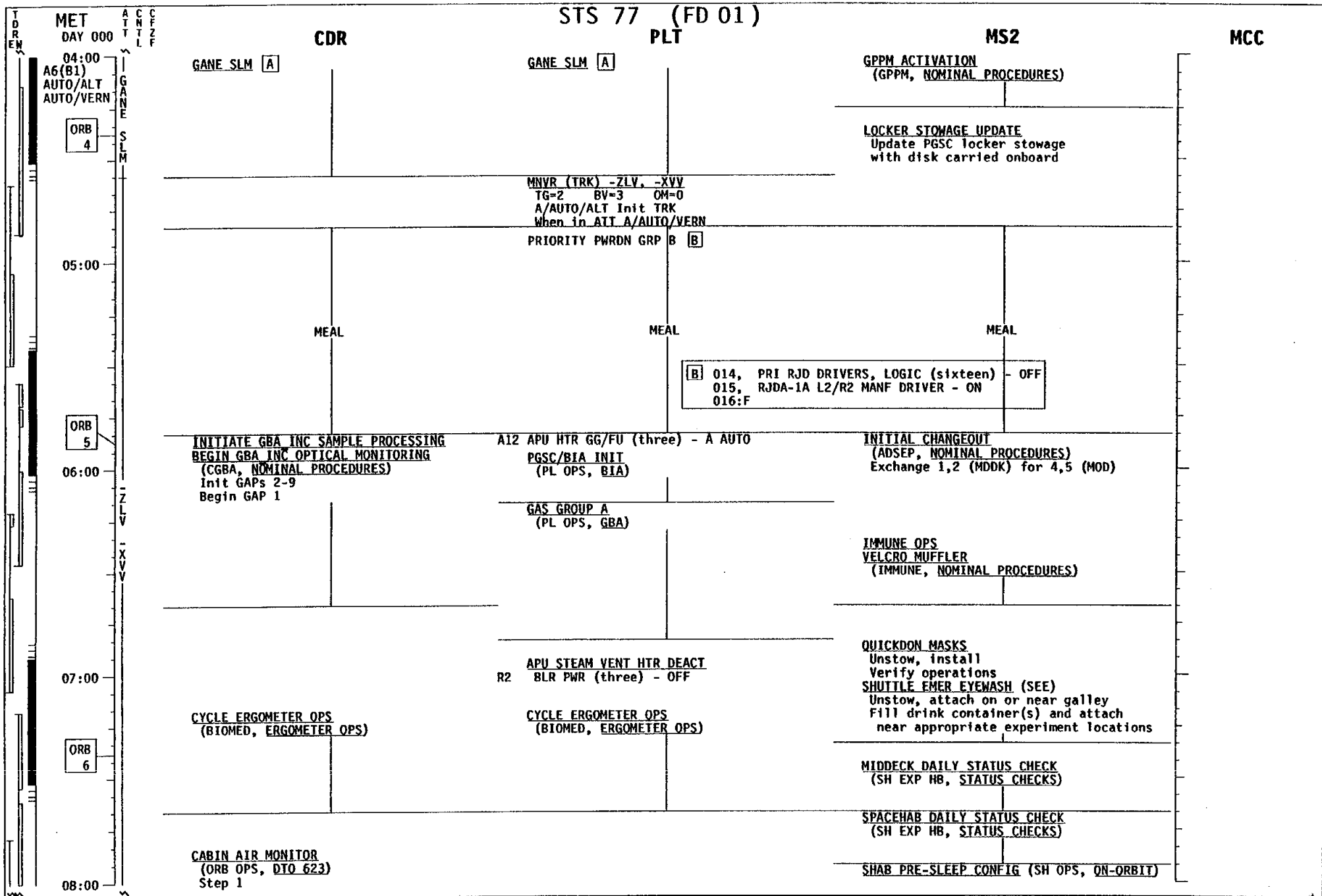
DETAILED
TIMELINE

DETAILED TIMELINE





[A] When PLT reports in SLM ATT, notify MCC once Lat, Lon, Alt displayed and 'TANS SOLN OLD' msg not displayed in Satellite Selection area



A GANE SLM

1. IMU ALIGN - S TRK (ORB OPS)

-Z: 70 AVAIL 03:41 TO 04:27
-Y: 43 AVAIL 03:57 TO 04:45
ANG SEP: 88.9

When IMU Align complete:

GNC 22 S TRK/COAS CNTL

-Y STAR TRKR - TERM/IDLE ITEM 9 EXEC (*)

2. SLM DATA TAKES

GNC 22 S TRK/COAS CNTL

CRT Clear Star Table ITEM 20 EXEC

Aquire star
SLM #1,2 STAR ID: 70
SLM #3,4 STAR ID: 43

C3 DAP: FREE

CRT Verify star in table
Clear Star Table ITEM 20 EXEC
Verify star in table

C3 DAP: AUTO

GNC UNIV PTG

CRT Load Next Attitude:
SLM #2 SLM #3 SLM #4
R=192.6 R=257.6 R=261.6
P=229.7 P=301.8 P=301.8
Y=294.1 Y= 5.2 Y= 4.6

A/AUTO/ALT
Init MNVR ITEM 18 EXEC

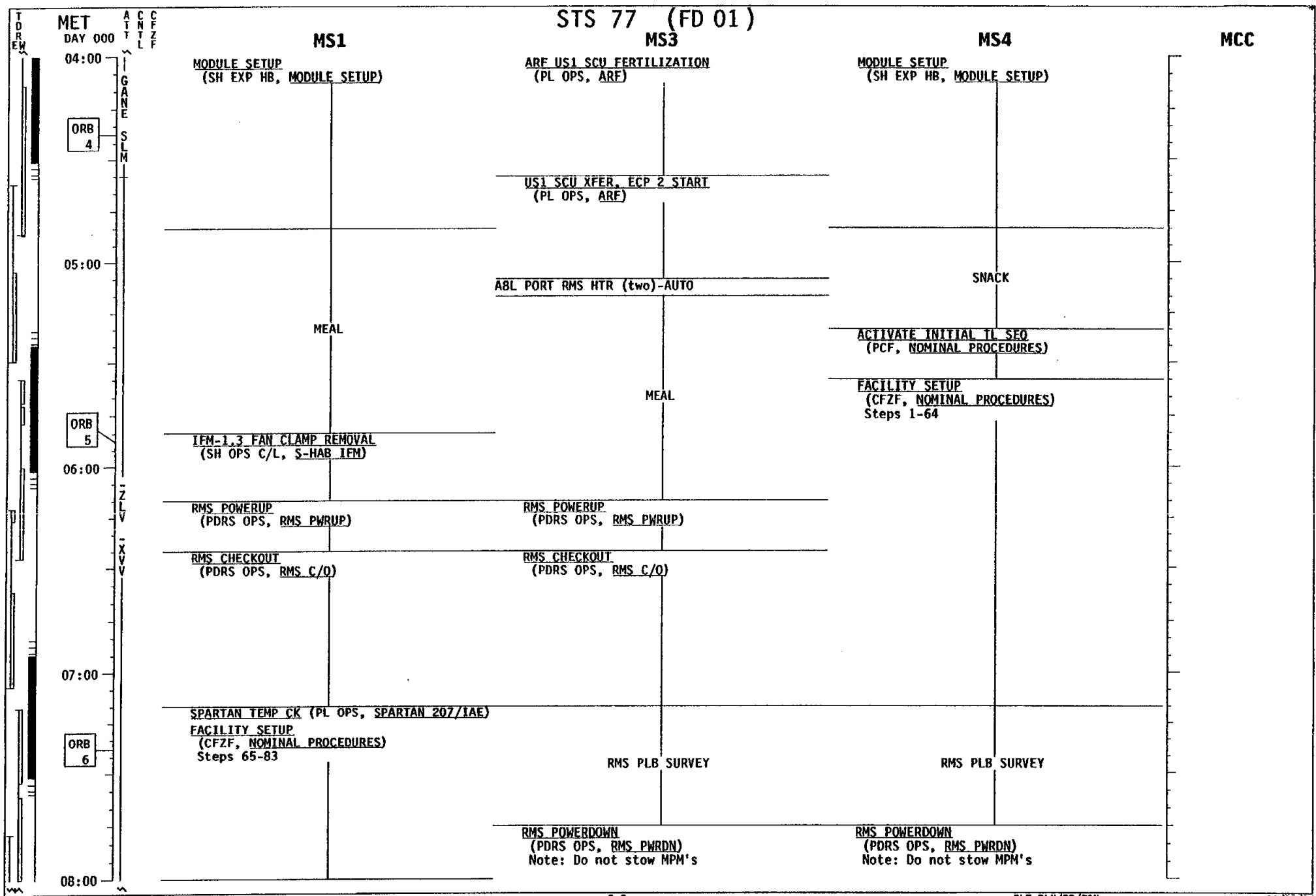
When in attitude, A/AUTO/VERN then repeat step 2

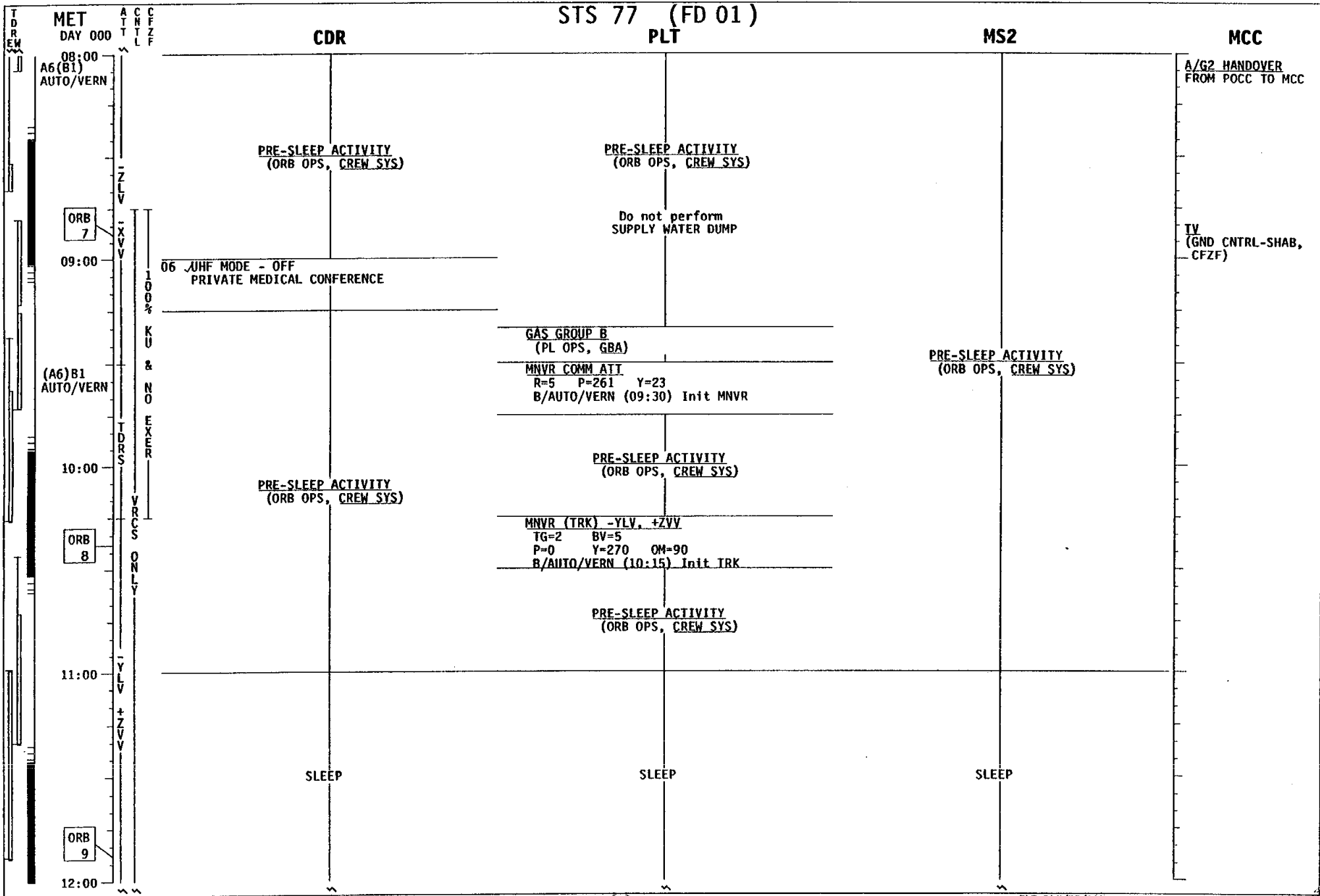
3. RESELECT -Y STAR TRACKER

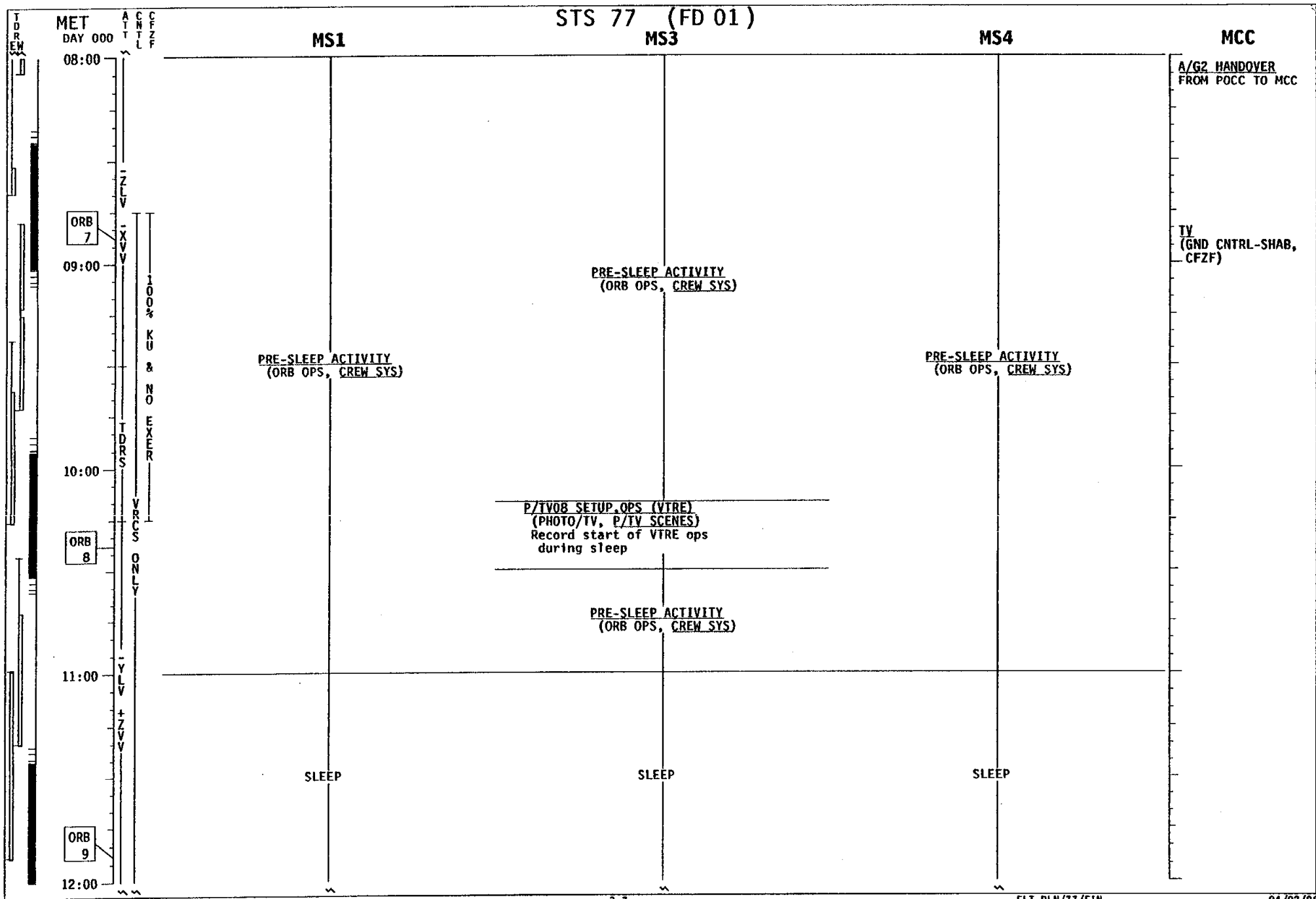
GNC 22 S TRK/COAS CNTL

-Y STAR TRKR - STAR TRK ITEM 3 EXEC (*)

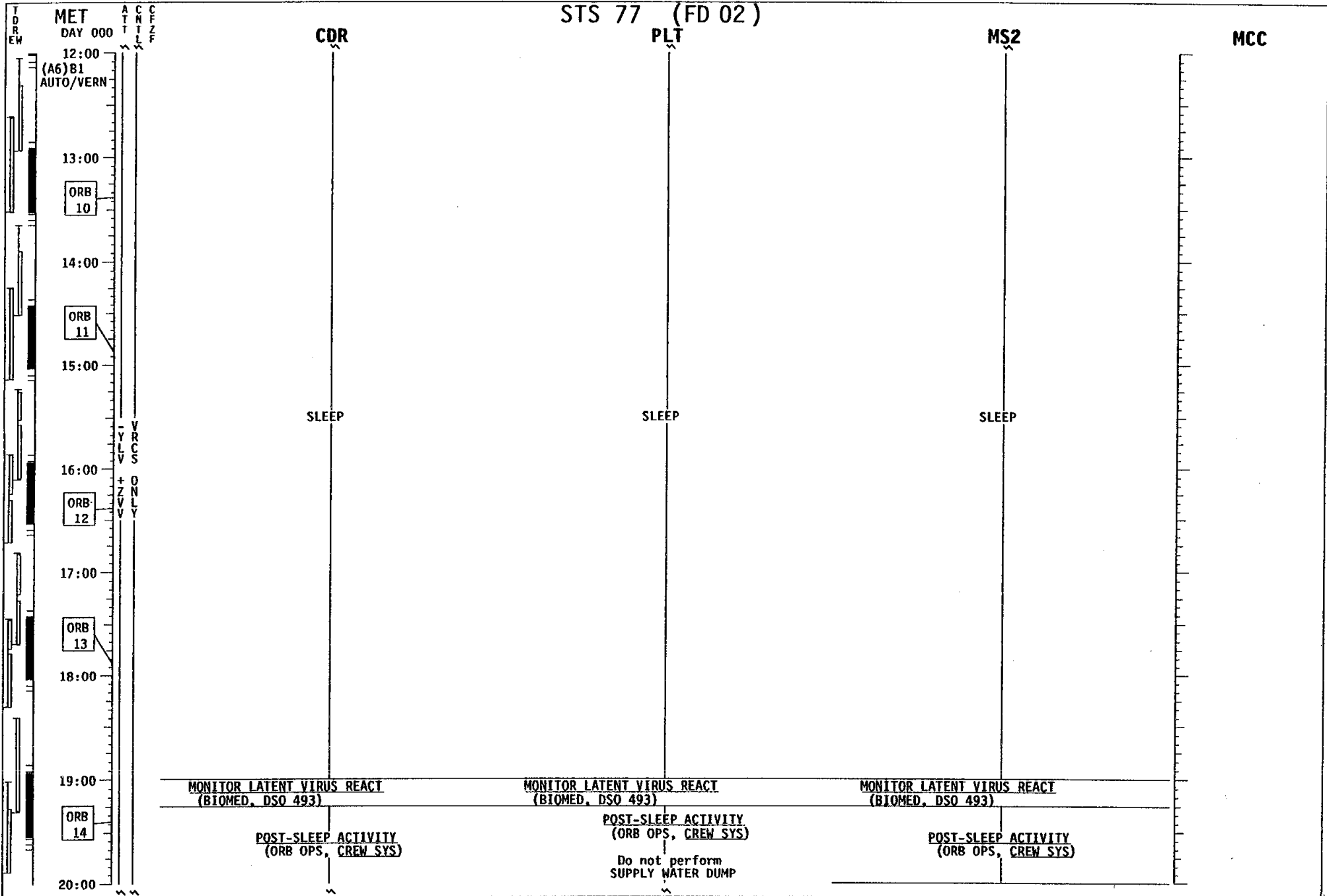
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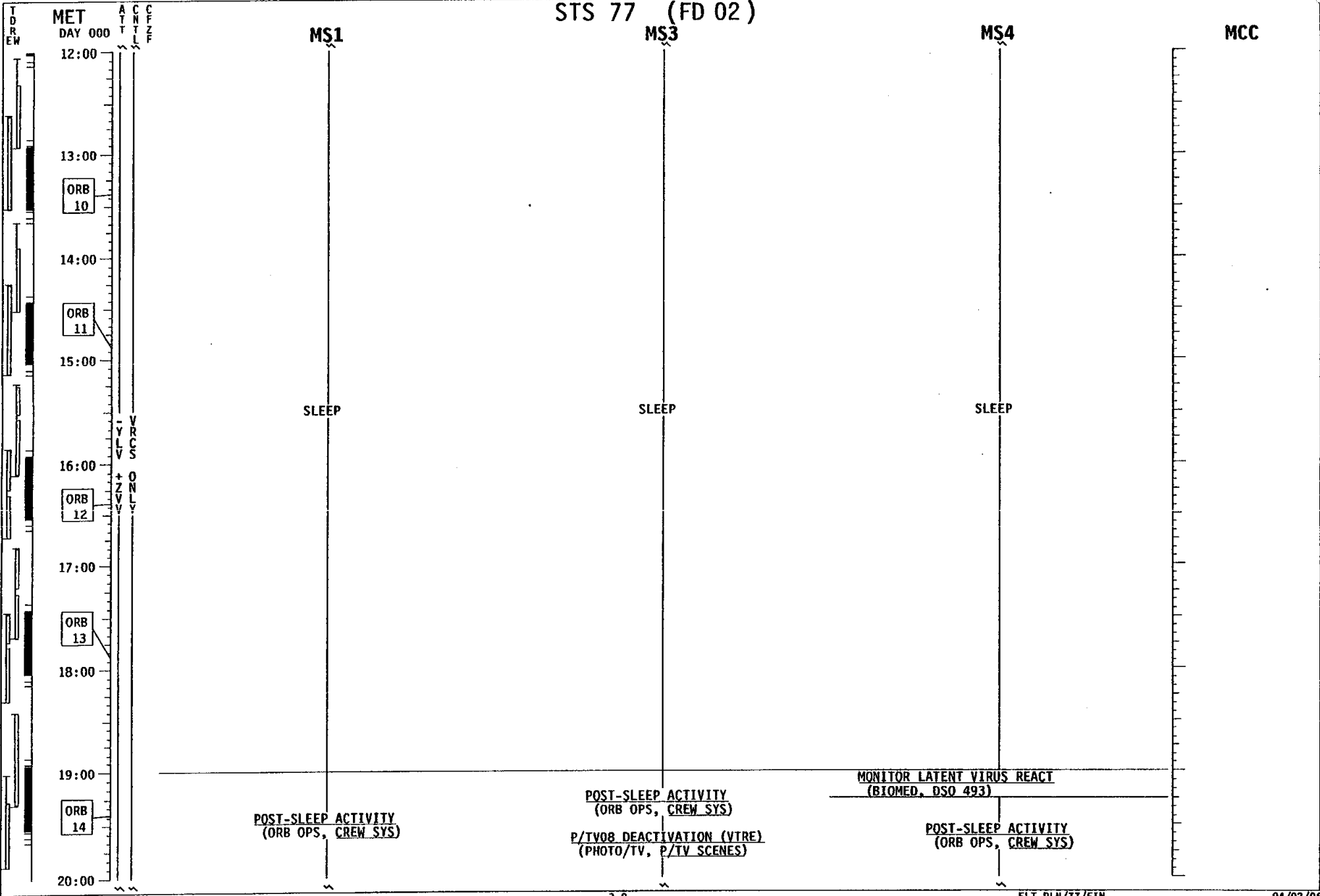


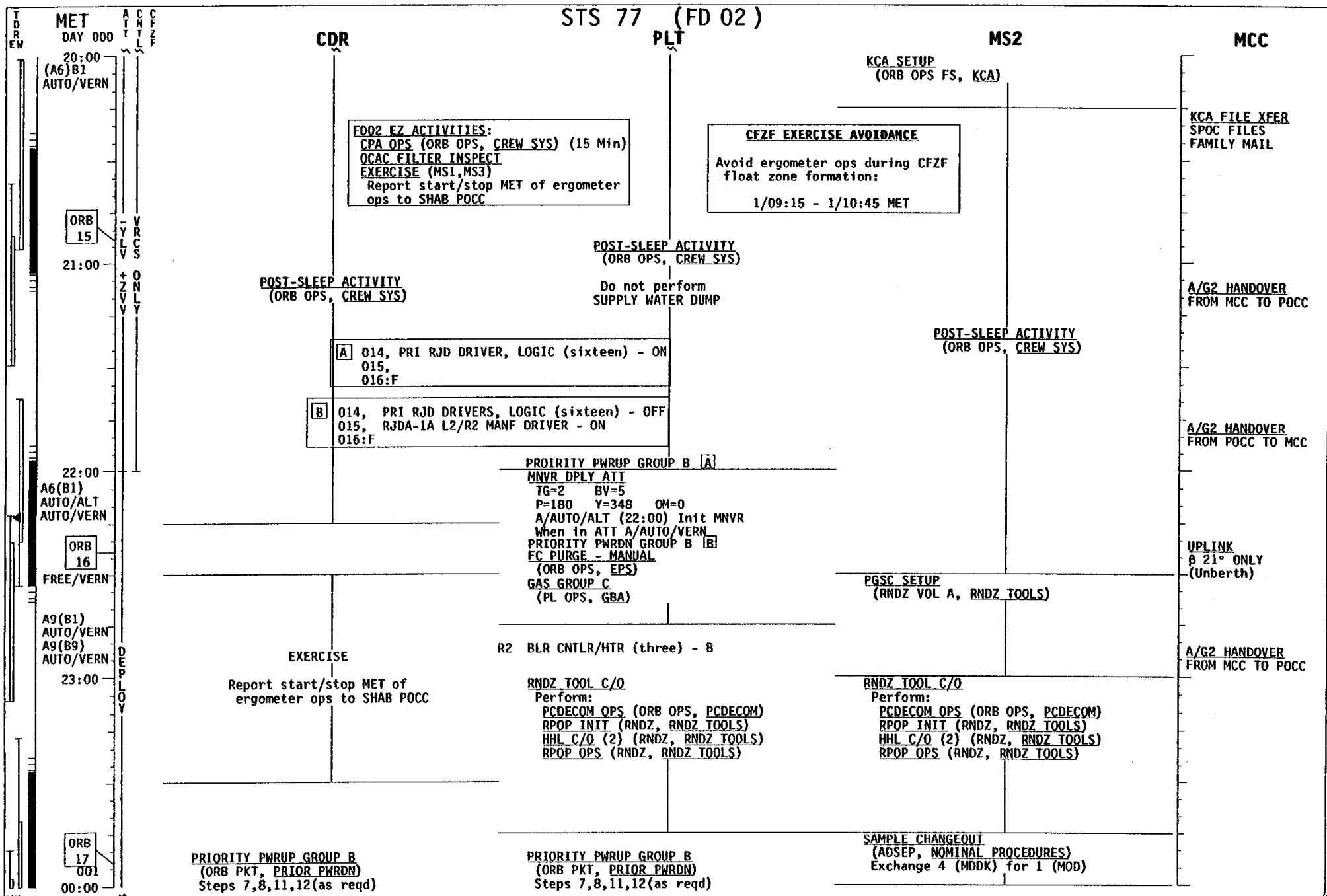


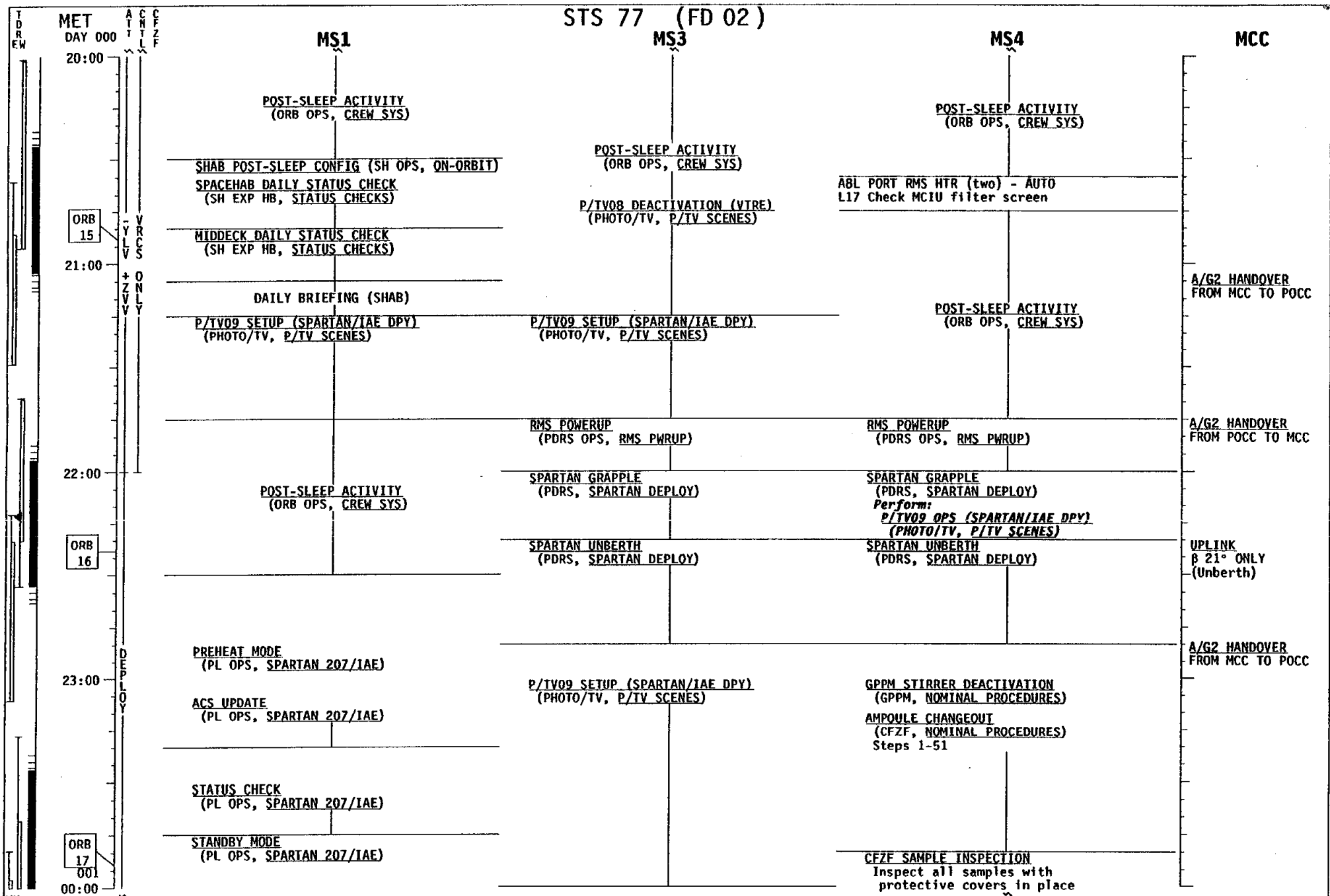
STS 77 (FD 02)

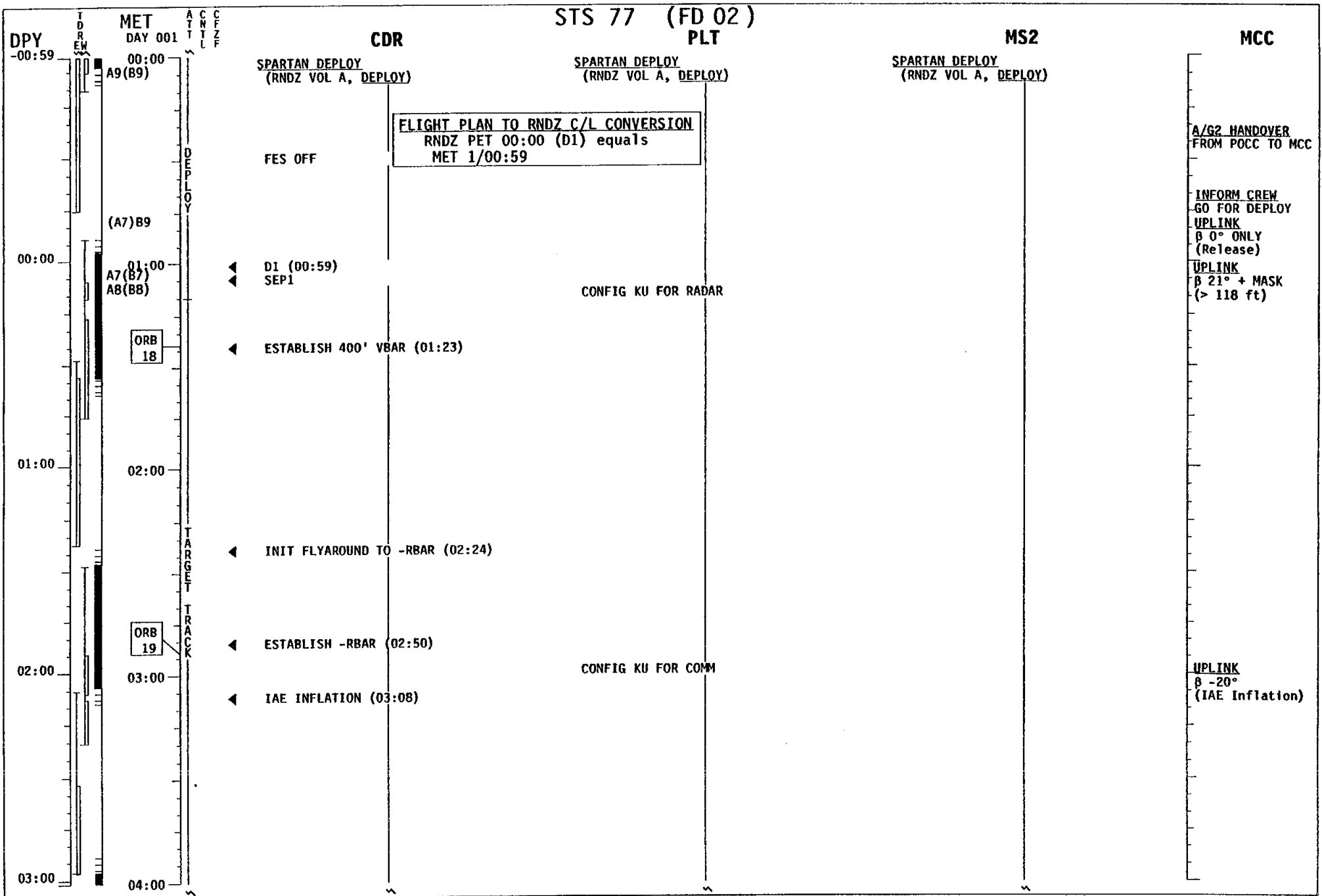


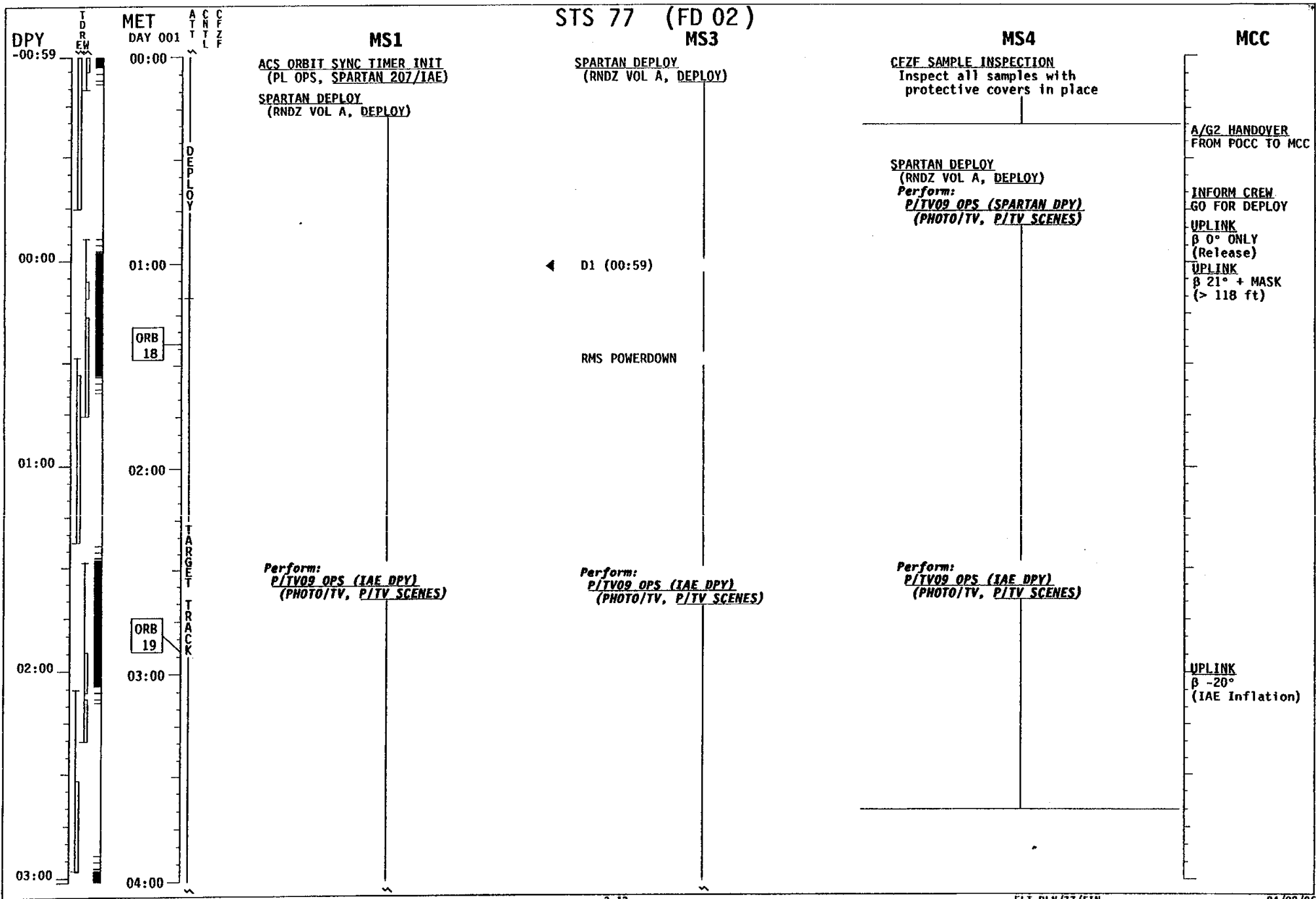
STS 77 (FD 02)

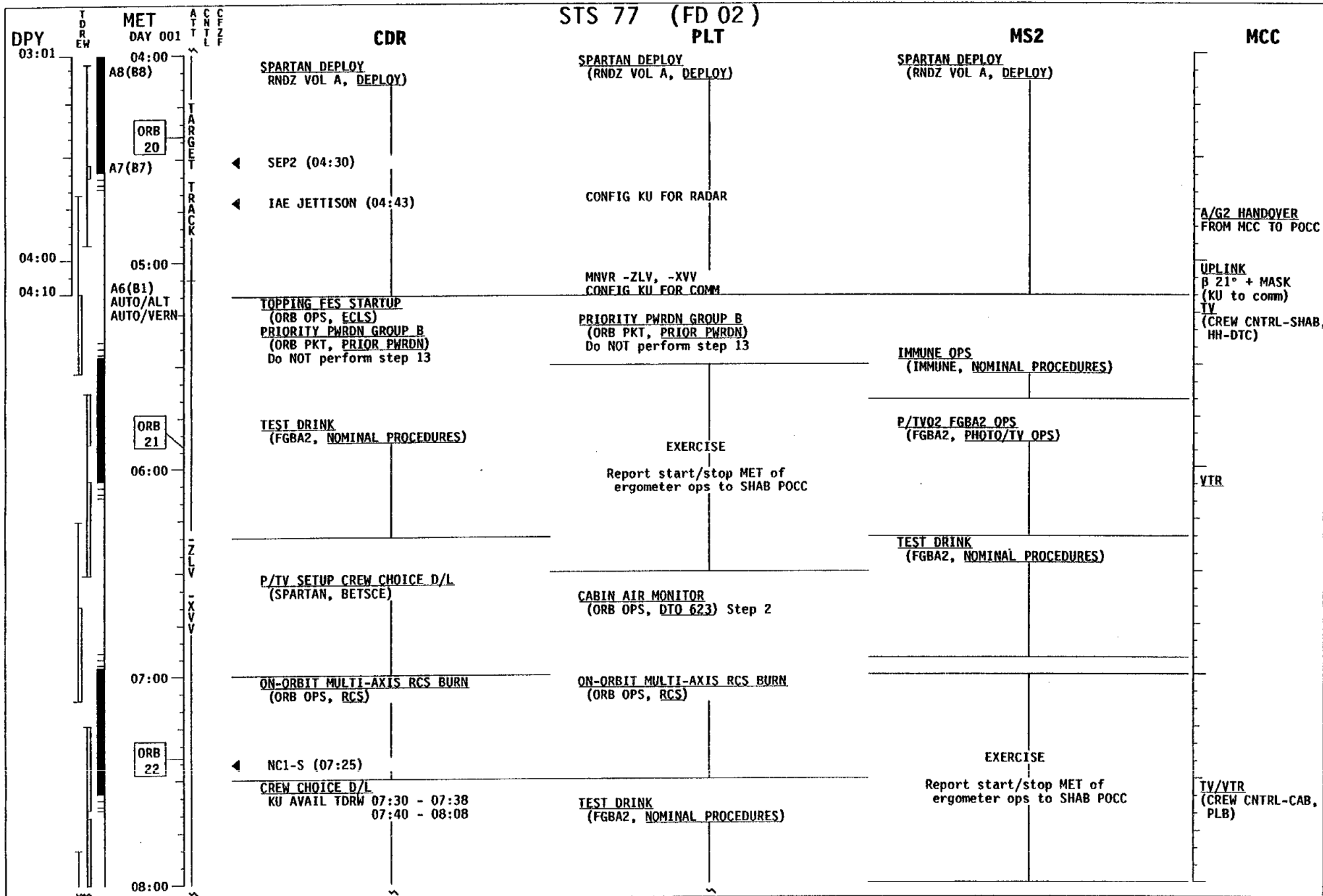


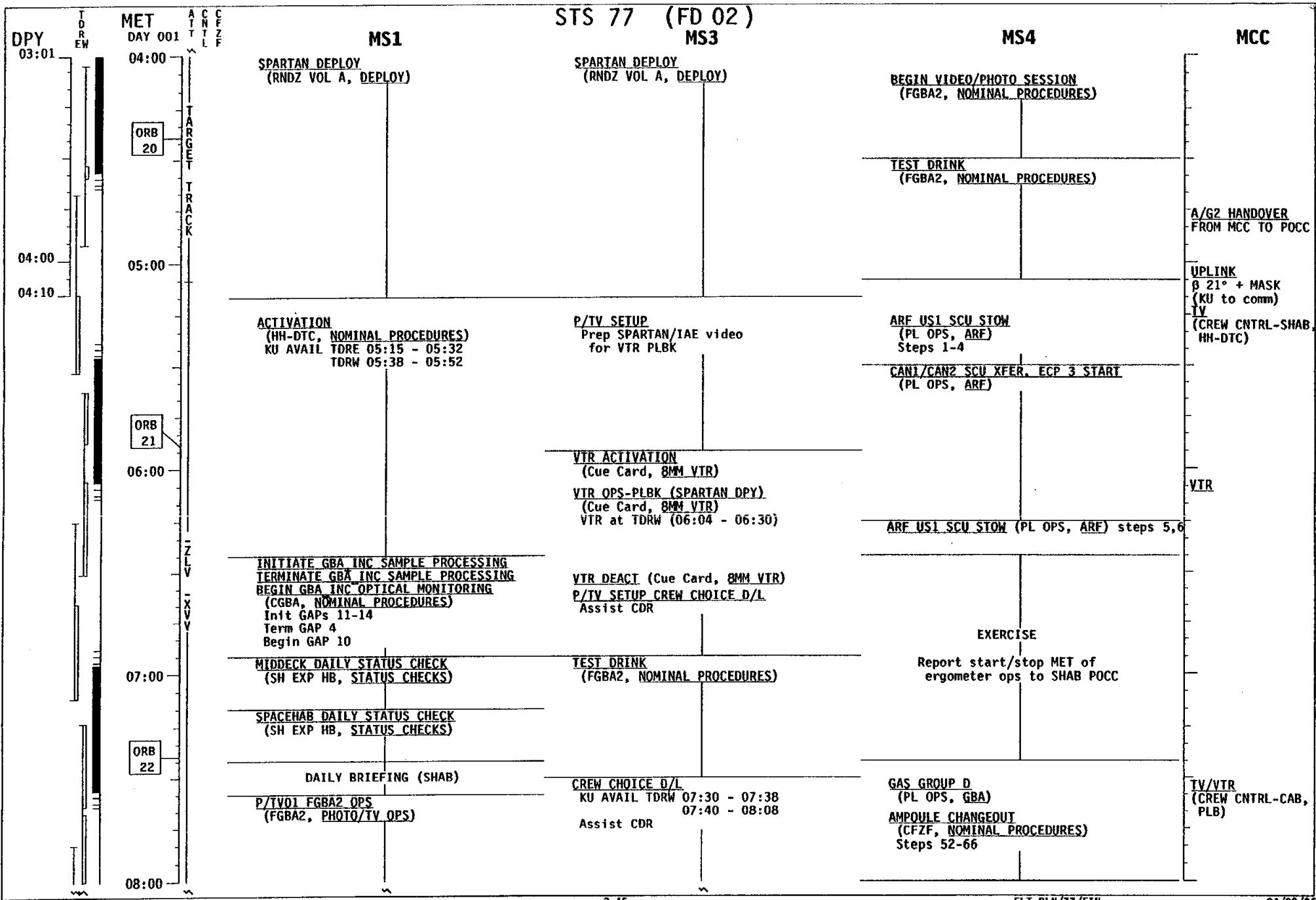










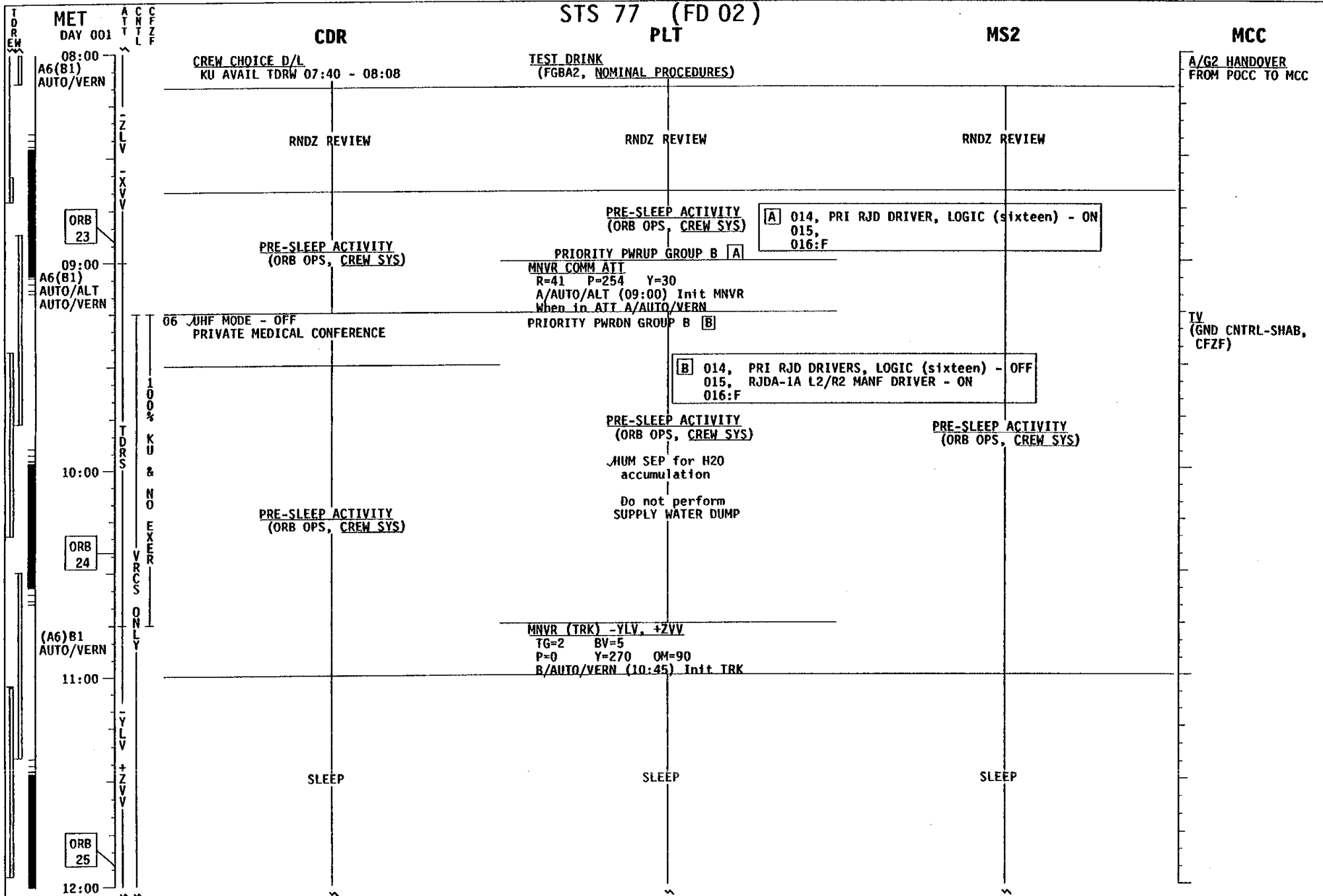


STS 77 (FD 02)
PLT

CDR

MS2

MCC



STS 77 (FD 02)

MS1

MS3

MS4

MCC

MET DAY 001

08:00

P/TV01 FGBA2 OPS
(FGBA2, PHOTO/TV OPS)

CREW CHOICE D/L
KU AVAIL TDRW 07:40 - 08:08

SHAB PRE-SLEEP CONFIG (SH OPS, ON-ORBIT)

A/G2 HANDOVER
FROM POCC TO MCC

TEST DRINK
(FGBA2, NOMINAL PROCEDURES)

FILTER CLEANING
(IFM, SCHEDULED MAINTENANCE)

END VIDEO/PHOTO SESSION
(FGBA2, NOMINAL PROCEDURES)

ORB 23

09:00

PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

TV
(GND CNTRL-SHAB,
CFZF)

10:00

ORB 24

P/TV08 SETUP OPS (VTRE)
(PHOTO/TV, P/TV SCENES)
Record start of VTRE ops
during sleep

11:00

SLEEP

SLEEP

SLEEP

ORB 25

12:00

ATTN

CRITL

INLV

KVV

KVV

KVV

KVV

KVV

KVV

KVV

KVV

KVV

KVV

KVV

KVV

KVV

KVV

KVV

KVV

KVV

KVV

KVV

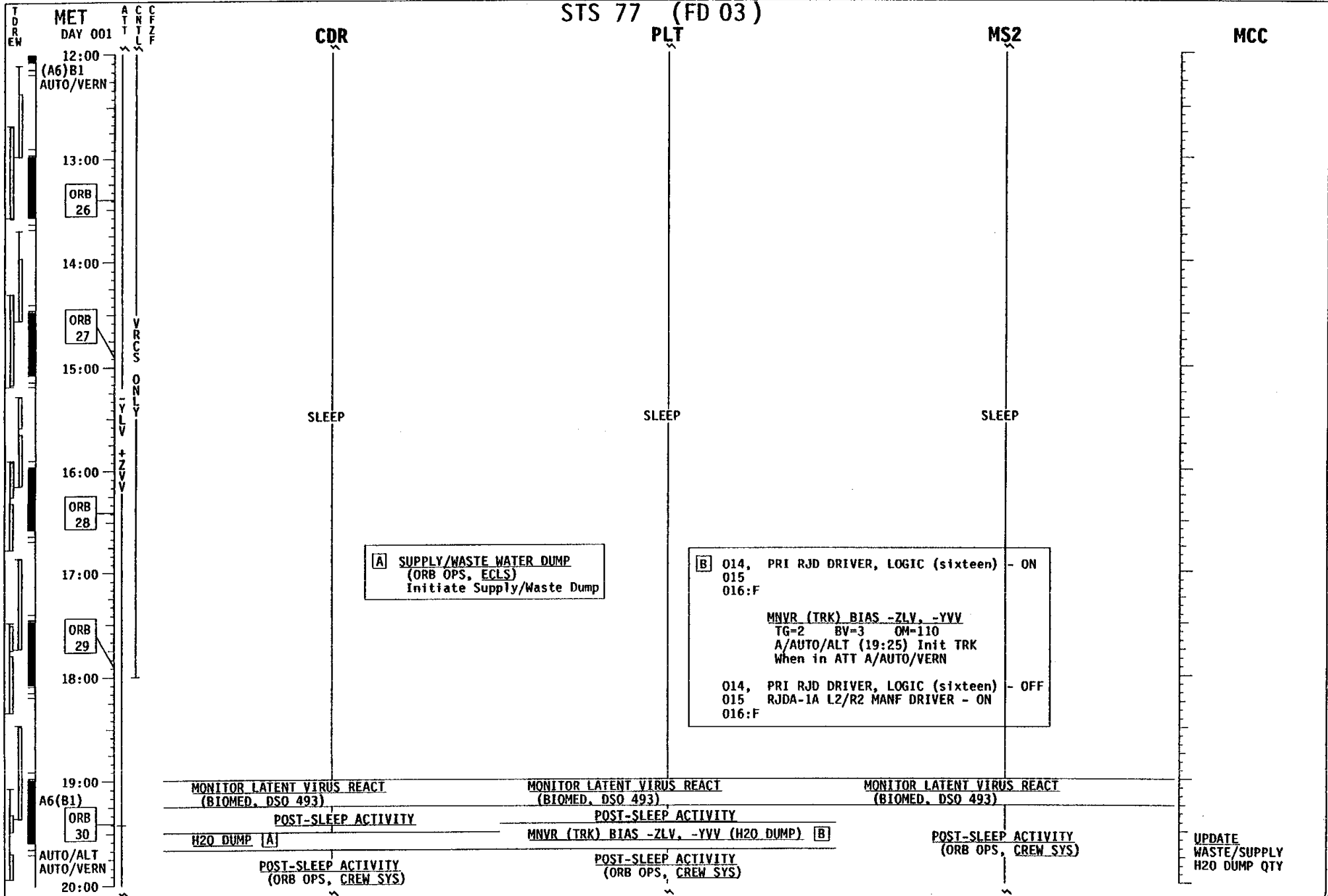
KVV

KVV

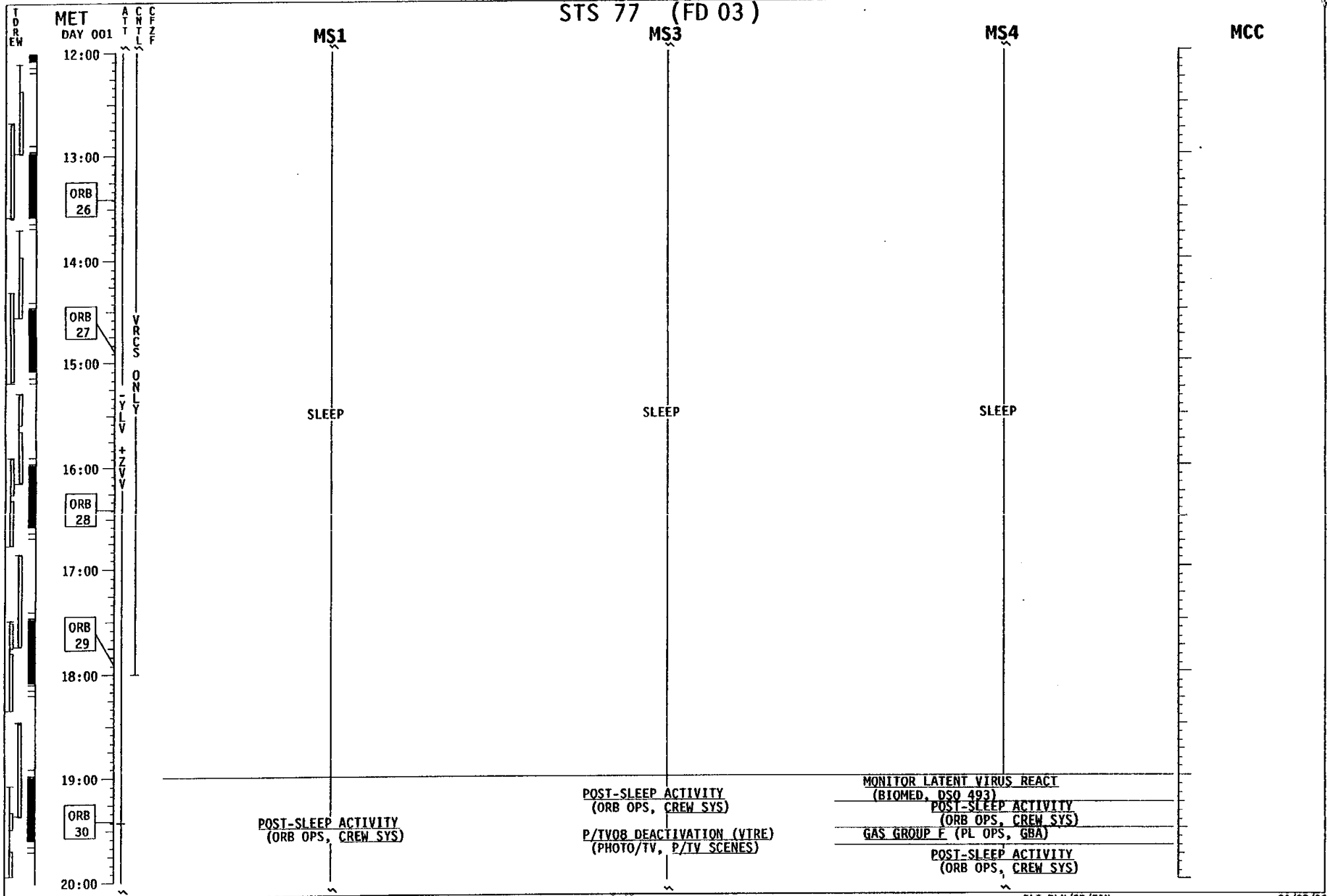
100% KU & NO EXER

DRS V SCNS ONLY

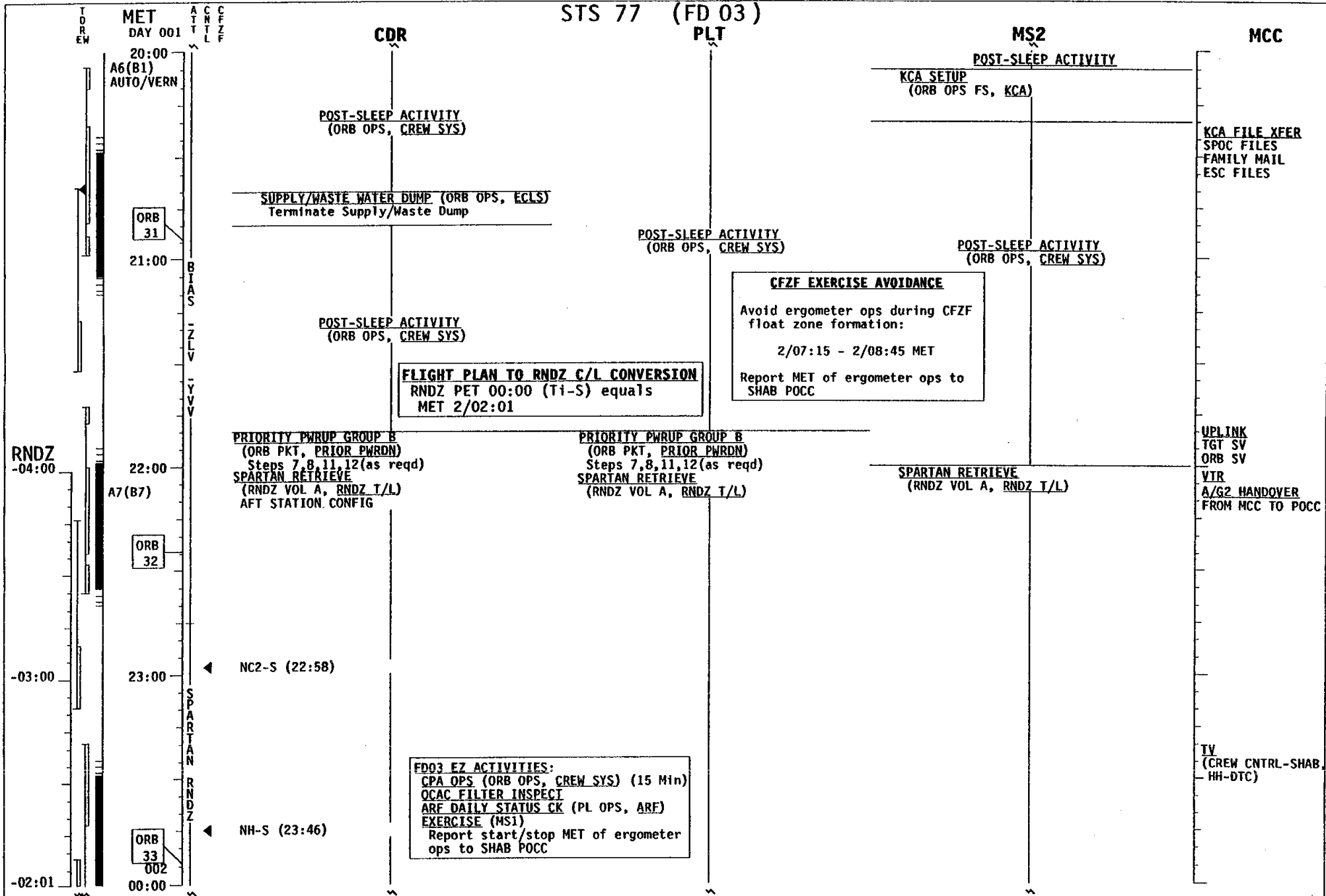
STS 77 (FD 03)



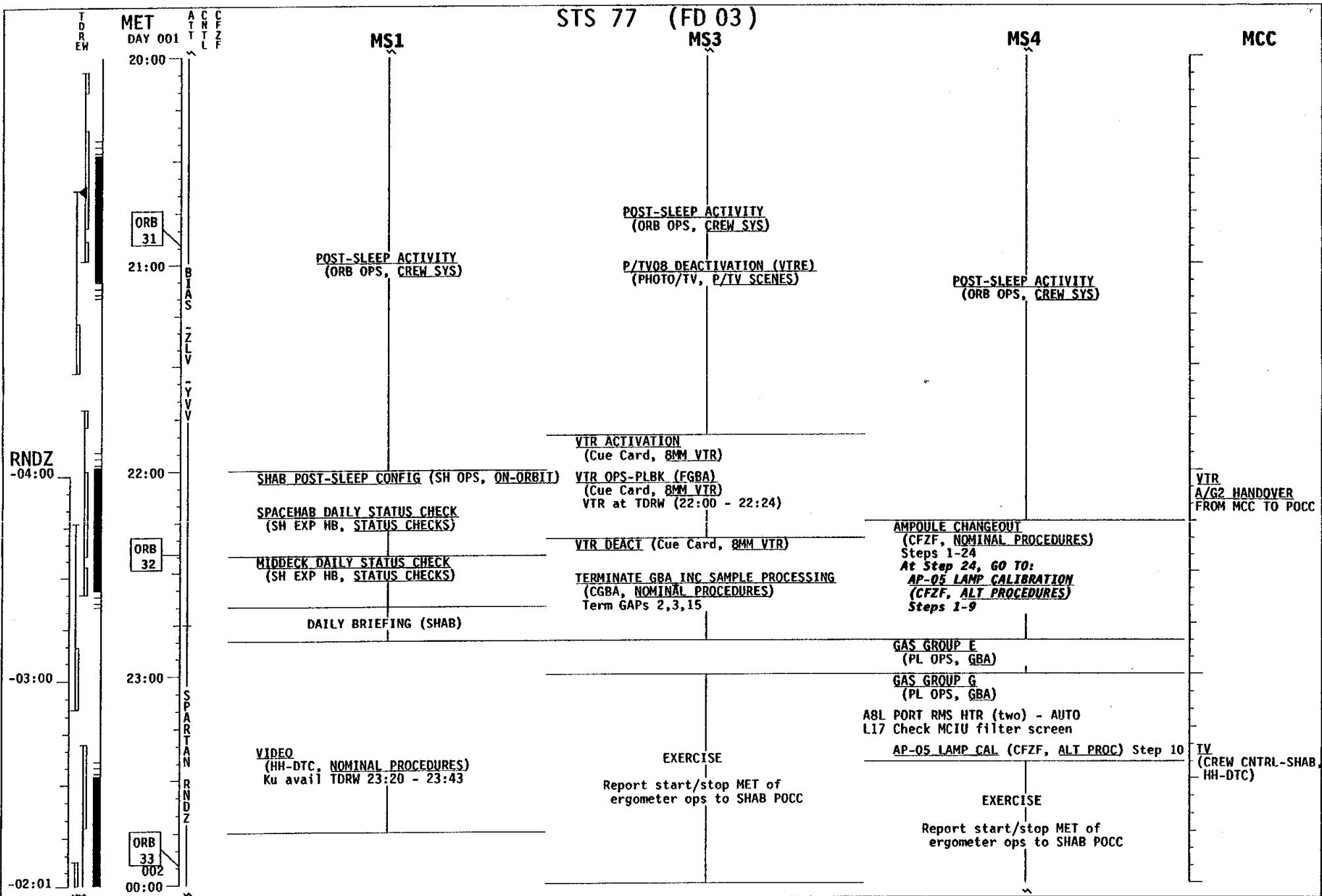
STS 77 (FD 03)

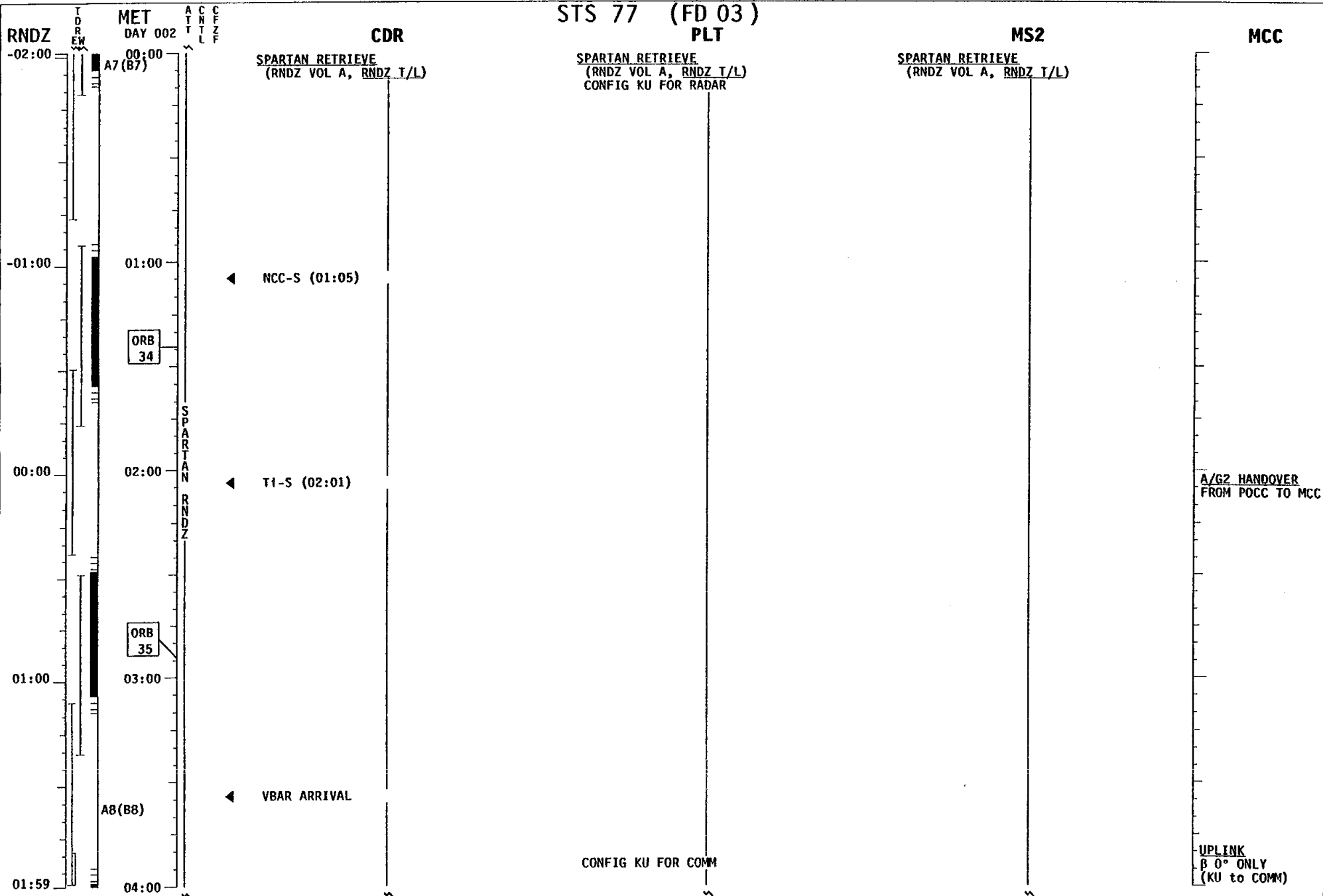


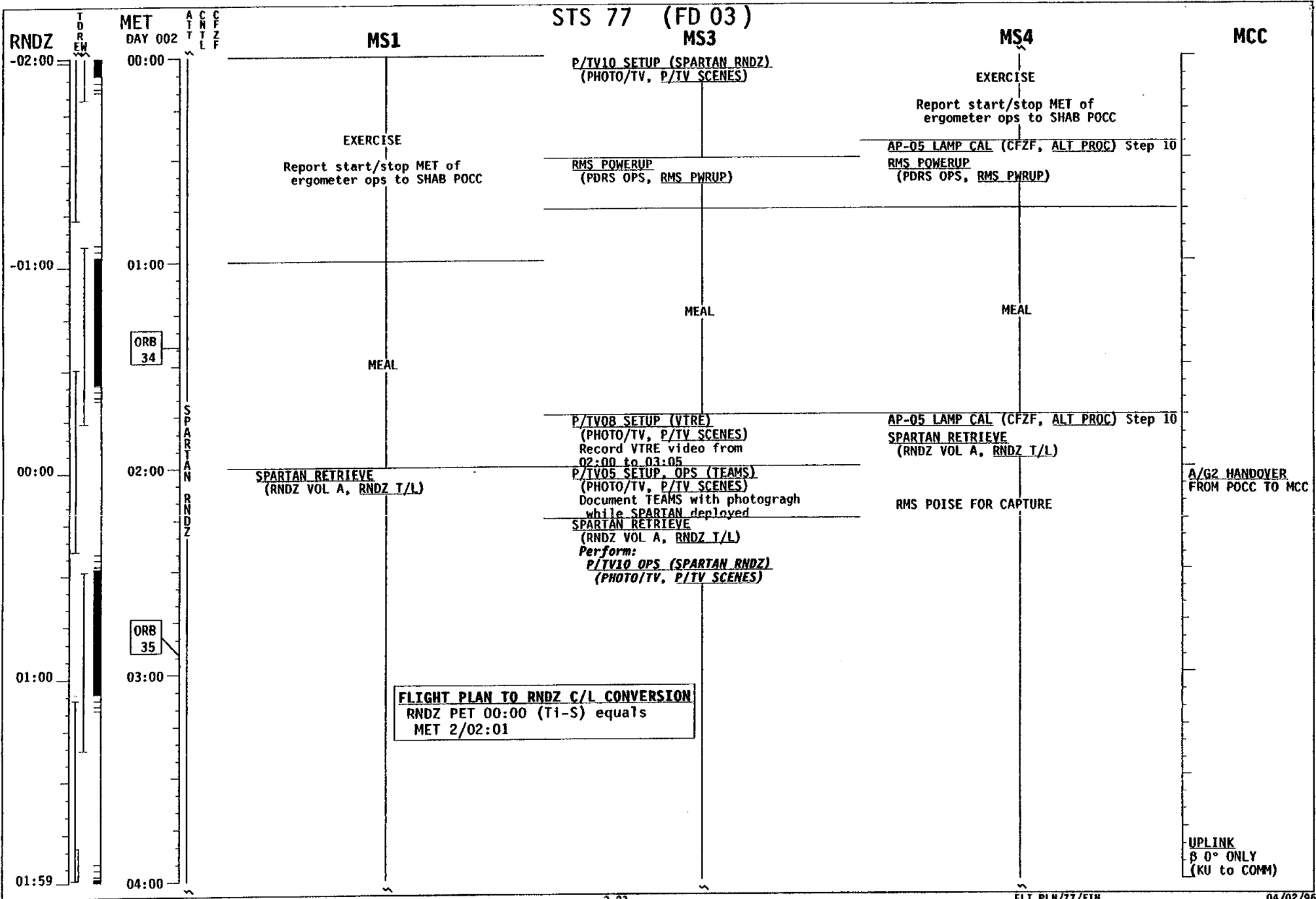
STS 77 (FD 03)

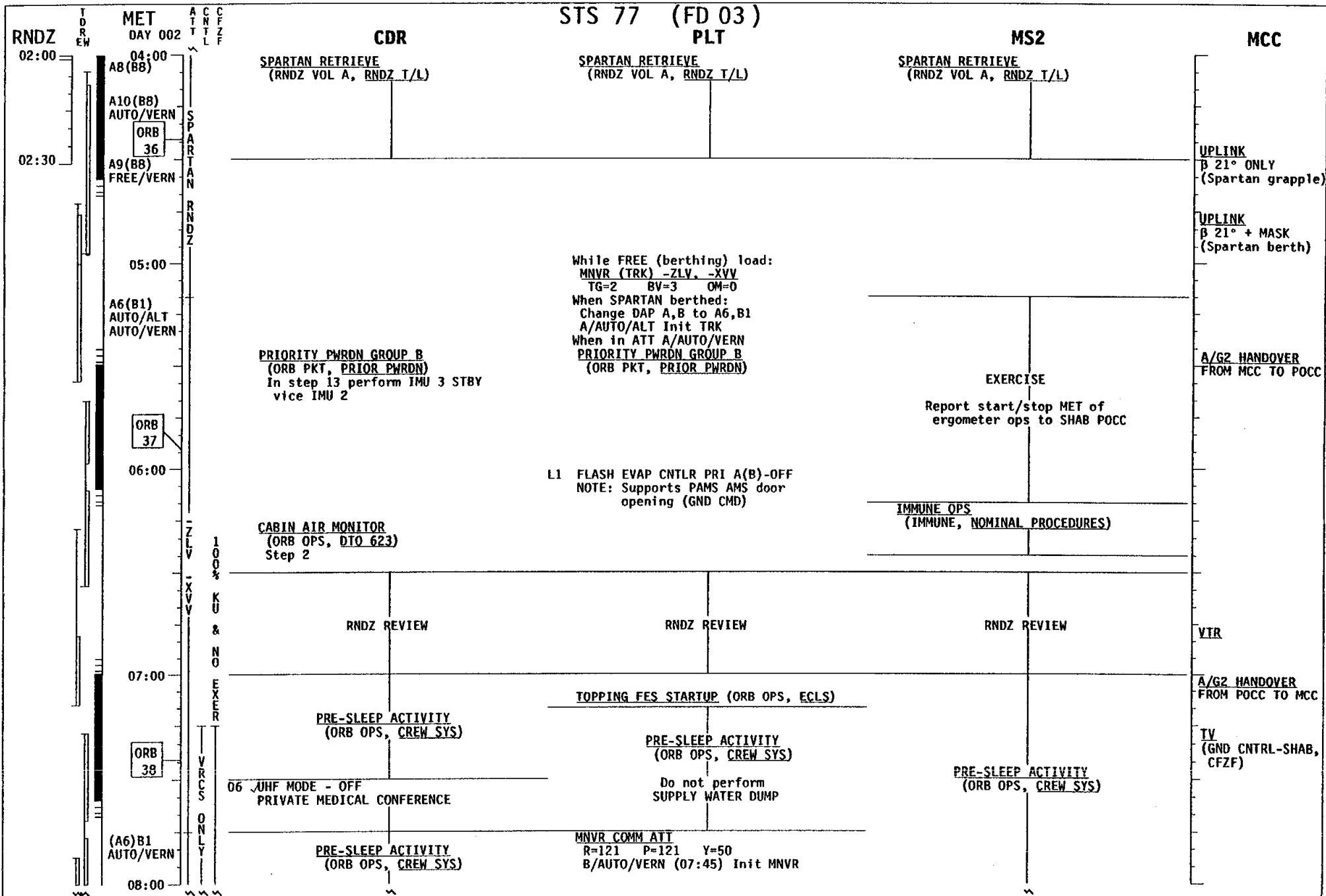


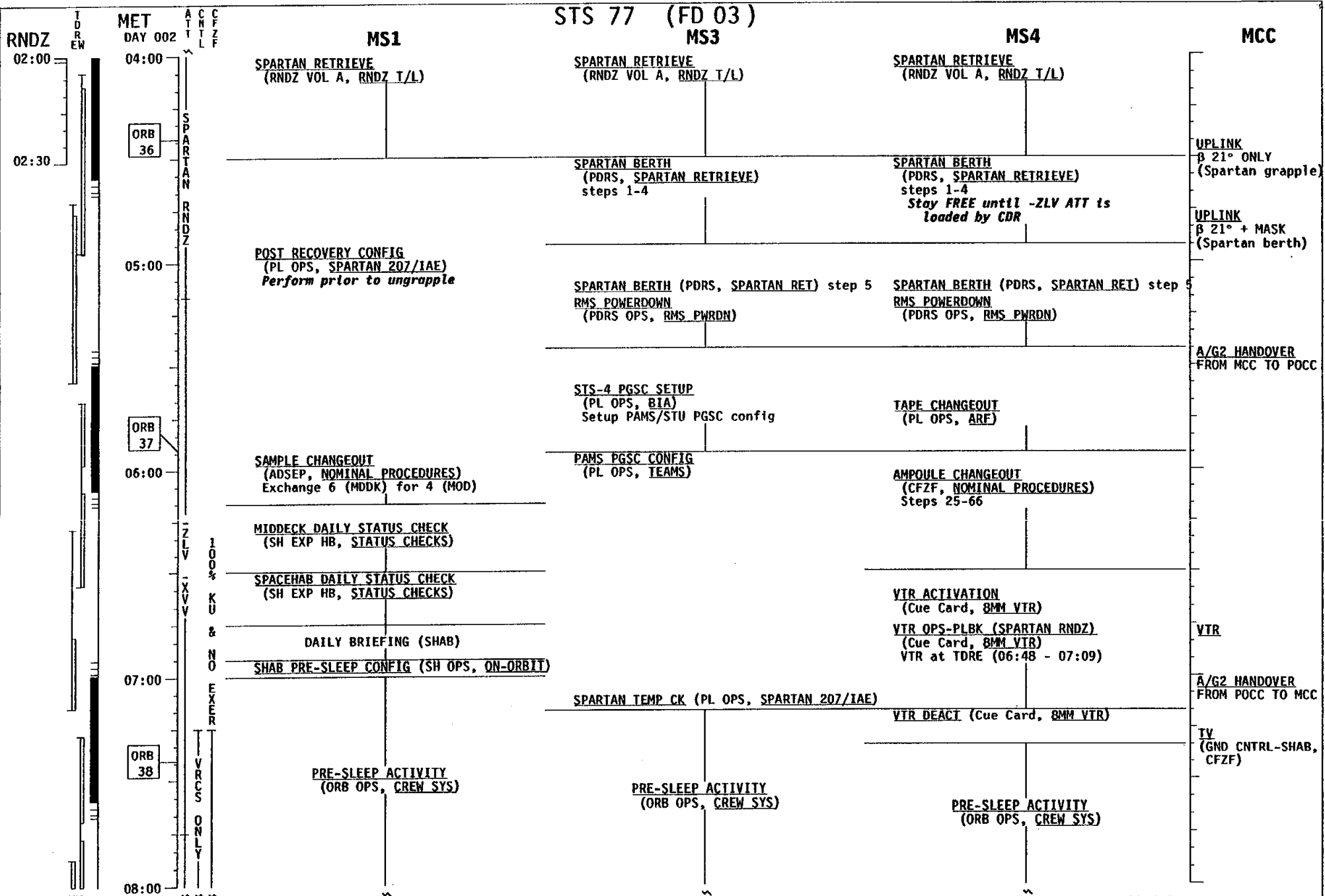
STS 77 (FD 03)



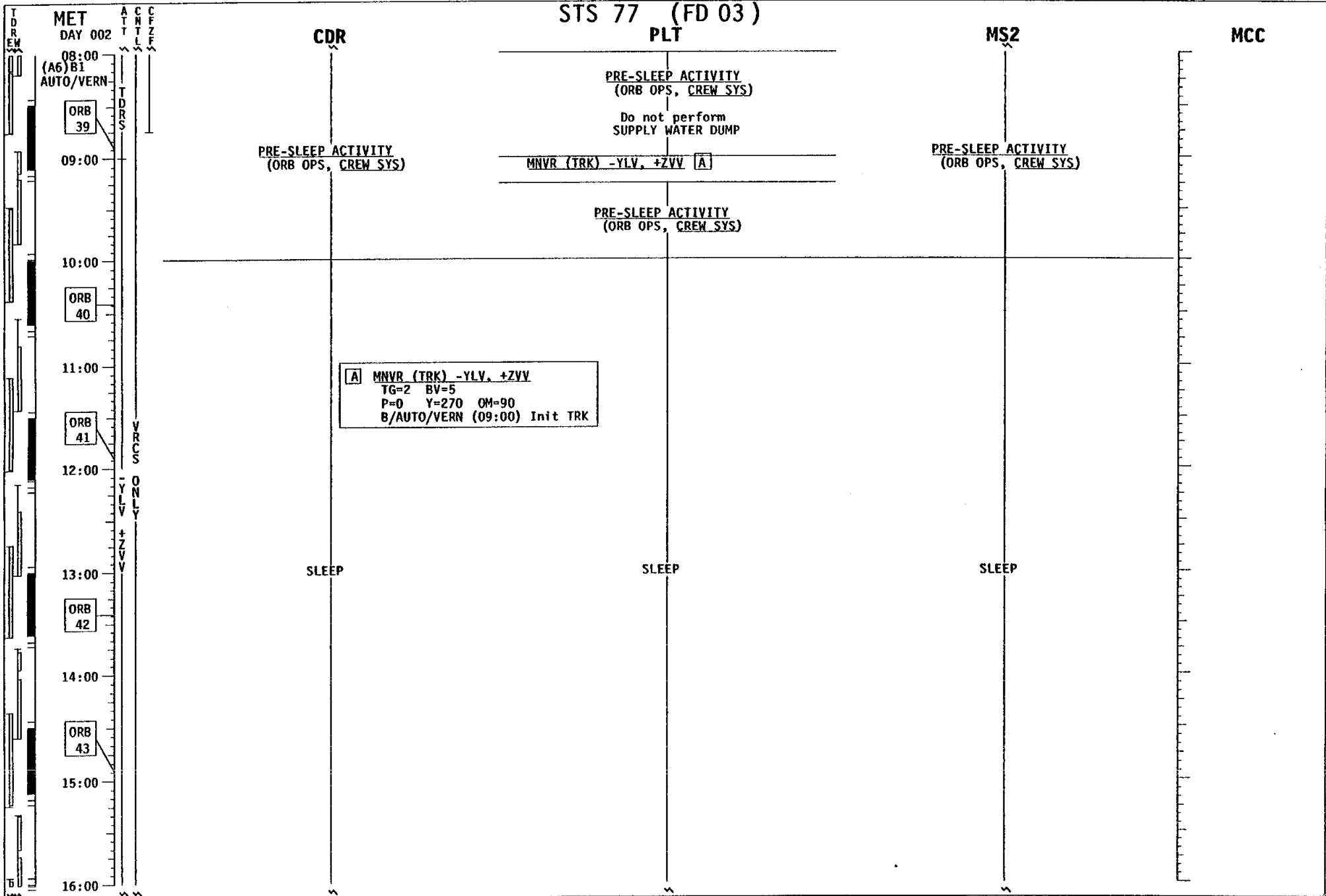








STS 77 (FD 03)



STS 77 (FD 03)

MS1

MS3

MS4

MCC

MET DAY 002

08:00

ORB 39

09:00

ORB 40

11:00

ORB 41

12:00

13:00

ORB 42

14:00

ORB 43

15:00

16:00

PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

P/TV08 SETUP OPS (VTRE)
(PHOTO/TV, P/TV SCENES)
Record start of VTRE ops during sleep

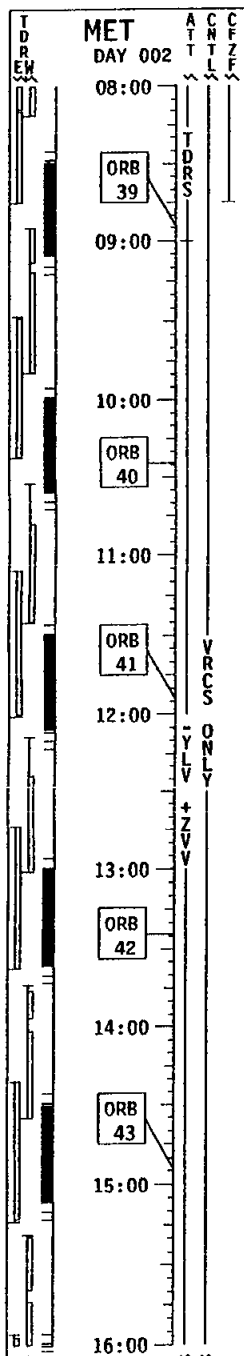
PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

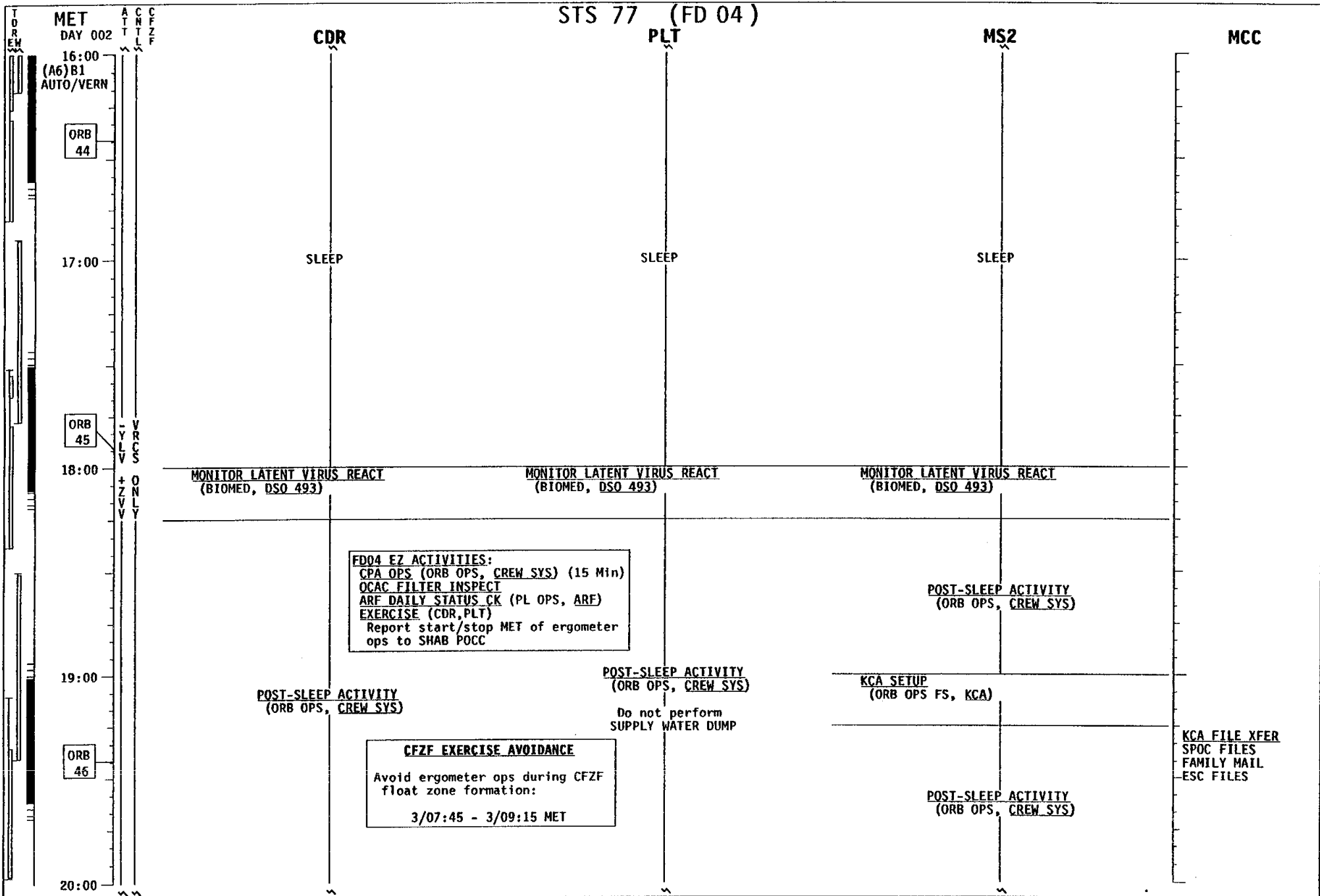
PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

SLEEP

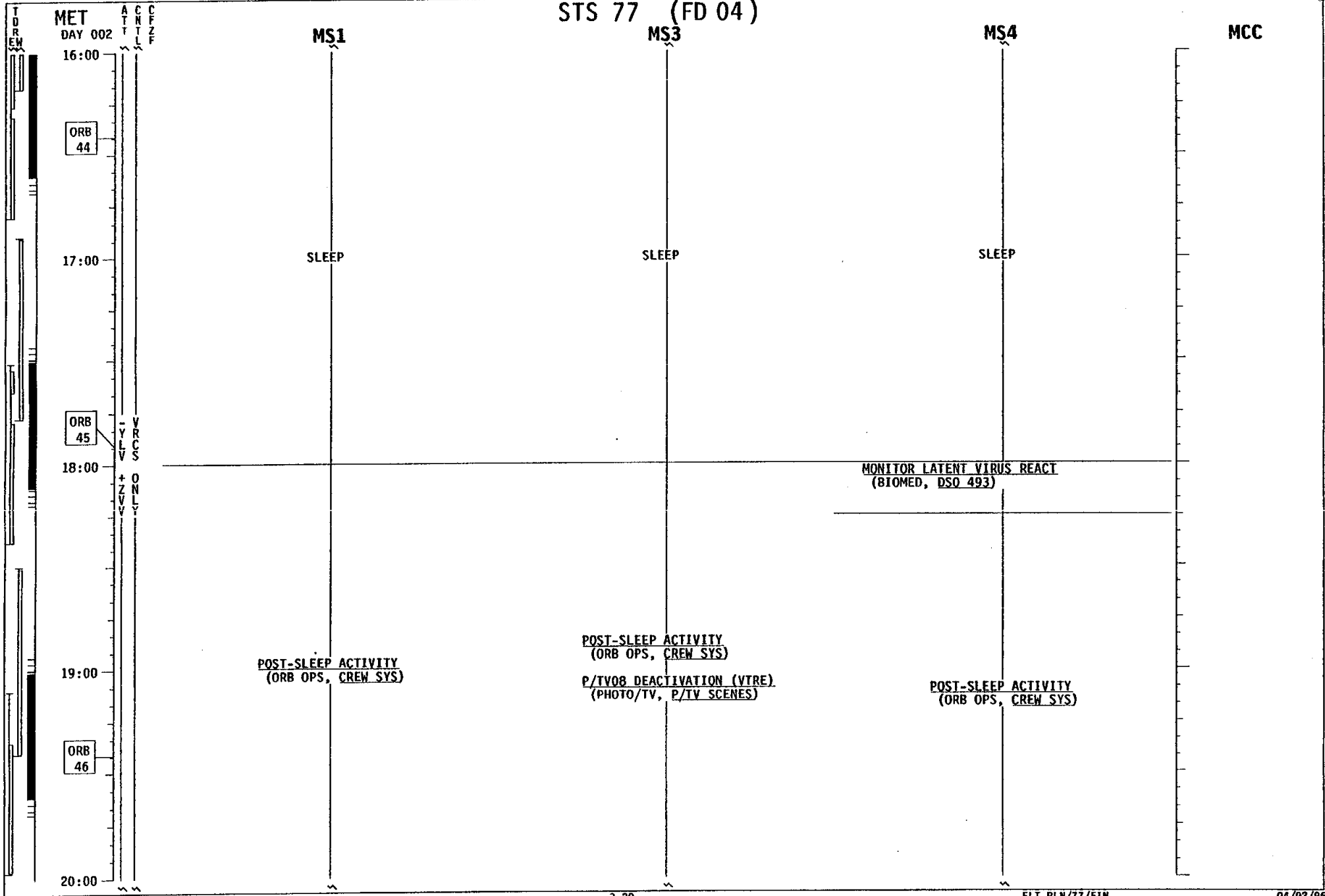
SLEEP

SLEEP

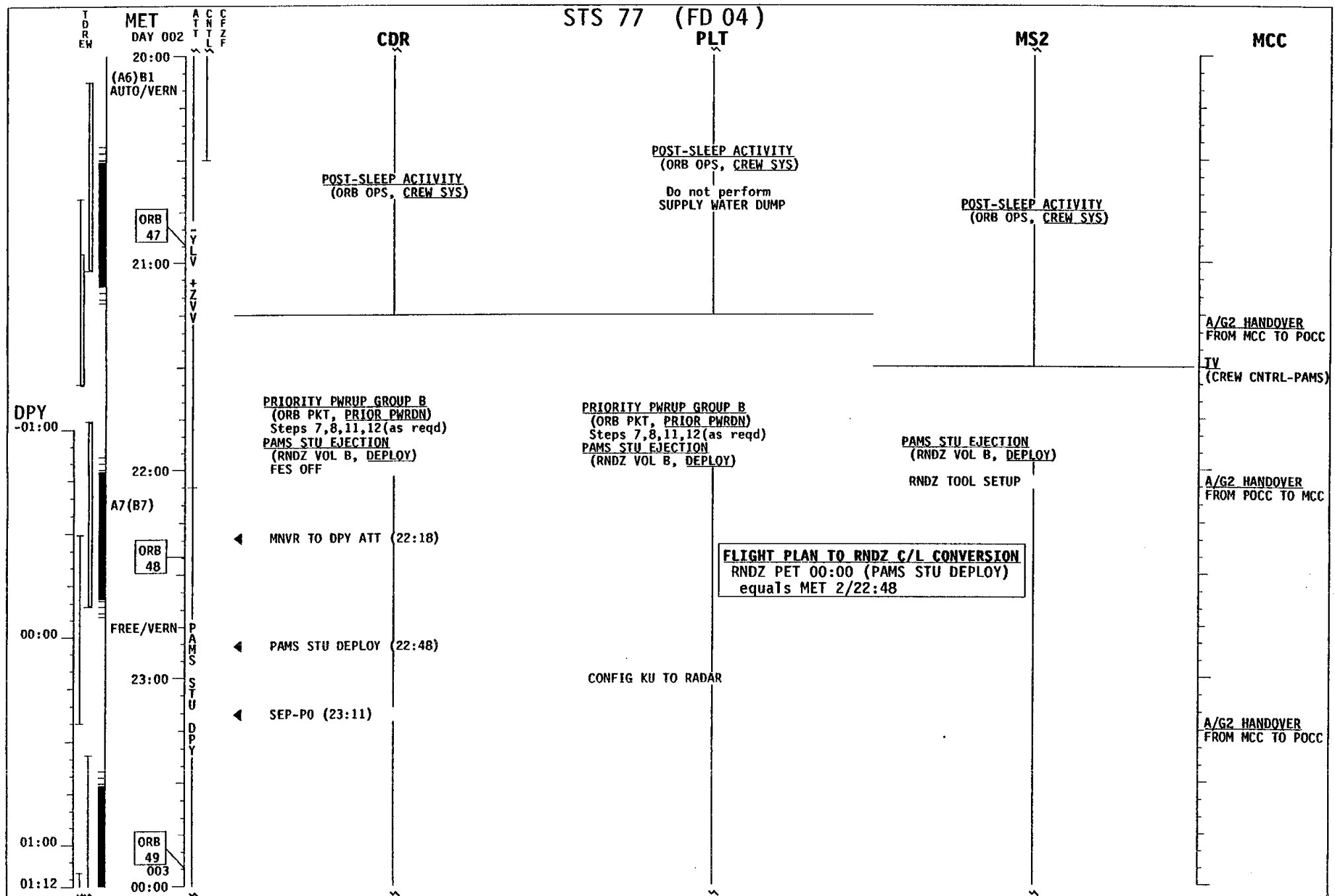




STS 77 (FD 04)



STS 77 (FD 04)



POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

Do not perform
SUPPLY WATER DUMP

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

PRIORITY PWRUP GROUP B
(ORB PKT, PRIOR PWRDN)
Steps 7,8,11,12(as reqd)
PAMS STU EJECTION
(RNDZ VOL B, DEPLOY)
FES OFF

PRIORITY PWRUP GROUP B
(ORB PKT, PRIOR PWRDN)
Steps 7,8,11,12(as reqd)
PAMS STU EJECTION
(RNDZ VOL B, DEPLOY)

PAMS STU EJECTION
(RNDZ VOL B, DEPLOY)

RNDZ TOOL SETUP

FLIGHT PLAN TO RNDZ C/L CONVERSION
RNDZ PET 00:00 (PAMS STU DEPLOY)
equals MET 2/22:48

◀ MNVR TO DPY ATT (22:18)

◀ PAMS STU DEPLOY (22:48)

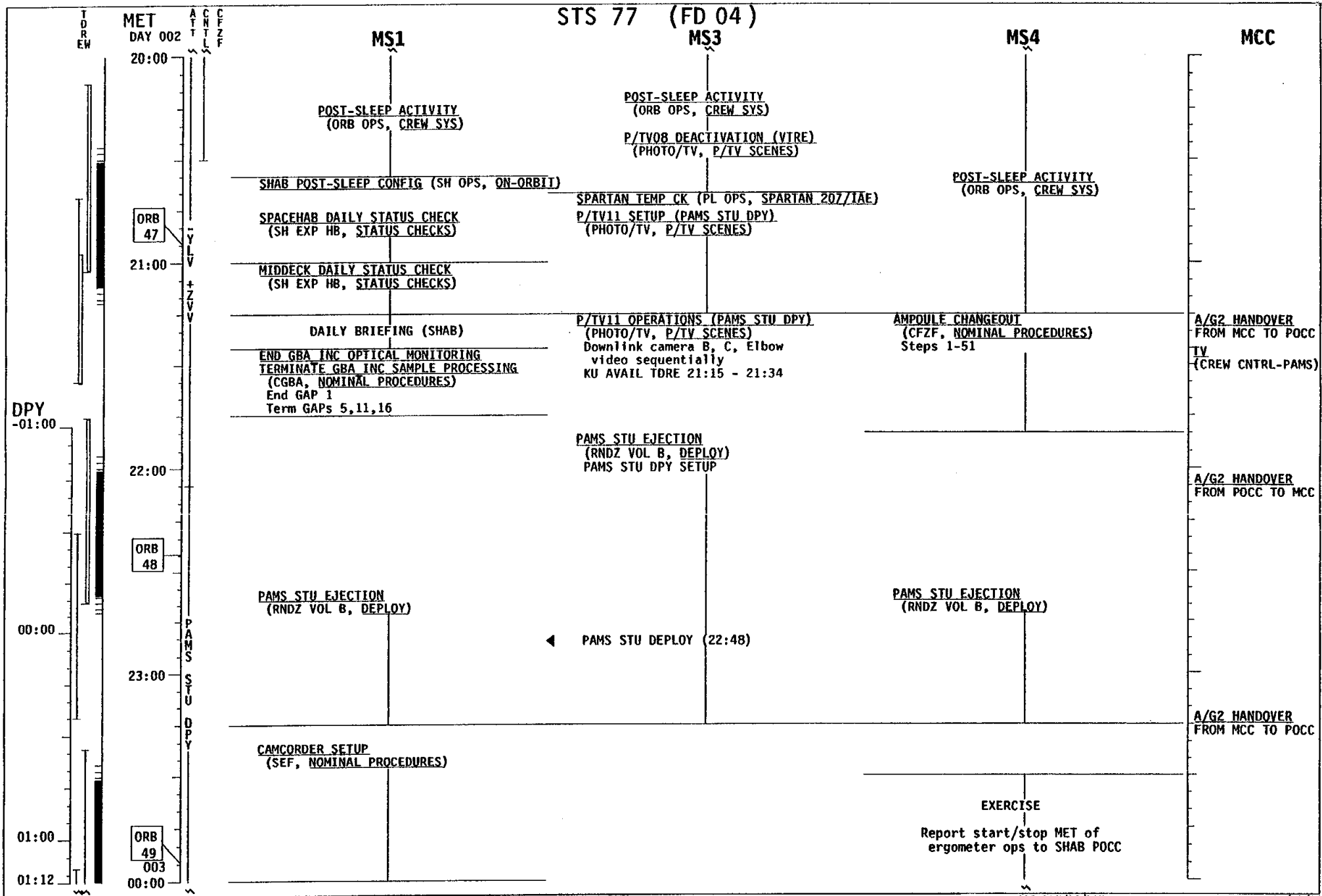
◀ SEP-P0 (23:11)

A/G2 HANDOVER
FROM MCC TO POCC

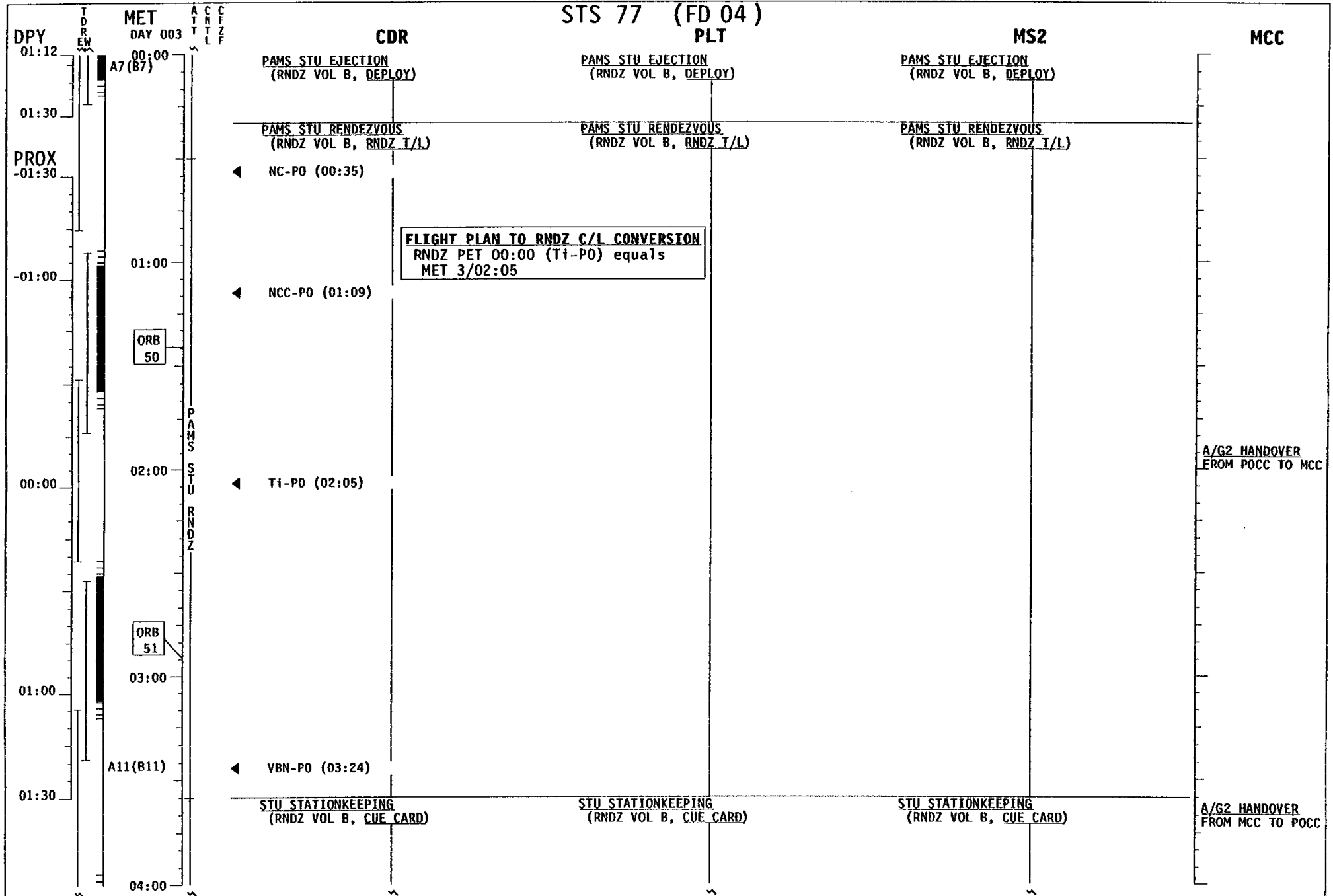
TV
(CREW CNTRL-PAMS)

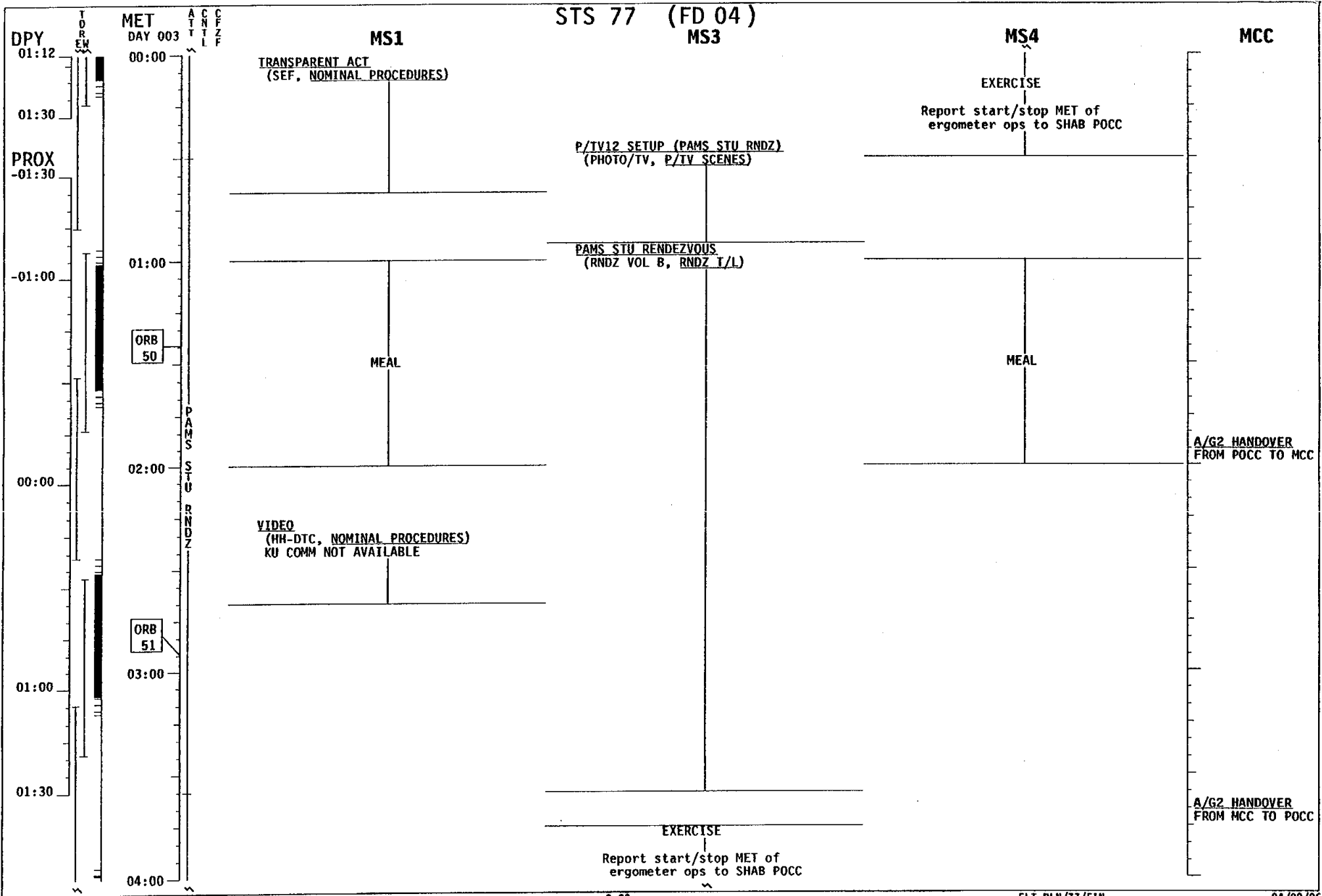
A/G2 HANDOVER
FROM POCC TO MCC

A/G2 HANDOVER
FROM MCC TO POCC

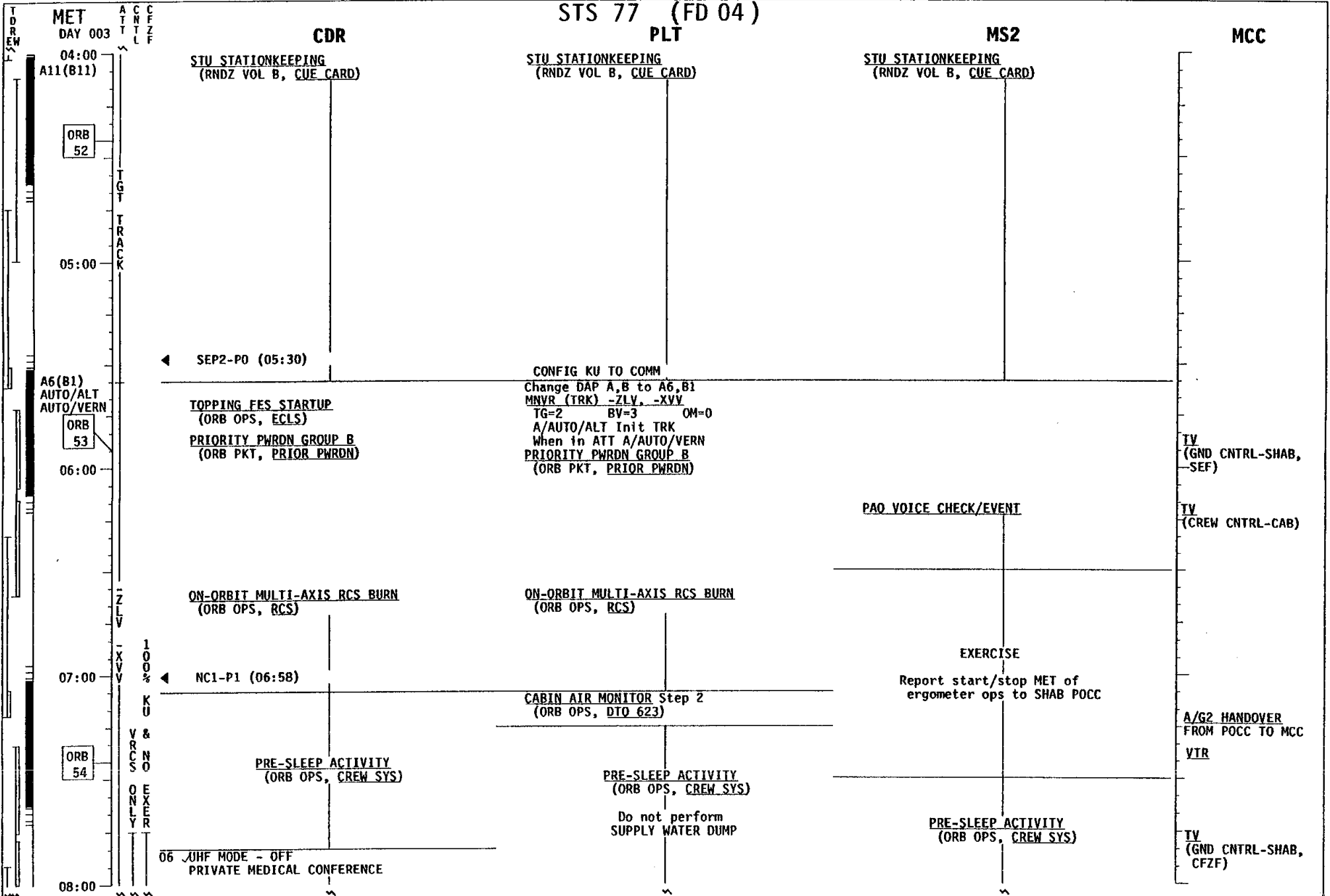


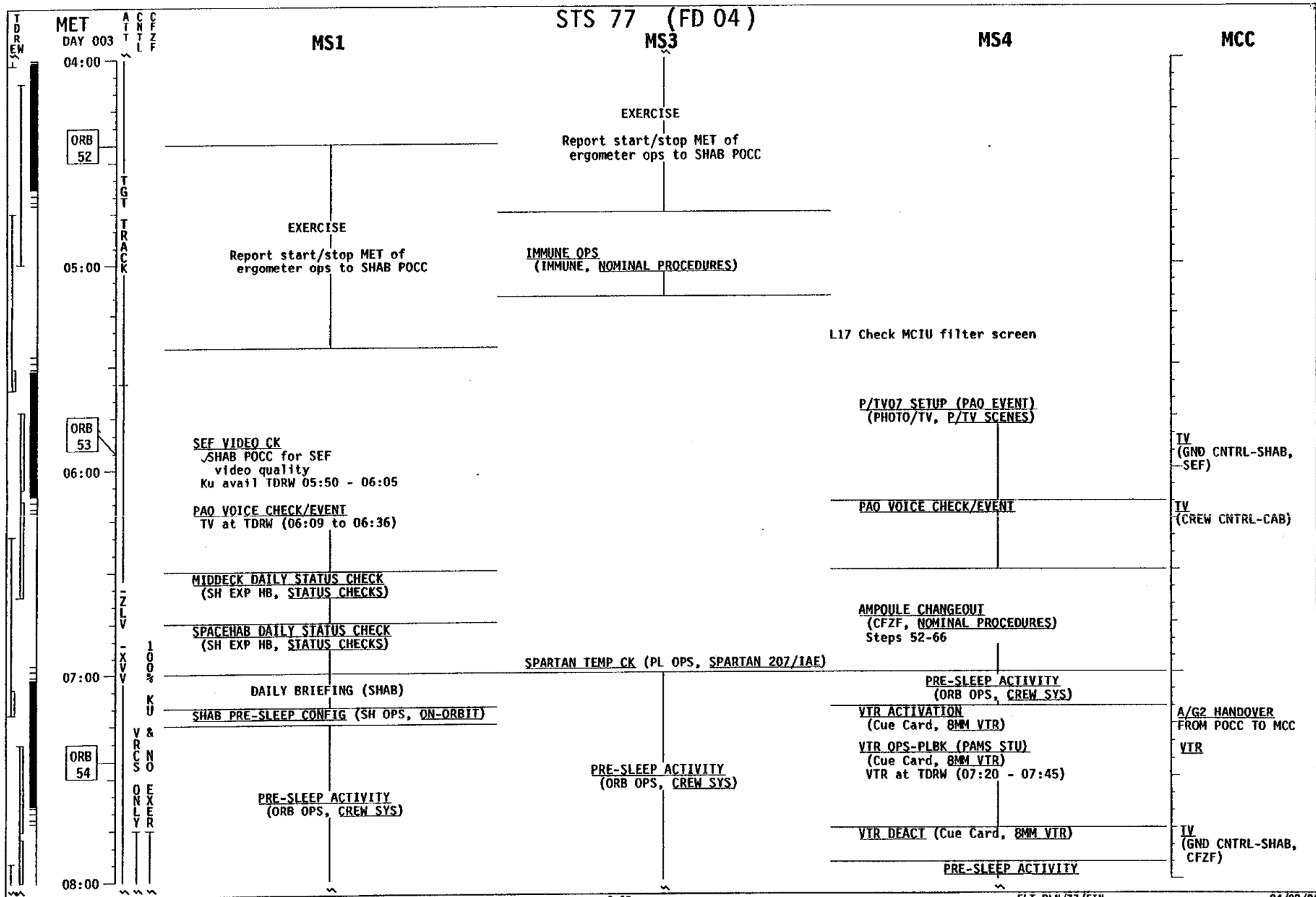
STS 77 (FD 04)



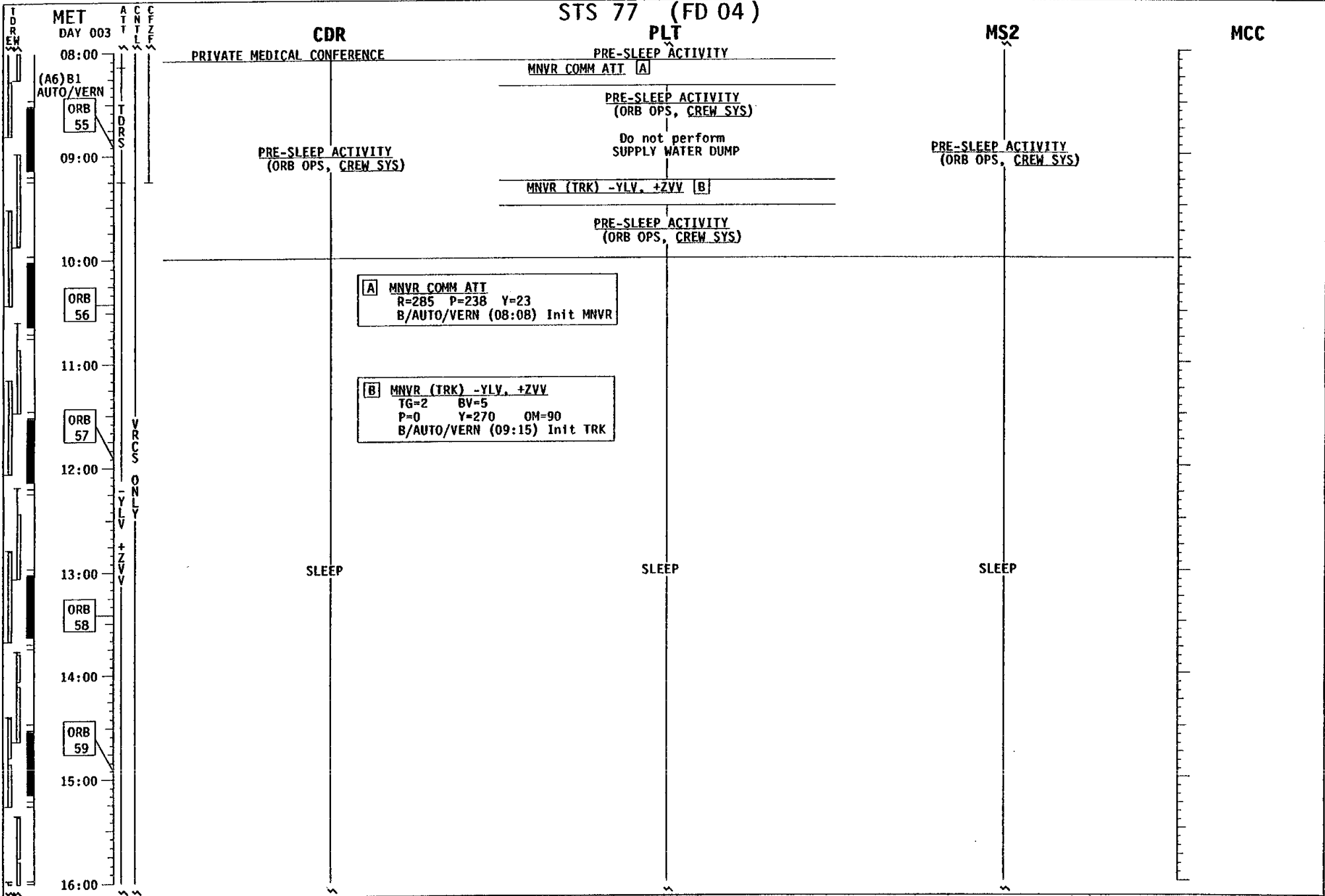


STS 77 (FD 04)





STS 77 (FD 04)



MET DAY 003

CDR

PLT

MS2

MCC

(A6) B1 AUTO/VERN

ORB 55

09:00

PRE-SLEEP ACTIVITY (ORB OPS, CREW SYS)

MNVR COMM ATT [A]

PRE-SLEEP ACTIVITY (ORB OPS, CREW SYS)

Do not perform SUPPLY WATER DUMP

PRE-SLEEP ACTIVITY (ORB OPS, CREW SYS)

MNVR (TRK) -YLV, +ZVV [B]

PRE-SLEEP ACTIVITY (ORB OPS, CREW SYS)

ORB 56

[A] MNVR COMM ATT
R=285 P=238 Y=23
B/AUTO/VERN (08:08) Init MNVR

11:00

[B] MNVR (TRK) -YLV, +ZVV
TG=2 BV=5
P=0 Y=270 OM=90
B/AUTO/VERN (09:15) Init TRK

ORB 57

12:00

13:00

ORB 58

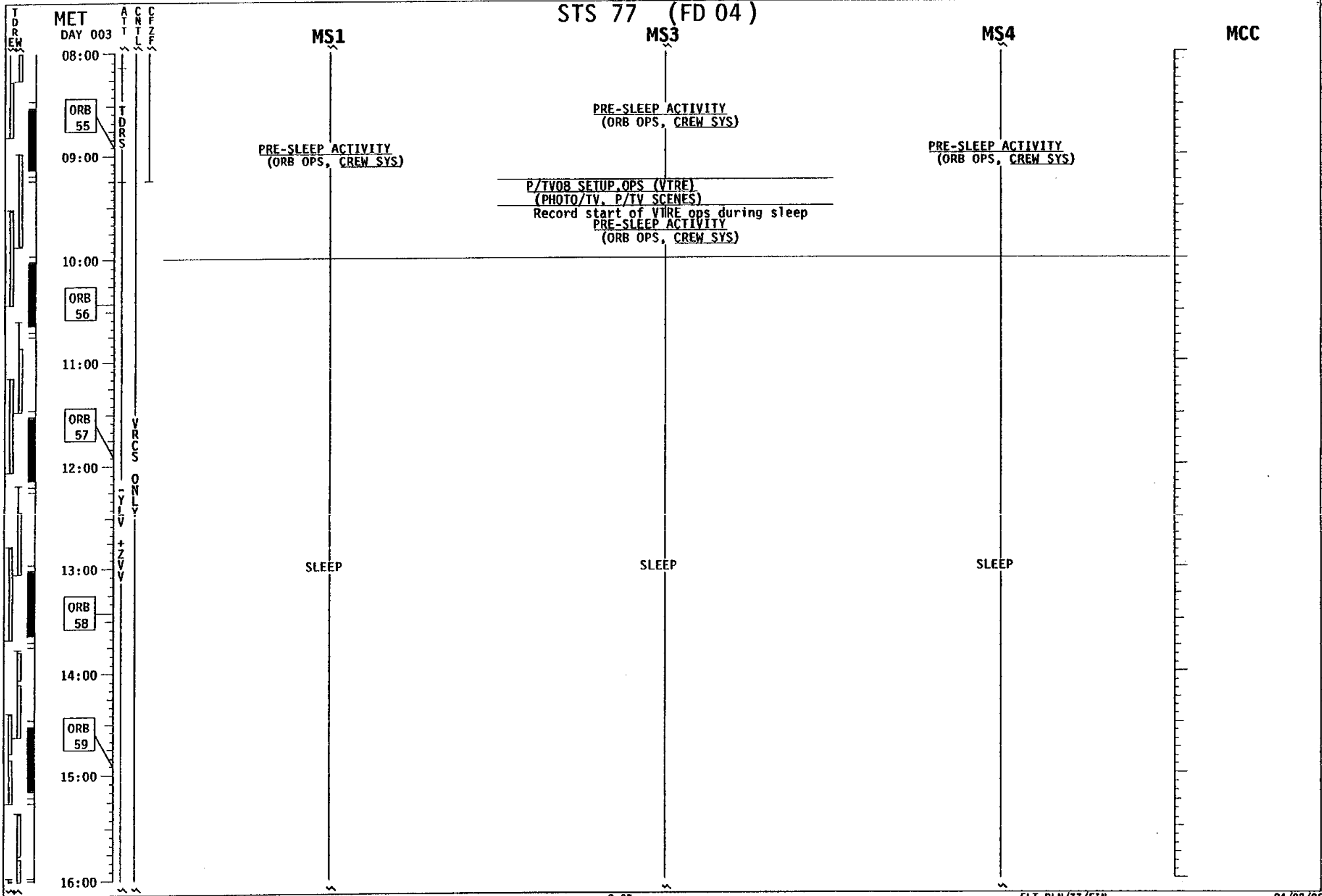
14:00

ORB 59

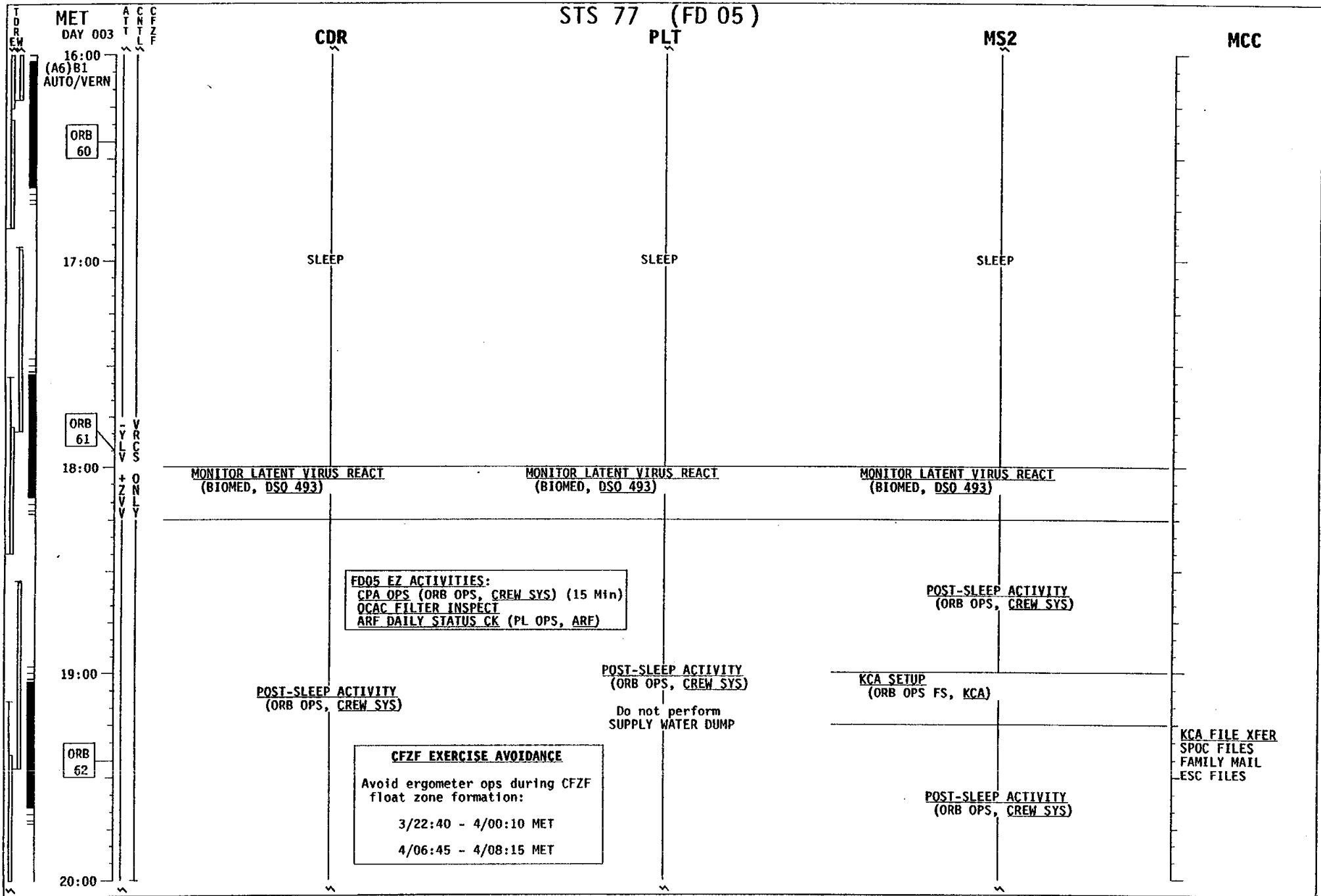
15:00

16:00

STS 77 (FD 04)



STS 77 (FD 05)



STS 77 (FD 05)

MET
DAY 003

MS1

MS3

MS4

MCC

16:00

ORB
60

17:00

SLEEP

SLEEP

SLEEP

ORB
61

18:00

MONITOR LATENT VIRUS REACT
(BIOMED, DSO 493)

19:00

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

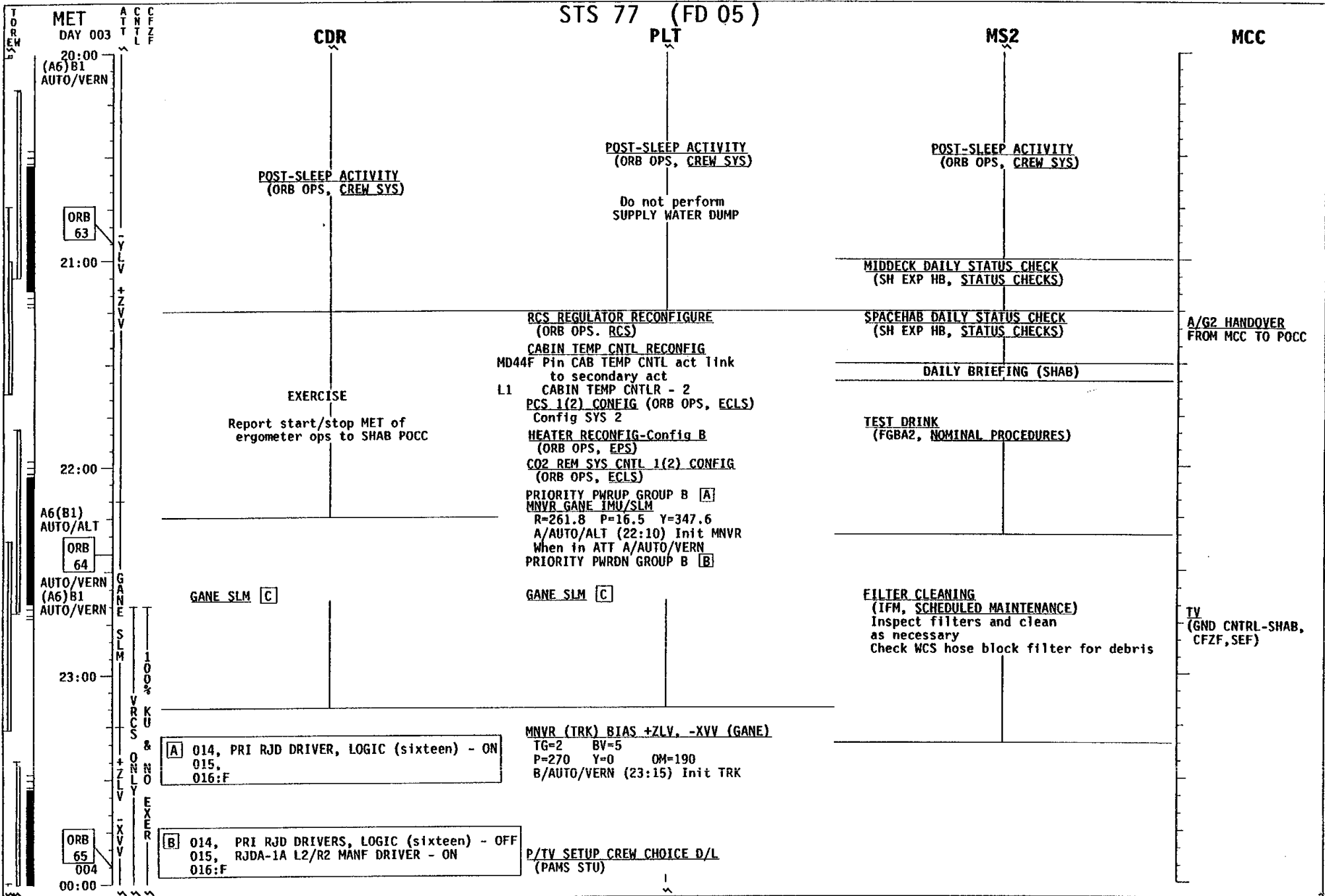
POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

P/TV08 DEACTIVATION (VTRE)
(PHOTO/TV, P/TV SCENES)

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

ORB
62

20:00



C GANE SLM

1. IMU ALIGN - S TRK (ORB OPS)

-Z: 43 AVAIL 22:09 TO 22:56
-Y: 38 AVAIL 22:29 TO 23:16
ANG SEP: 88.7

When IMU Align complete:

GNC 22 S TRK/COAS CNTL

-Y STAR TRKR - TERM/IDLE ITEM 9 EXEC (*)

2. SLM DATA TAKES

GNC 22 S TRK/COAS CNTL

CRT Clear Star Table ITEM 20 EXEC

Acquire star
SLM #1,2 STAR ID: 43
SLM #3,4 STAR ID: 38

C3 DAP: FREE

CRT Verify star in table
Clear Star Table ITEM 20 EXEC
Verify star in table

C3 DAP: AUTO

GNC UNIV PTG

CRT Load Next Attitude:
SLM #2 SLM #3 SLM #4
R=261.7 R=125.2 R=134.2
P=288.3 P= 83.4 P= 78.3
Y= 7.8 Y= 84.4 Y= 84.8
B/AUTO/VERN
Init MNVR ITEM 18 EXEC

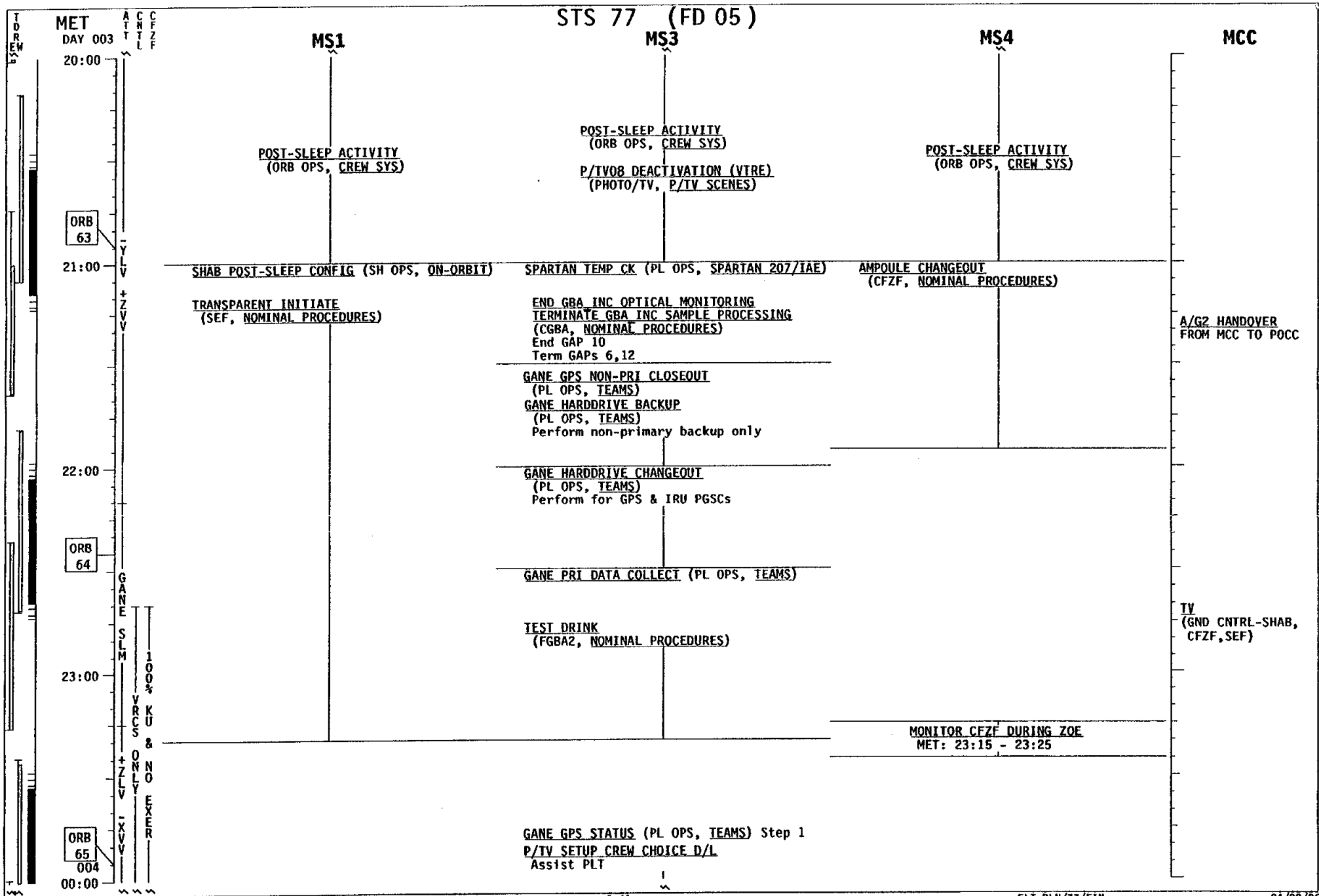
When in attitude, repeat step 2

3. RESELECT -Y STAR TRACKER

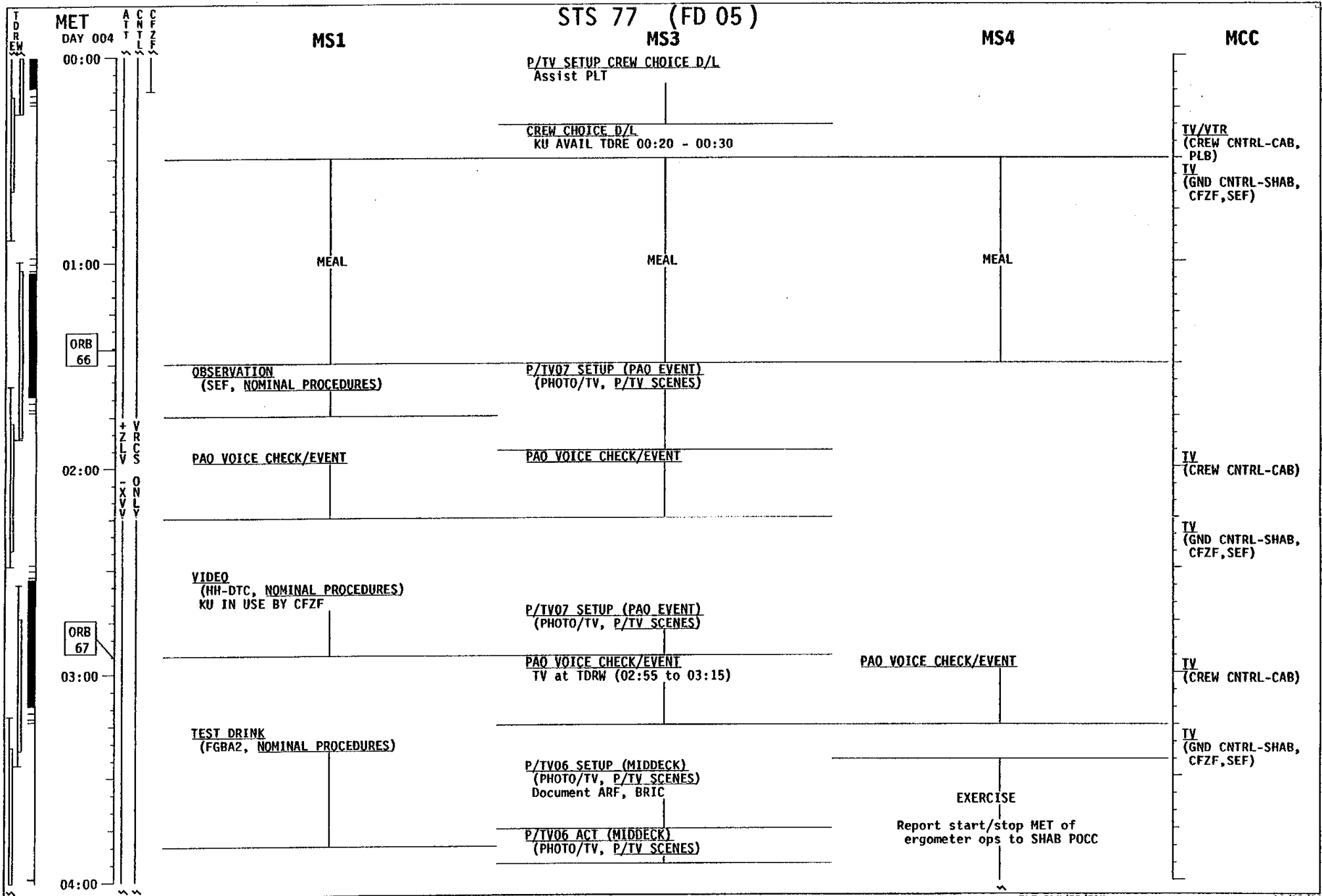
GNC 22 S TRK/COAS CNTL

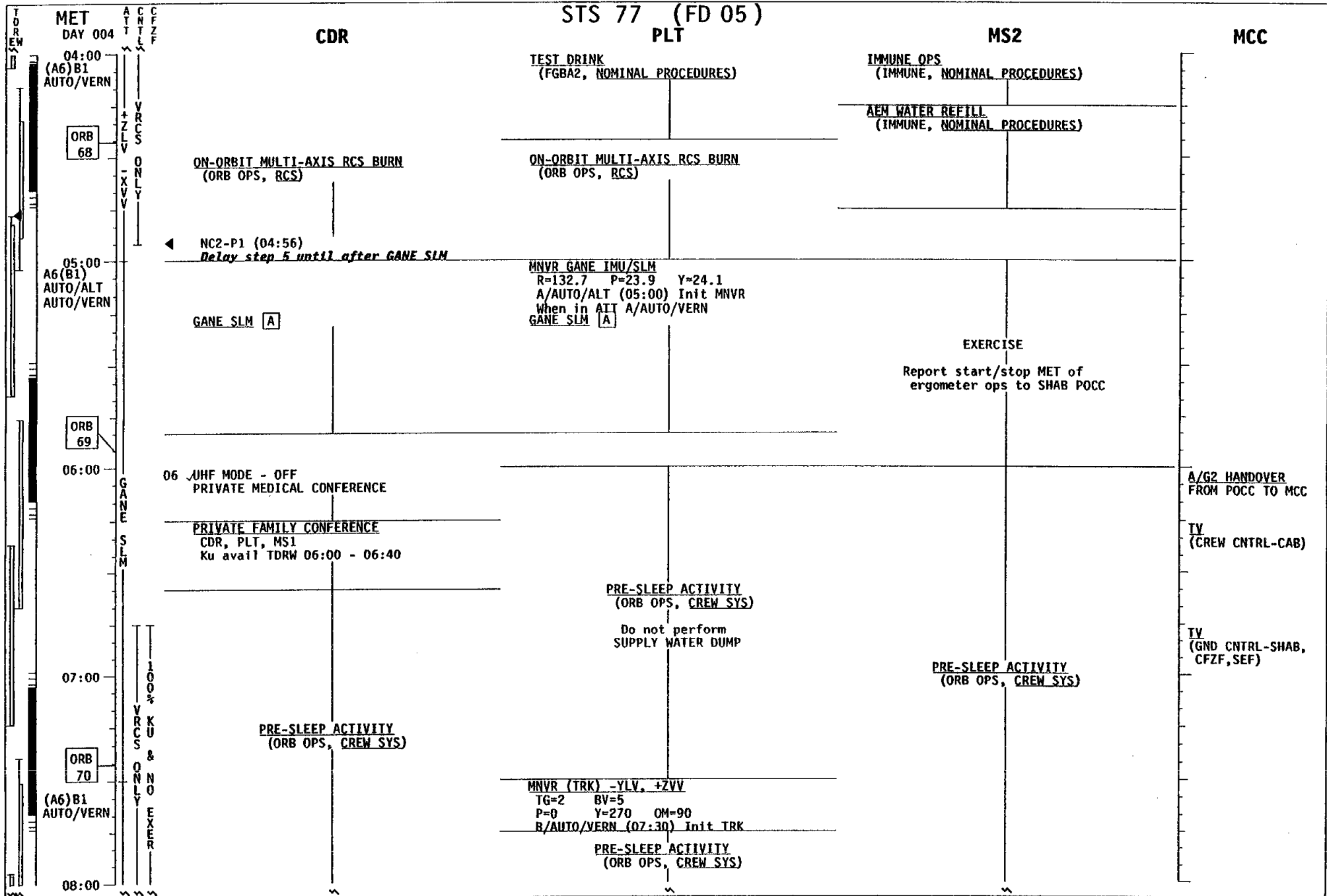
-Y STAR TRKR - STAR TRK ITEM 3 EXEC (*)

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| | | STS 77 (FD 05) | | | | |
|-------------|---------------------|--|--|--|-----|-------------------------------------|
| MET DAY 004 | | CDR | PLT | MS2 | MCC | |
| 00:00 | (A6)B1 AUTO/VERN | | P/TV SETUP CREW CHOICE D/L (PAMS STU) | | | TV/VTR (CREW CNTRL-CAB, PLB) |
| | | | CREW CHOICE D/L KU AVAIL TDRE 00:20 - 00:30 | | | TV (GND CNTRL-SHAB, CFZF,SEF) |
| 01:00 | | MEAL | MEAL | MEAL | | |
| | ORB 66 | | | | | |
| 02:00 | | PAO VOICE CHECK/EVENT TV at TDRE (01:55 to 02:15) | PAO VOICE CHECK/EVENT | PAO VOICE CHECK/EVENT | | TV (CREW CNTRL-CAB) |
| | | | | | | TV (GND CNTRL-SHAB, CFZF,SEF) |
| | | TEST DRINK (FGBA2, NOMINAL PROCEDURES) | CABIN AIR MONITOR (ORB OPS, DTO 623) Step 2 | | | |
| 03:00 | | | | PAO VOICE CHECK/EVENT TV at TDRW (02:55 to 03:15) | | TV (CREW CNTRL-CAB) |
| | | | EXERCISE Report start/stop MET of ergometer ops to SHAB POCC | | | TV (GND CNTRL-SHAB, CFZF,SEF) |
| | | | TEST DRINK (FGBA2, NOMINAL PROCEDURES) | | | |
| 04:00 | | | | | | |





A GANE SLM

1. IMU ALIGN - S TRK (ORB OPS)

-Z: 66 AVAIL 04:48 TO 05:30
-Y: 63 AVAIL 05:08 TO 05:56
ANG SEP: 89.4

When IMU Align complete:

GNC 22 S TRK/COAS CNTL

-Y STAR TRKR - TERM/IDLE ITEM 9 EXEC (*)

2. SLM DATA TAKES

GNC 22 S TRK/COAS CNTL

CRT Clear Star Table ITEM 20 EXEC

Acquire star

SLM #1,2 STAR ID: 66

SLM #3,4 STAR ID: 63

C3 DAP: FREE

CRT Verify star in table
Clear Star Table ITEM 20 EXEC
Verify star in table

C3 DAP: AUTO

GNC UNIV PTG

CRT Load Next Attitude:

| SLM #2 | SLM #3 | SLM #4 |
|---------|---------|---------|
| R= 62.9 | R= 77.0 | R= 80.9 |
| P=134.6 | P=103.9 | P=103.9 |
| Y= 38.5 | Y=314.8 | Y=315.4 |

A/AUTO/ALT

Init MNVR ITEM 18 EXEC

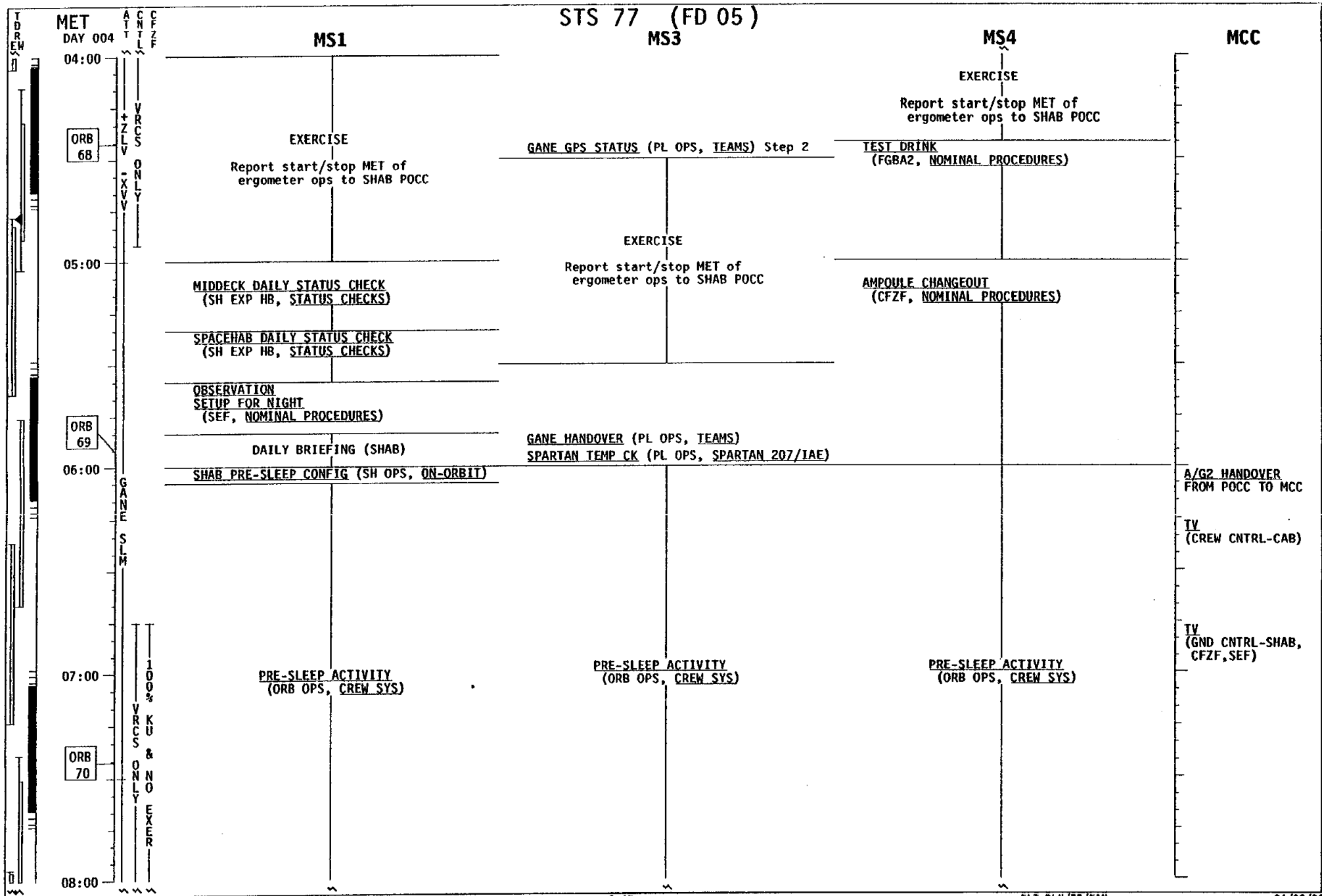
When in attitude, A/AUTO/VERN then repeat step 2

3. RESELECT -Y STAR TRACKER

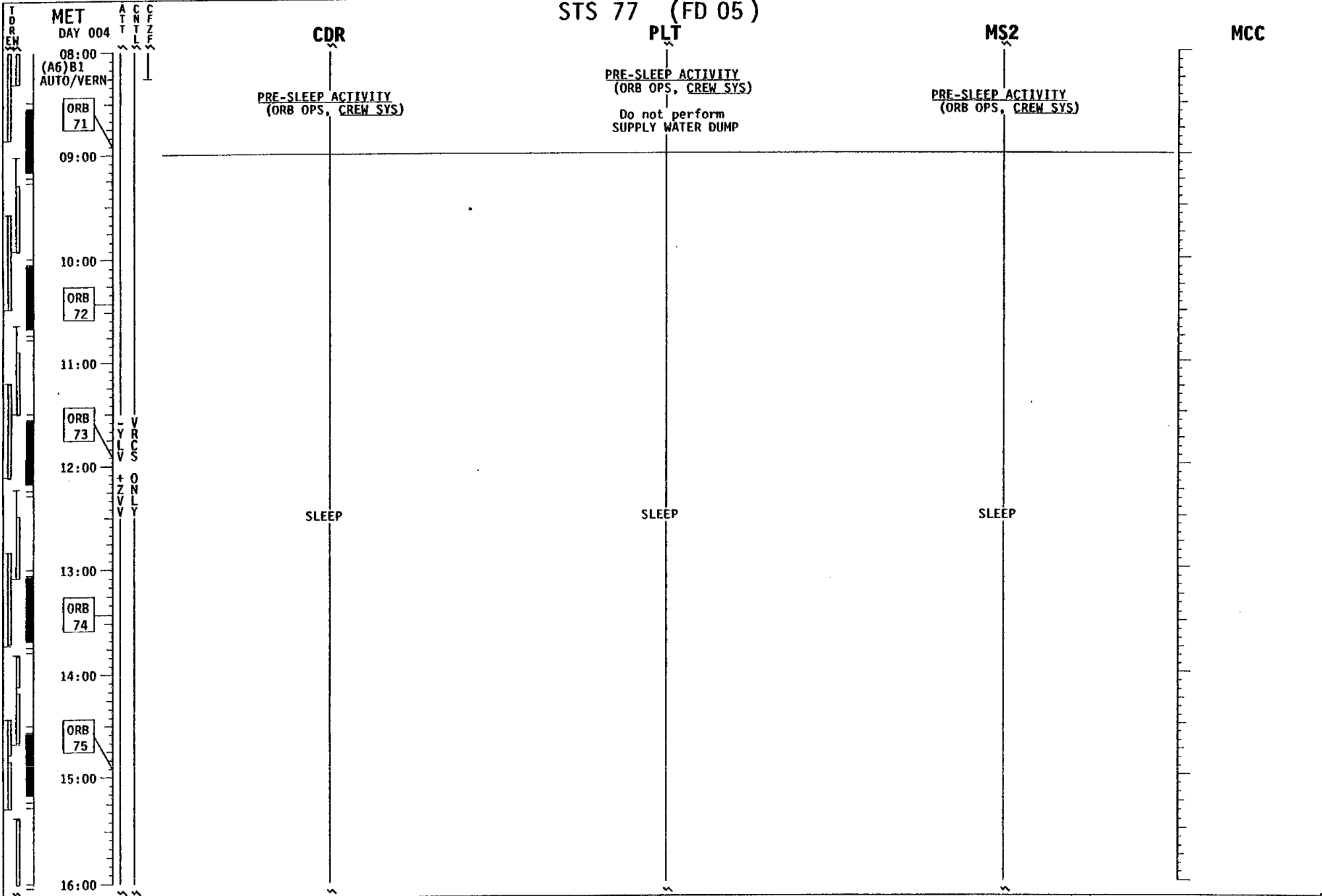
GNC 22 S TRK/COAS CNTL

-Y STAR TRKR - STAR TRK ITEM 3 EXEC (*)

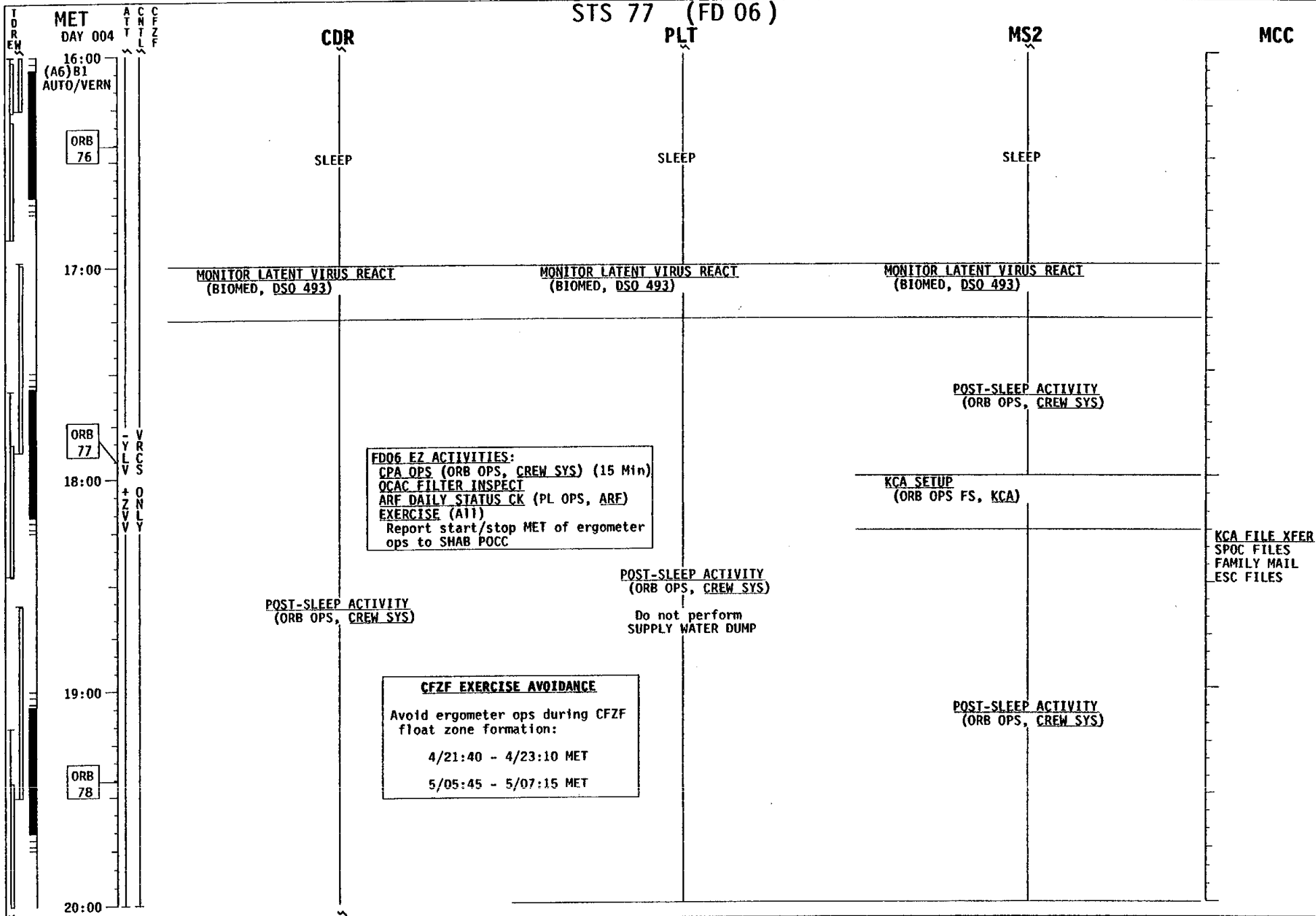
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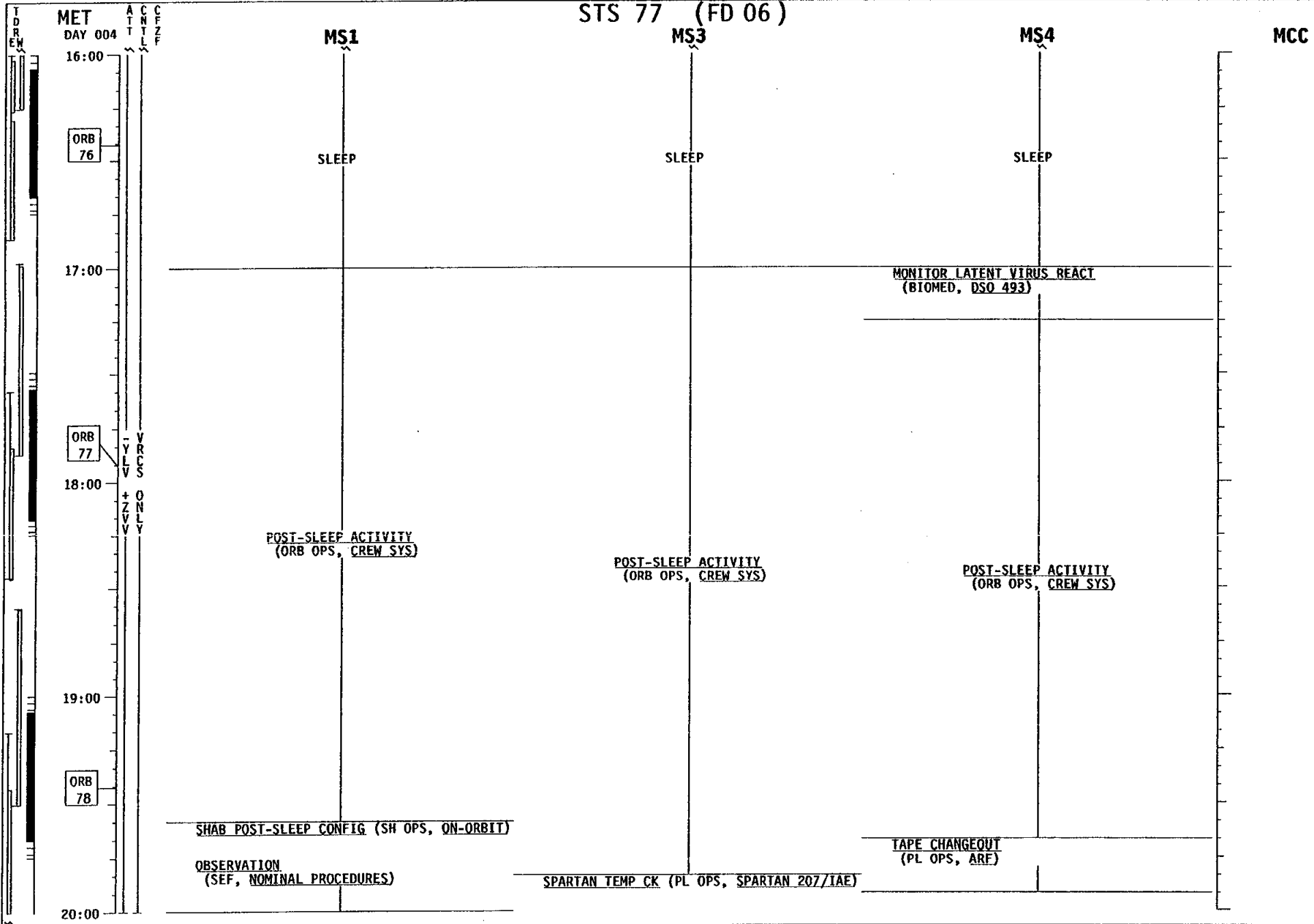
STS 77 (FD 05)



STS 77 (FD 06)



STS 77 (FD 06)



STS 77 (FD 06)

MET DAY 004

ATT
CNTRL

CDR

PLT

MS2

MCC

20:00
A6(B1)
AUTO/ALT
AUTO/VERN

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

PRIORITY PRWUP GROUP B [A]
MNVR GANE IMU/SLM
R=92.5 P=37.2 Y=347.8
A/AUTO/ALT (20:00) Init MNVR
When in ATT A/AUTO/VERN
GANE SLM [B]

MIDDECK DAILY STATUS CHECK
(SH EXP HB, STATUS CHECKS)

A/G2 HANDOVER
FROM MCC TO PCCC

GANE SLM [B]

SPACEHAB DAILY STATUS CHECK
(SH EXP HB, STATUS CHECKS)

[A] 014, PRI RJD DRIVER, LOGIC (sixteen) - ON
015,
016:F

DAILY BRIEFING (SHAB)
P/TV01 NIH-C
(NIH-C-07, PHOTO/TV OPS)

TV
(CREW CNTRL-SHAB,
HH-DTC)

ORB
79

AUTO/ALT
21:00
AUTO/VERN

PAO VOICE CHECK/EVENT
TV at TDRW (20:55 to 21:15)

MNVR (TRK) BIAS +ZLV, -XVV (GANE)
TG=2 BV=5
P=228.5 Y=0 OM=180
A/AUTO/ALT (20:50) Init TRK
When in ATT A/AUTO/VERN
PRIORITY PWRDN GROUP B [C]

PAO VOICE CHECK/EVENT

TV
(CREW CNTRL-CAB)

[C] 014, PRI RJD DRIVERS, LOGIC (sixteen) - OFF
015, RJDA-1A L2/R2 MANF DRIVER - ON
016:F

BIAS

+ZLV

-XVV

+ZLV

-XVV

+ZLV

-XVV

+ZLV

-XVV

+ZLV

-XVV

+ZLV

100% KU & NO EXCESS

22:00

ORB
80

(A6)B1
AUTO/VERN
23:00

OFF DUTY

OFF DUTY

OFF DUTY

TV
(GND CNTRL-SHAB,
CFZF,SEF)

A/G2 HANDOVER
FROM PCCC TO MCC

MNVR (TRK) COMM MNVR (GANE BIAS)
TG=2 BV=5
P=240 Y=330 OM=180
B/AUTO/VERN (22:50) Init TRK

MNVR (TRK) BIAS +ZLV, -XVV
TG=2 BV=5
P=228.5 Y=0 OM=180
B/AUTO/VERN (23:10) Init TRK

OFF DUTY

TV/VTR
(CREW CNTRL-CAB,
PLB)

[B] GANE SLM

1. IMU ALIGN - S TRK (ORB OPS)

-Z: 13 AVAIL 21:55 TO 22:41
-Y: 17 AVAIL 22:07 TO 22:56
ANG SEP: 90.7

When IMU Align complete:

GNC 22 S TRK/COAS CNTL

-Y STAR TRKR - TERM/IDLE ITEM 9 EXEC (*)

2. SLM DATA TAKES

GNC 22 S TRK/COAS CNTL

CRT Clear Star Table ITEM 20 EXEC

Aquire star
SLM #1,2 STAR ID: 13
SLM #3,4 STAR ID: 17

C3 DAP: FREE

CRT Verify star in table
Clear Star Table ITEM 20 EXEC
Verify star in table

C3 DAP: AUTO

GNC UNIV PTG

CRT Load Next Attitude:
SLM #2 SLM #3 SLM #4
R= 77.5 R=351.3 R=348.8
P=307.7 P= 39.6 P= 38.0
Y= 1.7 Y= 66.6 Y= 66.6
A/AUTO/ALT
Init MNVR ITEM 18 EXEC

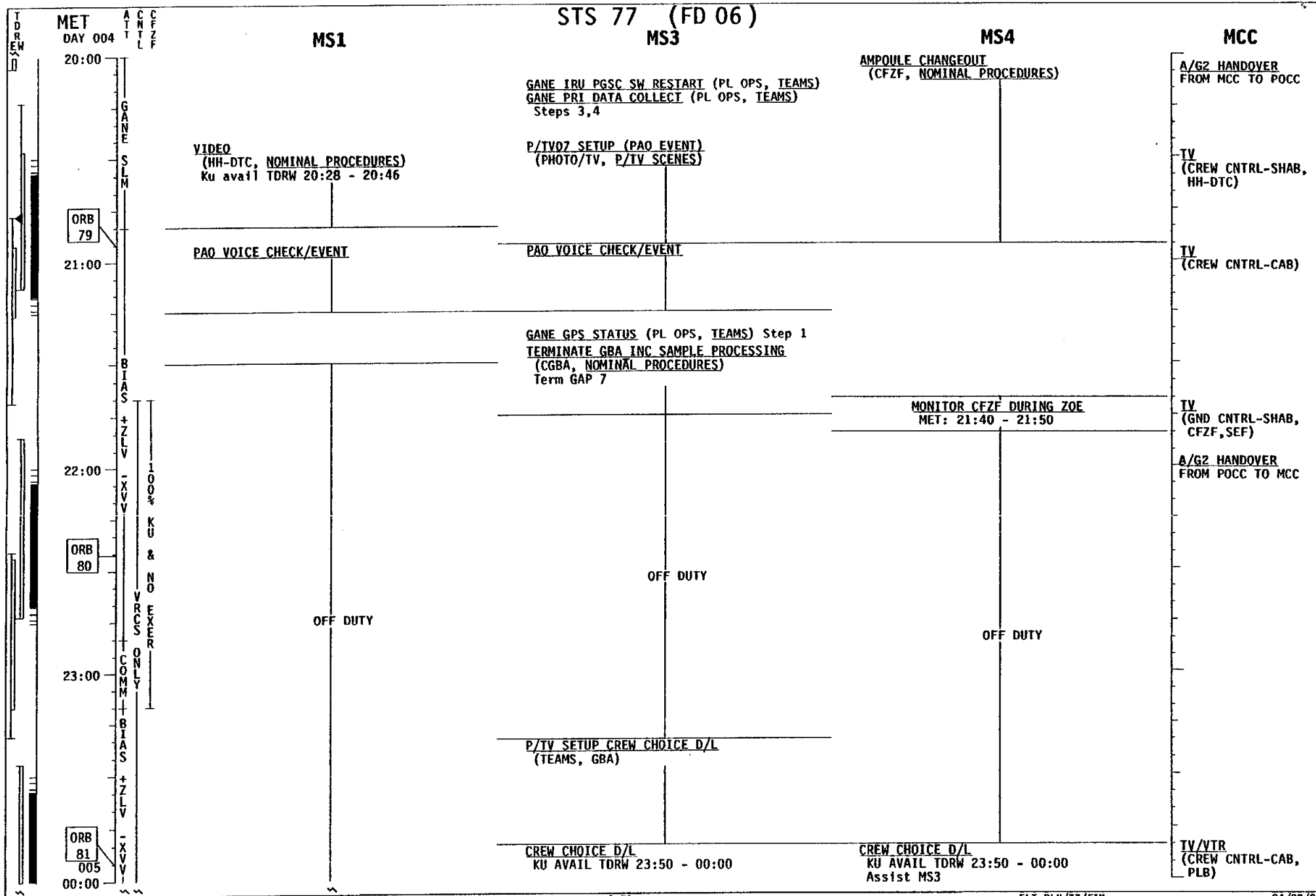
When in attitude, A/AUTO/VERN then repeat step 2

3. RESELECT -Y STAR TRACKER

GNC 22 S TRK/COAS CNTL

-Y STAR TRKR - STAR TRK ITEM 3 EXEC (*)

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STS 77 (FD 06)

| TIME | CDR | PLT | MS2 | MCC |
|-------|--|--|-----------------------|----------------------------------|
| 00:00 | OFF DUTY | OFF DUTY | OFF DUTY | TV (GND CNTRL-SHAB, CFZF, SEF) |
| 01:00 | MEAL | MEAL | MEAL | |
| 02:00 | OFF DUTY | OFF DUTY | OFF DUTY | UPDATE WASTE/SUPPLY H2O DUMP QTY |
| 03:00 | OFF DUTY | OFF DUTY | OFF DUTY | |
| 04:00 | PAO VOICE CHECK/EVENT TV at TDRE (03:30 to 03:50) | PAO VOICE CHECK/EVENT | PAO VOICE CHECK/EVENT | TV (CREW CNTRL-CAB) |
| | | IMMUNE OPS (IMMUNE, NOMINAL PROCEDURES) | | TV (GND CNTRL-SHAB, SEF) |

MET DAY 005
00:00 (A6) B1 AUTO/VERN

ATTN
CNTRL
CFZF

BIAS + ZLV - XVV
VRCS ONLY

ORB 82

ORB 83

STS 77 (FD 06)

MET
DAY 005

MS1

MS3

MS4

MCC

00:00
01:00
02:00
03:00
04:00

ORB 82

ORB 83

PERFORM
ATTN
CIRCUIT
TUNING
BIB
SAS
ZZ
VZ
XVV

| | | | |
|---------------|--|-----------------------|--|
| 00:00 - 01:00 | OFF DUTY OBSERVATION (SEF, NOMINAL PROCEDURES) | OFF DUTY | OFF DUTY |
| 01:00 - 02:00 | MEAL | MEAL | MEAL |
| 02:00 - 03:00 | OFF DUTY | OFF DUTY | OFF DUTY |
| 03:00 - 04:00 | PAO VOICE CHECK/EVENT | PAO VOICE CHECK/EVENT | PAO VOICE CHECK/EVENT P/TV07 SETUP (PAO EVENT) (PHOTO/TV, P/TV SCENES) |

TV
(GND CNTRL-SHAB,
CFZF, SEF)

TV
(CREW CNTRL-CAB)

TV
(GND CNTRL-SHAB,
SEF)

STS 77 (FD 06)
PLT

CDR

MS2

MCC

IMMUNE OPS
(IMMUNE, NOMINAL PROCEDURES)

A/G2 HANDOVER
FROM MCC TO PCC

CABIN AIR MONITOR Step 2
(ORB OPS, DTO 623)

ON-ORBIT MULTI-AXIS RCS BURN
(ORB OPS, RCS)

ON-ORBIT MULTI-AXIS RCS BURN
(ORB OPS, RCS)

◀ NC3-P1 (04:57)

06 AJHF MODE - OFF
PRIVATE MEDICAL CONFERENCE

PRIVATE FAMILY CONFERENCE
MS2, MS3, MS4
KU AVAIL TDRE 05:00 - 05:40

PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

Do not perform
SUPPLY WATER DUMP

A/G2 HANDOVER
FROM PCC TO MCC

TV
(CREW CNTRL-CAB)

TV
(GND CNTRL-SHAB,
CFZF,SEF)

PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

MNVR GANE IMU/SLM
R=128.7 P=10.2 Y=9.6
B/AUTO/VERN (06:10) Init MNVR

PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

GANESLM [A]

GANESLM [A]

100% KU & NO EXFER
GANESLM ONLY

MNVR (TRK) -YLV, +ZVV
TG=2 BV=5
P=0 Y=270 OM=90
B/AUTO/VERN (07:15) Init TRK

PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

PRE-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

MET
DAY 005

ATTN
CNTRL
CFZF

04:00
(A6)B1
AUTO/VERN

ORB
84

05:00

06:00

07:00

08:00

A GANE SLM

1. IMU ALIGN - S TRK (ORB OPS)

-Z: 83 AVAIL 06:23 TO 07:04
-Y: 12 AVAIL 06:37 TO 07:24
ANG SEP: 90.1

When IMU Align complete:

GNC 22 S TRK/COAS CNTL

-Y STAR TRKR - TERM/IDLE ITEM 9 EXEC (*)

2. SLM DATA TAKES

GNC 22 S TRK/COAS CNTL

CRT Clear Star Table ITEM 20 EXEC

Acquire star
SLM #1,2 STAR ID: 83
SLM #3,4 STAR ID: 12

C3 DAP: FREE

CRT Verify star in table
Clear Star Table ITEM 20 EXEC
Verify star in table

C3 DAP: AUTO

GNC UNIV PTG

CRT Load Next Attitude:
SLM #2 SLM #3 SLM #4
R= 82.0 R= 98.3 R=102.0
P=107.8 P=104.8 P=104.4
Y= 38.3 Y=309.6 Y=310.2
B/AUTO/VERN
Init MNVR ITEM 18 EXEC

When in attitude, repeat step 2

3. RESELECT -Y STAR TRACKER

GNC 22 S TRK/COAS CNTL

-Y STAR TRKR - STAR TRK ITEM 3 EXEC (*)

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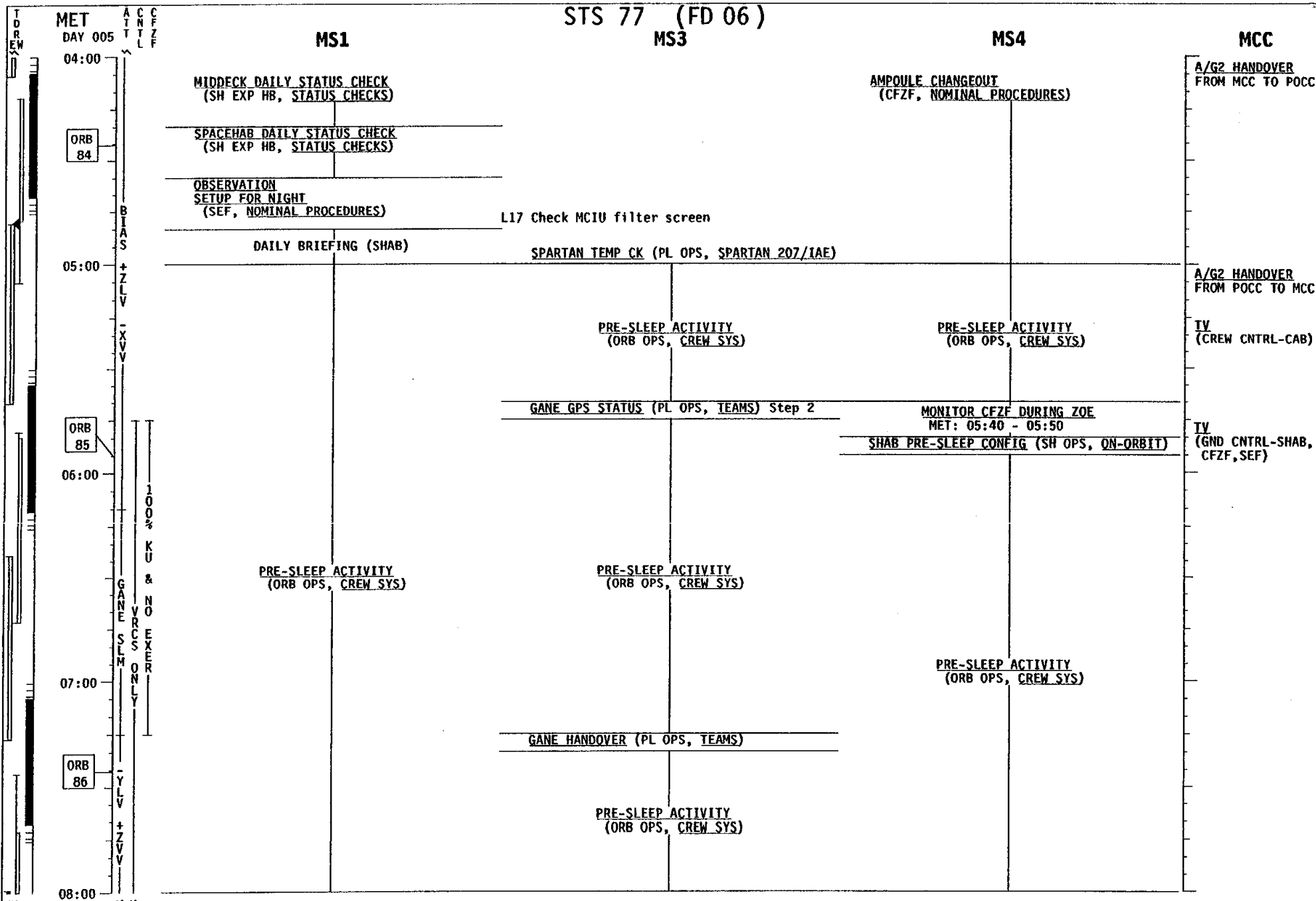
STS 77 (FD 06)
MS3

MET
DAY 005

MS1

MS4

MCC



04:00
ORB 84
05:00
ORB 85
06:00
07:00
ORB 86
08:00

ATTN
CNTRL
CFZF
BIAS
+ZLV
-XVV
LOOK & NO EXCURSIONS ONLY
GANE
SYM
-YLV
+ZVV

STS 77 (FD 06)

CDR

PLT

MS2

MCC

MET
DAY 005

08:00
(A6) B1
AUTO/VERN

ORB
87

09:00

ORB
88

10:00

ORB
89

11:00

SLEEP

SLEEP

SLEEP

ORB
90

12:00

ORB
91

13:00

14:00

15:00

16:00

STS 77 (FD 06)

MET
DAY 005

MS1

MS3

MS4

MCC

TDR
E
M

08:00

ORB 87

09:00

10:00

ORB 88

11:00

ORB 89

12:00

13:00

ORB 90

14:00

ORB 91

15:00

16:00

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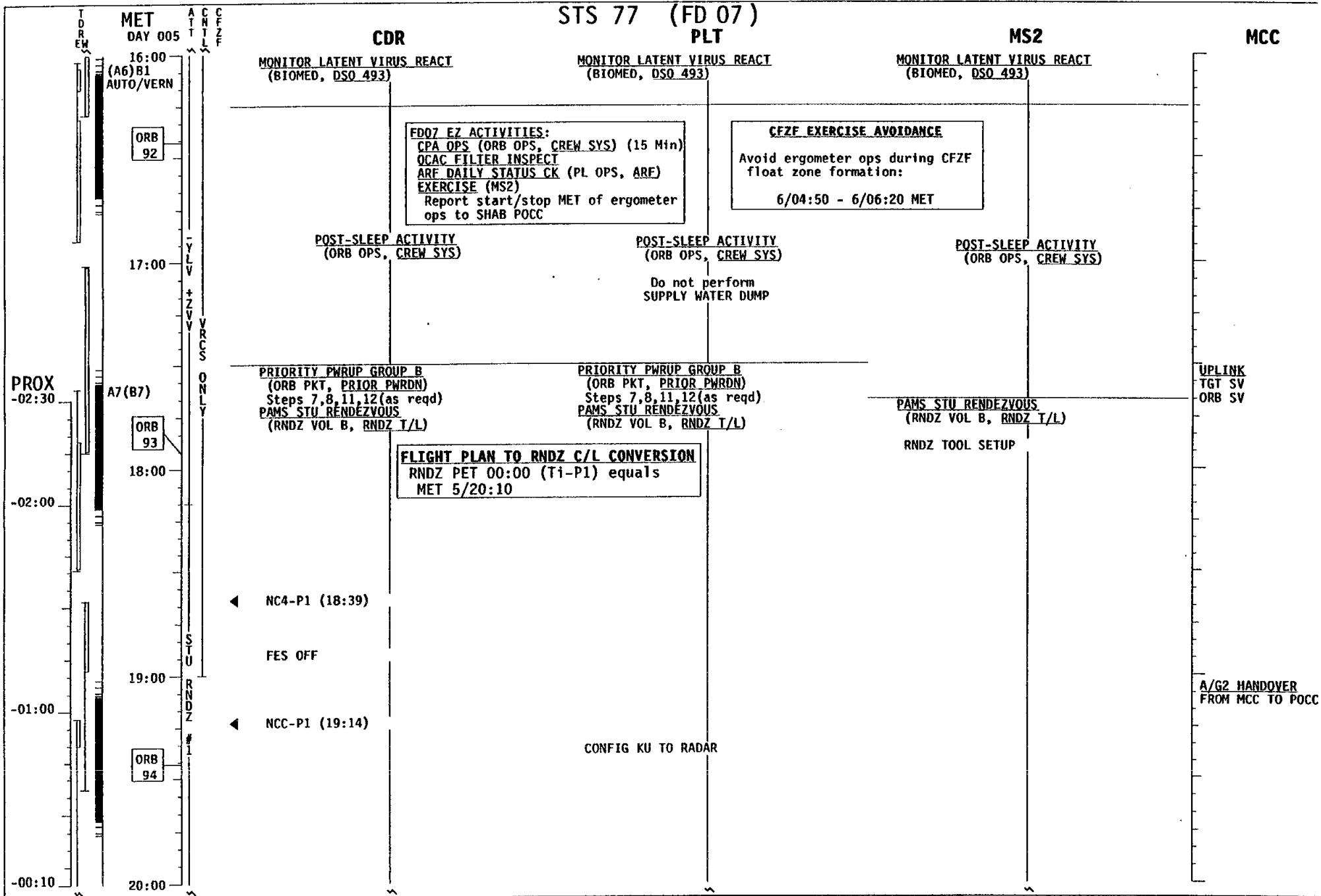
+
Z
V
V

SLEEP

SLEEP

SLEEP

STS 77 (FD 07)



STS 77 (FD 07)

MS1

MS3

MS4

MCC

MET DAY 005

16:00

ORB 92

17:00

ORB 93

18:00

PROX -02:30

-02:00

-01:00

-00:10

20:00

ATTN

CFZF

VTV

+ZVV

VRCSS

ONLY

STU

RNDZ

#1

ORB 94

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

MONITOR LATENT VIRUS REACT
(BIOMED, DSO 493)

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

KCA SETUP
(ORB OPS FS, KCA)

KCA FILE XFER
SPOC FILES
FAMILY MAIL
ESC FILES

SPARTAN TEMP CK (PL OPS, SPARTAN 207/IAE)
P/TV12 SETUP (PAMS STU RNDZ)
(PHOTO/TV, P/TV SCENES)

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

SHAB POST-SLEEP CONFIG (SH OPS, ON-ORBIT)

PAMS STU RENDEZVOUS
(RNDZ VOL B, RNDZ T/L)

Perform:
P/TV12 OPS (PAMS STU RNDZ)
(PHOTO/TV, P/TV SCENES)

A/G2 HANDOVER
FROM MCC TO POCC

OBSERVATION
(SEF, NOMINAL PROCEDURES)

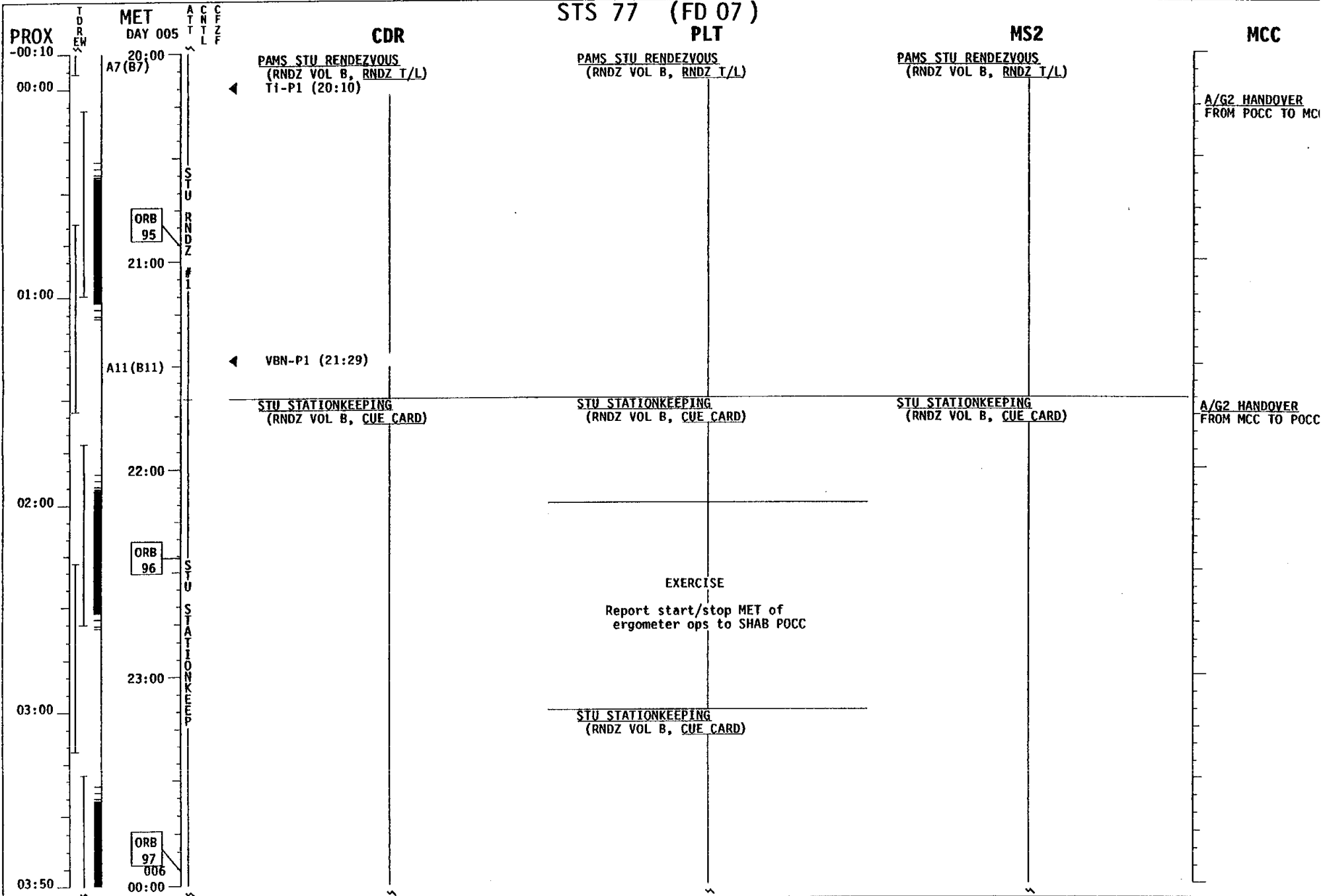
SPACEHAB DAILY STATUS CHECK
(SH EXP HB, STATUS CHECKS)

MIDDECK DAILY STATUS CHECK
(SH EXP HB, STATUS CHECKS)

DAILY BRIEFING (SHAB)

AMPOULE CHANGEOUT
(CFZF, NOMINAL PROCEDURES)
Steps 1-24
At Step 24, GO TO:
AP-05 LAMP CALIBRATION
(CFZF, ALT PROCEDURES)
Steps 1-9

STS 77 (FD 07)



PROX
-00:10
00:00
01:00
02:00
03:00
03:50

MET
DAY 005
20:00
21:00
22:00
23:00
00:00

STATION
FIELD
P
STATION
FIELD
P
STATION
FIELD
P

MS1

VIDEO
(HH-DTC, NOMINAL PROCEDURES)
KU COMM NOT AVAILABLE

TERMINATE GBA INC SAMPLE PROCESSING
(CGBA, NOMINAL PROCEDURES)
Term GAPS 8,13

ORB 95

ORB 96

ORB 97
006

OBSERVATION
(SEF, NOMINAL PROCEDURES)

MEAL

STS 77 (FD 07)

MS3

PAMS STU RENDEZVOUS
(RNDZ VOL B, RNDZ T/L)
Perform:
P/TV12 OPS (PAMS STU RNDZ)
(PHOTO/TV, P/TV SCENES)

MEAL

MS4

AMPOULE C/O (CFZF, NOM PROC) Steps 1-24

AP-05 LAMP CAL (CFZF, ALT PROC) Step 10

EXERCISE
Report start/stop MET of
ergometer ops to SHAB POCC

AP-05 LAMP CAL (CFZF, ALT PROC) Step 10

TL SEQ DELETION
(PCF, NOMINAL PROCEDURES)

AP-05 LAMP CAL (CFZF, ALT PROC) Step 10

AP-05 LAMP CAL (CFZF, ALT PROC) Step 10

AP-05 LAMP CAL (CFZF, ALT PROC) Step 10

MEAL

MCC

A/G2 HANDOVER
FROM POCC TO MCC

A/G2 HANDOVER
FROM MCC TO POCC

STS 77 (FD 07)
PLT

PROX
03:50
04:00
05:00
06:00
07:00
07:50

MET
DAY 006

A11 (B11)

00:00

01:00

02:00

03:00

04:00

ACFT
CNTRL

CROSS-HATCH

CDR

STU STATIONKEEPING
(RNDZ VOL B, CUE CARD)

EXERCISE

Report start/stop MET of
ergometer ops to SHAB POCC

STU STATIONKEEPING
(RNDZ VOL B, CUE CARD)

← SEPI-P1 (04:00)

STU STATIONKEEPING
(RNDZ VOL B, CUE CARD)

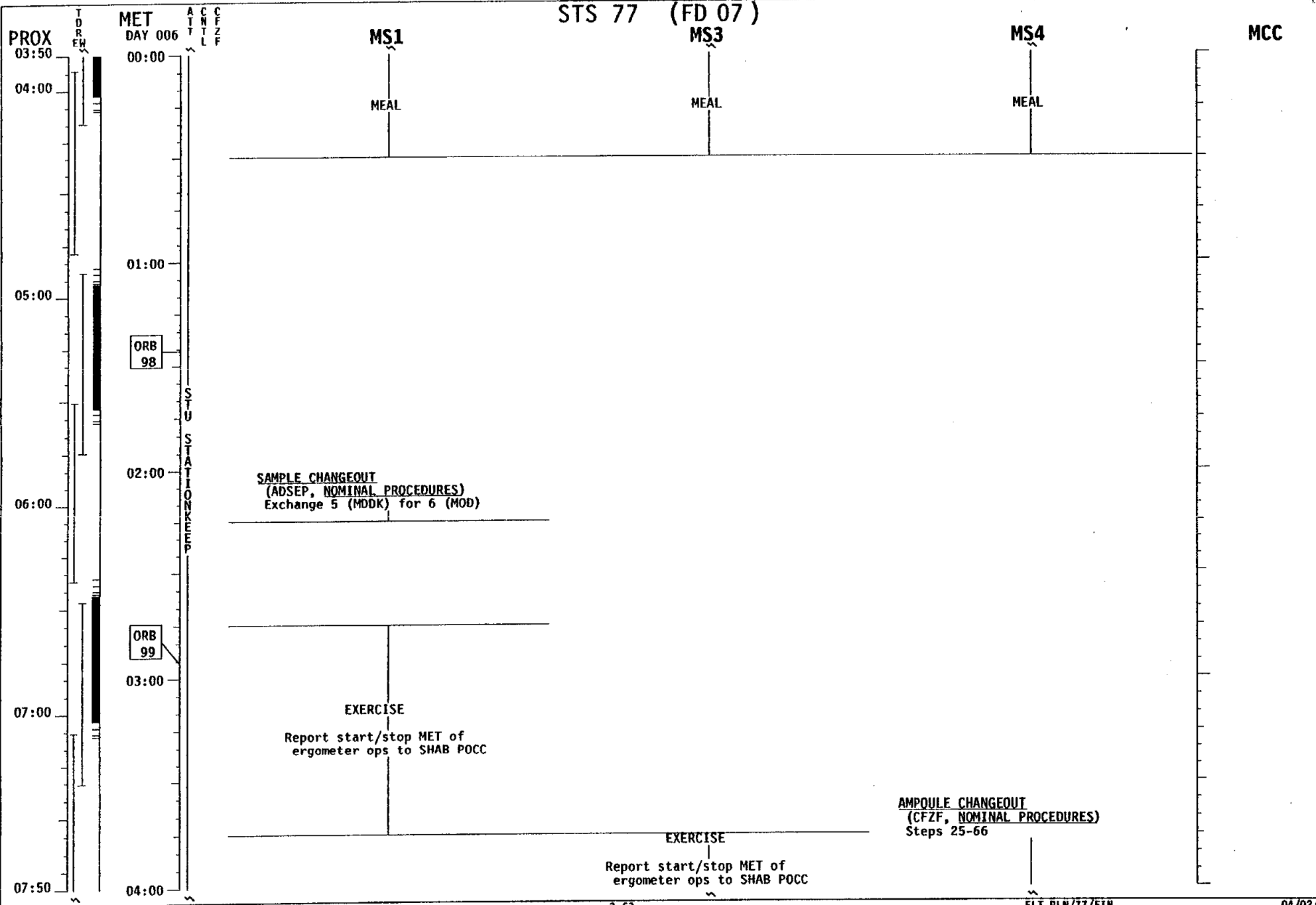
CONFIG KU TO COMM

MS2

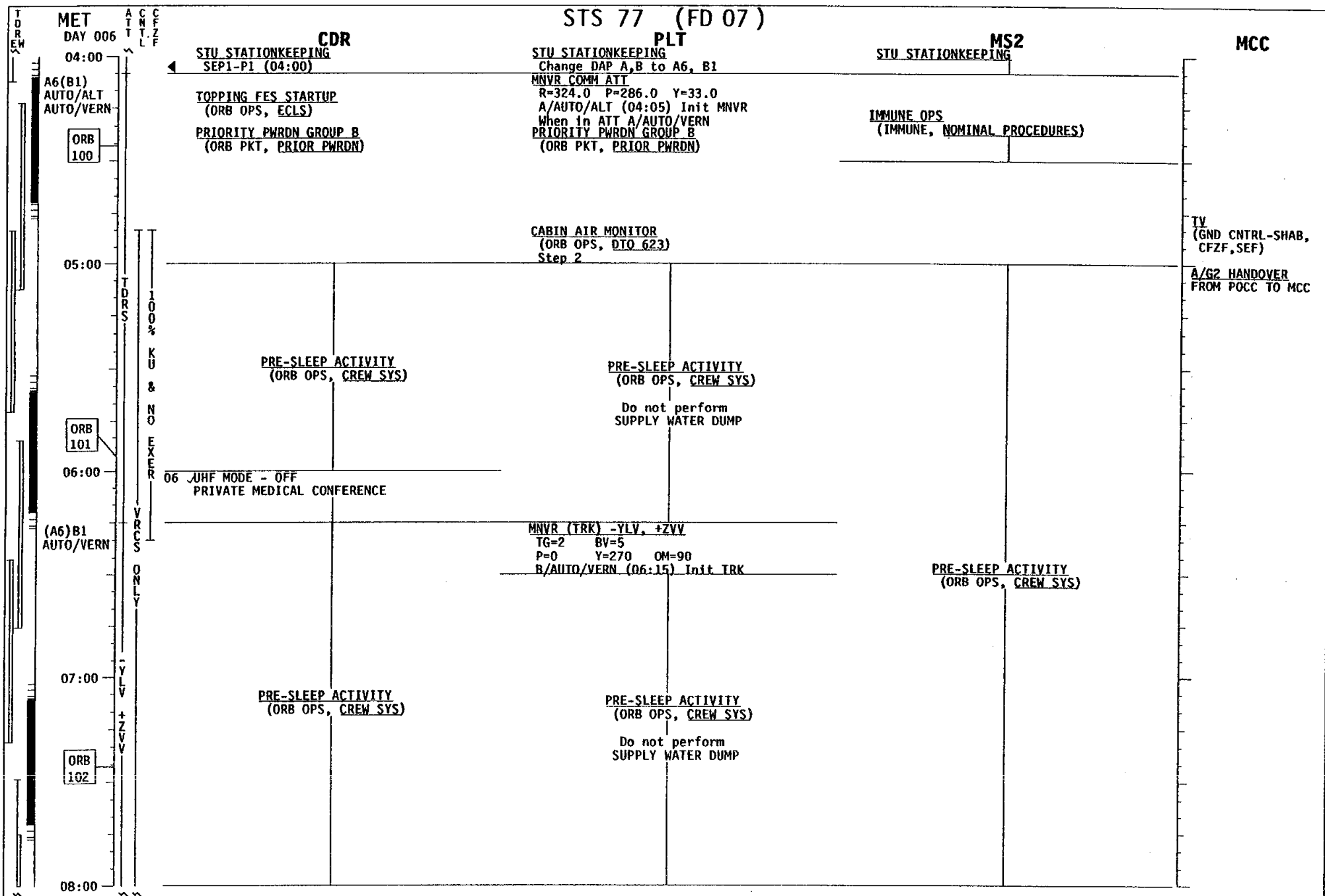
STU STATIONKEEPING
(RNDZ VOL B, CUE CARD)

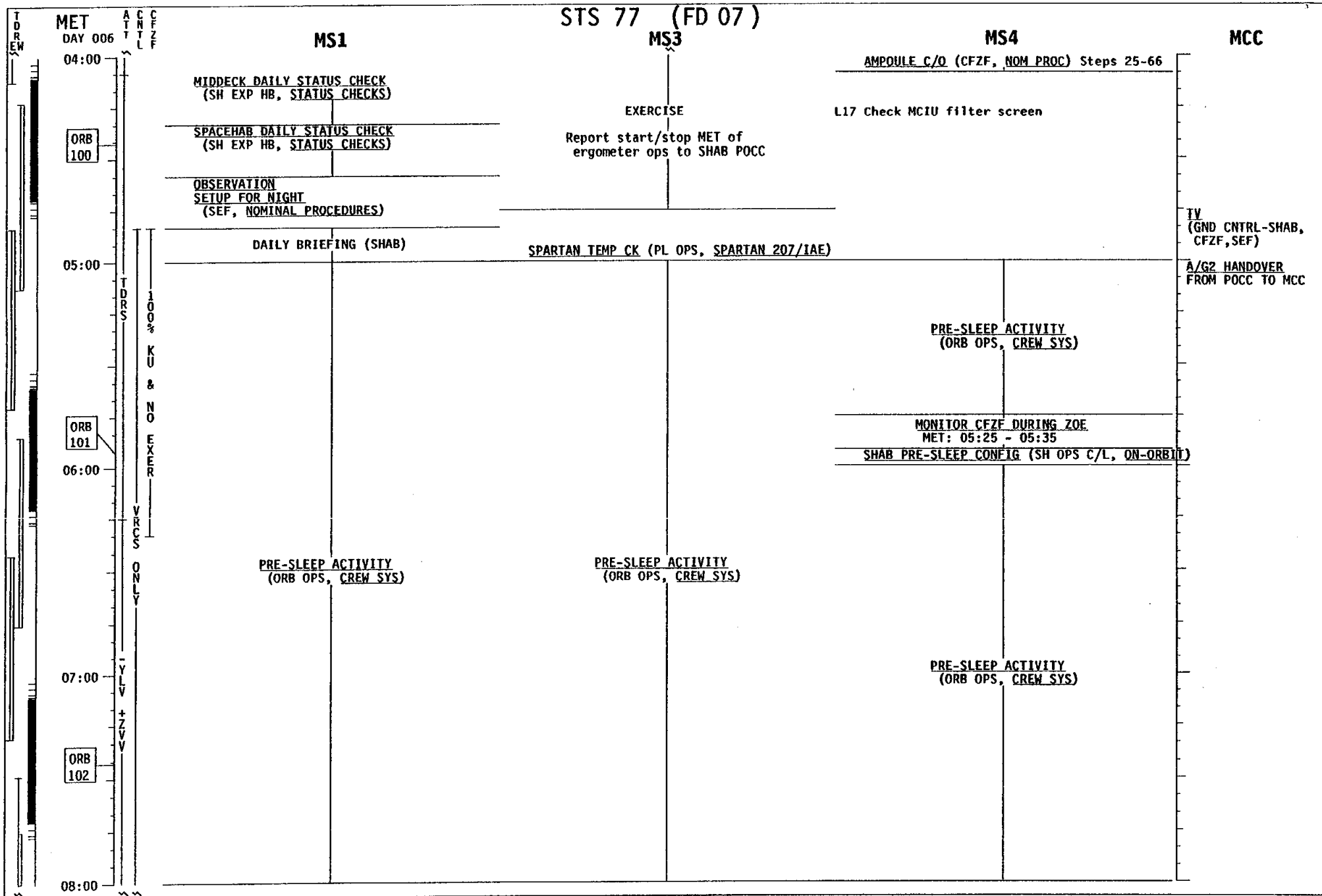
MCC

STS 77 (FD 07)



STS 77 (FD 07)





STS 77 (FD 07)

MET
DAY 006

CDR

PLT

MS2

MCC

08:00
(A6)B1
AUTO/VERN

ORB
103

09:00

10:00

ORB
104

11:00

ORB
105

12:00

SLEEP

SLEEP

SLEEP

13:00

ORB
106

14:00

ORB
107

15:00

16:00

ATTENT
CMTLL
FFZF
VRLCS
ONLY
+ZVVY

STS 77 (FD 07)

MET
DAY 006

MS1

MS3

MS4

MCC

T
D
R
E
H

A
T
T
C
N
T
Z
F

08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00

ORB
103

ORB
104

ORB
105

ORB
106

ORB
107

V
R
C
S
-
Y
L
V
+
Z
V
V
O
N
L
Y

SLEEP

SLEEP

SLEEP

STS 77 (FD 08)
 CDR PLT MS2 MCC

MET DAY 006

16:00
 (A6)B1
 AUTO/VERN

ORB 108

17:00

A7(B7)

ORB 109

18:00

PROX

-02:30

-02:00

-01:00

-00:11

19:00

ORB 110

20:00

MONITOR LATENT VIRUS REACT
 (BIOMED, DSO 493)

MONITOR LATENT VIRUS REACT
 (BIOMED, DSO 493)

MONITOR LATENT VIRUS REACT
 (BIOMED, DSO 493)

FD08 EZ ACTIVITIES:
 CPA OPS (ORB OPS, CREW SYS) (15 Min)
 OCAC FILTER INSPECT
 ARF DAILY STATUS CK (PL OPS, ARF)
 EXERCISE (MS2)
 Report start/stop MET of ergometer
 ops to SHAB POCC

CFZF EXERCISE AVOIDANCE
 Avoid ergometer ops during CFZF
 float zone formation:
 7/04:50 - 7/06:20 MET

POST-SLEEP ACTIVITY
 (ORB OPS, CREW SYS)

POST-SLEEP ACTIVITY
 (ORB OPS, CREW SYS)

POST-SLEEP ACTIVITY
 (ORB OPS, CREW SYS)

Do not perform
 SUPPLY WATER DUMP

PRIORITY PWRUP GROUP B
 (ORB PKT, PRIOR PWRDN)
 Steps 7,8,11,12(as reqd)
 PAMS STU RENDEZVOUS
 (RNDZ VOL B, RNDZ T/L)

PRIORITY PWRUP GROUP B
 (ORB PKT, PRIOR PWRDN)
 Steps 7,8,11,12(as reqd)
 PAMS STU RENDEZVOUS
 (RNDZ VOL B, RNDZ T/L)

PAMS STU RENDEZVOUS
 (RNDZ VOL B, RNDZ T/L)

UPLINK
 TGT SV
 ORB SV

FLIGHT PLAN TO RNDZ C/L CONVERSION
 RNDZ PET 00:00 (Ti-P2) equals
 MET 6/20:11

RNDZ TOOL SETUP

◀ NC-P2 (18:42)

FES OFF

◀ NCC-P2 (19:15)

CONFIG KU TO RADAR

A/G2 HANDOVER
 FROM MCC TO POCC

A C N T L F
 V R C S
 - Y L V
 + Z V V
 O N L Y
 S T U
 R N D Z
 # 2

STS 77 (FD 08)
MS3

MS1

MS4

MCC

MET
DAY 006

16:00

ORB
108

17:00

ORB
109

18:00

19:00

ORB
110

20:00

PROX

-02:30

-02:00

-01:00

-00:11

ATTN
CNTRL
CFZF
VRCSS
YLV
ZVV
STU
RNDZ
#2

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

MONITOR LATENT VIRUS REACT
(BIOMED, DSO 493)

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

KCA SETUP
(ORB OPS FS, KCA)

KCA FILE XFER
SPOC FILES
FAMILY MAIL
ESC FILES

SPARTAN TEMP CK (PL OPS, SPARTAN 207/IAE)
P/TV12 SETUP (PAMS STU RNDZ)
(PHOTO/TV, P/TV SCENES)

SHAB POST-SLEEP CONFIG (SH OPS, ON-ORBIT)

POST-SLEEP ACTIVITY
(ORB OPS, CREW SYS)

A/G2 HANDOVER
FROM MCC TO POCC

OBSERVATION
(SEF, NOMINAL PROCEDURES)

PAMS STU RENDEZVOUS
(RNDZ VOL B, RNDZ T/L)

Perform:
P/TV12 OPS (PAMS STU RNDZ)
(PHOTO/TV, P/TV SCENES)

SPACEHAB DAILY STATUS CHECK
(SH EXP HB, STATUS CHECKS)

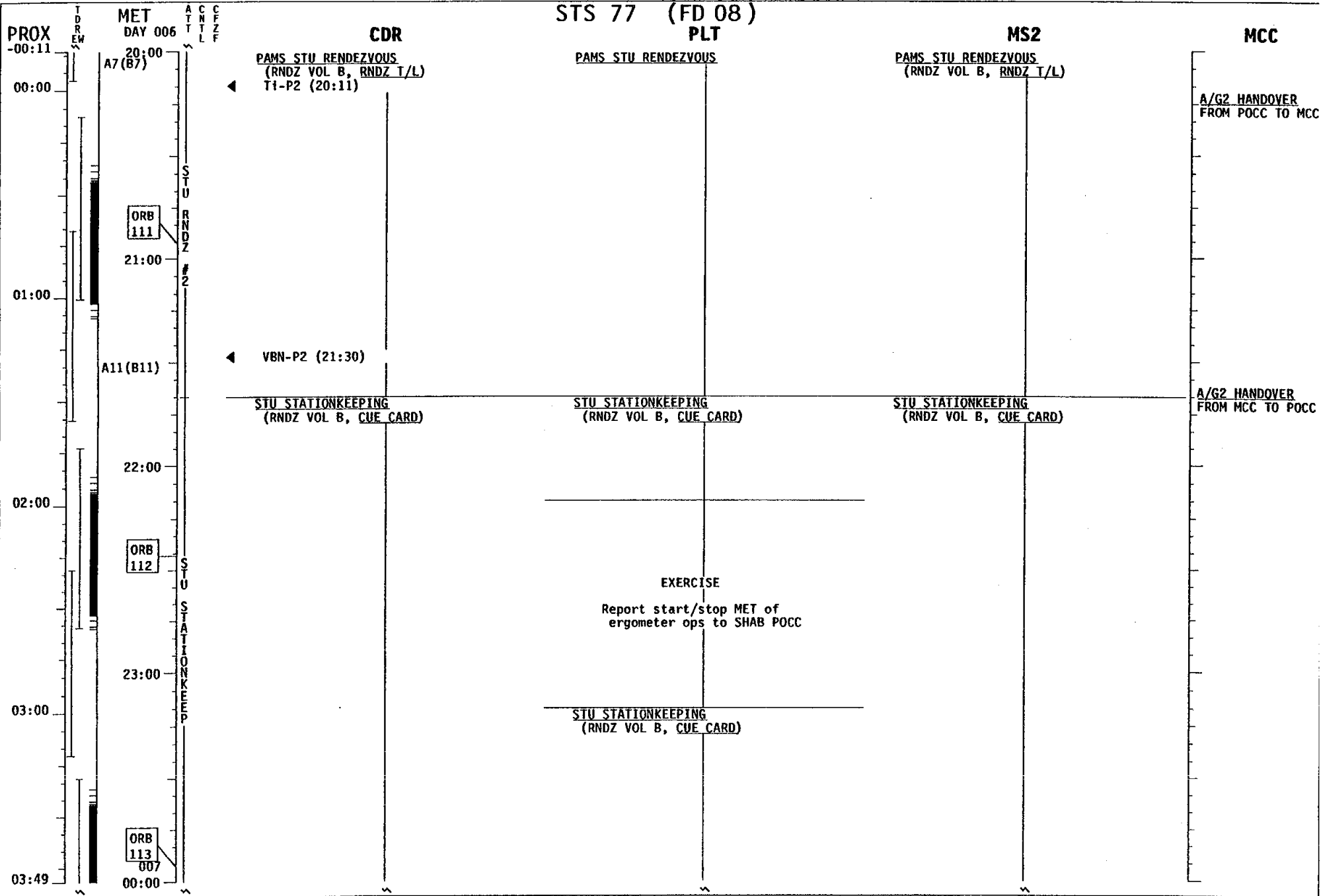
MIDDECK DAILY STATUS CHECK
(SH EXP HB, STATUS CHECKS)

AMPOULE CHANGEOUT
(CFZF, NOMINAL PROCEDURES)
Steps 1-51

DAILY BRIEFING (SHAB)

VIDEO
(HH-DTC, NOMINAL PROCEDURES)
KU COMM NOT AVAIL

STS 77 (FD 08)



STS 77 (FD 08)

PROX
-00:11
00:00
01:00
02:00
03:00
03:49

MET
DAY 006
20:00
21:00
22:00
23:00
00:00

A
C
C
F
Z
F
S
T
U
R
N
D
Z

2
S
T
U
S
T
A
T
I
O
N
K
E
E
P

ORB
111

ORB
112

ORB
113

007

MS1

VIDEO
(HH-DTC, NOMINAL PROCEDURES)
KU COMM NOT AVAIL

EXERCISE
Report start/stop MET of
ergometer ops to SHAB POCC

OBSERVATION
(SEF, NOMINAL PROCEDURES)

MEAL

MS3

PAMS STU RENDEZVOUS
(RNDZ VOL B, RNDZ T/L)
Perform:
P/TV12 OPS (PAMS STU RNDZ)
(PHOTO/TV, P/TV SCENES)

TERMINATE GBA INC SAMPLE PROCESSING
(CGBA, NOMINAL PROCEDURES)
Term GAP 14

MEAL

MS4

AMPOULE C/O (CFZF, NOM PROC) Steps 1-51

TAPE CHANGEOUT
(PL OPS, ARE)

EXERCISE
Report start/stop MET of
ergometer ops to SHAB POCC

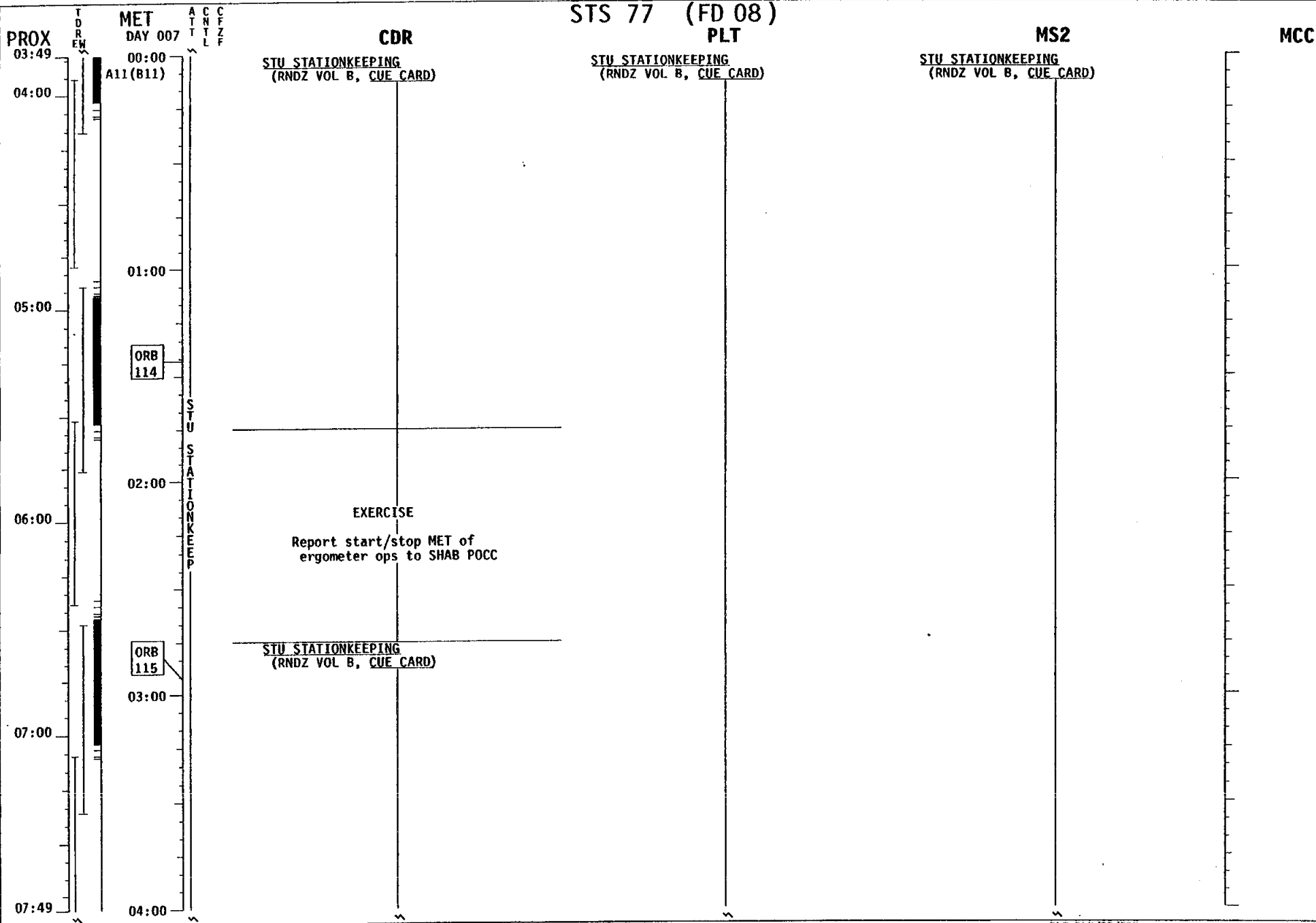
MEAL

MCC

A/G2 HANDOVER
FROM POCC TO MCC

A/G2 HANDOVER
FROM MCC TO POCC

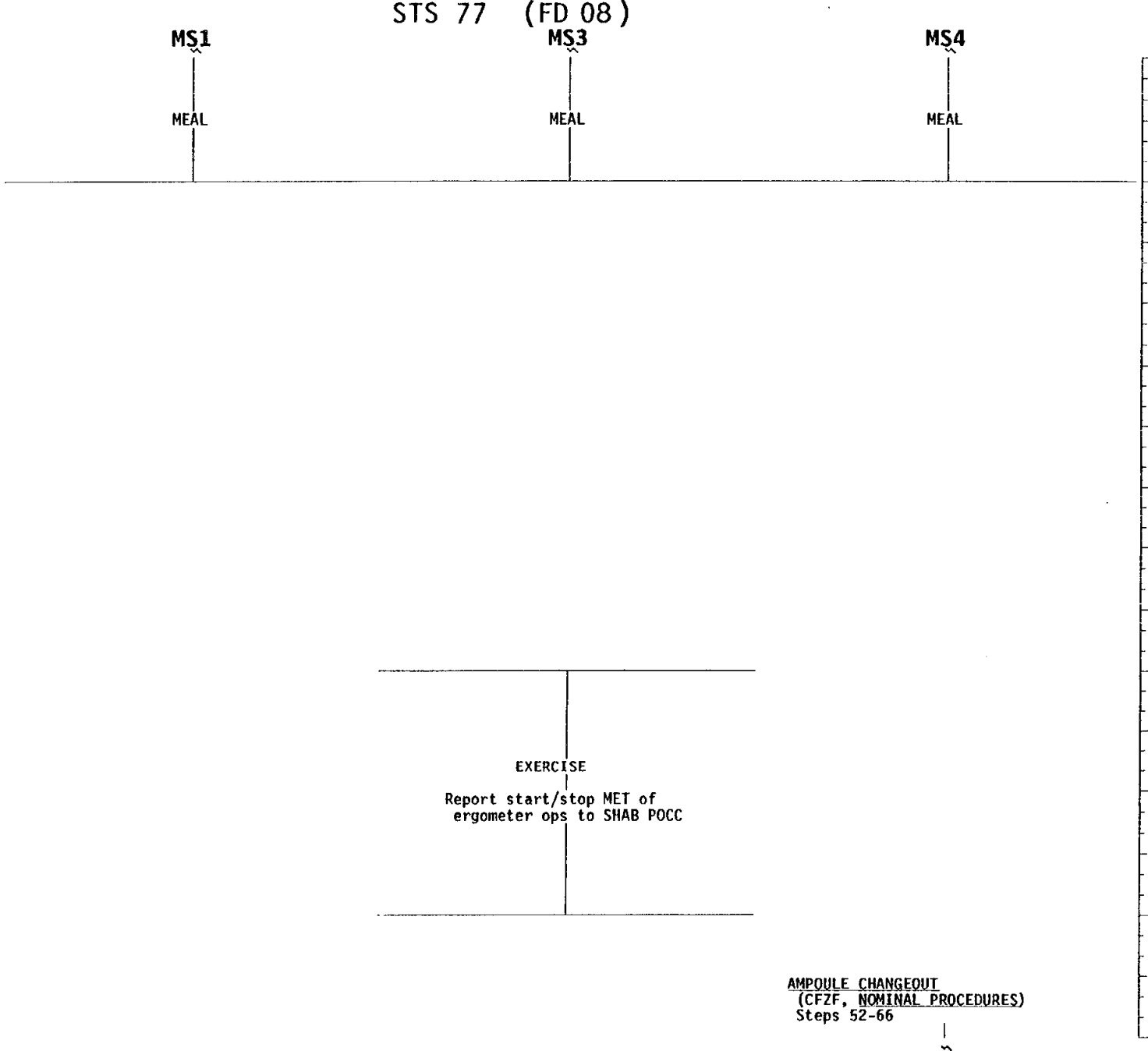
STS 77 (FD 08)
PLT



STS 77 (FD 08)

MET DAY 007
 PROX 03:49
 04:00
 05:00
 06:00
 07:00
 07:49
 04:00

A T T
 C N T L
 M E T
 S T U
 S T A T I O N
 P E E P



MS1
MEAL

MS3
MEAL

MS4
MEAL

MCC

ORB 114

ORB 115

EXERCISE
Report start/stop MET of
ergometer ops to SHAB POCC

AMPOULE CHANGEOUT
(CFZF, NOMINAL PROCEDURES)
Steps 52-66

STS 77 (FD 08)

MET DAY 007

MS1

MS3

MS4

MCC

| | | | | | |
|---|---|--|---|---|--|
| <p>TDRW</p> <p>04:00</p> <p>ORB 116</p> <p>05:00</p> <p>ORB 117</p> <p>06:00</p> <p>07:00</p> <p>ORB 118</p> <p>08:00</p> | <p>ACFT</p> <p>CFZF</p> <p>TDRS</p> <p>LOOK & NO EXERCISE</p> <p>VRS ONLY</p> <p>YLV</p> <p>ZVV</p> | <p>MIDDECK DAILY STATUS CHECK (SH EXP HB, STATUS CHECKS)</p> | <p>GANE GPS NON-PRI CLOSEOUT (PL OPS, TEAMS)</p> | <p>AMPOULE C/O (CFZF, NOM PROC) Steps 52-66</p> | <p>TV/VTR (CREW CNTRL-SHAB)</p> <p>TV (GND CNTRL-SHAB, CFZF, SEF) A/G2 HANDOVER FROM POCC TO MCC</p> |
| | | <p>SPACEHAB DAILY STATUS CHECK (SH EXP HB, STATUS CHECKS)</p> | <p>GANE HARDDRIVE BACKUP (PL OPS, TEAMS)</p> | <p>P/TV SETUP CREW CHOICE D/L (CFZF, GPPM, PCF)</p> | |
| | | <p>OBSERVATION SETUP FOR NIGHT (SEF, NOMINAL PROCEDURES)</p> | <p>GANE HARDDRIVE CHANGEOUT (PL OPS, TEAMS) Perform for GPS PGSC only</p> | <p>CREW CHOICE D/L KU AVAIL TDRW 04:35 - 04:45</p> | |
| | | <p>DAILY BRIEFING (SHAB)</p> | <p>GANE NON-PRI DATA COLLECT (PL OPS, TEAMS)</p> | <p>L17 Check MCIU filter screen</p> | |
| | | | <p>SPARTAN TEMP CK (PL OPS, SPARTAN 207/IAE)</p> | | |
| | | | | <p>PRE-SLEEP ACTIVITY (ORB OPS, CREW SYS)</p> | |
| | | | | <p>MONITOR CFZF DURING ZOE MET: 05:45 - 05:55</p> | |
| | | | | <p>SHAB PRE-SLEEP CONFIG (SH OPS, ON-ORBIT)</p> | |
| | | | <p>PRE-SLEEP ACTIVITY (ORB OPS, CREW SYS)</p> | | |
| | | | | <p>PRE-SLEEP ACTIVITY (ORB OPS, CREW SYS)</p> | |

STS 77 (FD 08)

MET

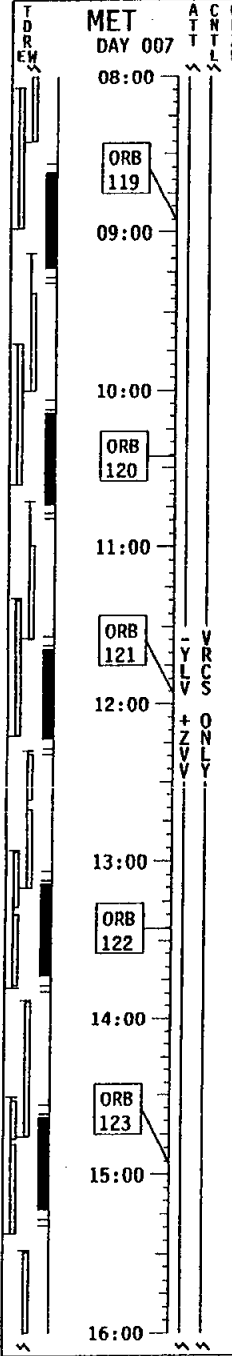
DAY 007

MS1

MS3

MS4

MCC



SLEEP

SLEEP

SLEEP

STS 77 (FD 09)

TDR
 MET DAY 007
 16:00 (A6) B1 AUTO/VERN
 ORB 124
 17:00
 ORB 125
 18:00
 19:00
 ORB 126
 20:00
 ATTENTION
 CFZF
 YLV
 + ZVV
 VPC SCS
 ONLY
 GANE SLM

| CDR | PLT | MS2 | MCC |
|---|--|---|---|
| MONITOR LATENT VIRUS REACT (BIOMED, DSO 493) | MONITOR LATENT VIRUS REACT (BIOMED, DSO 493) | MONITOR LATENT VIRUS REACT (BIOMED, DSO 493) | |
| F009 EZ ACTIVITIES: CPA OPS (ORB OPS, CREW SYS) (15 Min) OCAC FILTER INSPECT ARF DAILY STATUS CK (PL OPS, ARF) | | | |
| CFZF EXERCISE AVOIDANCE Avoid ergometer ops during CFZF float zone formation: 8/05:45 - 8/07:15 MET Report MET of ergometer ops to SHAB POCC | | | |
| POST-SLEEP ACTIVITY (ORB OPS, CREW SYS) | POST-SLEEP ACTIVITY (ORB OPS, CREW SYS) Do not perform SUPPLY WATER DUMP | POST-SLEEP ACTIVITY (ORB OPS, CREW SYS) | |
| | | KCA SETUP (ORB OPS FS, KCA) | |
| | | | KCA FILE XFER SPOC FILES FAMILY MAIL ESC FILES |
| | | POST-SLEEP ACTIVITY (ORB OPS, CREW SYS) | |
| | MNVR GANE IMU/SLM R=349.7 P=81.1 Y=311.4 B/AUTO/VERN (19:00) Init MNVR | | A/G2 HANDOVER FROM MCC TO POCC |
| GANE SLM [A] | GANE SLM [A] | | |

[A] GANE SLM

1. IMU ALIGN - S TRK (ORB OPS)

-Z: 103 AVAIL 19:02 TO 19:45
-Y: 14 AVAIL 19:21 TO 20:07
ANG SEP: 90.0

When IMU Align complete:

[GNC 22 S TRK/COAS CNTL]

-Y STAR TRKR - TERM/IDLE ITEM 9 EXEC (*)

2. SLM DATA TAKES

[GNC 22 S TRK/COAS CNTL]

CRT Clear Star Table ITEM 20 EXEC

Acquire star
SLM #1,2 STAR ID: 103
SLM #3,4 STAR ID: 14

C3 DAP: FREE

CRT Verify star in table
Clear Star Table ITEM 20 EXEC
Verify star in table

C3 DAP: AUTO

[GNC UNIV PTG]

CRT Load Next Attitude:
SLM #2 SLM #3 SLM #4
R=193.0 R=233.2 R=237.2
P=274.5 P=350.8 P=350.6
Y=319.3 Y= 13.4 Y= 12.8
B/AUTO/VERN
Init MNVR ITEM 18 EXEC

When in attitude, repeat step 2

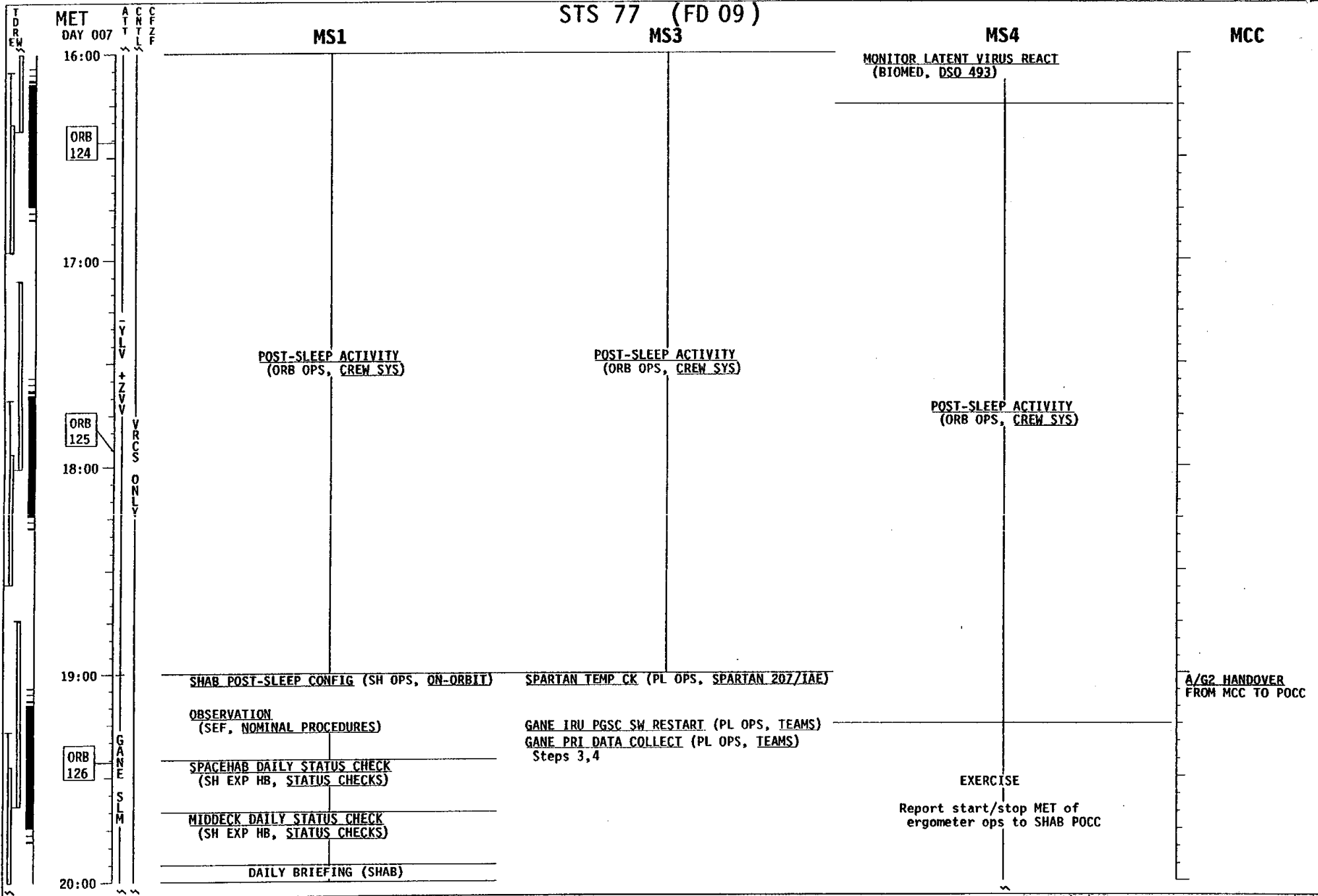
3. RESELECT -Y STAR TRACKER

[GNC 22 S TRK/COAS CNTL]

-Y STAR TRKR - STAR TRK ITEM 3 EXEC (*)

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STS 77 (FD 09)



STS 77 (FD 09)
PLT

CDR

MS2

MCC

P/TV SETUP CREW CHOICE D/L
(CVDA, GPPM, PGBA)

MNVR (TRK) BIAS +ZLV, -XVV (GANE)
TG=2 BV=5
P=228.5 Y=0 OM=180
B/AUTO/VERN (20:15) Init TRK
P/TV14 SETUP OPS (DSO 802)
(PHOTO/TV, P/TV SCENES)

CREW CHOICE D/L
KU AVAIL TDRW 20:30 - 20:40

TV/VTR
(CREW CNTRL-CAB)

TV
(GND CNTRL-SHAB,
CFZF, SEF)

FILTER CLEANING
(IFM, SCHEDULED MAINTENANCE)

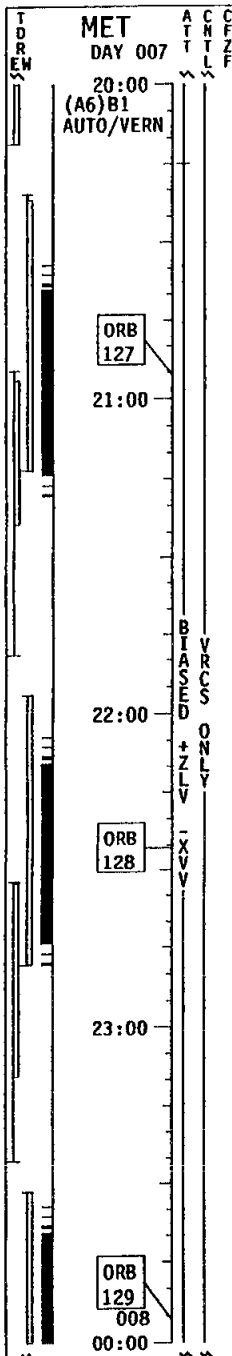
EXERCISE

Report start/stop MET of
ergometer ops to SHAB POCC

MEAL

MEAL

MEAL



STS 77 (FD 09)

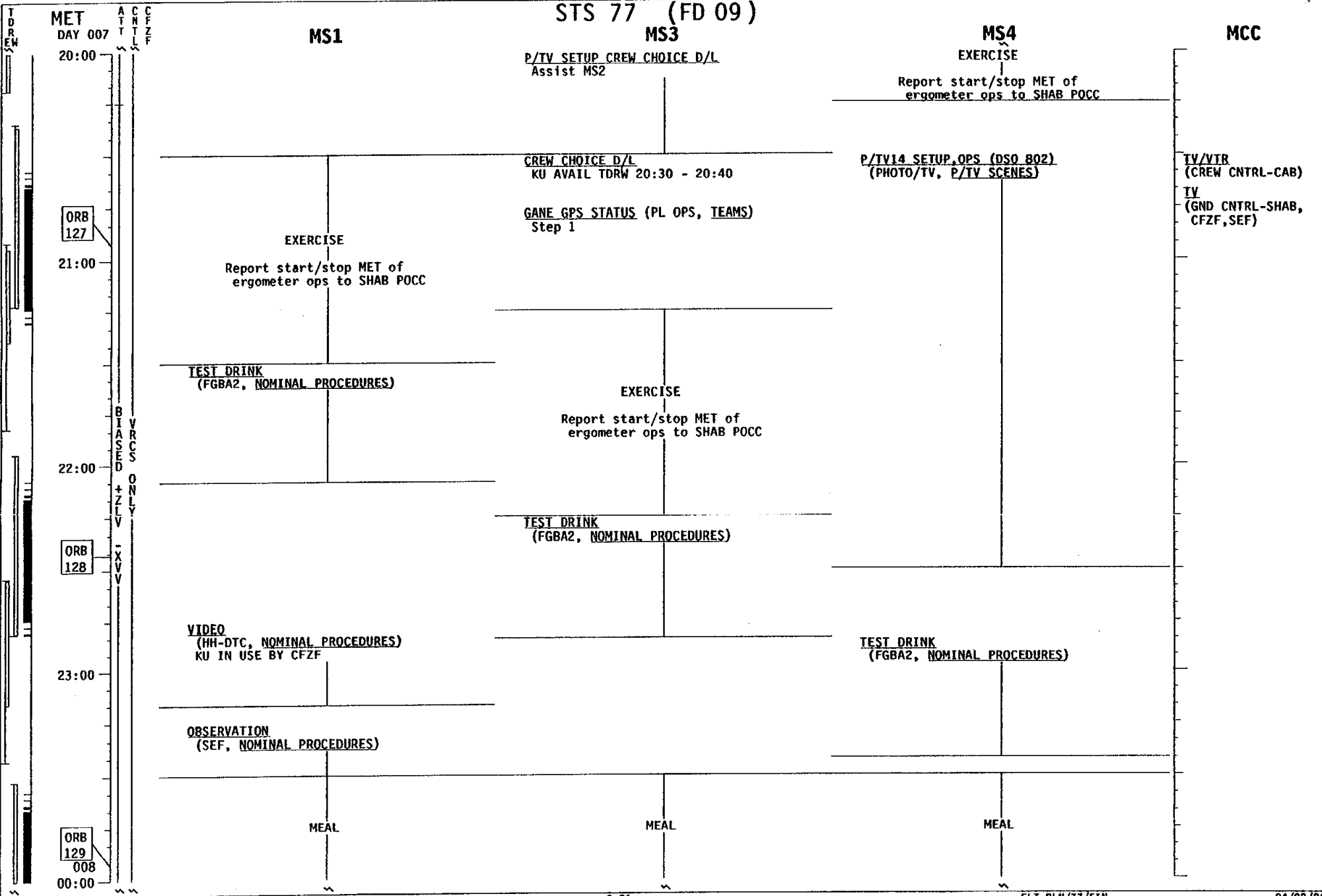
MET
DAY 007

MS1

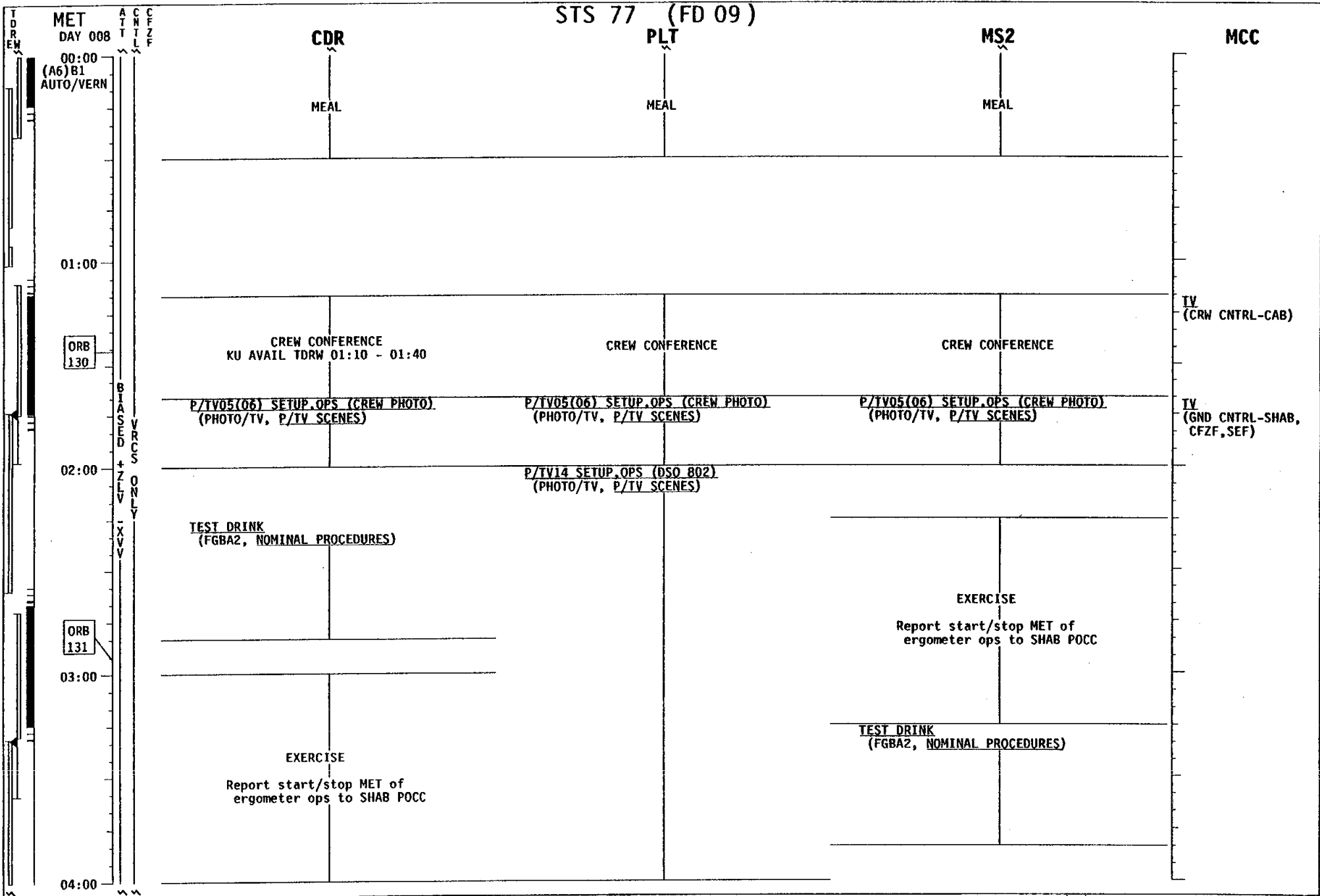
MS3

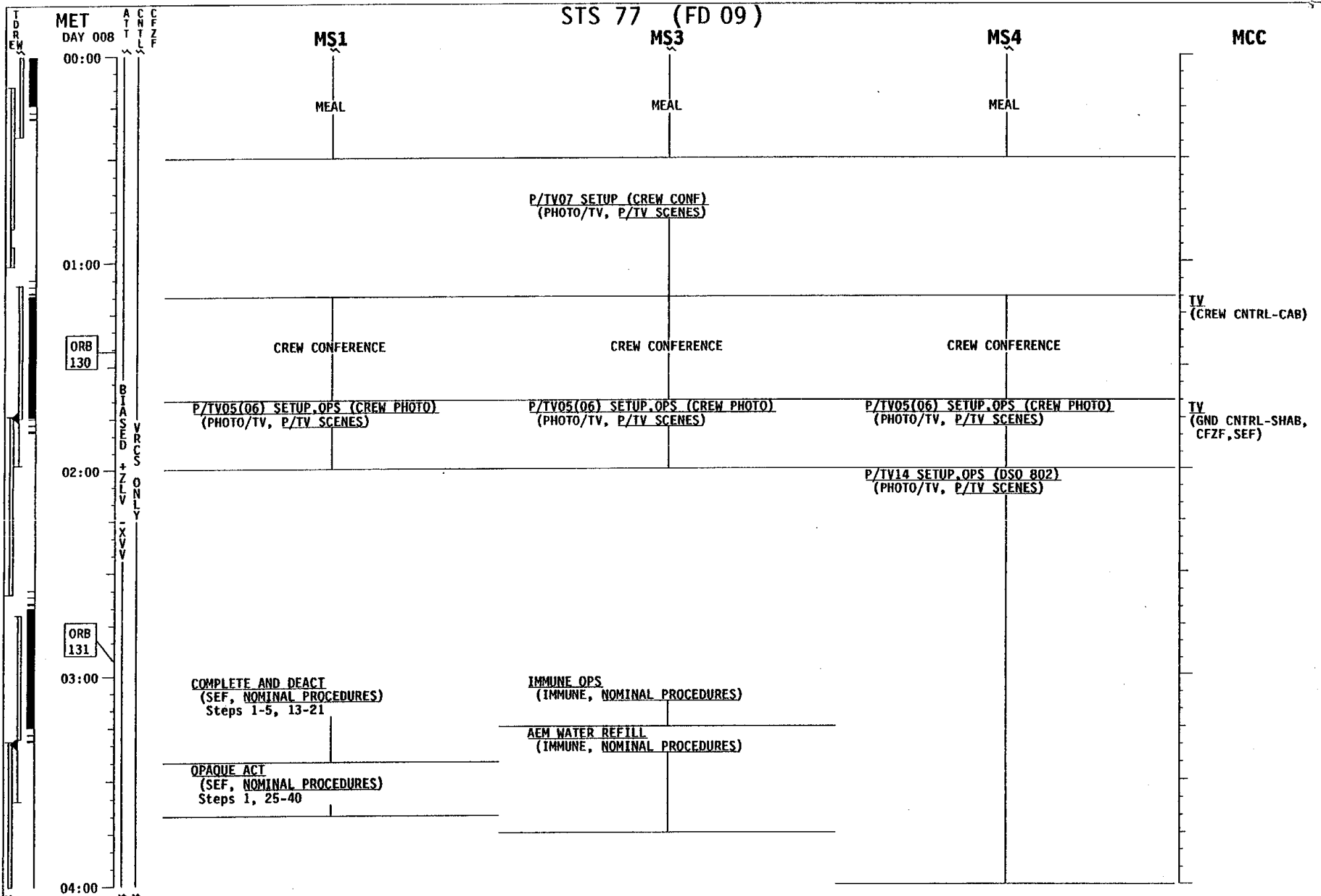
MS4

MCC



STS 77 (FD 09)





A GANE SLM

1. IMU ALIGN - S TRK (ORB OPS)

-Z: 36 AVAIL 06:05 TO 06:52
-Y: 59 AVAIL 05:40 TO 06:29
ANG SEP: 90.2

When IMU Align complete:

GNC 22 S TRK/COAS CNTL
-Y STAR TRKR - TERM/IDLE ITEM 9 EXEC (*)

2. SLM DATA TAKES

GNC 22 S TRK/COAS CNTL

CRT Clear Star Table ITEM 20 EXEC

Acquire star
SLM #1,2 STAR ID: 36
SLM #3,4 STAR ID: 59

C3 DAP: FREE

CRT Verify star in table
Clear Star Table ITEM 20 EXEC
Verify star in table

C3 DAP: AUTO

GNC UNIV PTG

CRT Load Next Attitude:
SLM #2 SLM #3 SLM #4
R=301.9 R=337.5 R=340.8
P=323.7 P=260.0 P=260.9
Y=339.0 Y= 46.7 Y= 46.6
B/AUTO/VERN
Init MNVR ITEM 18 EXEC

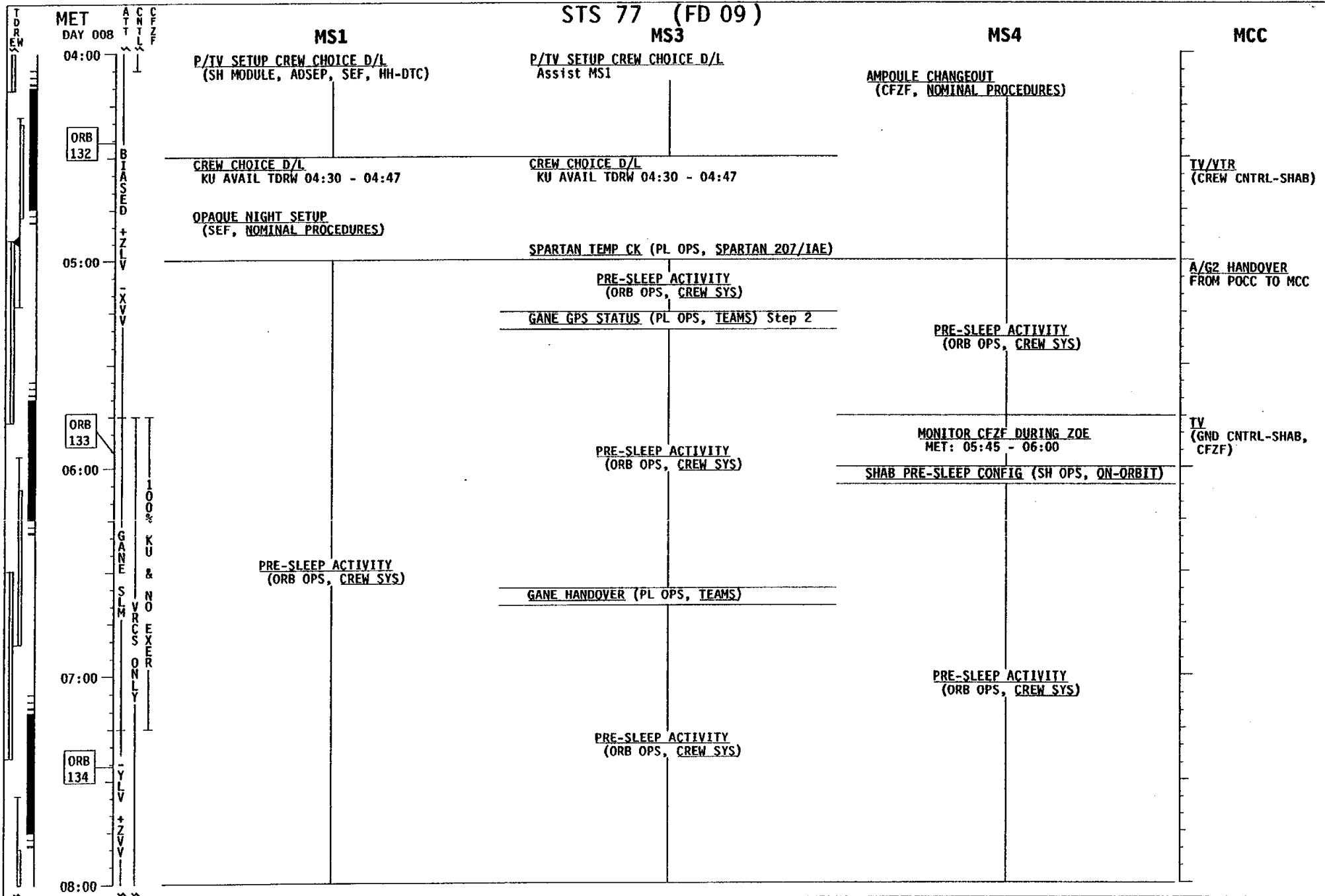
When in attitude, repeat step 2

3. RESELECT -Y STAR TRACKER

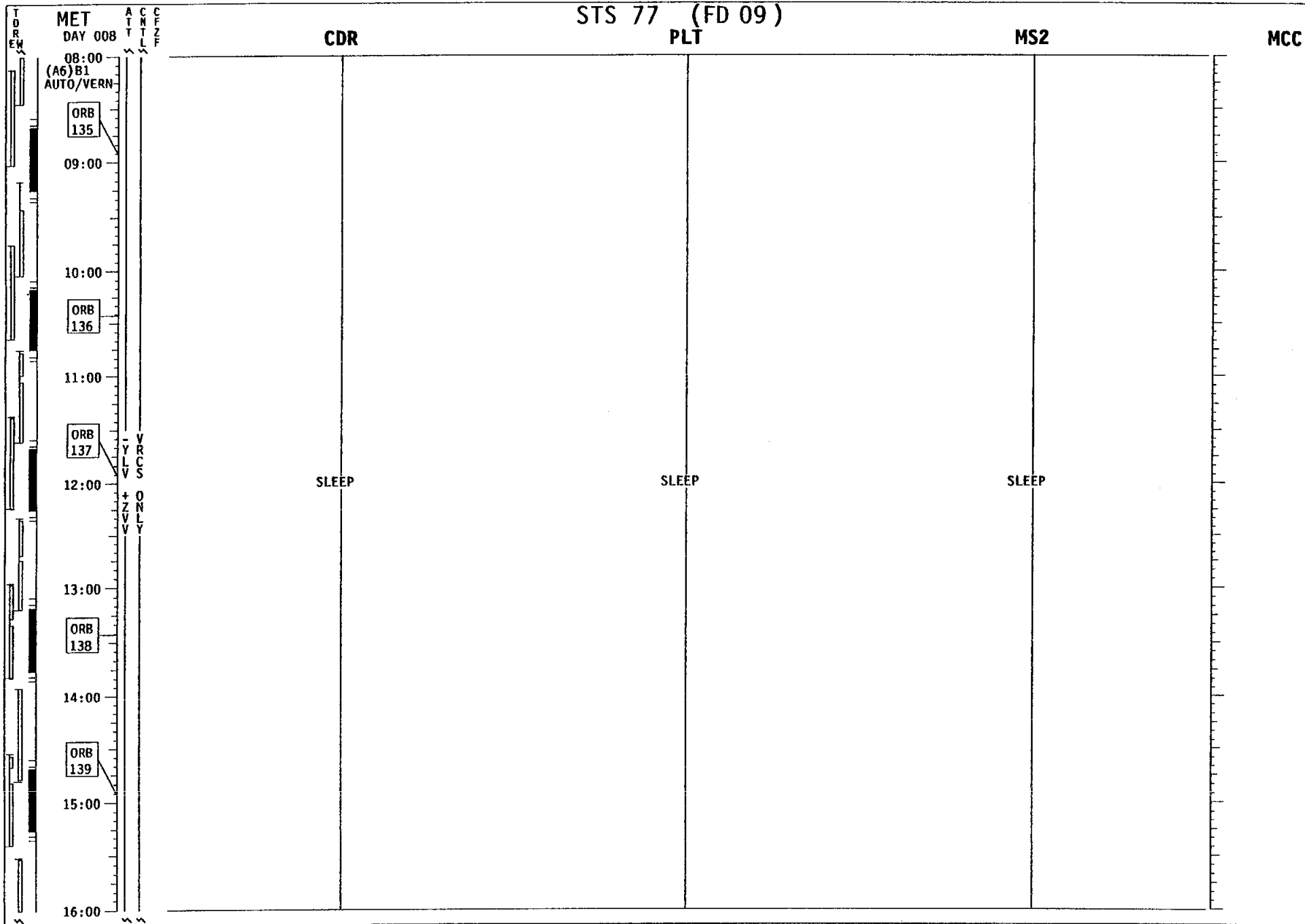
GNC 22 S TRK/COAS CNTL

-Y STAR TRKR - STAR TRK ITEM 3 EXEC (*)

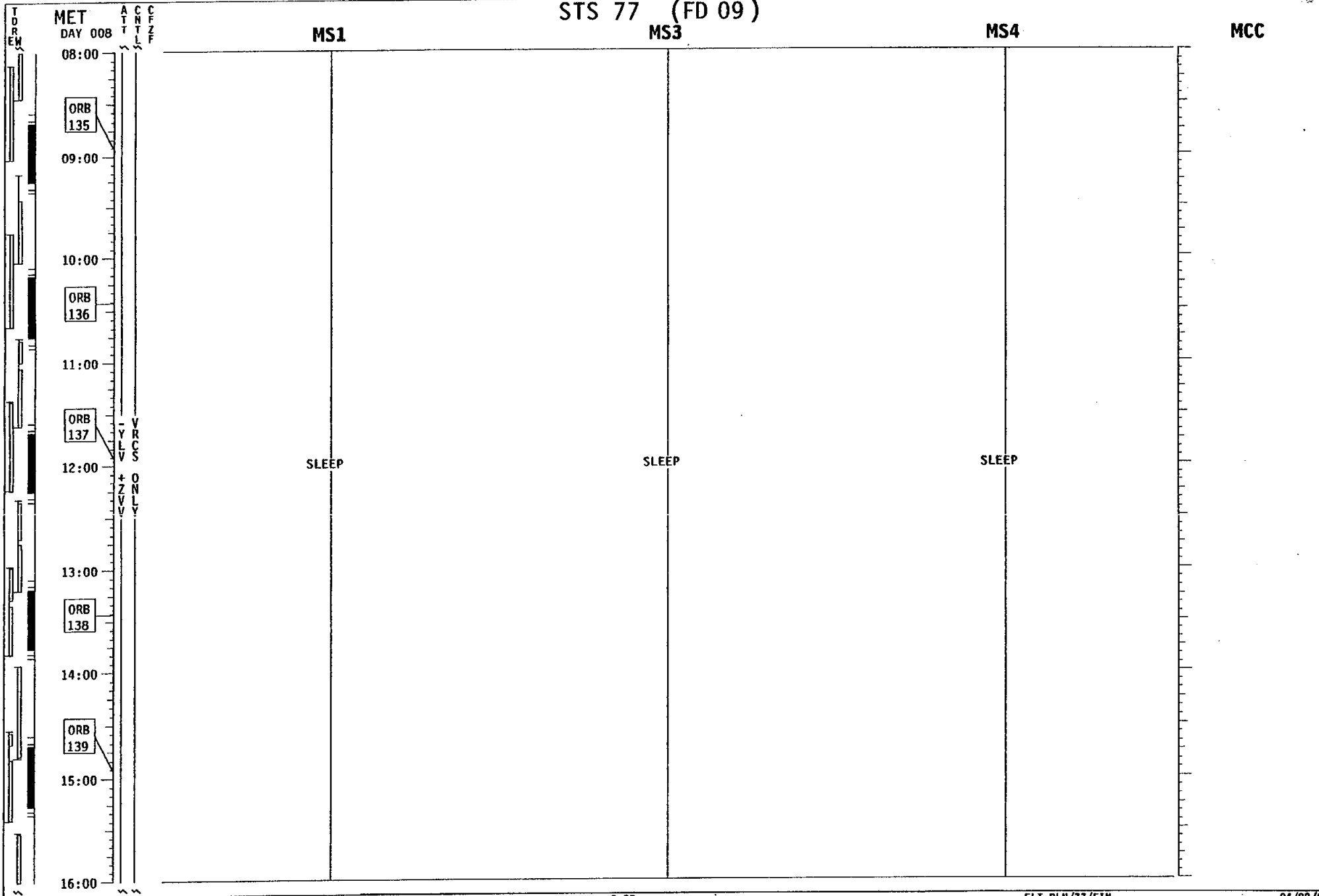
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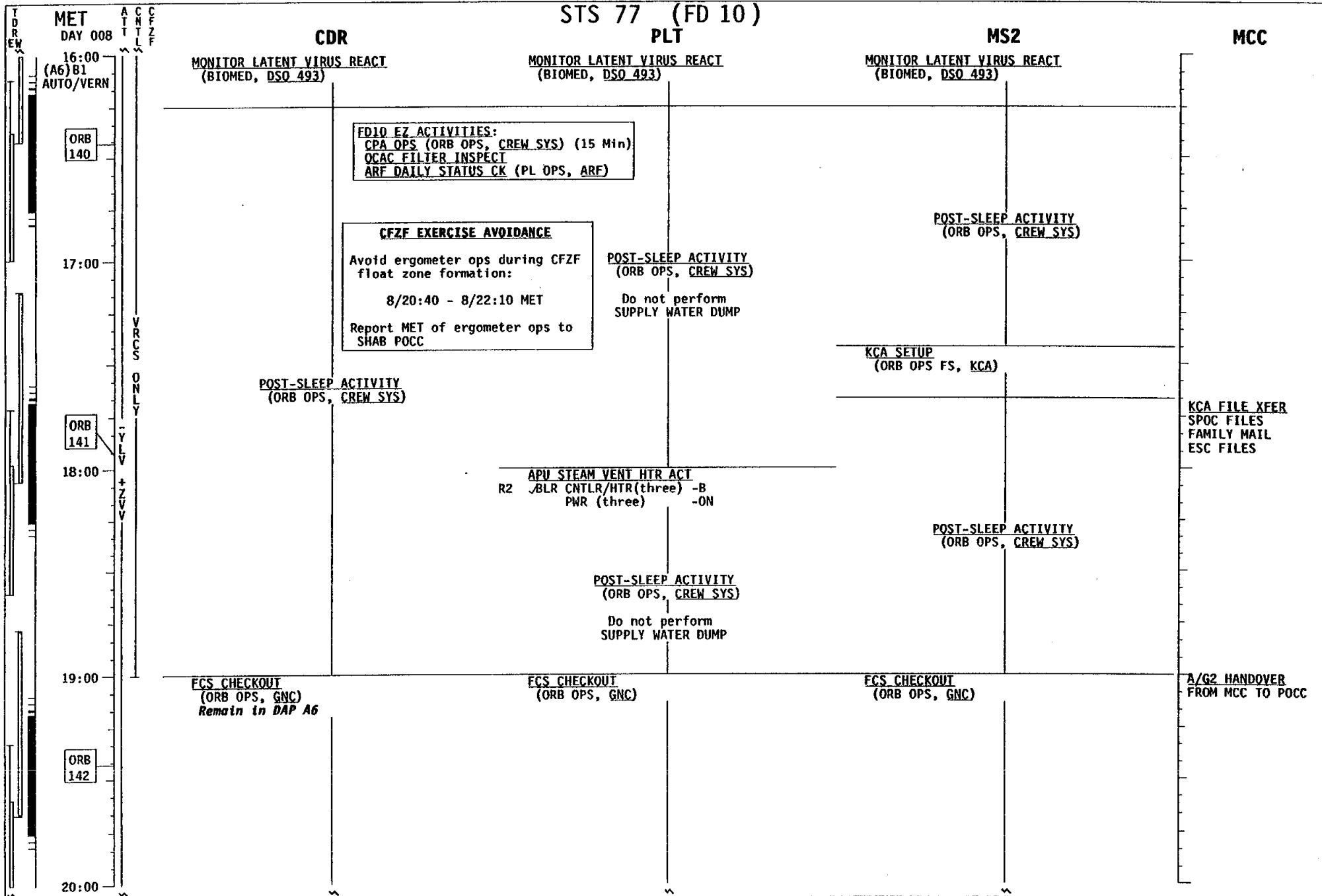
STS 77 (FD 09)



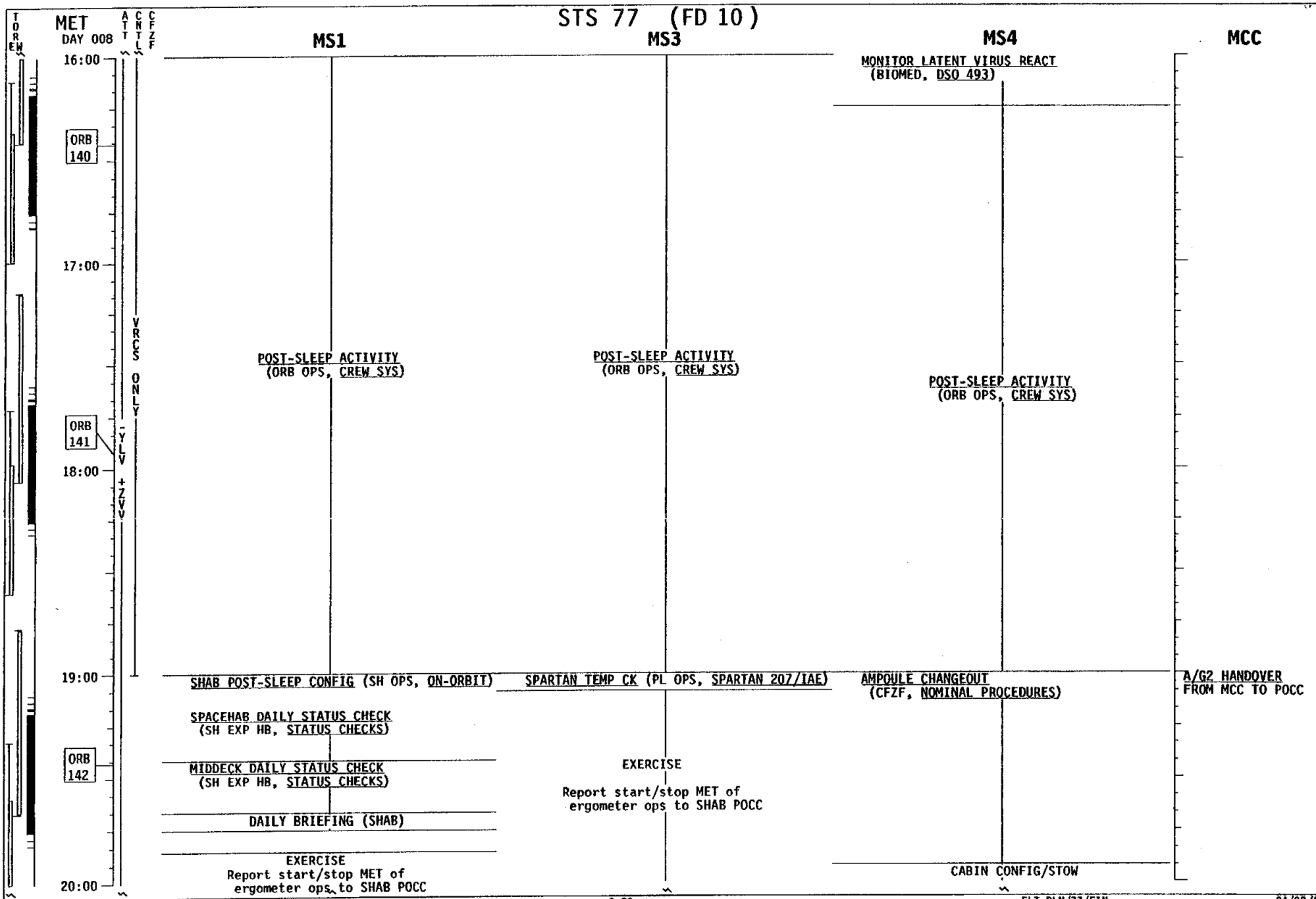
STS 77 (FD 09)



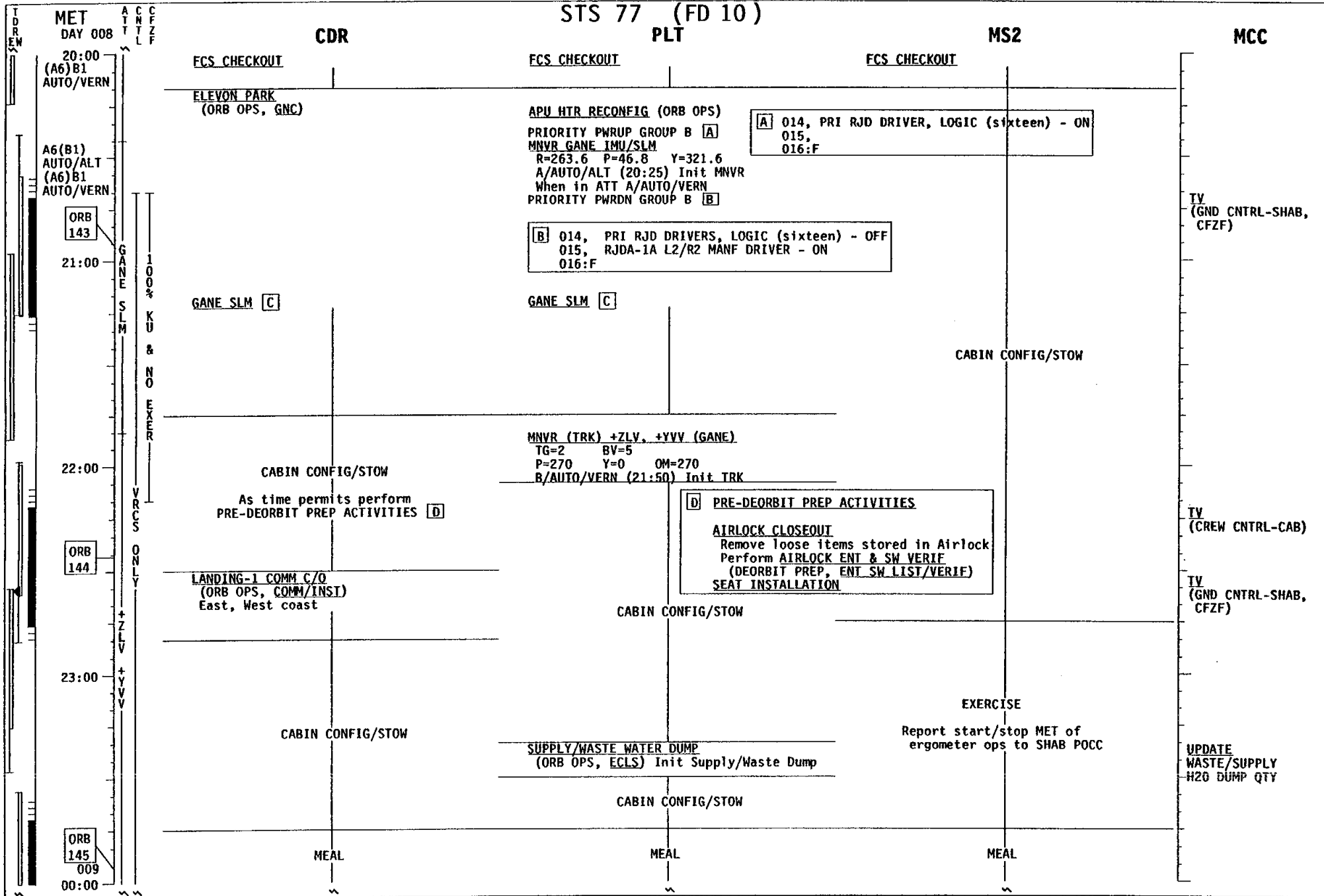
STS 77 (FD 10)



STS 77 (FD 10)



STS 77 (FD 10)



C GANE SLM

1. IMU ALIGN - S TRK (ORB OPS)

-Z: 110 AVAIL 21:08 TO 21:55
-Y: 37 AVAIL 20:46 TO 21:32
ANG SEP: 91.2

When IMU Align complete:

GNC 22 S TRK/COAS CNTL

-Y STAR TRKR - TERM/IDLE ITEM 9 EXEC (*)

2. SLM DATA TAKES

GNC 22 S TRK/COAS CNTL

CRT Clear Star Table ITEM 20 EXEC

Acquire star

SLM #1,2 STAR ID: 110

SLM #3,4 STAR ID: 37

C3 DAP: FREE

CRT Verify star in table
Clear Star Table ITEM 20 EXEC
Verify star in table

C3 DAP: AUTO

GNC UNIV PTG

CRT Load Next Attitude:

| SLM #2 | SLM #3 | SLM #4 |
|---------|---------|---------|
| R=235.6 | R=180.9 | R=186.0 |
| P=320.7 | P= 59.4 | P= 58.2 |
| Y= 4.8 | Y= 61.5 | Y= 61.3 |

B/AUTO/VERN

Init MNVR ITEM 18 EXEC

When in attitude, repeat step 2

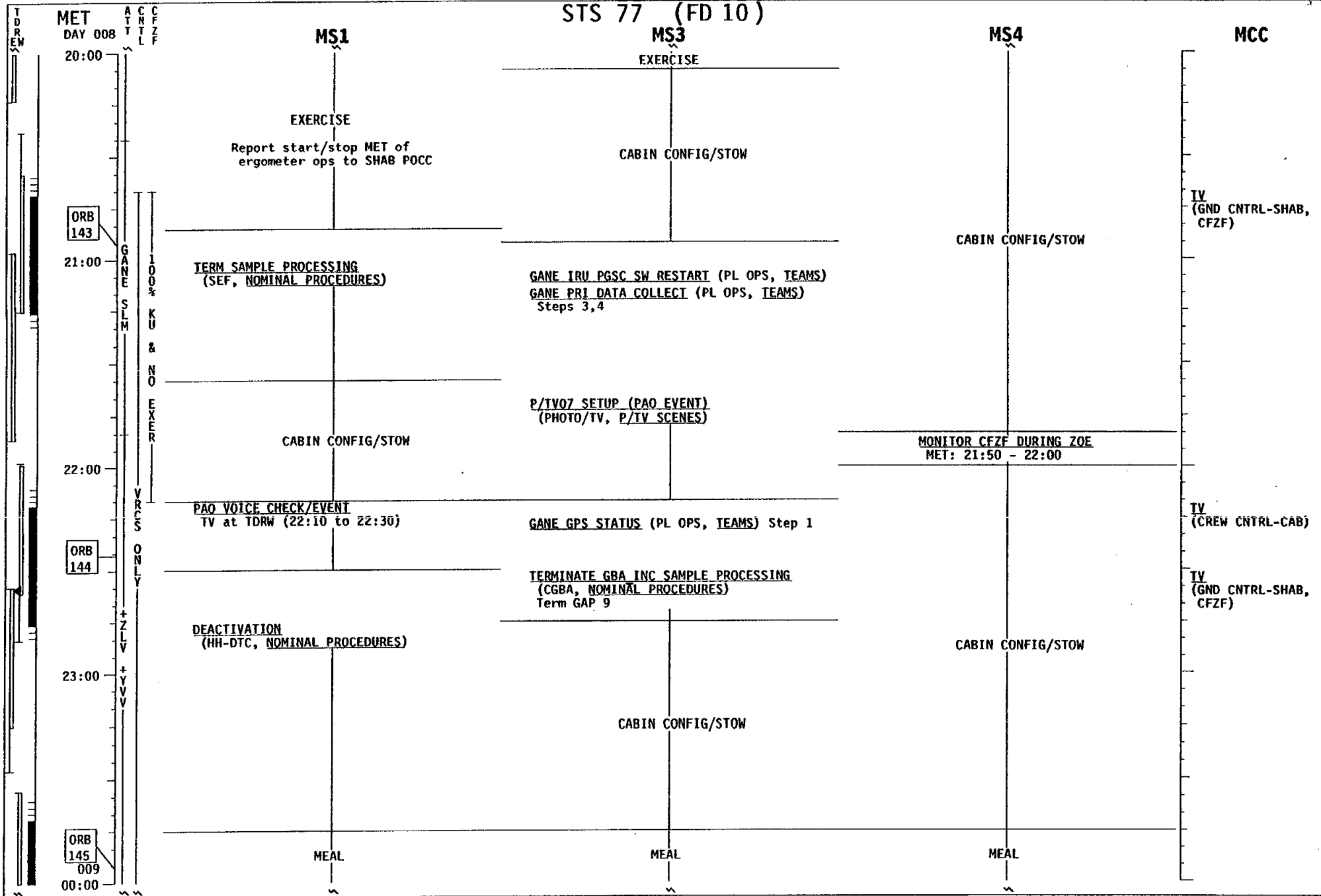
3. RESELECT -Y STAR TRACKER

GNC 22 S TRK/COAS CNTL

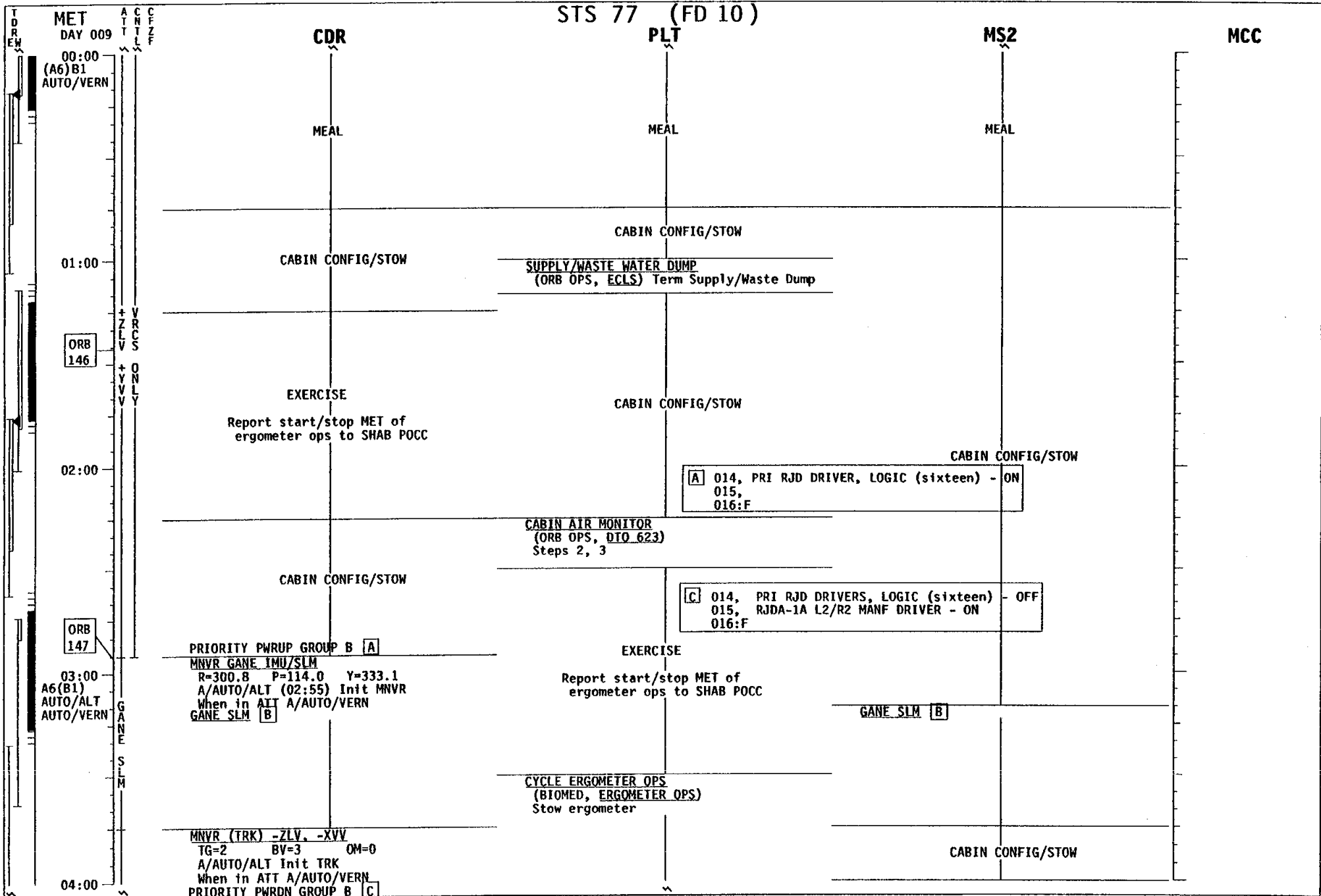
-Y STAR TRKR - STAR TRK ITEM 3 EXEC (*)

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STS 77 (FD 10)



STS 77 (FD 10)



B GANE SLM

1. IMU ALIGN - S TRK (ORB OPS)

-Z: 110 AVAIL 02:43 TO 03:29
-Y: 58 AVAIL 03:01 TO 03:49
ANG SEP: 87.3

When IMU Align complete:

GNC 22 S TRK/COAS CNTL

-Y STAR TRKR - TERM/IDLE ITEM 9 EXEC (*)

2. SLM DATA TAKES

GNC 22 S TRK/COAS CNTL

CRT Clear Star Table ITEM 20 EXEC

Aquire star
SLM #1,2 STAR ID: 110
SLM #3,4 STAR ID: 58

C3 DAP: FREE

CRT Verify star in table
Clear Star Table ITEM 20 EXEC
Verify star in table

C3 DAP: AUTO

GNC UNIV PTG

CRT Load Next Attitude:

| SLM #2 | SLM #3 | SLM #4 |
|---------|---------|---------|
| R=243.7 | R=249.1 | R=253.2 |
| P= 8.8 | P= 44.4 | P= 44.3 |
| Y=332.6 | Y= 52.9 | Y= 52.3 |

A/AUTO/ALT

Init MNVR ITEM 18 EXEC

When in attitude, A/AUTO/VERN then repeat step 2

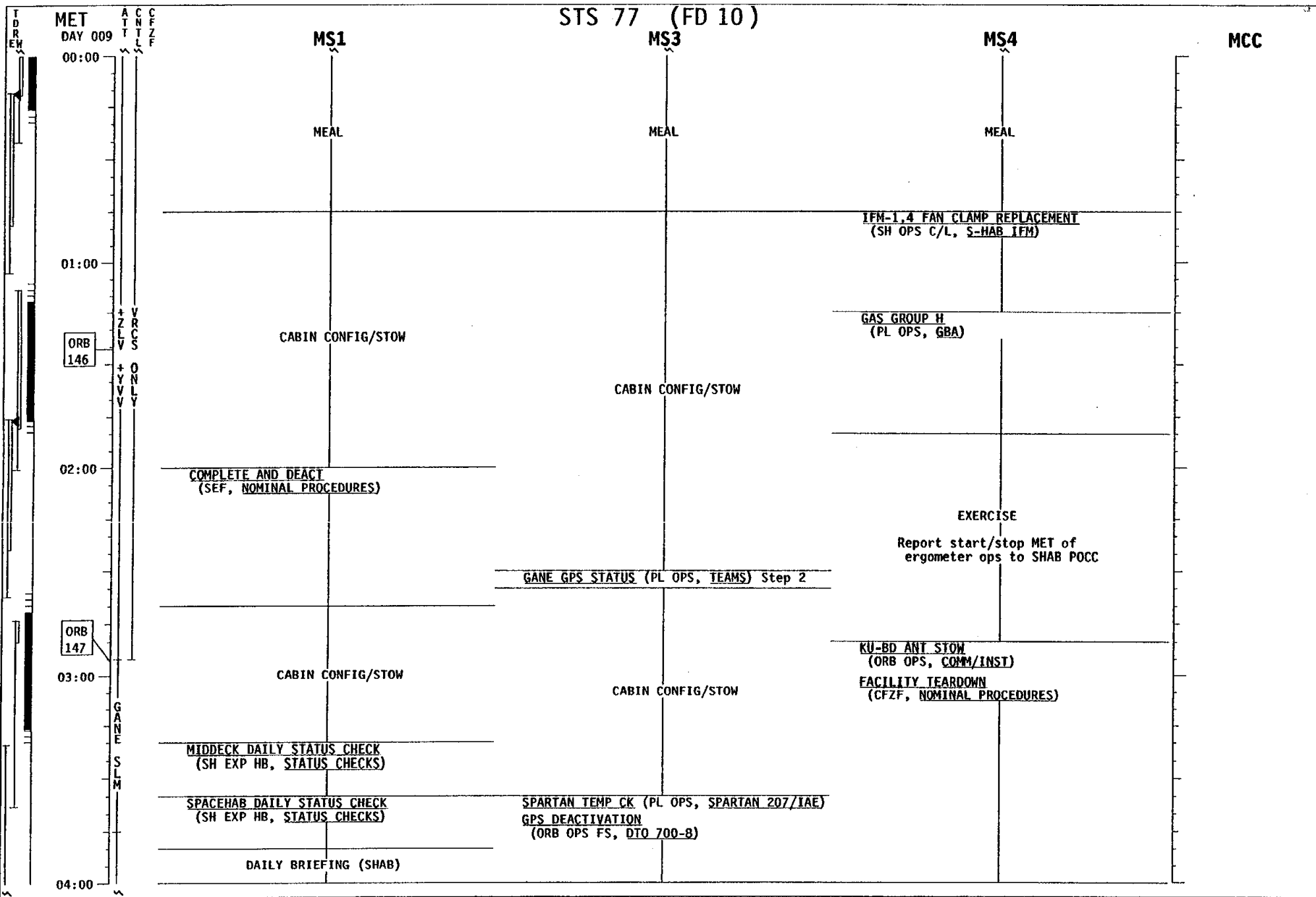
3. RESELECT -Y STAR TRACKER

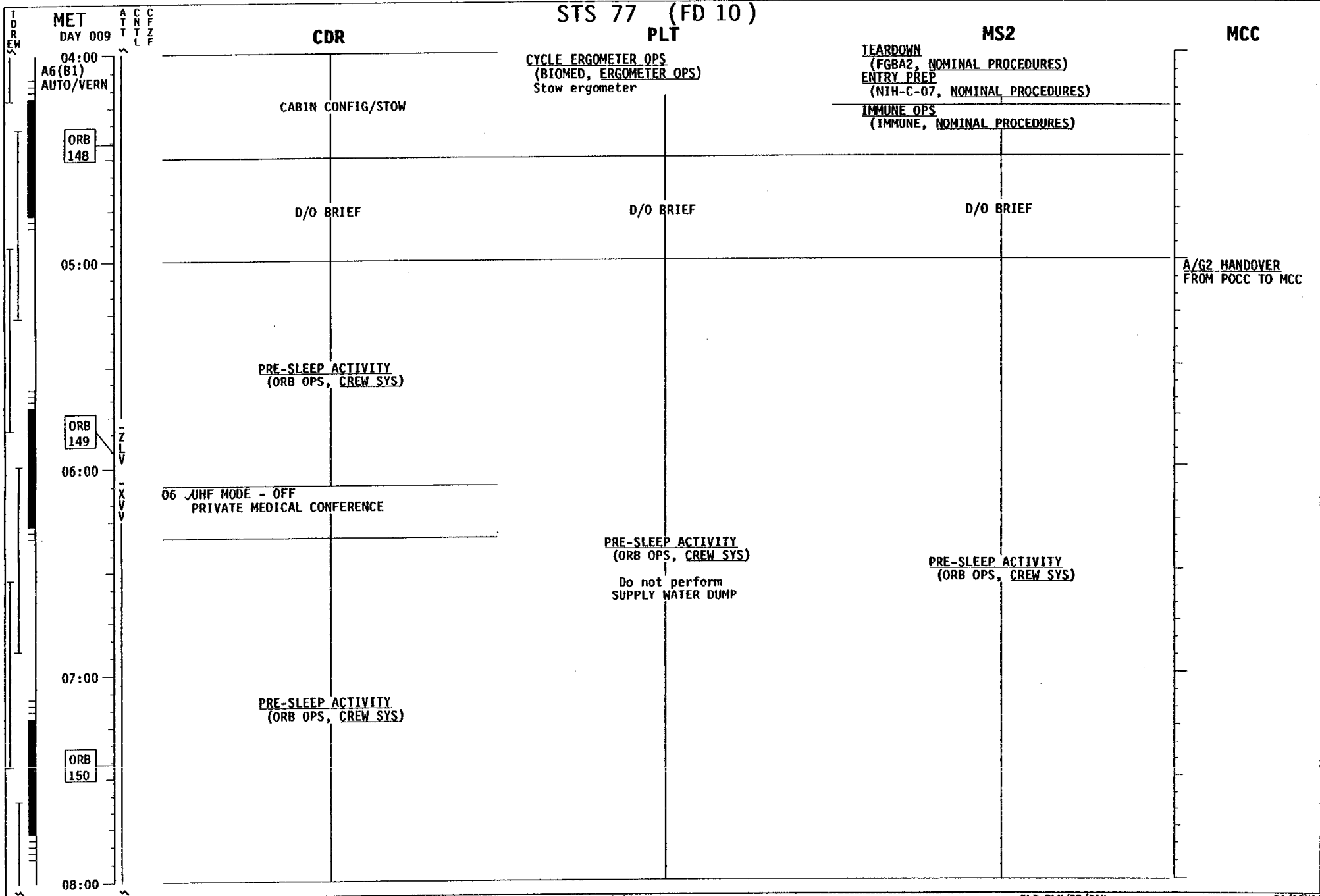
GNC 22 S TRK/COAS CNTL

-Y STAR TRKR - STAR TRK ITEM 3 EXEC (*)

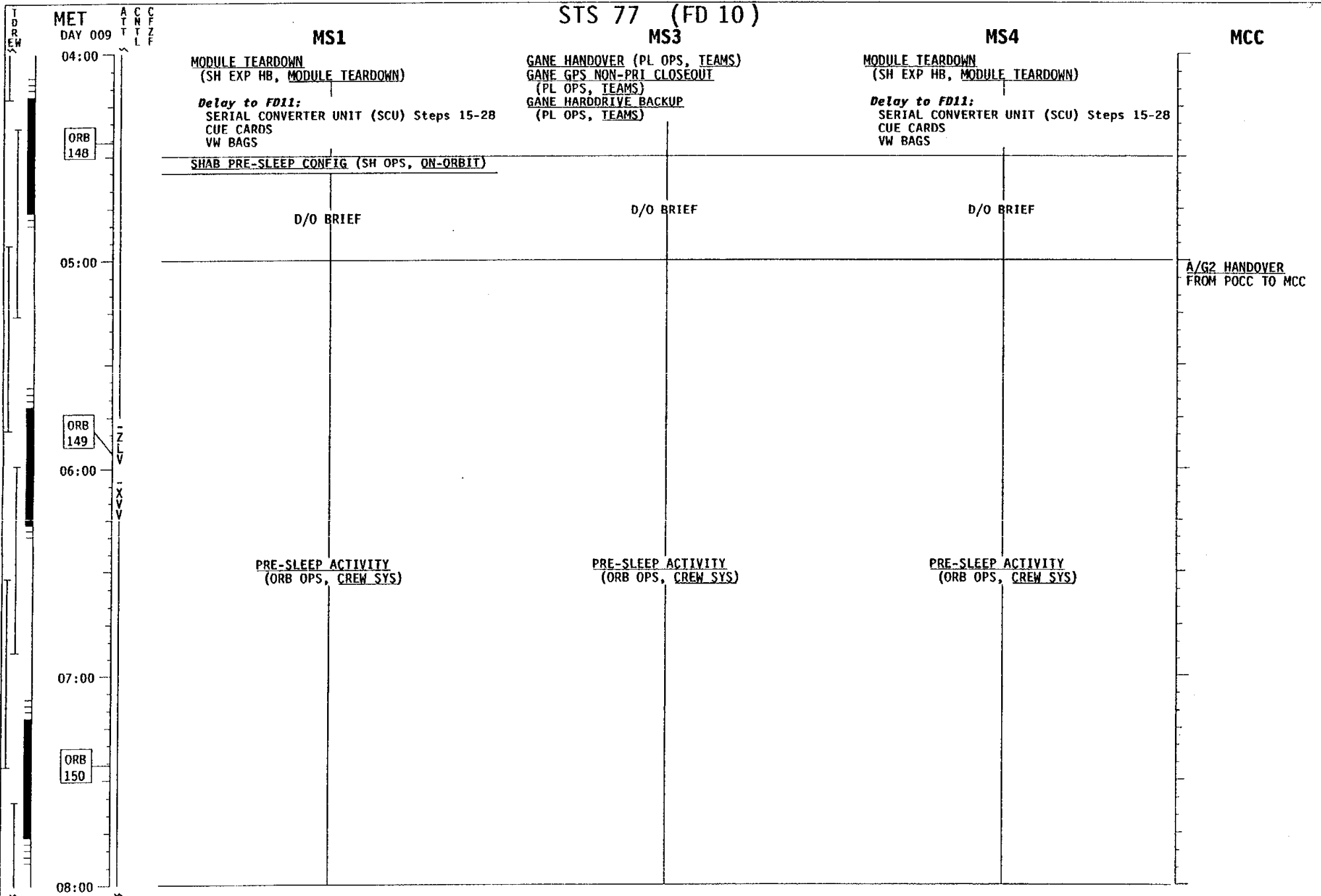
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STS 77 (FD 10)





STS 77 (FD 10)



STS 77 (FD 10)

MET DAY 009

CDR

PLT

MS2

MCC

T D R E W

08:00
A6(B1)
AUTO/VERN

ORB 151

09:00

ORB 152

10:00

ORB 153

11:00

ORB 154

12:00

ORB 155

13:00

14:00

15:00

16:00

A C N T L F

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

SLEEP

SLEEP

SLEEP

STS 77 (FD 10)

MET
DAY 009

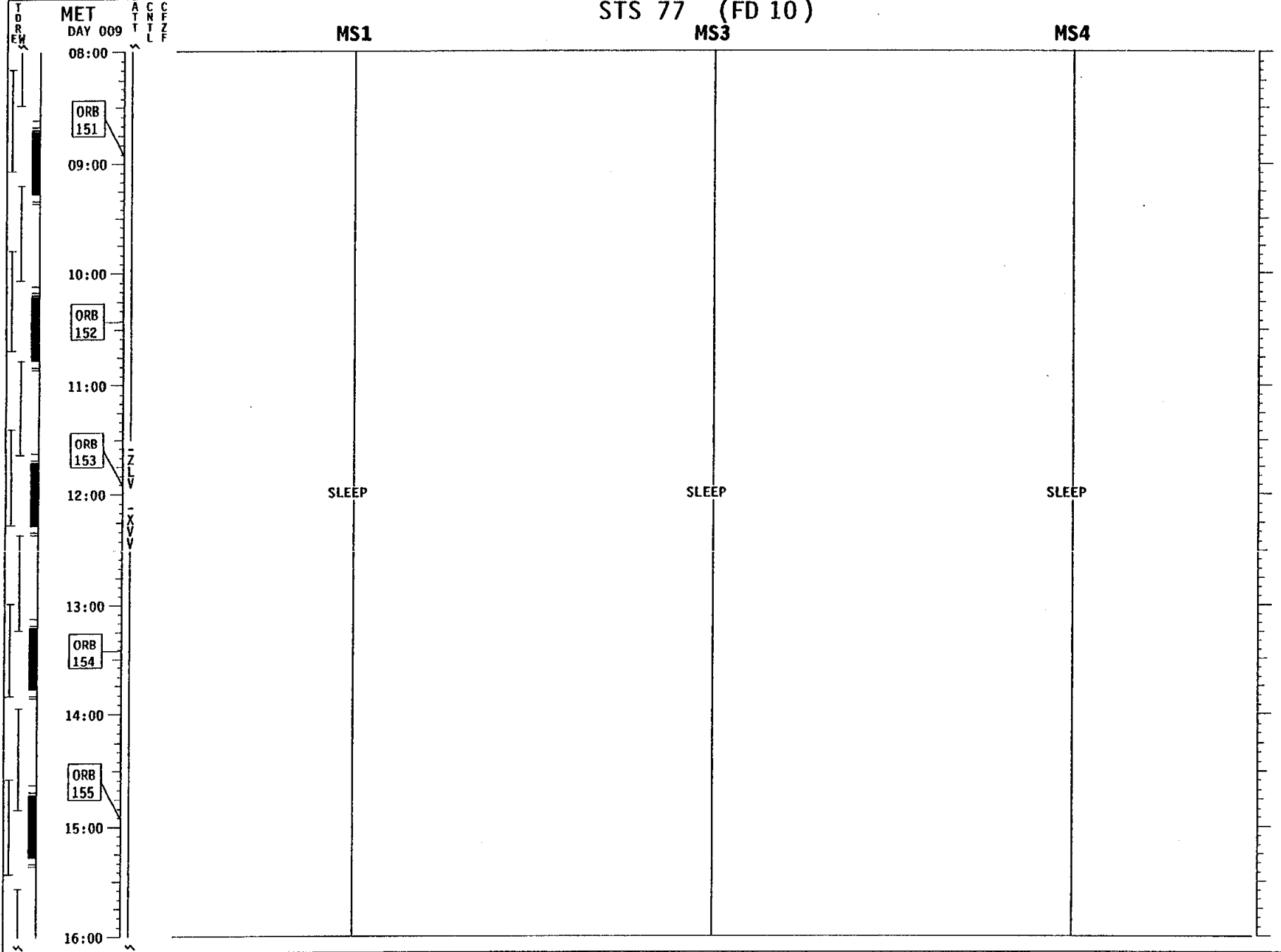
A
T
T
C
N
T
L
F

MS1

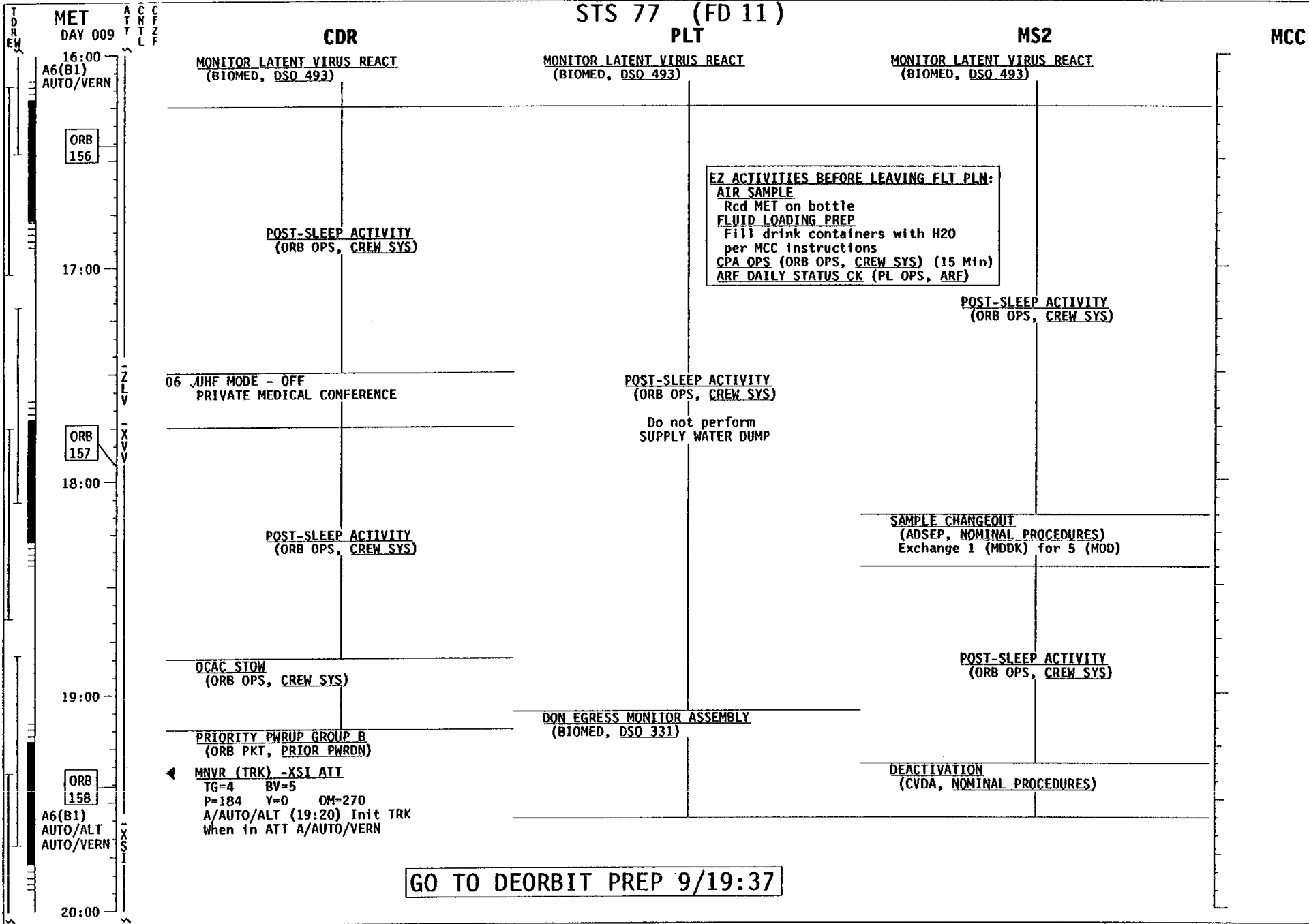
MS3

MS4

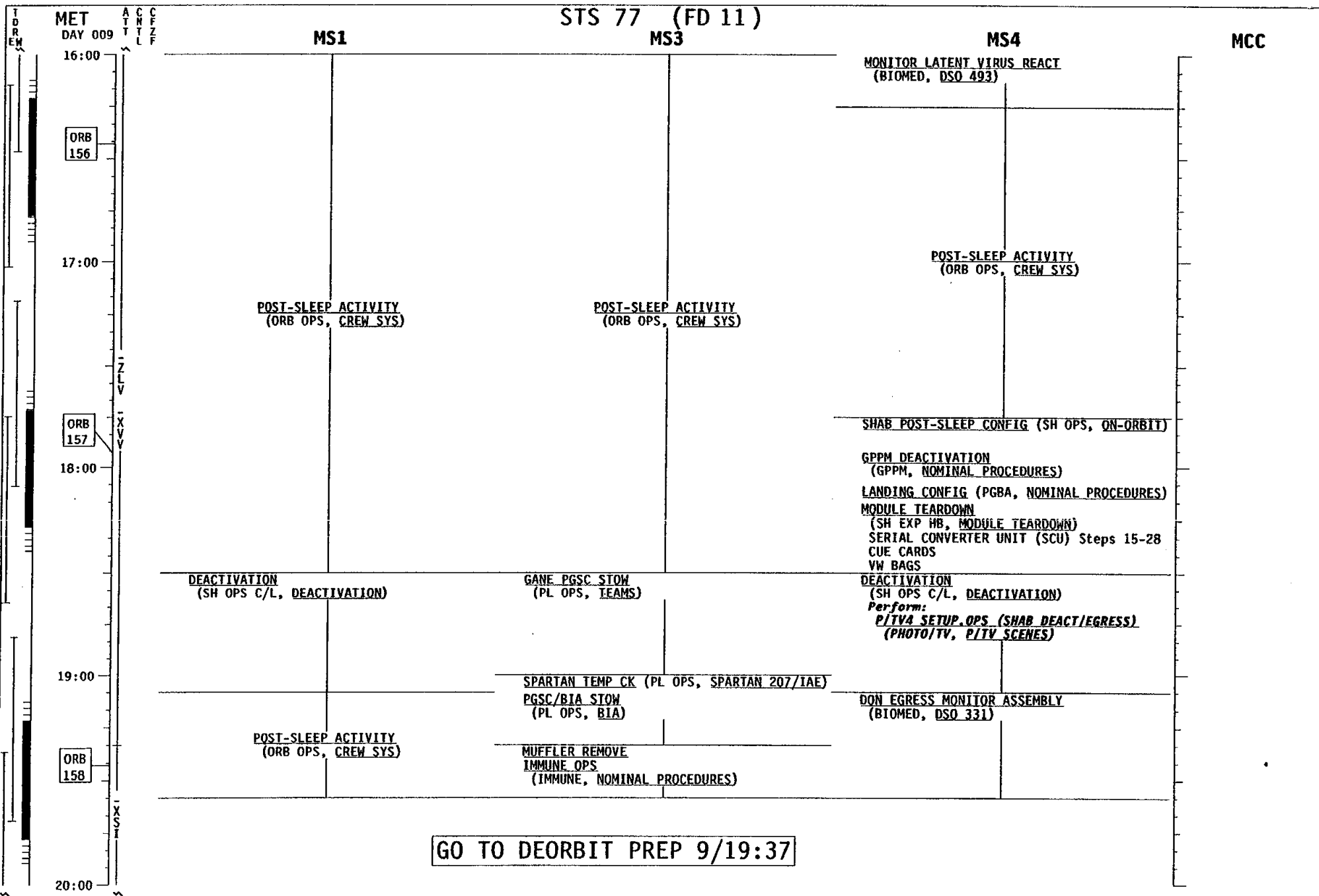
MCC



STS 77 (FD 11)



GO TO DEORBIT PREP 9/19:37

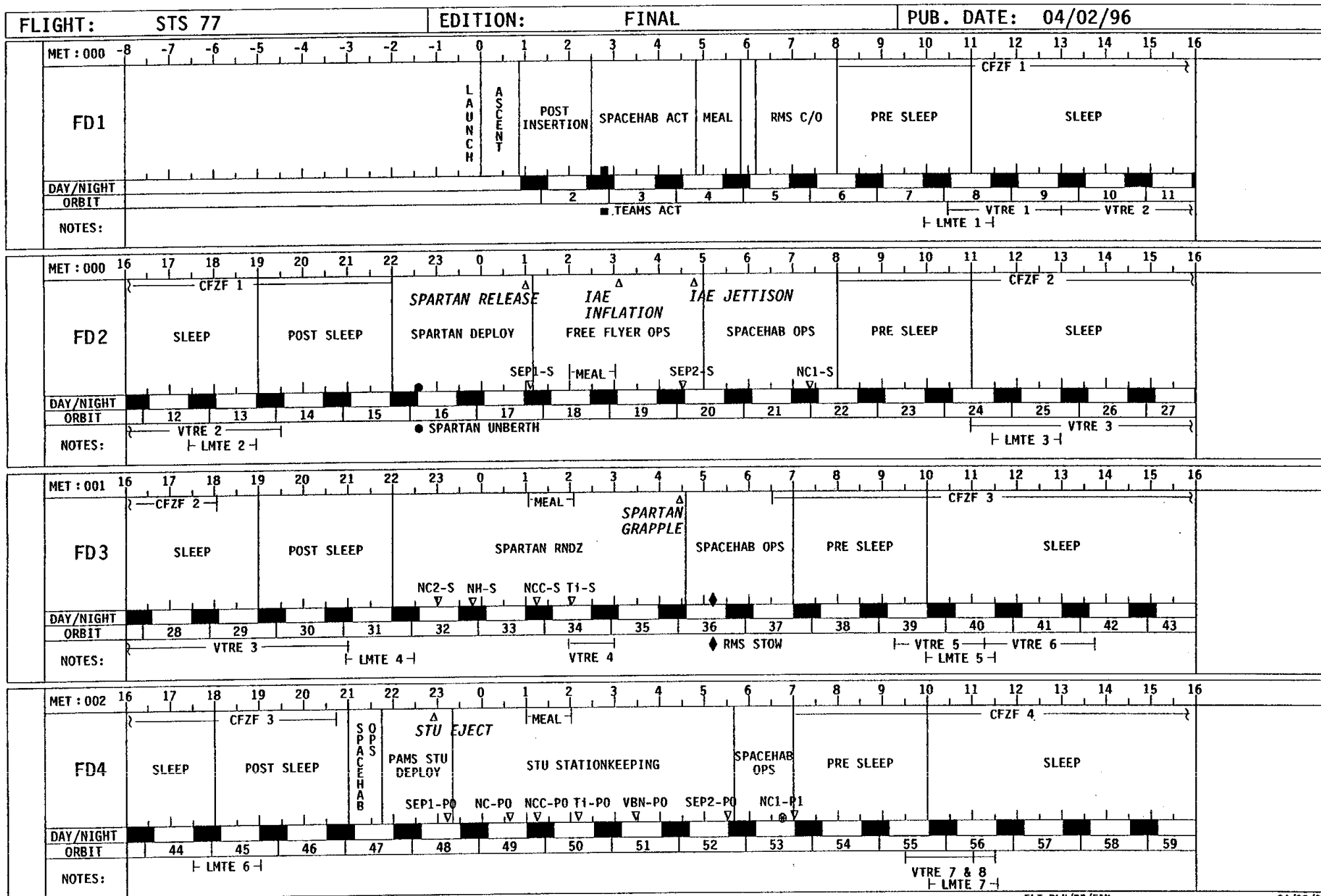


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9-DAY MISSION TIMELINE

If the power dependent extension day is not acquired onorbit, the mission will be 9 days in length. The second PAMS STU rendezvous scheduled on FD08 in the nominal timeline will be replaced with a Spacehab CFZF run to ensure that 12 CFZF runs are accomplished. Other experiments will remain in the timeline but may be rescheduled to ensure completion by EOM. Exact duration of GANE run 3 and run 4 has not been computed for the 9-day timeline. The Ku-antenna stow will be scheduled on FD10 in Deorbit Prep.

9 DAY MISSION TIMELINE



FLIGHT:

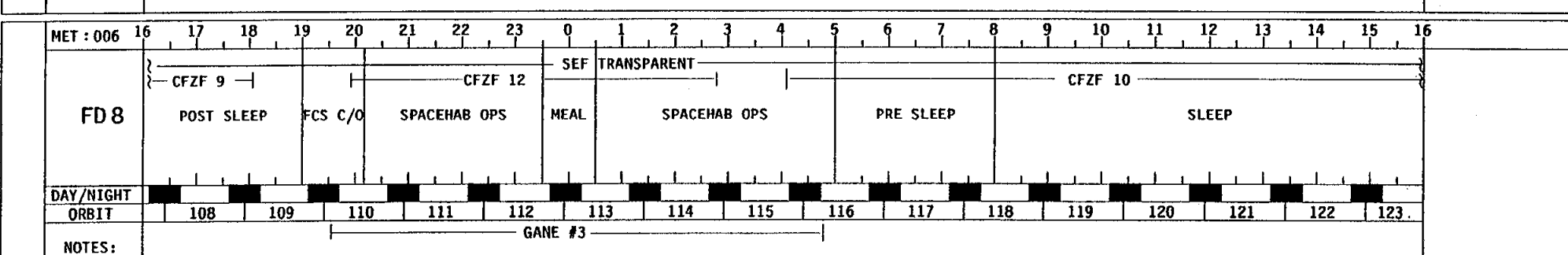
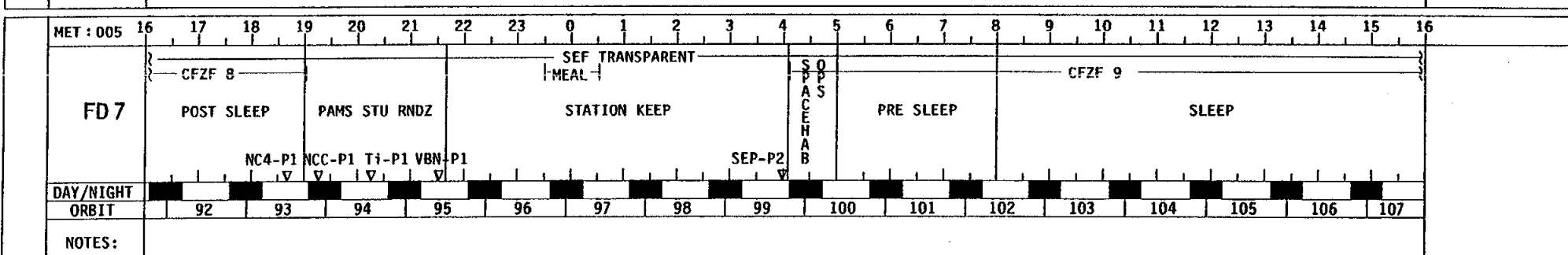
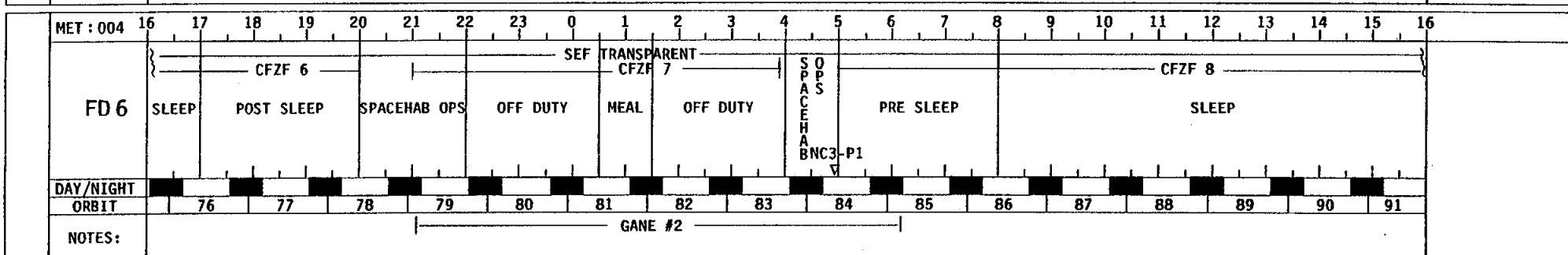
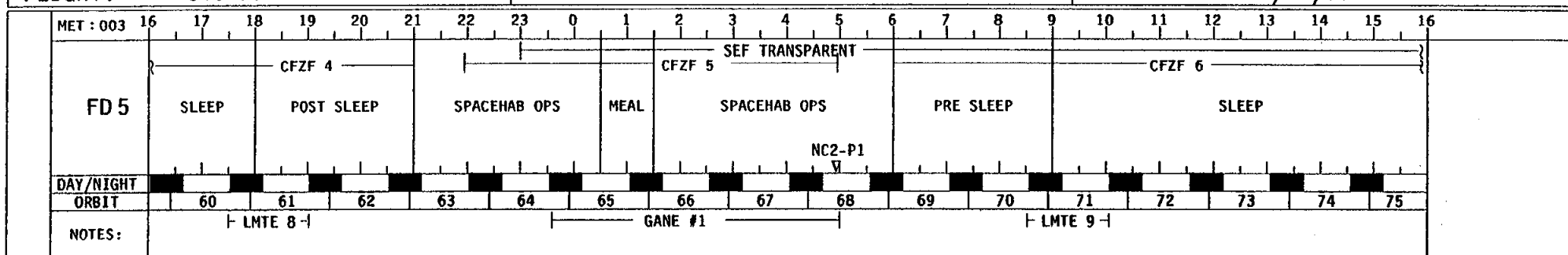
STS 77

EDITION:

FINAL

PUB. DATE:

04/02/96



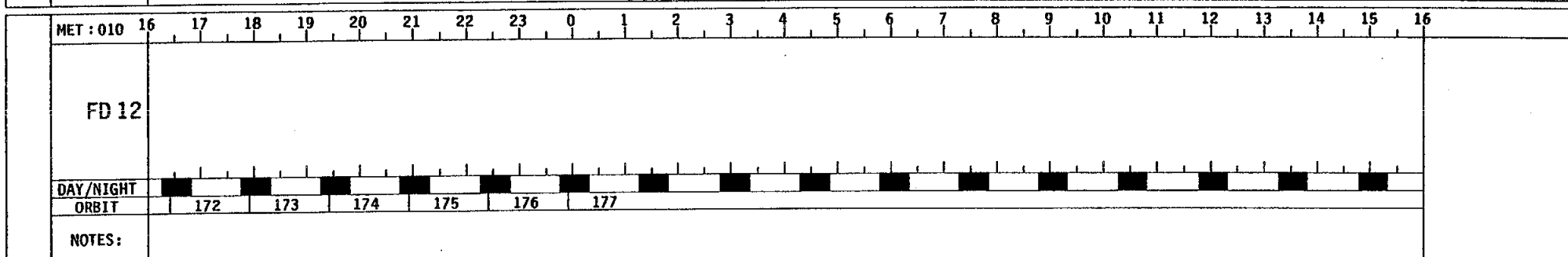
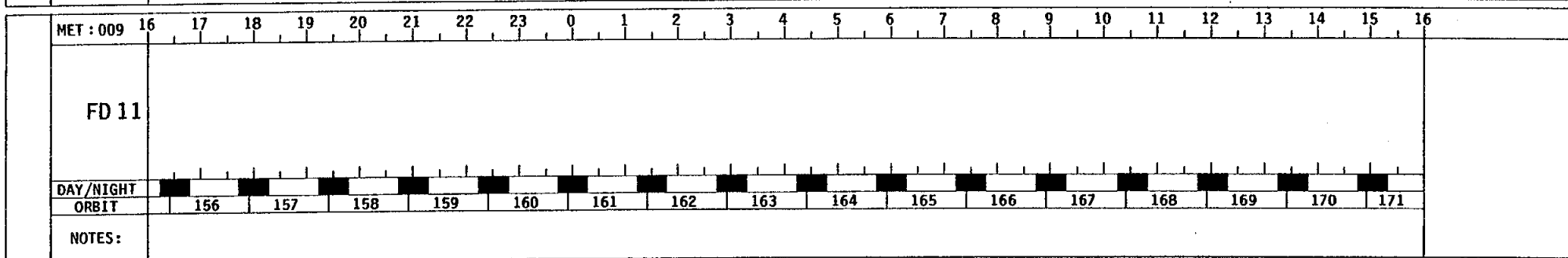
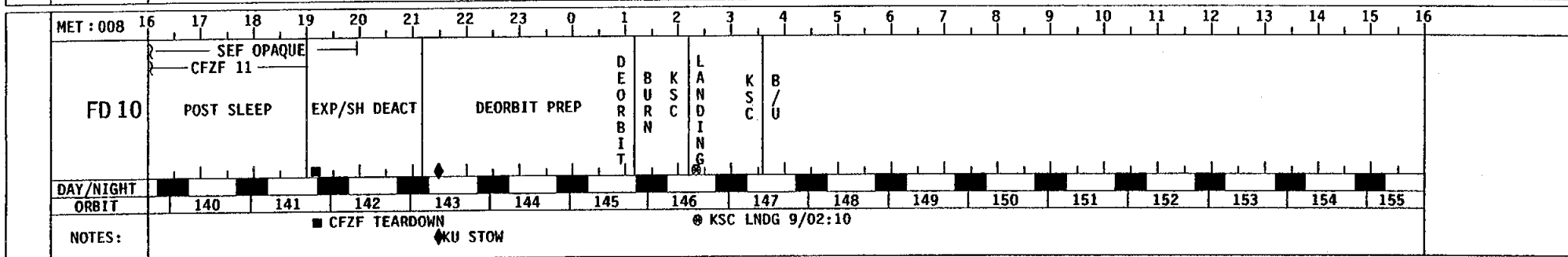
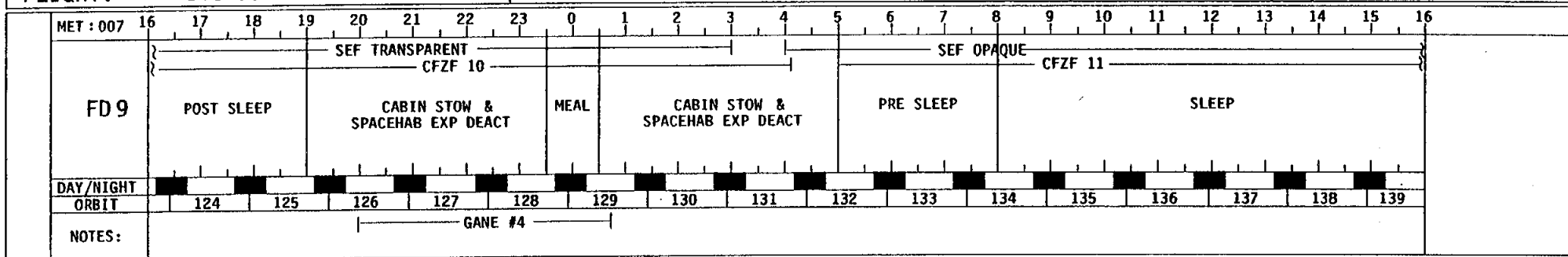
FLIGHT:

STS 77

EDITION:

FINAL

PUB. DATE: 04/02/96



STS-77 DAP TABLE

DAP TABLE

STS-77 DAP A - GENERIC

| | ITEM # | A1 | A2 | A3 | A4 | A5 | A7 | A8 |
|-------------|---------|---------|--------|--------|--------------------|-------------------------------------|--------|----------|
| PRI | | | | | | | | |
| ROT RATE | 10 (50) | 0.2000 | 0.4000 | 0.2000 | 0.5000 | 0.2000 | 0.2000 | 0.2000 |
| ATT DB | 11 (51) | 5.00 | 1.00 | 1.00 | 3.00 | 5.00 | 2.00 | 2.00 |
| RATE DB | 12 (52) | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| ROT PLS | 13 (53) | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 |
| COMP | 14 (54) | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| P OPTION | 15 (55) | ALL | ALL | ALL | ALL | ALL | ALL | ALL |
| Y OPTION | 16 (56) | ALL | ALL | TAIL | ALL | ALL | ALL | ALL |
| TRAN PLS | 17 (57) | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.05 |
| ALT | | | | | | | | |
| RATE DB | 18 (58) | 0.200 | 0.200 | 0.200 | 0.200 | 0.070 | 0.200 | 0.200 |
| JET OPT | 19 (59) | ALL | ALL | ALL | ALL | ALL | ALL | ALL |
| # JETS | 20 (60) | 2 | 2 | 2 | 2 | 1 | 2 | 2 |
| ON TIME | 21 (61) | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| DELAY | 22 (62) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| VERN | | | | | | | | |
| ROT RATE | 23 (63) | 0.2000 | 0.4000 | 0.0080 | 0.2000 | 0.2000 | 0.2000 | 0.2000 |
| ATT DB | 24 (64) | 1.000 | 1.000 | 0.070 | 1.000 | 1.000 | 1.000 | 1.000 |
| RATE DB | 25 (65) | .020 | .020 | .010 | .020 | .020 | .020 | .020 |
| ROT PLS | 26 (66) | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 | 0.010 |
| COMP | 27 (67) | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| CNTL ACC | 28 (68) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PURPOSE | | NOMINAL | PTC | GG | PRE/POST DEPLOY | LOSS OF VERN (NOSE & TAIL) | RNDZ | PROX OPS |

Note: **BOLD/ITALICS** indicate a change from the I-load

STS-77 DAP A CONFIGURATION

| | ITEM # | A6 | A9 | A10 | A11 |
|-------------|---------|--|---|--|----------------------------|
| PRI | | | | | |
| ROT RATE | 10 (50) | 0.2000 | 0.1000 | 0.1000 | 0.0500 |
| ATT DB | 11 (51) | 5.00 | 3.00 | 3.00 | 0.50 |
| RATE DB | 12 (52) | 0.20 | 0.20 | 0.20 | 0.10 |
| ROT PLS | 13 (53) | 0.10 | 0.04 | 0.04 | 0.10 |
| COMP | 14 (54) | .000 | .000 | .000 | .000 |
| P OPTION | 15 (55) | TAIL | ALL | ALL | ALL |
| Y OPTION | 16 (56) | TAIL | ALL | ALL | ALL |
| TRAN PLS | 17 (57) | 0.10 | 0.05 | 0.05 | 0.10 |
| ALT | | | | | |
| RATE DB | 18 (58) | 0.070 | 0.200 | 0.200 | 0.200 |
| JET OPT | 19 (59) | TAIL | ALL | ALL | ALL |
| # JETS | 20 (60) | 1 | 2 | 2 | 2 |
| ON TIME | 21 (61) | 0.08 | 0.08 | 0.08 | 0.08 |
| DELAY | 22 (62) | 0.00 | 4.10 | 3.30 | 0.00 |
| VERN | | | | | |
| ROT RATE | 23 (63) | 0.0667 | 0.2000 | 0.2000 | 0.0500 |
| ATT DB | 24 (64) | 1.000 | 3.000 | 3.000 | 0.500 |
| RATE DB | 25 (65) | .020 | .200 | .200 | .020 |
| ROT PLS | 26 (66) | 0.010 | 0.010 | 0.010 | 0.010 |
| COMP | 27 (67) | .000 | .000 | .000 | .000 |
| CNTL ACC | 28 (68) | 0 | 1 | 1 | 0 |
| PURPOSE | | MIN PROP LOSS OF VERN (TAIL ONLY) | SPARTAN LOW HOVER NOM REL SJ REL | SPARTAN NOM CAPT SJ CAPT EXT PARK | STU STATION- KEEPING |

Note: **BOLD/ITALICS** indicate a change from the I-load

STS-77 DAP B - GENERIC

| | ITEM # | B1 | B2 | B3 | B4 | B5 | B7 | B8 |
|-------------|---------|------------------------------|-----------------------------------|-------------------------------------|----------------|----------|--------|----------|
| PRI | | | | | | | | |
| ROT RATE | 30 (50) | 0.5000 | 0.2000 | 0.2000 | 0.2000 | 0.2000 | 0.5000 | 0.2000 |
| ATT DB | 31 (51) | 3.00 | 3.00 | 3.00 | 0.30 | 3.00 | 2.00 | 2.00 |
| RATE DB | 32 (52) | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| ROT PLS | 33 (53) | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |
| COMP | 34 (54) | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| P OPTION | 35 (55) | ALL | TAIL | ALL | TAIL | TAIL | ALL | ALL |
| Y OPTION | 36 (56) | ALL | TAIL | ALL | TAIL | TAIL | ALL | ALL |
| TRAN PLS | 37 (57) | 0.10 | 0.02 | 0.02 | 0.02 | 0.02 | 0.05 | 0.01 |
| ALT | | | | | | | | |
| RATE DB | 38 (58) | 0.200 | 0.070 | 0.070 | 0.200 | 0.200 | 0.200 | 0.200 |
| JET OPT | 39 (59) | ALL | TAIL | ALL | ALL | ALL | ALL | ALL |
| # JETS | 40 (60) | 2 | 1 | 1 | 2 | 2 | 2 | 2 |
| ON TIME | 41 (61) | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| DELAY | 42 (62) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| VERN | | | | | | | | |
| ROT RATE | 43 (63) | 0.2000 | 0.2000 | 0.2000 | 0.0080 | 0.0160 | 0.2000 | 0.2000 |
| ATT DB | 44 (64) | 1.000 | 1.000 | 1.000 | 0.100 | 0.033 | 1.000 | 1.000 |
| RATE DB | 45 (65) | .020 | .020 | .020 | .010 | .020 | .020 | .020 |
| ROT PLS | 46 (66) | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 |
| COMP | 47 (67) | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| CNTL ACC | 48 (68) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PURPOSE | | NOM OMS & RCS BURNS | LOSS OF VERN (TAIL ONLY) | LOSS OF VERN (NOSE & TAIL) | SSUS DEPLOY | COAS CAL | RNDZ | PROX OPS |

5-4

FLT PLN/77/FIN

STS-77 DAP B CONFIGURATION

| | ITEM # | B6 | B9 | B11 |
|-------------|---------|-----------------------------|------------------------|----------------------------|
| PRI | | | | |
| ROT RATE | 30 (50) | 0.5000 | 0.0500 | 0.0500 |
| ATT DB | 31 (51) | 3.00 | 1.00 | 0.50 |
| RATE DB | 32 (52) | 0.20 | 0.20 | 0.10 |
| ROT PLS | 33 (53) | 0.04 | 0.04 | 0.04 |
| COMP | 34 (54) | .000 | .000 | .000 |
| P OPTION | 35 (55) | TAIL | ALL | ALL |
| Y OPTION | 36 (56) | TAIL | ALL | ALL |
| TRAN PLS | 37 (57) | 0.02 | 0.01 | 0.05 |
| ALT | | | | |
| RATE DB | 38 (58) | 0.200 | 0.100 | 0.200 |
| JET OPT | 39 (59) | ALL | ALL | ALL |
| # JETS | 40 (60) | 2 | 2 | 2 |
| ON TIME | 41 (61) | 0.08 | 0.08 | 0.08 |
| DELAY | 42 (62) | 0.00 | 4.10 | 0.00 |
| VERN | | | | |
| ROT RATE | 43 (63) | 0.2000 | 0.1000 | 0.0500 |
| ATT DB | 44 (64) | 1.000 | 1.000 | 0.500 |
| RATE DB | 45 (65) | .020 | .020 | .020 |
| ROT PLS | 46 (66) | 0.002 | 0.002 | 0.002 |
| COMP | 47 (67) | .000 | .000 | .000 |
| CNTL ACC | 48 (68) | 0 | 1 | 0 |
| PURPOSE | | HIGH RATE (TAIL ONLY) | SPARTAN DB COLLAPSE | STU STATION- KEEPING |

Note: **BOLD/ITALICS** indicates a change from the I-load

The sections following this divider page will not be included in flight copies.

ATTITUDE TIMELINE

ATTITUDE
TIMELINE

Attitude Timeline

| MET/GMT | MNVR OPTION | DAF | E/S | REF ATT/REMARKS | EVENT | |
|--|---|--------------------|---|-------------------------|---|---|
| 1 000/01:12:00 MET 137/11:44:00 GMT | TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00 | A6 AUTO ALT | RATE 0.2000 DB AT 5.00 DB RT 0.070 | EARTH R 0 P 90 | LVLH R= 0.00 P=180.00 Y= 0.00 | -ZLV -XVV POST INSERTION |
| 2 000/03:45:00 MET 55:11 137/14:17:00 GMT 27:11 | INRTL R=356.00 MNVR P= 40.60 Y=336.10 | A6 AUTO ALT | RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 132 P 96 | BEGIN 0/04:00 | GAINE SLM 1 -Z:70 MUHLIFAIN -Y:43 RASALHAGE |
| 3 000/04:05:00 MET 12:30 137/14:37:00 GMT 44:30 | INRTL R=192.60 MNVR P=229.70 Y=294.10 | A6 AUTO ALT | RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 185 P 137 | | SLM 2 -Z:70 MUHLIFAIN |
| 4 000/04:15:00 MET 22:24 137/14:47:00 GMT 54:24 | INRTL R=257.60 MNVR P=301.80 Y= 5.20 | A6 AUTO ALT | RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 168 P 50 | | SLM 3 -Z:43 RASALHAGE |
| 5 000/04:25:00 MET 21 137/14:57:00 GMT 21 | INRTL R=261.70 MNVR P=301.80 Y= 4.60 | A6 AUTO ALT | RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 165 P 50 | | SLM 4 -Z:43 RASALHAGE |
| 6 000/04:35:00 MET 46:16 137/15:07:00 GMT 18:16 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00 | A6 AUTO ALT | RATE 0.2000 DB AT 5.00 DB RT 0.070 | EARTH R 360 P 90 | LVLH R= 0.00 P=180.00 Y= 0.00 | -ZLV -XVV |
| 7 000/09:30:00 MET 40:15 137/20:02:00 GMT 12:15 | INRTL R= 5.00 MNVR P=261.00 Y= 23.00 | B1 AUTO VERN | RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 40 P 59 | | CFZF KU COMM 100% 08:45 10:15 |
| 8 000/10:15:00 MET 26:26 137/20:47:00 GMT 58:26 | TGT=2 BV=5 P= 0.00 Y=270.00 OM= 90.00 | B1 AUTO VERN | RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 270 P 90 | LVLH R= 0.00 P= 90.00 Y=270.00 | -YLV +ZVV SLEEP CFZF RUN 1 |
| 9 000/22:00:00 MET 06:30 138/08:32:00 GMT 38:30 | TGT=2 BV=5 P=180.00 Y=348.00 OM= 0.00 | A6 AUTO ALT | RATE 0.2000 DB AT 5.00 DB RT 0.070 | EARTH R 270 P 168 | LVLH R= 0.00 P= 90.00 Y=348.00 | BIAS -XLV +ZVV SPARTAN DEPLOY 1/00:59 |
| 10 001/01:12:00 MET 13:00 138/11:44:00 GMT 45:00 | TGT=2 BV=2 P=180.00 Y= 0.00 OM= 0.00 | A8 AUTO VERN | RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 76 P 180 | LVLH R= 0.00 P= 90.00 Y= 0.00 | -XLV +ZVV SK ON VBAR |
| 11 001/02:24:00 MET 138/12:56:00 GMT | | A8 INRT VERN | RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 2 P 96 | INRTL R= 95.17 HOLD P=138.58 Y= 33.74 | INIT FLYAROUND |
| 12 001/02:50:00 MET 44 138/13:22:00 GMT 44 | TGT=2 BV=5 P= 85.00 Y= 0.00 OM= 0.00 | A8 AUTO VERN | RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 0 P 85 | LVLH R= 0.00 P=185.00 Y= 0.00 | -RBAR SK IAE 1/03:08 |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET/GMT | MNVR OPTION | DA | E/S | REF ATT/REMARKS | EVENT | |
|---|---|--------------------|---|------------------------|--------------------------------------|--|
| 13 001/04:30:00 MET 138/15:02:00 GMT | TGT=2 BV=5 P= 85.00 Y= 0.00 OM= 0.00 | A7 AUTO VERN | RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 0 P 85 | LVLH R= 0.00 P=185.00 Y= 0.00 | SEP2 1/04:30 |
| 14 001/04:33:00 MET 58:00 138/15:05:00 GMT 30:00 | TGT=2 BV=5 P= 25.00 Y= 0.00 OM= 0.00 | A7 AUTO VERN | RATE 0.0400 DB AT 1.000 DB RT 0.020 | EARTH R 0 P 25 | LVLH R= 0.00 P=245.00 Y= 0.00 | TGT TRACK -VBAR |
| 15 001/05:05:00 MET 10:25 138/15:37:00 GMT 42:25 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00 | A6 AUTO ALT | RATE 0.2000 DB AT 5.00 DB RT 0.070 | EARTH R 0 P 90 | LVLH R= 0.00 P=180.00 Y= 0.00 | -ZLV -XVV NC1-S 1/07:25 |
| 16 001/09:00:00 MET 09:59 138/19:32:00 GMT 41:59 | INRTL R= 41.00 MNVR P=254.00 Y= 30.00 | A6 AUTO ALT | RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 2 P 58 | | CFZF KU COMM 100% 09:15 10:45 |
| 17 001/10:45:00 MET 57:39 138/21:17:00 GMT 29:39 | TGT=2 BV=5 P= 0.00 Y=270.00 OM= 90.00 | B1 AUTO VERN | RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 270 P 90 | LVLH R= 0.00 P= 90.00 Y=270.00 | -YLV +ZVV SLEEP CFZF RUN 2 |
| 18 001/19:25:00 MET 32:39 139/05:57:00 GMT 06:04:39 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM=110.00 | A6 AUTO ALT | RATE 0.2000 DB AT 5.00 DB RT 0.070 | EARTH R 0 P 90 | LVLH R=180.00 P= 0.00 Y=290.00 | BIAS -ZLV -YVV H2O DUMP |
| 19 001/22:45:00 MET 54:06 139/09:17:00 GMT 26:06 | INRTL R=240.00 MNVR P=293.00 Y=298.00 | A7 AUTO VERN | RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 186 P 116 | RETRO OMS TVR 180 | NC2-S TIG: 01/22:58 |
| 20 001/23:05:00 MET 10:06 139/09:37:00 GMT 42:06 | TGT=2 BV=5 P=350.00 Y= 0.00 OM= 0.00 | A7 AUTO VERN | RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 180 P 10 | LVLH R= 0.00 P=280.00 Y= 0.00 | TGT TRACK NH-S 1/23:46 NCC-S 2/01:05 |
| 21 002/01:45:00 MET 47:11 139/12:17:00 GMT 19:11 | INRTL R=104.00 MNVR P=131.00 Y= 53.00 | A7 AUTO VERN | RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 357 P 76 | POSI TVR 0 | TI-S +X RCS TIG: 2/02:01 |
| 22 002/02:05:00 MET 13:51 139/12:37:00 GMT 45:51 | TGT=2 BV=5 P=350.00 Y= 0.00 OM= 0.00 | A7 AUTO VERN | RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 180 P 10 | LVLH R= 0.00 P=280.00 Y= 0.00 | TARGET TRACK |
| 23 002/02:49:00 MET 50:40 139/13:21:00 GMT 22:40 | TGT=2 BV=5 P=330.00 Y= 0.00 OM= 0.00 | A7 AUTO VERN | RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 180 P 30 | LVLH R= 0.00 P=300.00 Y= 0.00 | TARGET TRACK |
| 24 002/02:55:00 MET 57:30 139/13:27:00 GMT 29:30 | TGT=2 BV=5 P=300.00 Y= 0.00 OM= 0.00 | A7 AUTO VERN | RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 180 P 60 | LVLH R= 0.00 P=330.00 Y= 0.00 | TARGET TRACK |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET/GMT | MNVR OPTION | DAF | E/S | REF ATT/REMARKS | EVENT |
|---|---|---|-------------------------|---|-------------------------------------|
| 25 002/03:09:00 MET 11:30 139/13:41:00 GMT 43:30 | TGT=2 BV=5 P=270.00 Y= 0.00 OM= 0.00 | A7 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 180 P 90 | LVLH R= 0.00 P= 0.00 Y= 0.00 | RBAR |
| 26 002/03:12:00 MET 139/13:44:00 GMT | | A8 INRT VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 344 P 10 | INRTL R=253.17 HOLD P=336.60 Y= 58.93 | ESTABLISH INRTL LOS RATES |
| 27 002/03:35:00 MET 09 139/14:07:00 GMT 09 | TGT=2 BV=2 P=180.00 Y= 0.00 OM= 0.00 | A8 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 198 P 180 | LVLH R= 0.00 P= 90.00 Y= 0.00 | VBAR SPTN GRAPPLE 2/04:25 |
| 28 002/05:10:00 MET 17:30 139/15:42:00 GMT 49:30 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00 | A6 AUTO ALT RATE 0.2000 DB AT 5.00 DB RT 0.070 | EARTH R 360 P 90 | LVLH R= 0.00 P=180.00 Y= 0.00 | -ZLV +YVV |
| 29 002/07:45:00 MET 55:21 139/18:17:00 GMT 27:21 | INRTL R=121.00 MNVR P=121.00 Y= 50.00 | B1 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 346 P 77 | | CFZF KU COMM 100% 07:30 09:00 |
| 30 002/09:00:00 MET 13:03 139/19:32:00 GMT 45:03 | TGT=2 BV=5 P= 0.00 Y=270.00 OM= 90.00 | B1 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 270 P 90 | LVLH R= 0.00 P= 90.00 Y=270.00 | -YLV +ZVV SLEEP CFZF RUN 3 |
| 31 002/22:18:00 MET 28:00 140/08:50:00 GMT 09:00:00 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM=180.00 | A7 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 0 P 90 | LVLH R=180.00 P= 0.00 Y= 0.00 | -ZLV +XVV |
| 32 002/22:48:00 MET 140/09:20:00 GMT | | A7 INRT VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 166 P 28 | INRTL R= 44.90 HOLD P= 6.69 Y= 73.02 | PAMS/STU DEPLOY DPY 2/22:48 |
| 33 002/23:00:00 MET 04:00 140/09:32:00 GMT 36:00 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM=180.00 | A7 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 0 P 90 | LVLH R=180.00 P= 0.00 Y= 0.00 | PAMS SEP1-PO TIG 2/23:11 |
| 34 002/23:15:00 MET 22:30 140/09:47:00 GMT 54:30 | TGT=2 BV=5 P=135.00 Y= 0.00 OM=180.00 | A7 AUTO VERN RATE 0.1000 DB AT 1.000 DB RT 0.020 | EARTH R 360 P 135 | LVLH R=180.00 P= 45.00 Y= 0.00 | -XLV TGT TRK -V |
| 35 002/23:30:00 MET 32:30 140/10:02:00 GMT 04:30 | TGT=2 BV=5 P=150.00 Y= 0.00 OM=180.00 | A7 AUTO VERN RATE 0.1000 DB AT 1.000 DB RT 0.020 | EARTH R 0 P 150 | LVLH R=180.00 P= 60.00 Y= 0.00 | -XLV TGT TRK -V |
| 36 002/23:40:00 MET 42:30 140/10:12:00 GMT 14:30 | TGT=2 BV=2 P=180.00 Y= 0.00 OM=180.00 | A7 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 45 P 180 | LVLH R=180.00 P= 90.00 Y= 0.00 | -XLV TGT TRK -V NC-PO 3/00:35 |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET/GMT | MNVR OPTION | DAP | E/S | REF ATT/REMARKS | EVENT |
|---|---|---|------------------------|---------------------------------------|--|
| 37 003/00:45:00 MET 01:00:00 140/11:17:00 GMT 32:00 | TGT=2 BV=1 P= 0.00 Y= 0.00 OM= 0.00 | A7 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 291 P 0 | LVLH R= 0.00 P=270.00 Y= 0.00 | +XLV TGT TRK -V NCC-PO 3/01:09 |
| 38 003/01:55:00 MET 02:04:59 140/12:27:00 GMT 36:59 | INRTL R=253.00 MNVR P=311.00 Y=316.00 | A7 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 187 P 96 | RETRO TVR 180 | TI-PO +X RCS TIG: 3/02:05 |
| 39 003/02:10:00 MET 14:59 140/12:42:00 GMT 46:59 | TGT=2 BV=1 P= 0.00 Y= 0.00 OM= 0.00 | A7 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 336 P 0 | LVLH R= 0.00 P=270.00 Y= 0.00 | +XLV TGT TRK -V VBN-PO 3/03:24 SEP2-PO 3/05:30 |
| 40 003/05:35:00 MET 42:30 140/16:07:00 GMT 14:30 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00 | A6 AUTO ALT RATE 0.2000 DB AT 5.00 DB RT 0.070 | EARTH R 0 P 90 | LVLH R= 0.00 P=180.00 Y= 0.00 | -ZLV -XVV NC1 3/06:58 |
| 41 003/08:08:00 MET 15:51 140/18:40:00 GMT 47:51 | INRTL R=285.00 MNVR P=238.00 Y= 23.00 | B1 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 124 P 72 | | CFZF KU COMM 100% 07:45 09:15 |
| 42 003/09:15:00 MET 18:44 140/19:47:00 GMT 50:44 | TGT=2 BV=5 P= 0.00 Y=270.00 OM= 90.00 | B1 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 270 P 90 | LVLH R= 0.00 P= 90.00 Y=270.00 | -YLV +ZVV SLEEP CFZF RUN 4 |
| 43 003/22:10:00 MET 24:50 141/08:42:00 GMT 56:50 | INRTL R=261.80 MNVR P= 16.50 Y=347.60 | A6 AUTO ALT RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 217 P 77 | BEGIN 3/22:35 | GANE SLM 1 -Z:43 RASALHAGE -Y:38 NAVI |
| 44 003/22:40:00 MET 47:30 141/09:12:00 GMT 19:30 | INRTL R=261.70 MNVR P=288.30 Y= 7.80 | B1 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 160 P 54 | | GANE SLM 2 -Z:43 RASALHAGE |
| 45 003/22:50:00 MET 57:23 141/09:22:00 GMT 29:23 | INRTL R=125.20 MNVR P= 83.40 Y= 84.40 | B1 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 22 P 41 | | GANE SLM 3 -Z:38 NAVI |
| 46 003/23:00:00 MET 20 141/09:32:00 GMT 20 | INRTL R=134.20 MNVR P= 78.30 Y= 84.80 | B1 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 18 P 40 | | GANE SLM 4 -Z:38 NAVI |
| 47 003/23:15:00 MET 30:00 141/09:47:00 GMT 10:02:00 | TGT=2 BV=5 P=270.00 Y= 0.00 OM=190.00 | B1 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 180 P 90 | LVLH R=180.00 P=180.00 Y=350.00 | +ZLV -XVV GANE TEST 1 CFZF RUN 5 |
| 48 004/05:00:00 MET 10:10 141/15:32:00 GMT 42:10 | INRTL R=132.70 MNVR P= 23.90 Y= 24.10 | A6 AUTO ALT RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 359 P 52 | BEGIN 4/05:15 | GANE SLM 1 -Z:66 MENKALINA -Y:63 NAOS |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET/GMT | MNVR OPTION | DAF | E/S | REF ATT/REMARKS | EVENT | |
|---|--|--------------------|---|-------------------------|---------------------------------------|---|
| 49 004/05:20:00 MET 27:30 141/15:52:00 GMT 59:30 | INRTL R= 62.90 MNVR P=134.60 Y= 38.50 | A6 AUTO ALT | RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 34 P 89 | | GANE SLM 2 -Z:66 MENKALINA |
| 50 004/05:30:00 MET 37:27 141/16:02:00 GMT 09:27 | INRTL R= 77.00 MNVR P=103.90 Y=314.80 | A6 AUTO ALT | RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 74 P 152 | | GANE SLM 3 -Z:63 NAOS |
| 51 004/05:40:00 MET 20 141/16:12:00 GMT 20 | INRTL R= 80.90 MNVR P=103.90 Y=315.40 | A6 AUTO ALT | RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 69 P 151 | | GANE SLM 4 -Z:63 NAOS |
| 52 004/07:30:00 MET 41:05 141/18:02:00 GMT 13:05 | TGT=2 BV=5 P= 0.00 Y=270.00 OM= 90.00 | B1 AUTO VERN | RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 270 P 90 | LVLH R= 0.00 P= 90.00 Y=270.00 | -YLV +ZVV SLEEP CFZF RUN 6 |
| 53 004/20:00:00 MET 14:41 142/06:32:00 GMT 46:41 | INRTL R= 92.50 MNVR P= 37.20 Y=347.80 | A6 AUTO ALT | RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 33 P 89 | BEGIN 4/20:15 | GANE SLM 1 -Z:13 RIGEL -Y:17 ACRUX |
| 54 004/20:25:00 MET 32:30 142/06:57:00 GMT 07:04:30 | INRTL R= 77.50 MNVR P=307.70 Y= 1.70 | A6 AUTO ALT | RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 359 P 53 | | GANE SLM 2 -Z:13 RIGEL |
| 55 004/20:35:00 MET 42:32 142/07:07:00 GMT 14:32 | INRTL R=351.30 MNVR P= 39.60 Y= 66.60 | A6 AUTO ALT | RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 173 P 37 | | GANE SLM 3 -Z:17 ACRUX |
| 56 004/20:45:00 MET 20 142/07:17:00 GMT 20 | INRTL R=348.80 MNVR P= 38.00 Y= 66.60 | A6 AUTO ALT | RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 177 P 37 | | GANE SLM 4 -Z:17 ACRUX |
| 57 004/20:50:00 MET 57:48 142/07:22:00 GMT 29:48 | TGT=2 BV=5 P=228.50 Y= 0.00 OM=180.00 | A6 AUTO ALT | RATE 0.2000 DB AT 5.00 DB RT 0.070 | EARTH R 180 P 131 | LVLH R=180.00 P=138.50 Y= 0.00 | BIAS +ZLV -XVV GANE TEST 2 CFZF RUN 7 |
| 58 004/22:50:00 MET 52:40 142/09:22:00 GMT 24:40 | TGT=2 BV=5 P=240.00 Y=330.00 OM=180.00 | B1 AUTO VERN | RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 214 P 116 | LVLH R=153.43 P=153.43 Y= 14.48 | BIAS +ZLV -XVV COMM TWEAK |
| 59 004/23:10:00 MET 12:40 142/09:42:00 GMT 44:40 | TGT=2 BV=5 P=228.50 Y= 0.00 OM=180.00 | B1 AUTO VERN | RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 180 P 131 | LVLH R=180.00 P=138.50 Y= 0.00 | BACK TO GANE T2 |
| 60 005/06:10:00 MET 20:37 142/16:42:00 GMT 52:37 | INRTL R=128.70 MNVR P= 10.20 Y= 9.60 | B1 AUTO VERN | RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 352 P 56 | BEGIN 5/06:40 | GANE SLM 1 -Z:83 THETA AUR -Y:12 CANOPIUS |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET/GMT | MNVR OPTION | DAP | E/S | REF ATT/REMARKS | EVENT |
|---|---|---|------------------------|--------------------------------------|---|
| 61 005/06:45:00 MET 52:30 142/17:17:00 GMT 24:30 | INRTL R= 82.00 MNVR P=107.80 Y= 38.30 | B1 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 30 P 83 | | GANE SLM 2 -Z:83 THETA AUR |
| 62 005/06:55:00 MET 07:02:30 142/17:27:00 GMT 34:30 | INRTL R= 98.30 MNVR P=104.80 Y=309.60 | B1 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 60 P 155 | | GANE SLM 3 -Z:12 CANOPUS |
| 63 005/07:05:00 MET 20 142/17:37:00 GMT 20 | INRTL R=102.00 MNVR P=104.40 Y=310.20 | B1 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 55 P 155 | | GANE SLM 4 -Z:12 CANOPUS |
| 64 005/07:15:00 MET 26:39 142/17:47:00 GMT 58:39 | TGT=2 BV=5 P= 0.00 Y=270.00 OM= 90.00 | B1 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 270 P 90 | LVLH R= 0.00 P= 90.00 Y=270.00 | -YLV +ZVV SLEEP CFZF RUN 8 |
| 65 005/18:25:00 MET 38:32 143/04:57:00 GMT 05:10:32 | INRTL R= 62.00 MNVR P=311.00 Y=338.00 | A7 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 20 P 76 | RETRO OMS TVR 0 | NC4-P1 TIG: 5/18:39 |
| 66 005/18:42:00 MET 56:42 143/05:14:00 GMT 28:42 | TGT=2 BV=1 P= 0.00 Y= 0.00 OM= 0.00 | A7 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 202 P 0 | LVLH R= 0.00 P=270.00 Y= 0.00 | TGT TRACK NCC-P1 5/19:14 |
| 67 005/19:55:00 MET 58:41 143/06:27:00 GMT 30:41 | INRTL R=117.00 MNVR P=132.00 Y= 46.00 | A7 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 341 P 80 | POSI OMS TVR 0 | TI-P1 TIG: 5/20:10 |
| 68 005/20:00:00 MET 05:20 143/06:32:00 GMT 37:20 | TGT=2 BV=1 P= 0.00 Y= 0.00 OM= 0.00 | A7 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 184 P 0 | LVLH R= 0.00 P=270.00 Y= 0.00 | TGT TRACK VBN-P1 5/21:29 SEP-P1 6/04:00 |
| 69 006/04:05:00 MET 13:07 143/14:37:00 GMT 45:07 | INRTL R=324.00 MNVR P=286.00 Y= 33.00 | A6 AUTO ALT RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 85 P 34 | | CFZF KU COMM 100% 04:45 06:15 |
| 70 006/06:15:00 MET 25:42 143/16:47:00 GMT 57:42 | TGT=2 BV=5 P= 0.00 Y=270.00 OM= 90.00 | B1 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 270 P 90 | LVLH R= 0.00 P= 90.00 Y=270.00 | -YLV +ZVV SLEEP CFZF RUN 9 |
| 71 006/18:25:00 MET 39:23 144/04:57:00 GMT 05:11:23 | INRTL R= 61.00 MNVR P=315.00 Y=345.00 | A7 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 24 P 69 | RETRO OMS TVR 0 | NC-P2 TIG: 6/18:42 |
| 72 006/18:43:00 MET 57:34 144/05:15:00 GMT 29:34 | TGT=2 BV=1 P= 0.00 Y= 0.00 OM= 0.00 | A7 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 233 P 0 | LVLH R= 0.00 P=270.00 Y= 0.00 | TGT TRACK NCC-P2 6/19:15 |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET/GMT | MNVR OPTION | DAP | E/S | REF ATT/REMARKS | EVENT |
|---|---|--|-------------------------|--------------------------------------|--|
| 73 006/19:55:00 MET 58:10 144/06:27:00 GMT 30:10 | INRTL R=122.00 MNVR P=131.00 Y= 45.00 | A1 AUTO DB AT 1.000 VERN DB RT 0.020 | SUN R 335 P 81 | POSI OMS TVR 0 | TI-P2 TIG: 6/20:11 |
| 74 006/20:02:00 MET 07:28 144/06:34:00 GMT 39:28 | TGT=2 BV=1 P= 0.00 Y= 0.00 OM= 0.00 | A7 AUTO DB AT 1.000 VERN DB RT 0.020 | EARTH R 347 P 0 | LVLH R= 0.00 P=270.00 Y= 0.00 | TGT TRACK VBN-P2 6/21:30 FIN SEP 7/04:05 |
| 75 007/04:10:00 MET 17:43 144/14:42:00 GMT 49:43 | INRTL R=326.00 MNVR P=287.00 Y= 32.00 | A6 AUTO DB AT 5.00 ALT DB RT 0.070 | SUN R 86 P 34 | | CFZF KU COMM 100% 04:45 06:15 |
| 76 007/06:15:00 MET 26:18 144/16:47:00 GMT 58:18 | TGT=2 BV=5 P= 0.00 Y=270.00 OM= 90.00 | B1 AUTO DB AT 1.000 VERN DB RT 0.020 | EARTH R 270 P 90 | LVLH R= 0.00 P= 90.00 Y=270.00 | -YLV +ZVV SLEEP CFZF RUN 10 |
| 77 007/19:00:00 MET 13:22 145/05:32:00 GMT 45:22 | INRTL R=349.70 MNVR P= 81.10 Y=311.40 | B1 AUTO DB AT 1.000 VERN DB RT 0.020 | SUN R 157 P 143 | BEGIN 7/19:20 | GAME SLM 1 -Z:103 ARICH -Y:14 VEGA |
| 78 007/19:25:00 MET 32:30 145/05:57:00 GMT 06:04:30 | INRTL R=193.00 MNVR P=274.50 Y=319.30 | B1 AUTO DB AT 1.000 VERN DB RT 0.020 | SUN R 231 P 104 | | GAME SLM 2 -Z:103 ARICH |
| 79 007/19:35:00 MET 42:29 145/06:07:00 GMT 14:29 | INRTL R=233.20 MNVR P=350.80 Y= 13.40 | B1 AUTO DB AT 1.000 VERN DB RT 0.020 | SUN R 239 P 47 | | GAME SLM 3 -Z:14 VEGA |
| 80 007/19:45:00 MET 20 145/06:17:00 GMT 20 | INRTL R=237.20 MNVR P=350.60 Y= 12.80 | B1 AUTO DB AT 1.000 VERN DB RT 0.020 | SUN R 235 P 47 | | GAME SLM 4 -Z:14 VEGA |
| 81 007/20:15:00 MET 29:59 145/06:47:00 GMT 07:01:59 | TGT=2 BV=5 P=228.50 Y= 0.00 OM=180.00 | B1 AUTO DB AT 1.000 VERN DB RT 0.020 | EARTH R 180 P 131 | LVLH R=180.00 P=138.50 Y= 0.00 | BIAS +ZLV -XVV GAME TEST 3 |
| 82 008/05:45:00 MET 52:50 145/16:17:00 GMT 24:50 | INRTL R=293.30 MNVR P= 42.90 Y= 25.70 | B1 AUTO DB AT 1.000 VERN DB RT 0.020 | SUN R 196 P 64 | BEGIN 8/06:00 | GAME SLM 1 -Z:36 KAUS AUST -Y:59 SCHEAT |
| 83 008/06:05:00 MET 12:30 145/16:37:00 GMT 44:30 | INRTL R=301.90 MNVR P=323.70 Y=339.00 | B1 AUTO DB AT 1.000 VERN DB RT 0.020 | SUN R 149 P 76 | | GAME SLM 2 -Z:36 KAUS AUST |
| 84 008/06:15:00 MET 22:30 145/16:47:00 GMT 54:30 | INRTL R=337.50 MNVR P=260.00 Y= 46.70 | B1 AUTO DB AT 1.000 VERN DB RT 0.020 | SUN R 58 P 39 | | GAME SLM 3 -Z:59 SCHEAT |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET/GMT | MNVR OPTION | DAF | E/S | REF ATT/REMARKS | EVENT |
|---|---|---|------------------------|--------------------------------------|--|
| 85 008/06:25:00 MET 20 145/16:57:00 GMT 20 | INRTL R=340.80 MNVR P=260.90 Y= 46.60 | B1 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 55 P 38 | | GANE SLM 4 -Z:59 SCHEAT |
| 86 008/07:15:00 MET 23:18 145/17:47:00 GMT 55:18 | TGT=2 BV=5 P= 0.00 Y=270.00 OM= 90.00 | B1 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 270 P 90 | LVLH R= 0.00 P= 90.00 Y=270.00 | -YLV +ZVV SLEEP CFZF RUN 11/12 |
| 87 008/20:25:00 MET 39:30 146/06:57:00 GMT 07:11:30 | INRTL R=263.60 MNVR P= 46.80 Y=321.60 | A6 AUTO ALT RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 227 P 118 | BEGIN 8/21:10 | GANE SLM 1 -Z:110 ZETA HER -Y:37 ALPHERATZ |
| 88 008/21:15:00 MET 22:30 146/07:47:00 GMT 54:30 | INRTL R=235.60 MNVR P=320.70 Y= 4.80 | B1 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 214 P 51 | | GANE SLM 2 -Z:110 ZETA HER |
| 89 008/21:25:00 MET 32:36 146/07:57:00 GMT 08:04:36 | INRTL R=180.90 MNVR P= 59.40 Y= 61.50 | B1 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 320 P 47 | | GANE SLM 3 -Z:37 ALPHERATZ |
| 90 008/21:35:00 MET 20 146/08:07:00 GMT 20 | INRTL R=186.00 MNVR P= 58.20 Y= 61.30 | B1 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | SUN R 315 P 47 | | GANE SLM 4 -Z:37 ALPHERATZ |
| 91 008/21:50:00 MET 59:21 146/08:22:00 GMT 31:21 | TGT=2 BV=5 P=270.00 Y= 0.00 OM=270.00 | B1 AUTO VERN RATE 0.2000 DB AT 1.000 DB RT 0.020 | EARTH R 180 P 90 | LVLH R= 0.00 P= 0.00 Y=270.00 | +ZLV +YVV GANE TEST 4 SIMO DUMP |
| 92 009/02:55:00 MET 03:07:19 146/13:27:00 GMT 39:19 | INRTL R=300.80 MNVR P=114.00 Y=333.10 | A6 AUTO ALT RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 176 P 145 | BEGIN 9/03:10 | GANE SLM 1 -Z:110 ZETA HER -Y:58 DENEALG |
| 93 009/03:15:00 MET 22:30 146/13:47:00 GMT 54:30 | INRTL R=243.70 MNVR P= 8.80 Y=332.60 | A6 AUTO ALT RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 231 P 92 | | GANE SLM 2 -Z:110 ZETA HER |
| 94 009/03:25:00 MET 32:16 146/13:57:00 GMT 14:04:16 | INRTL R=249.14 MNVR P= 44.37 Y= 52.87 | A6 AUTO ALT RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 252 P 46 | | GANE SLM 3 -Z:58 DENEALG |
| 95 009/03:35:00 MET 20 146/14:07:00 GMT 20 | INRTL R=253.17 MNVR P= 44.27 Y= 52.26 | A6 AUTO ALT RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 248 P 46 | | GANE SLM 4 -Z:58 DENEALG |
| 96 009/03:45:00 MET 54:59 146/14:17:00 GMT 26:59 | TGT=2 BV=3 P= 90.00 Y= 0.00 OM= 0.00 | A6 AUTO ALT RATE 0.2000 DB AT 5.00 DB RT 0.070 | EARTH R 360 P 90 | LVLH R= 0.00 P=180.00 Y= 0.00 | -ZLV -XVV |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

Attitude Timeline

| MET/GMT | MNVR OPTION | DAP | E/S | REF ATT/REMARKS | EVENT | |
|---|---|--------------------|--|-------------------------|---|------------------------------------|
| 97 009/19:20:00 MET 30:11 147/05:52:00 GMT 06:02:11 | TGT=4 RA= 62.657 BV=5 DEC= 21.068N P=184.00 Y= 0.00 OM=270.00 | A6 AUTO ALT | RATE 0.2000 DB AT 5.00 DB RT 0.070 | SUN R 180 P 176 | INRTL R=191.17 P=147.04 Y=304.59 | -XSI |
| 98 009/20:30:00 MET 38:49 147/07:02:00 GMT 10:49 | INRTL R=287.00 MNVR P=335.00 Y=293.00 | A1 AUTO PRI | RATE 0.2000 DB AT 5.00 DB RT 0.20 | SUN R 173 P 124 | | D/O IMU ALIGN -Y:29 -Z:53 |
| 99 009/20:50:00 MET 53:06 147/07:22:00 GMT 25:06 | INRTL R=291.00 MNVR P=304.00 Y= 21.00 | B1 AUTO PRI | RATE 0.5000 DB AT 3.00 DB RT 0.20 | SUN R 144 P 37 | | D/O VERIF -Y:29 -Z:22 |
| 100 009/21:00:00 MET 04:37 147/07:32:00 GMT 36:37 | INRTL R=193.00 MNVR P=149.00 Y=300.00 | B1 AUTO PRI | RATE 0.5000 DB AT 3.00 DB RT 0.20 | SUN R 131 P 174 | | D/O COMM |
| 101 009/23:15:00 MET 19:10 147/09:47:00 GMT 51:10 | INRTL R=215.00 MNVR P= 50.00 Y= 9.00 | B1 AUTO PRI | RATE 0.5000 DB AT 3.00 DB RT 0.20 | SUN R 269 P 83 | | MNVR TO DO BURN TIG: 9/23:37:00 |
| 102 009/23:42:00 MET 46:31 147/10:14:00 GMT 18:31 | INRTL R=199.42 MNVR P=276.13 Y=307.64 | TRN AUTO PRI | RATE 0.5000 DB AT 3.50 DB RT 0.20 | SUN R 226 P 114 | | TIG +5 |
| 103 010/00:02:00 MET 147/10:34:00 GMT | | TRN LVLH PRI | RATE 0.5000 DB AT 3.50 DB RT 0.20 | EARTH R 180 P 130 | LVLH R=360.00 HOLD P= 40.00 Y= 0.00 | EI -5 |

*** ALL ATTITUDES IN MEAN OF 1950 ***
*** PYR EULER SEQUENCE ***

STS-77 DAP BOOK



| <u>DAP</u> | <u>PURPOSE</u> | <u>DAP</u> | <u>PURPOSE</u> |
|------------|---|------------|---------------------------------|
| A1 | - NOMINAL | B1 | - NOMINAL |
| A2 | - PTC | | OMS & RCS BURNS |
| A3 | - GG | B2 | - LOSS OF VERN (TAIL ONLY) |
| A4 | - PRE/POST DEPLOY | B3 | - LOSS OF VERN (NOSE & TAIL) |
| A5 | - LOSS OF VERN (NOSE & TAIL) | B4 | - SSUS DEPLOY |
| A6 | - MIN PROP LOSS OF VERN (TAIL ONLY) | B5 | - COAS CAL |
| A7 | - RENDEZVOUS | B6 | - HIGH RATE (TAIL ONLY) |
| A8 | - PROX OPS | B7 | - RENDEZVOUS |
| A9 | - SPARTAN LOW HOVER NOM RELEASE SJ RELEASE | B8 | - PROX OPS |
| A10 | - SPARTAN NOM CAPTURE SJ CAPTURE EXT PARK | B9 | - SPARTAN DB COLLAPSE |
| A11 | - STU STATIONKEEPING | B11 | - STU STATIONKEEPING |

CNT ACC = 0 UNLOADED RMS
 = 1 ALL SPARTAN RMS POSN
 = 2-5 NOT USED



FLT PLN-1a/77/O/B



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FLT PLN-1b/77/O/A



(reduced copy)



DAP A

DAP A1

PURPOSE:
NOMINAL

FLT PLN-2a/77/O/A

FLT PLN-2b/77/O/A

A1

A1

DAP A2

PURPOSE:
PTC

| | | |
|------------------|----|----------|
| DAP A 0 1 | 1 | PRI |
| <u>0.2 0 0 0</u> | 10 | ROT RATE |
| <u>- 5.0 0</u> | 11 | ATT DB |
| <u>0.2 0</u> | 12 | RATE DB |
| <u>0.1 0</u> | 13 | ROT PLS |
| <u>.0 0 0</u> | 14 | COMP |
| ALL | 15 | P OPTION |
| ALL | 16 | Y OPTION |
| <u>0.1 0</u> | 17 | TRAN PLS |
| | | ALT |
| <u>0.2 0 0</u> | 18 | RATE DB |
| ALL | 19 | JET OPT |
| <u>2</u> | 20 | #JETS |
| <u>0.0 8</u> | 21 | ON TIME |
| <u>- 0.0 0</u> | 22 | DELAY |
| | | VERN |
| <u>0.2 0 0 0</u> | 23 | ROT RATE |
| <u>- 1.0 0 0</u> | 24 | ATT DB |
| <u>.0 2 0</u> | 25 | RATE DB |
| <u>0.0 1 0</u> | 26 | ROT PLS |
| <u>.0 0 0</u> | 27 | COMP |
| <u>0</u> | 28 | CNTL ACC |

FLT PLN-3a/77/O/A

FLT PLN-3b/77/O/A

A2

(reduced copy)



A2

A2

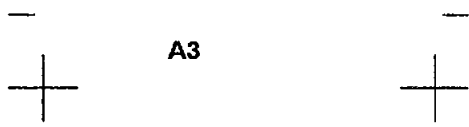
DAP A3

| | | |
|------------------|----|----------|
| DAP A 0 2 | 1 | PRI |
| <u>0.4 0 0 0</u> | 10 | ROT RATE |
| <u>- 1.0 0</u> | 11 | ATT DB |
| <u>0.2 0</u> | 12 | RATE DB |
| <u>0.1 0</u> | 13 | ROT PLS |
| <u>.0 0 0</u> | 14 | COMP |
| ALL | 15 | P OPTION |
| ALL | 16 | Y OPTION |
| <u>0.1 0</u> | 17 | TRAN PLS |
| | | ALT |
| <u>0.2 0 0</u> | 18 | RATE DB |
| ALL | 19 | JET OPT |
| <u>2</u> | 20 | #JETS |
| <u>0.0 8</u> | 21 | ON TIME |
| <u>- 0.0 0</u> | 22 | DELAY |
| | | VERN |
| <u>0.4 0 0 0</u> | 23 | ROT RATE |
| <u>- 1.0 0 0</u> | 24 | ATT DB |
| <u>.0 2 0</u> | 25 | RATE DB |
| <u>0.0 1 0</u> | 26 | ROT PLS |
| <u>.0 0 0</u> | 27 | COMP |
| <u>0</u> | 28 | CNTL ACC |

PURPOSE:
GG

FLT PLN-4a/77/O/A

FLT PLN-4b/77/O/A



A3



A3

DAP A4

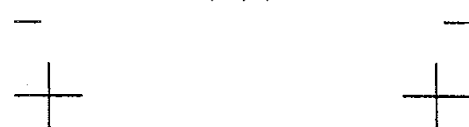
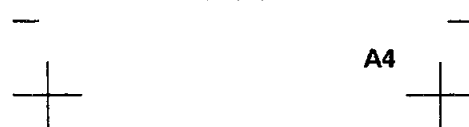
A3

| | | |
|------------------|----|----------|
| DAP A 0 3 | 1 | PRI |
| <u>0.2 0 0 0</u> | 10 | ROT RATE |
| <u>- 1.0 0</u> | 11 | ATT DB |
| <u>0.2 0</u> | 12 | RATE DB |
| <u>0.1 0</u> | 13 | ROT PLS |
| <u>.0 0 0</u> | 14 | COMP |
| ALL | 15 | P OPTION |
| TAIL | 16 | Y OPTION |
| <u>0.1 0</u> | 17 | TRAN PLS |
| | | ALT |
| <u>0.2 0 0</u> | 18 | RATE DB |
| ALL | 19 | JET OPT |
| <u>2</u> | 20 | #JETS |
| <u>- 0.0 8</u> | 21 | ON TIME |
| <u>- 0.0 0</u> | 22 | DELAY |
| | | VERN |
| <u>0.0 0 8 0</u> | 23 | ROT RATE |
| <u>- 0.0 7 0</u> | 24 | ATT DB |
| <u>.0 1 0</u> | 25 | |
| <u>0.0 1 0</u> | 26 | ROT PLS |
| <u>.0 0 0</u> | 27 | COMP |
| <u>0</u> | 28 | CNTL ACC |

PURPOSE:
PRE/POST DEPLOY

FLT PLN-5a/77/O/A

FLT PLN-5b/77/O/A



A4

(reduced copy)



A4

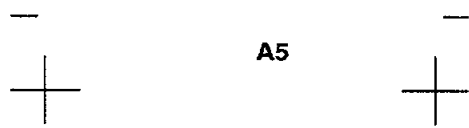
**A4
DAP A5**

| | | |
|------------------|----|----------|
| DAP A 0 4 | 1 | PRI |
| <u>0.5 0 0 0</u> | 10 | ROT RATE |
| <u>- 3.0 0</u> | 11 | ATT DB |
| <u>0.2 0</u> | 12 | RATE DB |
| <u>0.1 0</u> | 13 | ROT PLS |
| <u>.0 0 0</u> | 14 | COMP |
| ALL | 15 | P OPTION |
| ALL | 16 | Y OPTION |
| <u>0.1 0</u> | 17 | TRAN PLS |
| | | ALT |
| <u>0.2 0 0</u> | 18 | RATE DB |
| ALL | 19 | JET OPT |
| <u>2</u> | 20 | #JETS |
| <u>0.0 8</u> | 21 | ON TIME |
| <u>- 0.0 0</u> | 22 | DELAY |
| | | VERN |
| <u>0.2 0 0 0</u> | 23 | ROT RATE |
| <u>- 1.0 0 0</u> | 24 | ATT DB |
| <u>.0 2 0</u> | 25 | RATE DB |
| <u>0.0 1 0</u> | 26 | ROT PLS |
| <u>.0 0 0</u> | 27 | COMP |
| <u>0</u> | 28 | CNTL ACC |

PURPOSE:
LOSS OF VERN
(NOSE & TAIL)

FLT PLN-6a/77/O/A

FLT PLN-6b/77/O/A



A5



A5

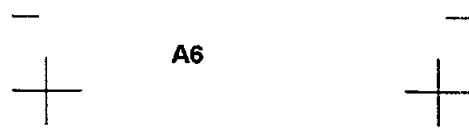
**A5
DAP A6**

| | | |
|------------------|----|----------|
| DAP A 0 5 | 1 | PRI |
| <u>0.2 0 0 0</u> | 10 | ROT RATE |
| <u>- 5.0 0</u> | 11 | ATT DB |
| <u>0.2 0</u> | 12 | RATE DB |
| <u>0.1 0</u> | 13 | ROT PLS |
| <u>.0 0 0</u> | 14 | COMP |
| ALL | 15 | P OPTION |
| ALL | 16 | Y OPTION |
| <u>0.1 0</u> | 17 | TRAN PLS |
| | | ALT |
| <u>0.0 7 0</u> | 18 | RATE DB |
| ALL | 19 | JET OPT |
| <u>1</u> | 20 | #JETS |
| <u>0.0 8</u> | 21 | ON TIME |
| <u>- 0.0 0</u> | 22 | DELAY |
| | | VERN |
| <u>0.2 0 0 0</u> | 23 | ROT RATE |
| <u>- 1.0 0 0</u> | 24 | ATT DB |
| <u>.0 2 0</u> | 25 | RATE DB |
| <u>0.0 1 0</u> | 26 | ROT PLS |
| <u>.0 0 0</u> | 27 | COMP |
| <u>0</u> | 28 | CNTL ACC |

PURPOSE:
MIN PROP
LOSS OF VERN
(TAIL ONLY)

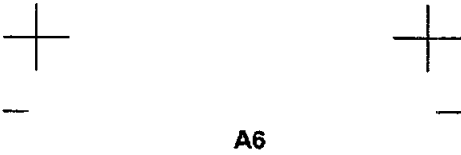
FLT PLN-7a/77/O/A

FLT PLN-7b/77/O/A



A6

(reduced copy)



A6

| | | |
|------------------|-------|----------|
| DAP A 0 6 | 1 | PRI |
| <u>0.2 0 0 0</u> | 10/50 | ROT RATE |
| <u>- 5.0 0</u> | 11/51 | ATT DB |
| <u>0.2 0</u> | 12/52 | RATE DB |
| <u>0.1 0</u> | 13/53 | ROT PLS |
| <u>0.0 0</u> | 14/54 | COMP |
| TAIL | 15/55 | P OPTION |
| TAIL | 16/56 | Y OPTION |
| <u>0.1 0</u> | 17/57 | TRAN PLS |
| | | ALT |
| <u>0.0 7 0</u> | 18/58 | RATE DB |
| TAIL | 19/59 | JET OPT |
| <u>1</u> | 20/60 | #JETS |
| <u>0.0 8</u> | 21/61 | ON TIME |
| <u>- 0.0 0</u> | 22/62 | DELAY |
| | | VERN |
| <u>0.0 6 6 7</u> | 23/63 | ROT RATE |
| <u>- 1.0 0 0</u> | 24/64 | ATT DB |
| <u>0.2 0</u> | 25/65 | RATE DB |
| <u>0.0 1 0</u> | 26/66 | ROT PLS |
| <u>0.0 0</u> | 27/67 | COMP |
| <u>0</u> | 28/68 | CNTL ACC |

FLT PLN-8a/77/O/A



A6

DAP A7

PURPOSE:
RENDEZVOUS

FLT PLN-8b/77/O/A



A7

A7

| | | |
|------------------|----|----------|
| DAP A 0 7 | 1 | PRI |
| <u>0.2 0 0 0</u> | 10 | ROT RATE |
| <u>- 2.0 0</u> | 11 | ATT DB |
| <u>0.2 0</u> | 12 | RATE DB |
| <u>0.1 0</u> | 13 | ROT PLS |
| <u>0.0 0</u> | 14 | COMP |
| ALL | 15 | P OPTION |
| ALL | 16 | Y OPTION |
| <u>0.1 0</u> | 17 | TRAN PLS |
| | | ALT |
| <u>0.2 0 0</u> | 18 | RATE DB |
| ALL | 19 | JET OPT |
| <u>2</u> | 20 | #JETS |
| <u>0.0 8</u> | 21 | ON TIME |
| <u>- 0.0 0</u> | 22 | DELAY |
| | | VERN |
| <u>0.2 0 0 0</u> | 23 | ROT RATE |
| <u>- 1.0 0 0</u> | 24 | ATT DB |
| <u>0.2 0</u> | 25 | RATE DB |
| <u>0.0 1 0</u> | 26 | ROT PLS |
| <u>0.0 0</u> | 27 | COMP |
| <u>0</u> | 28 | CNTL ACC |

FLT PLN-9a/77/O/A

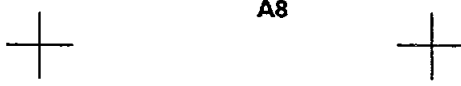


A7

DAP A8

PURPOSE:
PROX OPS

FLT PLN-9b/77/O/A



A8

(reduced copy)





A8

A8

DAP A9

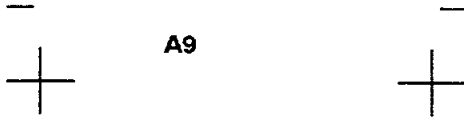
| | | |
|------------------|----|----------|
| DAP A 0 8 | 1 | PRI |
| <u>0.2 0 0 0</u> | 10 | ROT RATE |
| <u>- 2.0 0</u> | 11 | ATT DB |
| <u>0.2 0</u> | 12 | RATE DB |
| <u>0.1 0</u> | 13 | ROT PLS |
| <u>0.0 0</u> | 14 | COMP |
| ALL | 15 | P OPTION |
| ALL | 16 | Y OPTION |
| <u>0.0 5</u> | 17 | TRAN PLS |
| | | ALT |
| <u>0.2 0 0</u> | 18 | RATE DB |
| ALL | 19 | JET OPT |
| 2 | 20 | #JETS |
| <u>0.0 8</u> | 21 | ON TIME |
| <u>- 0.0 0</u> | 22 | DELAY |
| | | VERN |
| <u>0.2 0 0 0</u> | 23 | ROT RATE |
| <u>- 1.0 0 0</u> | 24 | ATT DB |
| <u>0.2 0</u> | 25 | RATE DB |
| <u>0.0 1 0</u> | 26 | ROT PLS |
| <u>0.0 0</u> | 27 | COMP |
| 0 | 28 | CNTL ACC |

PURPOSE:

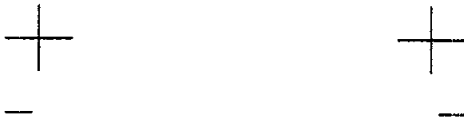
SPARTAN
LOW HOVER
NOM RELEASE
SJ RELEASE

FLT PLN-10a/77/O/A

FLT PLN-10b/77/O/B



A9



A9

| | | |
|------------------|-------|----------|
| DAP A 0 9 | 1/3 | PRI |
| <u>0.1 0 0 0</u> | 10/50 | ROT RATE |
| <u>- 3.0 0</u> | 11/51 | ATT DB |
| <u>0.2 0</u> | 12/52 | RATE DB |
| <u>0.0 4</u> | 13/53 | ROT PLS |
| <u>0.0 0</u> | 14/54 | COMP |
| ALL | 15/55 | P OPTION |
| ALL | 16/56 | Y OPTION |
| <u>0.0 5</u> | 17/57 | TRAN PLS |
| | | ALT |
| <u>0.2 0 0</u> | 18/58 | RATE DB |
| ALL | 19/59 | JET OPT |
| 2 | 20/60 | #JETS |
| <u>0.0 8</u> | 21/61 | ON TIME |
| <u>- 4.1 0</u> | 22/62 | DELAY |
| | | VERN |
| <u>0.2 0 0 0</u> | 23/63 | ROT RATE |
| <u>- 3.0 0 0</u> | 24/64 | ATT DB |
| <u>2.0 0</u> | 25/65 | RATE DB |
| <u>0.0 1 0</u> | 26/66 | ROT PLS |
| <u>0.0 0</u> | 27/67 | COMP |
| 1 | 28/68 | CNTL ACC |

PURPOSE:

SPARTAN
NOM CAPTURE
SJ CAPTURE
EXT PARK

FLT PLN-11a/77/O/B

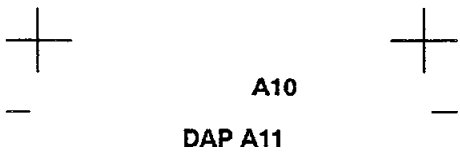
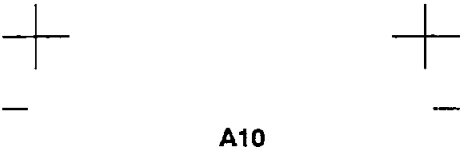
FLT PLN-11b/77/O/B



A10



(reduced copy)



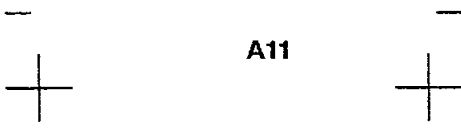
A10

A10
DAP A11

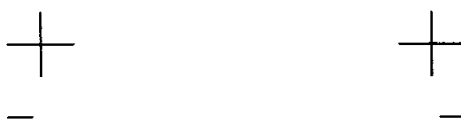
DAP A 1 0 1/3 PRI
0.1 0 0 0 10/50 ROT RATE
- 3.0 0 11/51 ATT DB
0.2 0 12/52 RATE DB
0.0 4 13/53 ROT PLS
.0 0 0 14/54 COMP
 ALL 15/55 P OPTION
 ALL 16/56 Y OPTION
0.0 5 17/57 TRAN PLS
 ALT
0.2 0 0 18/58 RATE DB
 ALL 19/59 JET OPT
2 20/60 #JETS
0.0 8 21/61 ON TIME
- 3.3 0 22/62 DELAY
 VERN
0.2 0 0 0 23/63 ROT RATE
- 3.0 0 0 24/64 ATT DB
.2 0 0 25/65 RATE DB
0.0 1 0 26/66 ROT PLS
.0 0 0 27/67 COMP
1 28/68 CNTL ACC
 FLT PLN-12a/77/O/B

PURPOSE:
 STU STATIONKEEPING

FLT PLN-12b/77/O/A



A11



A11

DAP A 1 1 1/3 PRI
0.0 5 0 0 10/50 ROT RATE
- 0.5 0 11/51 ATT DB
0.1 0 12/52 RATE DB
0.1 0 13/53 ROT PLS
.0 0 0 14/54 COMP
 ALL 15/55 P OPTION
 ALL 16/56 Y OPTION
0.1 0 17/57 TRAN PLS
 ALT
0.2 0 0 18/58 RATE DB
 ALL 19/59 JET OPT
2 20/60 #JETS
0.0 8 21/61 ON TIME
- 0.0 0 22/62 DELAY
 VERN
0.0 5 0 0 23/63 ROT RATE
- 0.5 0 0 24/64 ATT DB
.0 2 0 25/65 RATE DB
0.0 1 0 26/66 ROT PLS
.0 0 0 27/67 COMP
0 28/68 CNTL ACC
 FLT PLN-13a/77/O/B

A11

FLT PLN-13b/77/O/A

(reduced copy)



DAP B



DAP B1

PURPOSE:

NOMINAL; OMS &
RCS BURNS

FLT PLN-14a/77/O/A



B1



B1



| | |
|----|-----------|
| 2 | DAP B 0 1 |
| 30 | 0.5 0 0 0 |
| 31 | - 3.0 0 |
| 32 | 0.2 0 |
| 33 | 0.0 4 |
| 34 | .0 0 0 |
| 35 | ALL |
| 36 | ALL |
| 37 | 0.1 0 |
| 38 | 0.2 0 0 |
| 39 | ALL |
| 40 | 2 |
| 41 | 0.0 8 |
| 42 | - 0.0 0 |
| 43 | 0.2 0 0 0 |
| 44 | - 1.0 0 0 |
| 45 | .0 2 0 |
| 46 | 0.0 0 2 |
| 47 | .0 0 0 |
| 48 | 0 |

FLT PLN-15a/77/O/A



B2



FLT PLN-14b/77/O/A



B1



DAP B2

PURPOSE:

LOSS OF VERN
(TAIL ONLY)

FLT PLN-15b/77/O/A



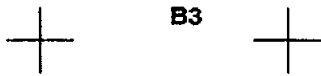
(reduced copy)



B2

| | |
|----|------------------|
| 2 | DAP B 0 2 |
| 30 | <u>0.2 0 0 0</u> |
| 31 | <u>- 3.0 0</u> |
| 32 | <u>0.2 0</u> |
| 33 | <u>0.0 4</u> |
| 34 | <u>.0 0 0</u> |
| 35 | TAIL |
| 36 | TAIL |
| 37 | <u>0.0 2</u> |
| 38 | <u>0.0 7 0</u> |
| 39 | TAIL |
| 40 | <u>1</u> |
| 41 | <u>0.0 8</u> |
| 42 | <u>- 0.0 0</u> |
| 43 | <u>0.2 0 0 0</u> |
| 44 | <u>- 1.0 0 0</u> |
| 45 | <u>.0 2 0</u> |
| 46 | <u>0.0 0 2</u> |
| 47 | <u>.0 0 0</u> |
| 48 | <u>0</u> |

FLT PLN-16a/77/O/A



B3



B3

| | |
|----|------------------|
| 2 | DAP B 0 3 |
| 30 | <u>0.2 0 0 0</u> |
| 31 | <u>- 3.0 0</u> |
| 32 | <u>0.2 0</u> |
| 33 | <u>0.0 4</u> |
| 34 | <u>.0 0 0</u> |
| 35 | ALL |
| 36 | ALL |
| 37 | <u>0.0 2</u> |
| 38 | <u>0.0 7 0</u> |
| 39 | ALL |
| 40 | <u>1</u> |
| 41 | <u>0.0 8</u> |
| 42 | <u>- 0.0 0</u> |
| 43 | <u>0.2 0 0 0</u> |
| 44 | <u>- 1.0 0 0</u> |
| 45 | <u>.0 2 0</u> |
| 46 | <u>0.0 0 2</u> |
| 47 | <u>.0 0 0</u> |
| 48 | <u>0</u> |

FLT PLN-17a/77/O/A



B4



B2

DAP B3

PURPOSE:

LOSS OF VERN
(NOSE & TAIL)

FLT PLN-16b/77/O/A



B3

DAP B4

PURPOSE:

SSUS DEPLOY

FLT PLN-17b/77/O/A



(reduced copy)



B4

| | |
|----|------------------|
| 2 | DAP B 0 4 |
| 30 | <u>0.2 0 0 0</u> |
| 31 | - <u>0.3 0</u> |
| 32 | <u>0.2 0</u> |
| 33 | <u>0.0 4</u> |
| 34 | <u>.0 0 0</u> |
| 35 | TAIL |
| 36 | TAIL |
| 37 | <u>0.0 2</u> |
| 38 | <u>0.2 0 0</u> |
| 39 | ALL |
| 40 | 2 |
| 41 | <u>0.0 8</u> |
| 42 | - <u>0.0 0</u> |
| 43 | <u>0.0 0 8 0</u> |
| 44 | - <u>0.1 0 0</u> |
| 45 | - <u>0 1 0</u> |
| 46 | <u>0.0 0 2</u> |
| 47 | <u>.0 0 0</u> |
| 48 | 0 |

FLT PLN-18a/77/O/A



B5



B5

| | |
|----|------------------|
| 2 | DAP B 0 5 |
| 30 | <u>0.2 0 0 0</u> |
| 31 | - <u>3.0 0</u> |
| 32 | <u>0.2 0</u> |
| 33 | <u>0.0 4</u> |
| 34 | <u>.0 0 0</u> |
| 35 | TAIL |
| 36 | TAIL |
| 37 | <u>0.0 2</u> |
| 38 | <u>0.2 0 0</u> |
| 39 | ALL |
| 40 | 2 |
| 41 | <u>0.0 8</u> |
| 42 | - <u>0.0 0</u> |
| 43 | <u>0.0 1 6 0</u> |
| 44 | - <u>0.0 3 3</u> |
| 45 | - <u>0 2 0</u> |
| 46 | <u>0.0 0 2</u> |
| 47 | <u>.0 0 0</u> |
| 48 | 0 |

FLT PLN-19a/77/O/A



B6



B4

DAP B5

PURPOSE:
COAS CAL

FLT PLN-18b/77/O/A



B5

DAP B6

PURPOSE:
HIGH RATE
(TAIL ONLY)

FLT PLN-19b/77/O/A



(reduced copy)



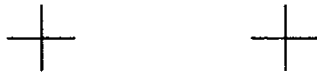
B6

| | |
|-------|-----------|
| 2 | DAP B 0 6 |
| 30/50 | 0.5 0 0 0 |
| 31/51 | - 3.0 0 |
| 32/52 | 0.2 0 |
| 33/53 | 0.0 4 |
| 34/54 | - 0 0 0 |
| 35/55 | TAIL |
| 36/56 | TAIL |
| 37/57 | 0.0 2 |
| 38/58 | 0.2 0 0 |
| 39/59 | ALL |
| 40/60 | 2 |
| 41/61 | 0.0 8 |
| 42/62 | - 0.0 0 |
| 43/63 | 0.2 0 0 0 |
| 44/64 | - 1.0 0 0 |
| 45/65 | - 0 2 0 |
| 46/66 | 0.0 0 2 |
| 47/67 | - 0 0 0 |
| 48/68 | 0 |

FLT PLN-20a/77/O/B



B7



B7

| | |
|----|-----------|
| 2 | DAP B 0 7 |
| 30 | 0.5 0 0 0 |
| 31 | - 2.0 0 |
| 32 | 0.2 0 |
| 33 | 0.0 4 |
| 34 | - 0 0 0 |
| 35 | ALL |
| 36 | ALL |
| 37 | 0.0 5 |
| 38 | 0.2 0 0 |
| 39 | ALL |
| 40 | 2 |
| 41 | 0.0 8 |
| 42 | - 0.0 0 |
| 43 | 0.2 0 0 0 |
| 44 | - 1.0 0 0 |
| 45 | - 0 2 0 |
| 46 | 0.0 0 2 |
| 47 | - 0 0 0 |
| 48 | 0 |

FLT PLN-21a/77/O/A



B8



B6

DAP B7

PURPOSE:
RENDEZVOUS

FLT PLN-20b/77/O/A



B7

DAP B8

PURPOSE:
PROX OPS

FLT PLN-21b/77/O/A



(reduced copy)



B8

| | |
|----|------------------|
| 2 | DAP B 0 8 |
| 30 | <u>0.2 0 0 0</u> |
| 31 | - <u>2.0 0</u> |
| 32 | <u>0.2 0</u> |
| 33 | <u>0.0 4</u> |
| 34 | <u>.0 0 0</u> |
| 35 | ALL |
| 36 | ALL |
| 37 | <u>0.0 1</u> |
| 38 | <u>0.2 0 0</u> |
| 39 | ALL |
| 40 | <u>2</u> |
| 41 | <u>0.0 8</u> |
| 42 | - <u>0.0 0</u> |
| 43 | <u>0.2 0 0 0</u> |
| 44 | - <u>1.0 0 0</u> |
| 45 | <u>.0 2 0</u> |
| 46 | <u>0.0 0 2</u> |
| 47 | <u>.0 0 0</u> |
| 48 | <u>0</u> |

FLT PLN-22a/77/O/A



B9



B9

| | |
|-------|------------------|
| 2/4 | DAP B 0 9 |
| 30/50 | <u>0.0 5 0 0</u> |
| 31/51 | - <u>1.0 0</u> |
| 32/52 | <u>0.2 0</u> |
| 33/53 | <u>0.0 4</u> |
| 34/54 | <u>.0 0 0</u> |
| 35/55 | ALL |
| 36/56 | ALL |
| 37/57 | <u>0.0 1</u> |
| 38/58 | <u>0.1 0 0</u> |
| 39/59 | ALL |
| 40/60 | <u>2</u> |
| 41/61 | <u>0.0 8</u> |
| 42/62 | - <u>4.1 0</u> |
| 43/63 | <u>0.1 0 0 0</u> |
| 44/64 | - <u>1.0 0 0</u> |
| 45/65 | <u>.0 2 0</u> |
| 46/66 | <u>0.0 0 2</u> |
| 47/67 | <u>.0 0 0</u> |
| 48/68 | <u>1</u> |

FLT PLN-23a/77/O/B



B11



B8

DAP B9

PURPOSE:

SPARTAN DB
COLLAPSE



FLT PLN-22b/77/O/B



B9

DAP B11

PURPOSE:

STU
STATIONKEEPING



FLT PLN-23b/77/O/A

(reduced copy)



B11



B11

| | |
|-------|------------------|
| 2/4 | DAP B 1 1 |
| 30/50 | <u>0.0 5 0 0</u> |
| 31/51 | <u>- 0.5 0</u> |
| 32/52 | <u>0.1 0</u> |
| 33/53 | <u>0.0 4</u> |
| 34/54 | <u>-0.0 0</u> |
| 35/55 | ALL |
| 36/56 | ALL |
| 37/57 | <u>0.0 5</u> |
| 38/58 | <u>0.2 0 0</u> |
| 39/59 | ALL |
| 40/60 | 2 |
| 41/61 | <u>0.0 8</u> |
| 42/62 | <u>- 0.0 0</u> |
| 43/63 | <u>0.0 5 0 0</u> |
| 44/64 | <u>- 0.5 0 0</u> |
| 45/65 | <u>.0 2 0</u> |
| 46/66 | <u>0.0 0 2</u> |
| 47/67 | <u>-0.0 0</u> |
| 48/68 | <u>0</u> |

FLT PLN-24a/77/O/B



FLT PLN-24b/77/O/A



| UNIV PTG | |
|-------------|---|
| TGT ID | = 1 Orbiting Vehicle = 2 Earth ctr = 3 Earth tgt Input LAT (± 90) LON (± 180 , + = East) ALT (-3444.0 to 20000.0 nm) |
| | = 4 Sun ctr = 5 Celestial tgt Input RA (0-359.99) DEC (± 90) = 11-110 Nav Stars |
| BODY VECT | = 1 +X* = 2 -X* = 3 -Z* = 4 -Y Star Tracker* = 5 Optional Input P (0-359.99) Y (270-359.99, 0-90) |
| *Input OM → | OM (0-359.99) |
| MON AXIS | = 1 +X = 2 -X |

FLT PLN-25/77/O/A

FLT PLN-25/77/O/A is mounted on the back of the DAP Book

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STS-77
FLIGHT PLAN NOTES

FLIGHT PLAN
NOTES

FLIGHT PLAN NOTES
(CONSTRAINTS AND GUIDELINES)

A. FLIGHT DESCRIPTION

Orbiter: OV105/Endeavour
 Inclination: 39°
 Insertion Altitude: 153nm
 Duration: 9 + (1) + 2

B. MAJOR EVENTS

An "S" after a burn title indicates a trajectory event in support of Spartan retrieval planned on FD03. "P" after a burn title indicates an event in support of the PAMS STU rendezvous planned on FD04, FD07, and FD08.

| <u>EVENT</u> | <u>MET</u> |
|-------------------------|------------|
| <u>FD01</u> | |
| Launch | 00/00:00 |
| OMS-2 | 00/00:43 |
| <u>FD02</u> | |
| Spartan-207/IAE Release | 01/00:59 |
| SEP1-S | 01/01:01 |
| IAE Inflation | 01/03:08 |
| SEP2-S | 01/04:30 |
| IAE Jettison | 01/04:43 |
| <u>FD03</u> | |
| Ti-S | 02/02:01 |
| Spartan-204 Grapple | 02/04:25 |
| <u>FD04</u> | |
| PAM STU Ejection | 02/22:48 |
| SEP1-P0 | 02/23:11 |
| TI-P0 | 03/02:05 |
| VBN-P0 | 03/03:24 |
| SEP2-P0 | 03/05:30 |
| <u>FD07</u> | |
| Ti-P1 | 05/20:10 |
| VBN-P1 | 05/21:29 |
| SEP1-P1 | 06/04:00 |
| <u>FD08</u> | |
| Ti-P2 | 06/20:11 |
| VBN-P2 | 06/21:30 |
| SEP1-P2 | 07/04:05 |
| <u>FD11</u> | |
| D/O Burn | 09/23:37 |

FLIGHT PLAN
NOTES

C. LANDING OPPORTUNITIES

| | | <u>Landing Orbit</u> | <u>Site</u> | <u>Local Time</u> | <u>MET</u> |
|-------------|------------|----------------------|-------------|-------------------|------------|
| | | <u>No.</u> | | | |
| Nominal | Primary | 161 | KSC | 07:09 EDT | 10/00:37 |
| | 1 Rev Late | 162 | KSC | 08:44 EDT | 10/02:12 |
| 1 Day Late | Primary | 177 | KSC | 07:10 EDT | 11/00:38 |
| | 1 Rev Late | 178 | KSC | 08:45 EDT | 11/02:13 |
| 2 Days Late | Primary | 193 | KSC | 07:12 EDT | 12/00:40 |
| | 1 Rev Late | 194 | KSC | 08:46 EDT | 12/02:14 |

D. CREW

CDR - John Casper
PLT - Curtis Brown (IV)
MS1 - Andrew Thomas (RMS B/U)
MS2 - Daniel Bursch (EV2)
MS3 - Mario Runco (RMS, EV1)
MS4 - Marc Garneau (RMS)

E. COMMUNICATIONS

SHUTTLE

TDRS Support: East (41° W), West (174° W)
Backup Real-Time TV: GDS(GDX), MIL(MLX)
Contingency GSTDN: DFR*, MIL(MLX)*, BDA(BDX), GDS(GDX), and WLP
Contingency RTS: HTS, GTS, VTS, IOS*, CTS, DGS, OTS*, and NHS

*UHF capability

Lead time for site call-up: GSTDN - 2 hr, RTS - 4 hr

F. PAYLOADS

1. SPACEHAB-04

STS-77 is the fourth in a series of flights for Spacehab, a pressurized module which is crew-accessible from the middeck via an airlock tunnel adapter. Subsystems which require orbiter support include AC/DC power, cooling via the Freon heat exchanger, O₂/N₂, humidity control, and CO₂ scrubbing.

Spacehab is comprised of 12 experiments housed in the module and in the middeck. A short description of each of the experiments follows:

- a. Advanced Separations (ADSEP) - demonstrates the separation of organic materials using the aqueous techniques.
- b. Commercial Float Zone Furnace (CFZF) - studies the growing of single crystals using the floating zone technique.
- c. Commercial Generic Bioprocessing Apparatus (CGBA) - studies biological fluids mixing.
- d. Commercial Vapor Diffusion Apparatus (CVDA) - produces large, high quality protein crystals for analysis of molecular structures.

- e. Fluids Generic Bioprocessing Apparatus (FGBA) – investigates the dispensing of chilled two-phase liquids.
- f. Gas Permeable Polymer Membrane (GPPM) – grows gas permeable polymer materials.
- g. Hand-Held Diffusion Test Cell (HH-DTC) – produces large, high-quality crystals of selected proteins.
- h. IMMUNE – studies several rats for a commercial pharmaceutical study.
- i. National Institutes of Health-C-07 (NIH-C-07) – validates models of tissue cell biochemical and functional loss and evaluates tissue loss pharmaceuticals.
- j. Plant Generic Bioprocessing Apparatus (PGBA) – studies plant growth.
- k. Protein Crystallization Facility) (PCF) – grows crystals under controlled conditions.
- l. Space Experiment Facility (SEF) – grows uniform, high quality single crystals.

2. Spartan-207/IAE

Spartan to be deployed and retrieved via the Remote Manipulator System (RMS), carries one payload, the Inflatable Antenna Experiment (IAE). During the initial portion of Spartan's free-flying phase, the payload will transmit video to the orbiter. IAE will be jettisoned from the deployed Spartan at the conclusion of the experiment and will not be returned to Earth.

3. Technology Experiments Advancing Missions in Space (TEAMS-01)

TEAMS consists of a Hitchhiker carrier with the following four experiments mounted on the bridge:

- a. Vented Tank Resupply Experiment (VTRE) (NASA/Lewis Research Center) – studies tank venting. Capillary vane devices that will enable direct tank venting and resupply of partially filled tanks by locating and concentrating the liquid will be tested.
- b. Liquid Metal Thermal Experiment (LMTE) (Air Force Phillips Laboratory, Kirtland Air Force Base) – tests three liquid metal heat pipe designs, providing a flight history to base the further design and testing of liquid metal heat pipes.
- c. Passive Aerodynamically-Stabilized Magnetically-Damped Satellite (PAMS) Shuttle Test Flight (NASA Goddard Space Flight Center) – provides an orbital test flight for the PAMS concept. The Satellite Test Unit (STU) will be deployed in an initially unstable attitude. The subsequent stabilization and steady state performance will be observed and measured using a laser-based attitude measurement system.
- d. Global Positioning System (GPS) Attitude and Navigation Experiment (GANE) (NASA/JSC/International Space Station) – studies attitude determination, navigation, and overall performance of a GPS antenna system proposed for the International Space Station. The DTO 700-8 GPS hardware will collect support data for GANE.

4. Aquatic Research Facility (ARF-01)

ARF supports life sciences research using a broad range of small aquatic species in two separate units.

5. Brilliant Eyes Ten-Kelvin Sorption Cryocooler Experiment (BETSCE)

BETSCE is a test of advanced sorption cooler technologies.

6. Biological Research Canisters (BRIC-07)

BRIC provides opportunities for investigations into the effects of spaceflight on small arthropod animal and plant specimens. The development of the tobacco hornworm's flight muscle in microgravity will be studied.

7. Get-Away Special (GAS) Bridge

The twelve GAS payloads consist of self-contained experiments which are integrated into customer-provided standard canisters. The payloads are controlled by a crewmember via the Bus Interface Adapter (BIA) connected to a Payload and General Support Computer (PGSC).

The GAS payloads include:

G056 (California Institute of Technology) – detects gamma-ray bursts and coincidental occurrence of optical transients from celestial sources.

G063 (Pennsylvania State University and Martin Marietta) – consists of three experiments: one detects and records particles impacting with the space shuttle using sensitive piezoelectric sensors; the second collects data on four semiconductor materials to determine the effects of high energy particles on memory devices; and the third records a magnetic field map of the cargo bay along the shuttle's trajectory using a fluxgate magnetometer.

G142 (Deutsche Agentur für Raumfahrtangelegenheiten GmbH (DARA)) Subcooled and Saturated Pool Boiling in a Microgravity Environment Experiment Heat Transfer Phenomena – classifies the gravity independent heat transport mechanism of boiling.

G144 (Deutsche Agentur für Raumfahrtangelegenheiten GmbH (DARA) and sponsored by the German Federal Ministry for Research and Development) The Reaction Kinetics in Glass Melts – studies the processes involved in the formation of glass melts.

G163 (European Space Agency – ESA) -- measures the speed at which Mercuric Iodide in solid form is evaporated and then transported in gas form under microgravity conditions.

G200 (Utah State University) – studies the electrohydro-dynamics of a water droplet in an electric field, sound propagation in a granular material and the speed of propagation, the role gravity and friction play in vibration-induced size separation, and the growth pattern of slime mold.

G490 (British Sugar – developed by Robert Gordon University of Scotland) – consists of two experiments: one, convection currents on a fluid, records convection currents in a fluid produced by a small heater; two, effects of the space environment on seeds, compares samples of various flown seeds with ground samples post flight.

G564 (Canadian Space Agency) – processes liquid samples from various water based slurries each containing the necessary precursors for growing nanoporous semiconductors.

G565 (Canadian Space Agency) – manufactures organic thin films by the Physical Vapor Transport (PVT) method. These will be compared to control samples manufactured on the Earth.

G703 (NASA Lewis Research Center) – studies the smoldering combustion of polyurethane foam.

G741 (National Aeronautics and Space Administration (NASA) Lewis Research Center (LeRC) – determines the effects of heat flux and liquid subcooling on nuceate pool boiling in a long-term reduced gravity environment.

Reduced-Fill Tank Pressure Control Experiment (RFTPCE) – obtains data on the effectiveness of jet mixing as a method of pressure control.

G. ON-ORBIT DTOs

1. Cabin Air Monitoring (DTO 623)

This DTO will use the solid sorbent sampler to continuously sample the orbiter atmosphere throughout the flight.

H. ON-ORBIT DSOs

1. The Interaction of the Space Shuttle and Entry Suit (LES) and Sustained Weightlessness and Egress and Locomotion (DSO 331)

DSO 331 measures the effect of the LES/Advanced Crew Escape Suit (ACES) on egress locomotion and will assess the emergency egress capacity of crewmembers at wheel stop.

2. Monitoring Latent Virus Reaction and Shedding in Astronauts (DSO 493)

DSO 493 studies the potential for reactivation and dissemination of latent viruses.

3. Educational Activities (DSO 802)

Video recordings will use the subject of space flight to capture the interest of students in the fields of science, engineering, and mathematics.

4. Documentary Television (DSO 901)

DSO 901 provides guidelines for scheduling live television or VTR dumps of on-orbit activities.

5. Documentary Motion Picture Photography (DSO 902)

DSO 902 provides guidelines for scheduling documentary and public affairs motion picture photography of on-orbit activities.

6. Documentary Still Photography (DSO 903)

DSO 903 provides guidelines for scheduling still photography of on-orbit activities.

** PRIORITY MAIL **

NASA GSFC

530/MORSE, G.
542.2/HILL, P.
553.3/DELL, G. (3)
715.1/PACINI, L.
740.1/STEINER, M. (6)
740.3/BARTHELME, N.F.
740.3/LEWIS, R.
740.3/OLDEN, S. (12)

NASA HEADQUARTERS

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ME/POSEY, G.
MZD/MILLER, H.
PM/MC CULLA, J.W.
PT/SHAFFER, R.
UO/DOARN, C.
US/ZWIERKO, R.

NASA KSC

B10-3/FISER, R.L.
CV-PSD-1/MACKEY, A.J.
F264/HUNTER, R.
KSC/KSC TECH LIBRARY-D
LSO-215/KELLY, T.E.
LSO-247/HOOPER, J. (2)
PA-PIB/GRINTER, K.
TP-LOD-1/SOWASH, S. (2)
TP-PED-3/VITT OFFICE
TP-PED-3A/CREW QUARTERS

NASA LERC

500-217/SEIGNEUR, A.
TSC 333-1/CARLISLE-MORGAN, K.L.

NASA MSFC

AVS-A101/JAMES, C.
CA01/TAYLOR, J.B. (2)
CA10/BERG, J.
CN31D/TECH DOC REPOSITORY
EL02/HILL, C.K.
EO02/MELTON, T. (2)
EO22/PDFD MGR (2)
EO42/BRANCH CHIEF
EO43/BRANCH CHIEF
EO52/CHIEF DATA MGMT

JA21/ANDERSON, S.H.
NTI/MARSHAL OPERATIONS

FALCON AIR FORCE BASE
LAUNCH OPS
50 OSS/OSPL
300 O'MALEY AVENUE
SUITE 26
FALCON, CO 80912-5000
LAUNCH OPERATIONS OFF

JET PROPULSION LABORATORY JPL
CA INSTITUTE OF TECHNOLOGY
4800 OAK GROVE DRIVE
PASADENA, CA 91109-8099
157-316/BARD, S.

ROCKWELL INTERNATIONAL DOWNEY
SPACE SYSTEMS DIVISION
12214 LAKEWOOD BOULEVARD
DOWNEY, CA 90241
841-2, AC85/TAYLOR, B.N.
AA05/WOOLHOUSE, D.L.
AC28/HARPER, L.
AD60/MC MILLAN, B.J.
AD75/STS DATA MGMT
AE70/GALLARDO, J.A.
AE85/BRYON, K.
FA19/FERGUS, E.M.
FA35/GULSBY, J.A.
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FA43/SMITH, C.W. (2)
FA99/LARSON, J.J.
FB13/FRANK, G.
FB14/ITO, J.K.
FB75/MC DERMOTT, W.A.
FC94/GOOSSENS, M.H.
FC95/FRIEND, R.

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32B3/JASKOLKA, C. (2)

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GODDARD CORPORATE PARK
7515 MISSION DRIVE
LANHAM, MD 20706
NOG/MMU/SIDOTTIL, J. (2)

CANADIAN ASTRONAUT PROGRAM
CANADIAN SPACE AGENCY
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SAINT-HUBERT, QUEBEC
J3Y 8Y9
CANADA
KHAN, F.

DRAPER LABORATORIES
555 TECHNOLOGY SQUARE
CAMBRIDGE, MA 02139-3539
81/SARGENT, D.
KACHMAR, P.

GTE GOVERNMENT SYSTEMS CORP-NM
P O BOX 235
LAS CRUCES, NM 88004
GC/GOMEZ, N.

HAMILTON STANDARD
BRADLEY FIELD RD.
WINDSOR LOCKS, CT 06096
1A-2-X65/AUMAN, J.

INTERMETRICS, INC.
1100 HERCULES SUITE 300
HOUSTON, TX 77058
ATTN:/HUTCHINS, J.

INTERMETRICS, INC.
1750 112TH AVE NE
SUITE D-151
BELLEVUE, WA 98004
NIKKEL, G.

LOCKHEED MARTIN, COLORADO
P O BOX 179
DENVER, CO 80201
S8000/MARTIN, T.

LOCKHEED MARTIN, WEBSTER, TX
FORGE RIVER ROAD
SUITE 100
WEBSTER, TX 77598
C102/HEYDORM, J.

NASA GSFC-AL
116 JETPLEX CIRCLE
MADISON, AL 35758
442/OLSON, K.

OMITRON, INC.
6411 IVY LANE, SUITE 600
GREENBELT, MD 20770
740.3/BROPHY, G. (3)
740.3/WASIAK, F.

PL/VTPT
3550 ABERDEEN AVE SE
BLDG 30117-MANZANO
KIRTLAND AFB,
NEW MEXICO 87117-5776
ATTN:/STOYANOF, M.

ROCKWELL INTERNATIONAL CORP.
ROCKETDYNE DIVISION
6633 CANOGA AVENUE
CANOGA PARK, CA 91303
055-LA38/CONNOR, T.J.

SPAR AEROSPACE
9445 AIRPORT ROAD
BRAMPTON, ONTARIO
CANADA L6S4J3
WOODLAND, C. (2)

TELEDYNE BROWN ENGINEERING
CUMMINGS RESEARCH PARK
300 SPARKMAN DRIVE, NW
P. O. BOX 70007
HUNTSVILLE, AL 35807-7007
MS 172/GILCHRIST, M.

=====
Total 436
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