MISSION OPERATIONS DIRECTORATE
FLIGHT DIRECTOR OFFICE

STS-104/7A MISSION SUMMARY

FLIGHT READINESS REVIEW

June 28, 2001

DA8/P.S. Hill
DA8/M.A. Kirasich

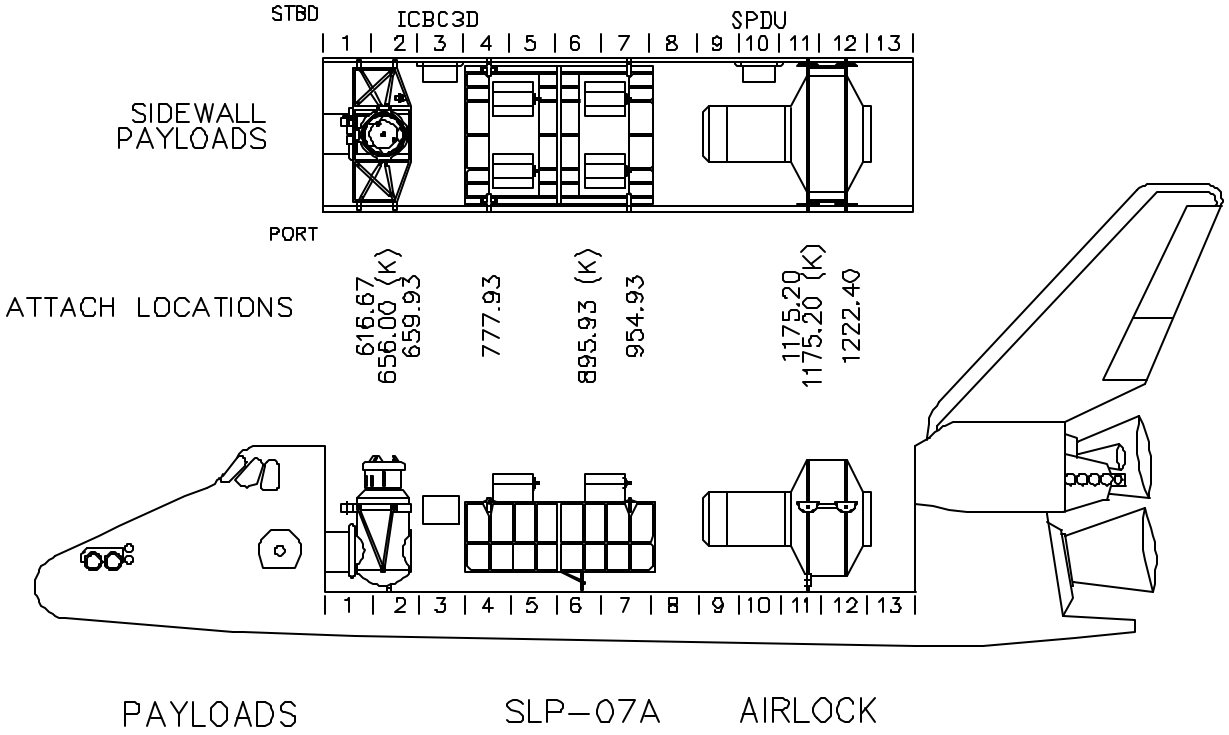
STS-104/7A Shuttle Overview

- **OV-104 – Atlantis**
- **Crew** (No crew exchange)

  CDR – Steve Lindsey **PLT – Charlie Hobaugh**

  MS1/EV1 – Mike Gernhardt **MS3/EV2 – Jim Reilly** **MS2/RMS – Janet Kavandi**
- **Mission Duration 11+1+2**
- **7 N2 tanks**
- **5 Cryo Tanks sets**
  - Cryo margins positive for 11+1+2 mission with >96 hr pad hold, H2 limited (~150 kWh above 96 hr pad hold).
  - Preliminary final analysis shows powered PCG-STES can be supported.
- **Three planned EVAs, one unscheduled EVA**
- **Propellant acceptable**
  - FRCS ~60 lbm, ARCS ~ 300 lbm, OMS ~ 2600 lbm margin
  - ~3100 lbm OMS is redlined as ballast for HPGT return.
- **>7 nmi Shuttle reboost has been accounted for in the margins**

STS-104 Payload Bay Configuration



STS-104/7A Mission Summary

- **Three primary objectives for STS-104, in priority order:**
  1) **Transfer critical ISS crew consumables**
  2) **Joint Airlock delivery and checkout**
  3) **Install high pressure gas tanks**
     - **1 O2 and 1 N2 tank are required for normal EVA capability.**
     - **A second O2 and N2 tank are required for normal logistics and payload support.**

- **It is highly desirable to demonstrate Joint Airlock EMU EVA capability.**
  - **Confirms all EVA functionality and provides real-time training to the ISS crew.**
  - **This is planned for EVA-3.**

STS-104/7A Critical Activities

- **Activities required for ISS EMU EVA capability:**
  - **FD3:** Rendezvous/dock
  - **FD4: EVA1:** Prep the Joint A/L via EVA and install the Joint A/L with SSRMS
  - **FD5:** Connect internal umbilicals, activate the Joint A/L, purge the O2/N2 systems from Shuttle
  - **FD6: EVA2:** Install 1 O2 and 1 N2 tank via EVA and SSRMS
  - **FD7:** Undock
  - **FD8:** Deorbit

- **This mission would require a minimum of 7 days (4 docked)**

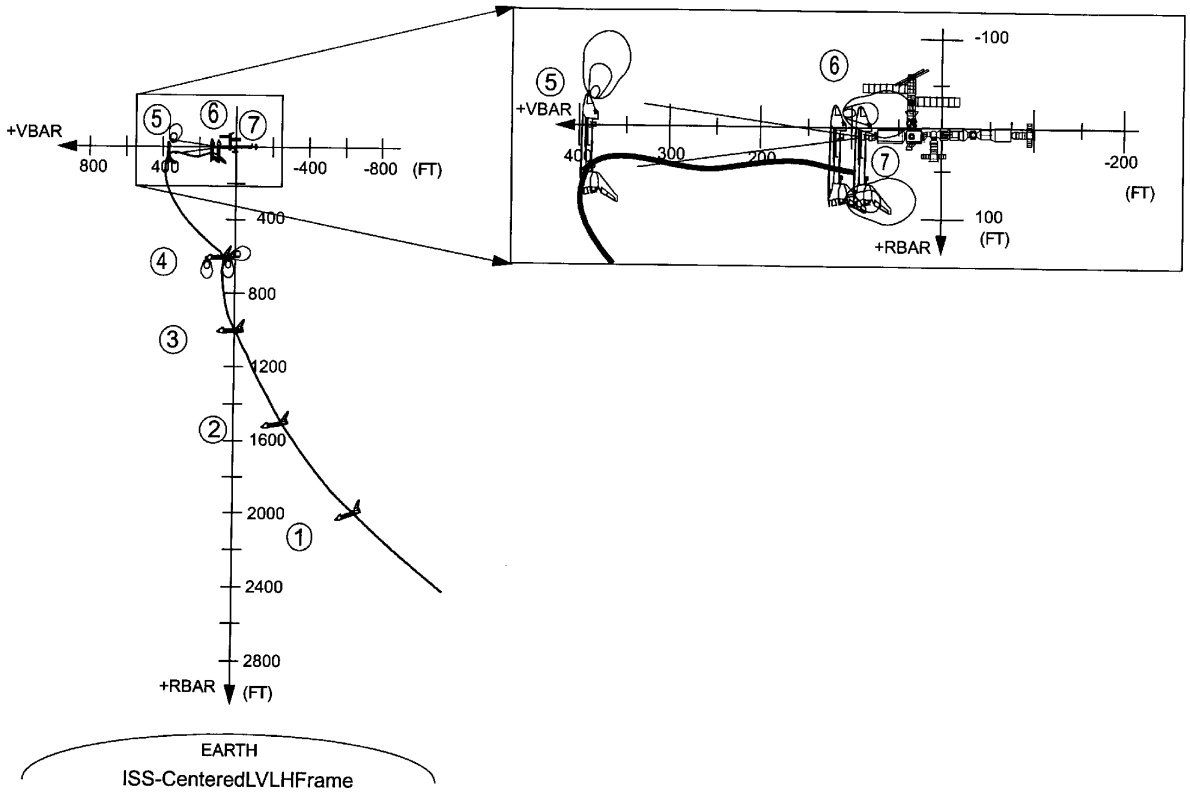
- **ISS assembly can continue without the Joint A/L, but will have an impact on future assembly flights due to Shuttle N2 usage and hatch-closed time for EVA prebreathing and EVA.**

7A Mission Overview

- **FD1**
  - **Launch (0503 EDT)**
  - **Activate APCUs**
  - **Activate A/L heaters and MWIS**

- **FD2**
  - **Activate and checkout OIUs**
  - **SRMS Checkout**
  - **EMU checkout**
  - **Activate and checkout Orbiter Docking System**
  - **OSVS Checkout**

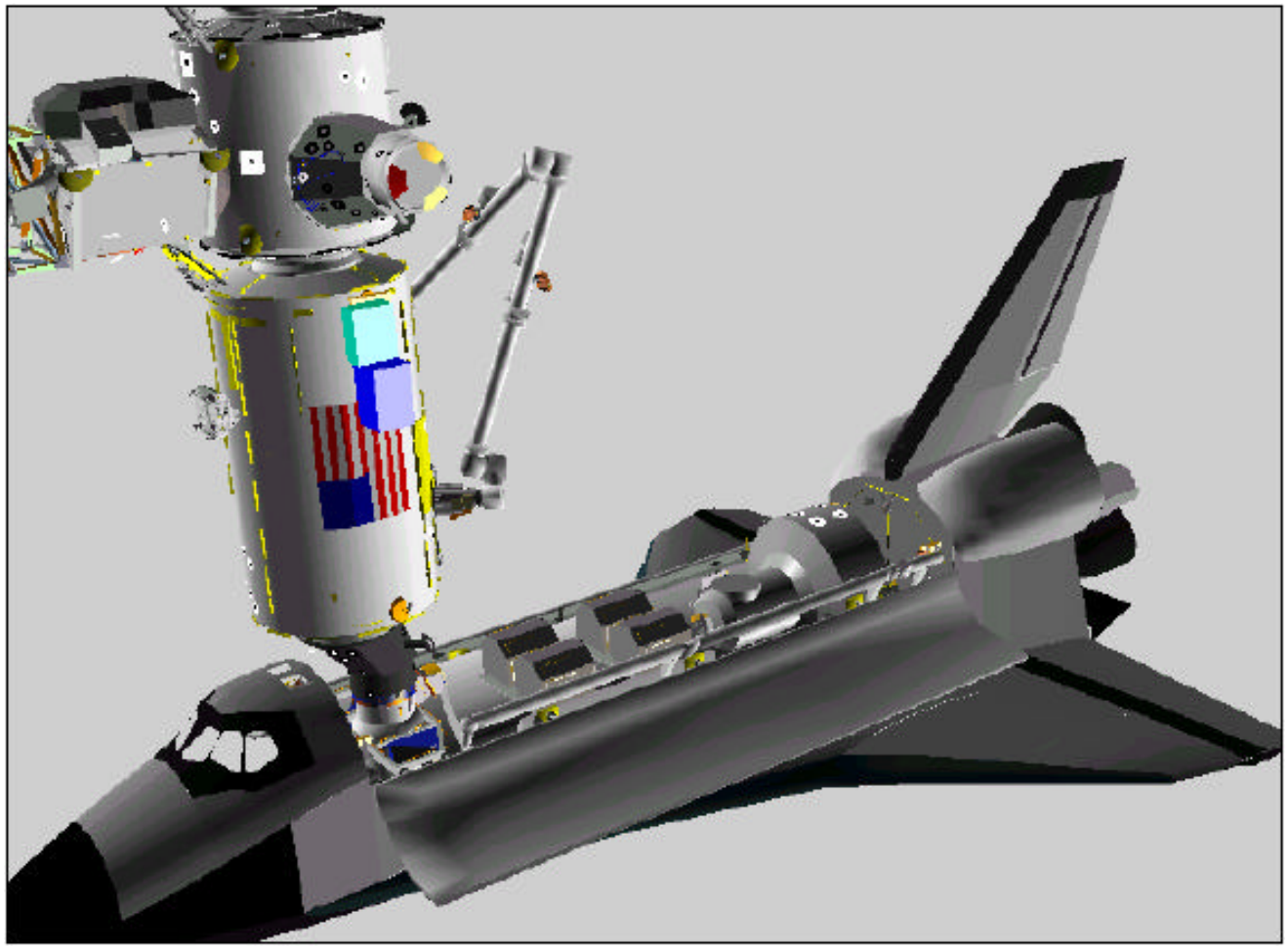
7A Docking to ISS



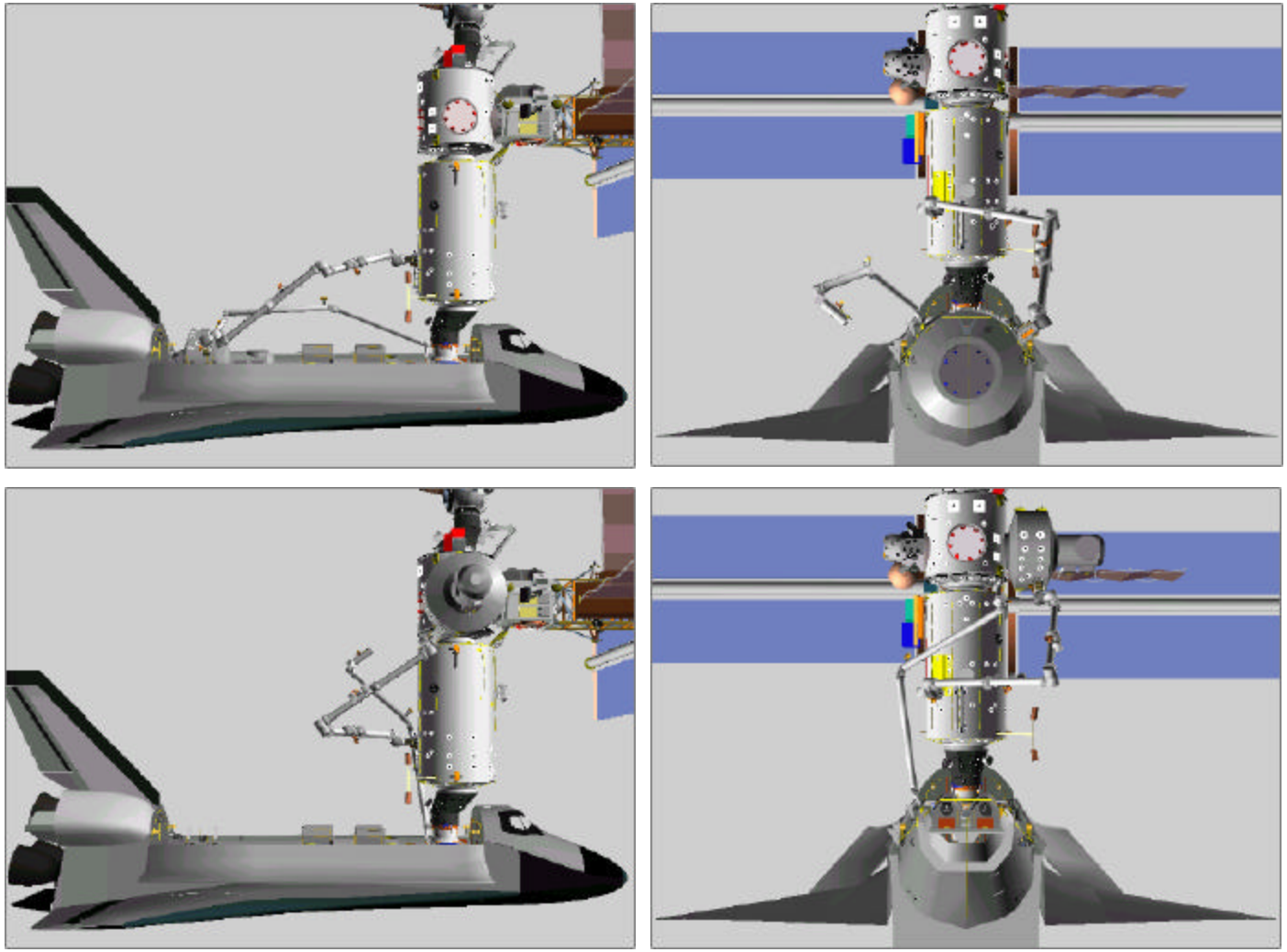
7A Mission Overview

- **FD3**
  - **ISS Maneuver to Docking Attitude**
  - **ISS Feather Solar Arrays for Docking (P6, FGB, SM)**
  - **+Vbar ISS rendezvous, docking to PMA2**
  - **Transfer key items**
    - **To ISS: CWC's, Airlock Vestibule Outfitting Kit, AVU harddrives, ODF, IMAX Film**
    - **From ISS: SAFERs, spare EMU, 3 crewlock bags for EVA, 5A PCS laptop**
  - **ISS and Shuttle crew EVA1 timeline and procedure review**
  - **A/L unberth and installation dry-run with SSRMS**
  - **Egress ISS and depress Orbiter cabin to 10.2 ps**

Initial Docked Configuration



EVA 1/Joint A/L Installation



7A Mission Overview

- **FD4**
  - **Open Node1 starboard hatch latch**
  - **SSRMS inspection of Node1 starboard CBM**
  - **EVA 1**
    - Remove PCBM cover, disconnect LTA jumper and install HPGT attach structures
    - Payload bay clean up
    - EV crew connect to SCU in Ext A/L

    SRMS in position for A/L robotic viewing support

    SSRMS unberth Joint A/L
    - Egress Ext A/L to confirm no debris in CBM interface and for possible GCA

    Install Joint A/L on Node1 starboard
    - Connect LTA jumper from Node1 and power LTA heaters
    - EVA2 worksite set up on Joint A/L
  - **Orbiter 14.7 psi repress**
  - **ISS ingress**
  - **Connect Joint A/L vestibule jumpers and initiate ITCS flow.**
  - **Ingress Joint A/L for internal LTA heater connections, then close hatch for overnight leak check**

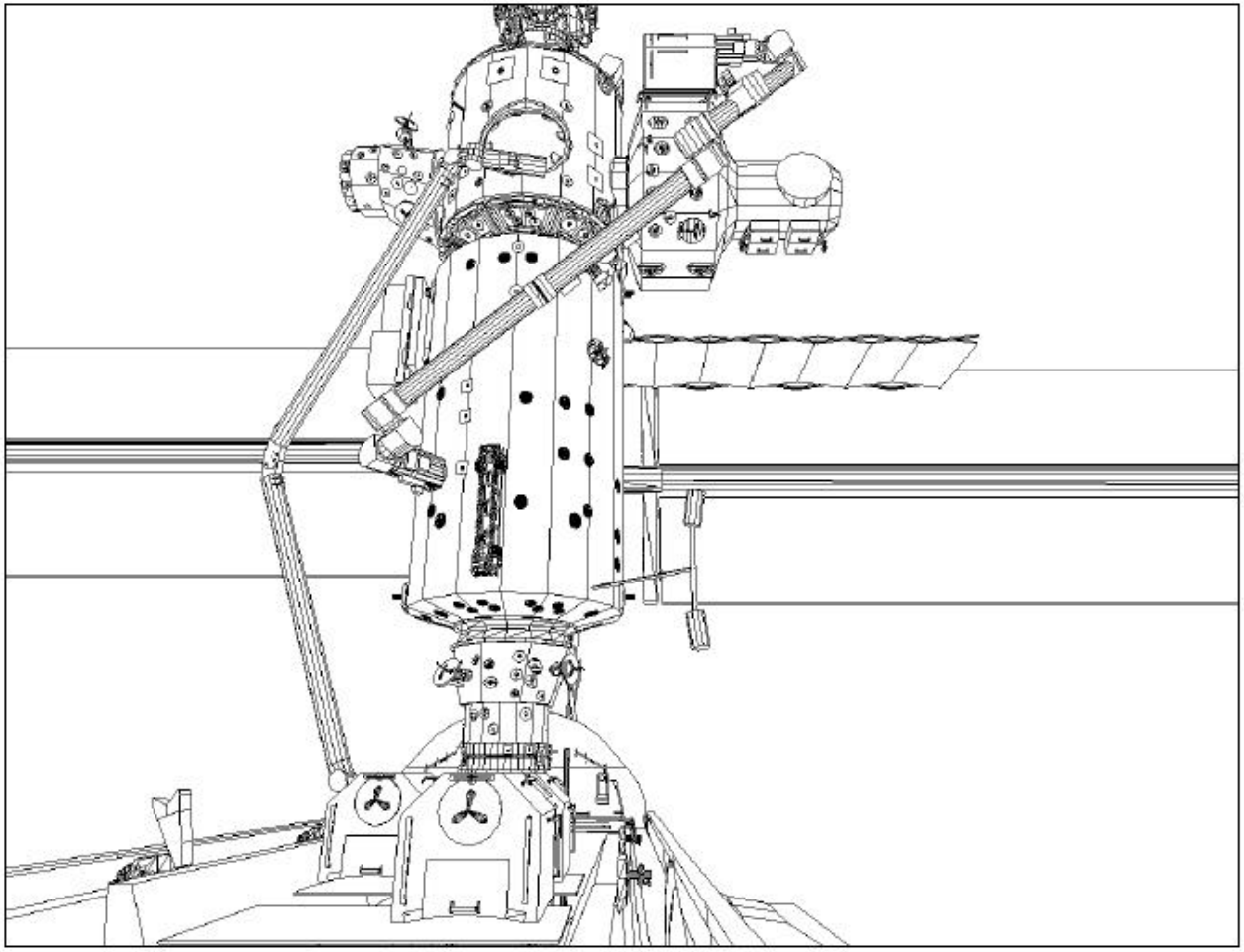
7A Mission Overview

- **FD5**
  - **Complete Joint A/L vestibule connections**
  - **Activate Joint A/L MDM**
  - **Complete internal O2/N2 system set-up**
  - **Purge and charge O2/N2 systems from Orbiter O2/N2 transfer lines**
  - **Valve change out:**
    - Replace Node NPRVs with IMV valves
    - Replace Node hatch PPRV with an MPEV
  - **Close Joint A/L hatch for overnight leak check of new valves**

7A Mission Overview

- **FD6**
  - **Replace A/L hatch PPRV with an IV PEV**
  - **Close hatch and leak check IV PEV**
  - **Relocate A/L hatch to Equipment Lock – Crew Lock position**
  - **Checkout Joint A/L EVA equipment (ISS crew assists Shuttle EV crew)**
  - **ISS and Shuttle crew EVA2 timeline and procedure review**
  - **Test run EVA exercise prebreathe (ISS crew assists Shuttle EV crew) , including Joint A/L depress to 10.2 psi**
  - **Depress Crew Lock to 5 psi for overnight leak check**
  - **Close hatches, Shuttle 10.2 depress**

EVA 2



7A Mission Overview

- **FD7**
  - **Repress Crew Lock**
  - **EVA-2**
    - Install O2 tank via SSRMS handoff to EV crew
    - Leak check O2 tank and jumper, then pressurize Joint A/L system from HPGT
    - Install N2 tank via SSRMS handoff to EV crew
    - Leak check N2 tank and jumper, then pressurize Joint A/L system from HPGT
  - **Repress Shuttle to 14.7, open hatches**
  - **Install Oxygen Resupply Compressor Assembly**

- **FD8**
  - **Half day off duty**
  - **ISS and Shuttle crew EVA-3 timeline and procedure review**
  - **Crew conference**
  - **EMU and SAFER transfer to ISS**
  - **EVA prep in the Joint A/L (ISS crew assists Shuttle EV crew)**
  - **Confirm exercise prebreathe and Joint A/L go for EVA-3**
    - If exercise prebreathe no-go, EV crew campout in Joint A/L at 10.2 psi
    - If Joint A/L no-go, depress Orbiter to 10.2 for Orbiter based EVA-3

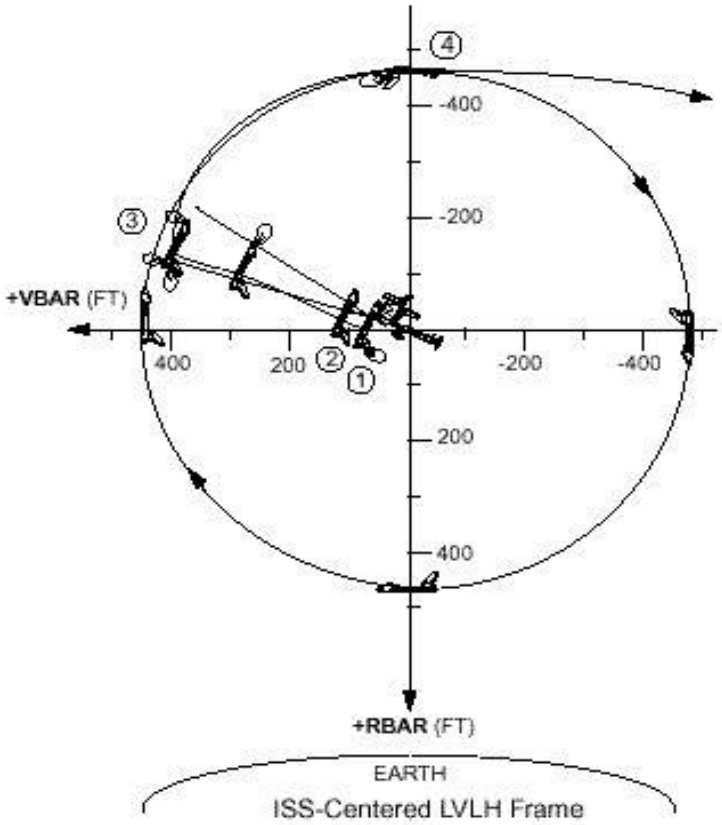
7A Mission Overview

- **FD9**
  - **Exercise prebreathe protocol (ISS crew assists Shuttle EV crew)**
  - **EVA-3 from Joint A/L (ISS crew assists Shuttle EV crew)**
    - Install O2 tank via SSRMS handoff to EV crew and leak check
    - Install N2 tank via SSRMS handoff to EV crew and leak check
    - Open Node1 nadir hatch cover flap
    - Install Joint A/L trunnion, keel and FRGF covers and hand rails
  - **Return PCG-STESs**

- **FD10**
  - **Close hatches**
  - **Undock, Flyaround (ICBC3D Filming), Separate**
  - **GPS Ops2 test**
  - **Cabin Stow**
  - **Half day off duty**

D. Brownfield/USH-483L
J. Hill/USH-483L

STS-104 FRR
UNDOCKING, TORF, AND FINAL SEPARATION



	APPROX. PET (h:mm)	EVENT
	-0:03	ORBITER AND ISS IN FREE DRIFT TO BEGIN UNHOOKING PROCESS NEAR ISS LVLH MATED TEA ATTITUDE (25,0,0)
1	0:00	UNDOCKING; AT 2 FT MODE TO LVLH HOLD AND PERFORM 4 DAP B +Z NORMZ BURNS SEPARATED BY 10 SEC; 3 MIN LATER PERFORM +Z NORMZ BURNS OUTSIDE 30 FT TO BUILD OPENING RATE TO 0.2 FPS; MAINTAIN CORRIDOR
	0:04	OUTSIDE 50 FT, RESELECT -X JETS (F1F, F2F)
2	0:05	AT 75 FT, MODE TO LOWZ, MANEUVER BACK TO UNDOCKING ATTITUDE IN AUTO; MAINTAIN CORRIDOR AND OPENING RATE GREATER THAN OR EQUAL TO 0.2 FPS
3	0:25	AT 450 FT, NULL RDOT AND INITIATE TORF; MAINTAIN 400 FT < R < 500 FT (CG-TO-CG)
4	0:34 OR 1:20	AT MINUS RBAR: IF PROP AVAILABLE, CONTINUE 1 LAP TORF*; IF PROP NOT AVAILABLE OR AFTER 1 LAP TORF, PERFORM 3 FPS RETROGRADE +X LOWZ FINAL SEP BURN AT -RBAR CROSSING; INITIATE TARGET TRACK 2 MIN LATER

*If required, flyaround may be terminated at any Rbar crossing

7A Mission Overview

- **FD11**
  - **FCS C/O, RCS hot-fire, cabin stow**
  - **SIMPLEX**

- **FD12**
  - **D/O Prep**
  - **Landing 10/19:52 MET (0056 EDT)**