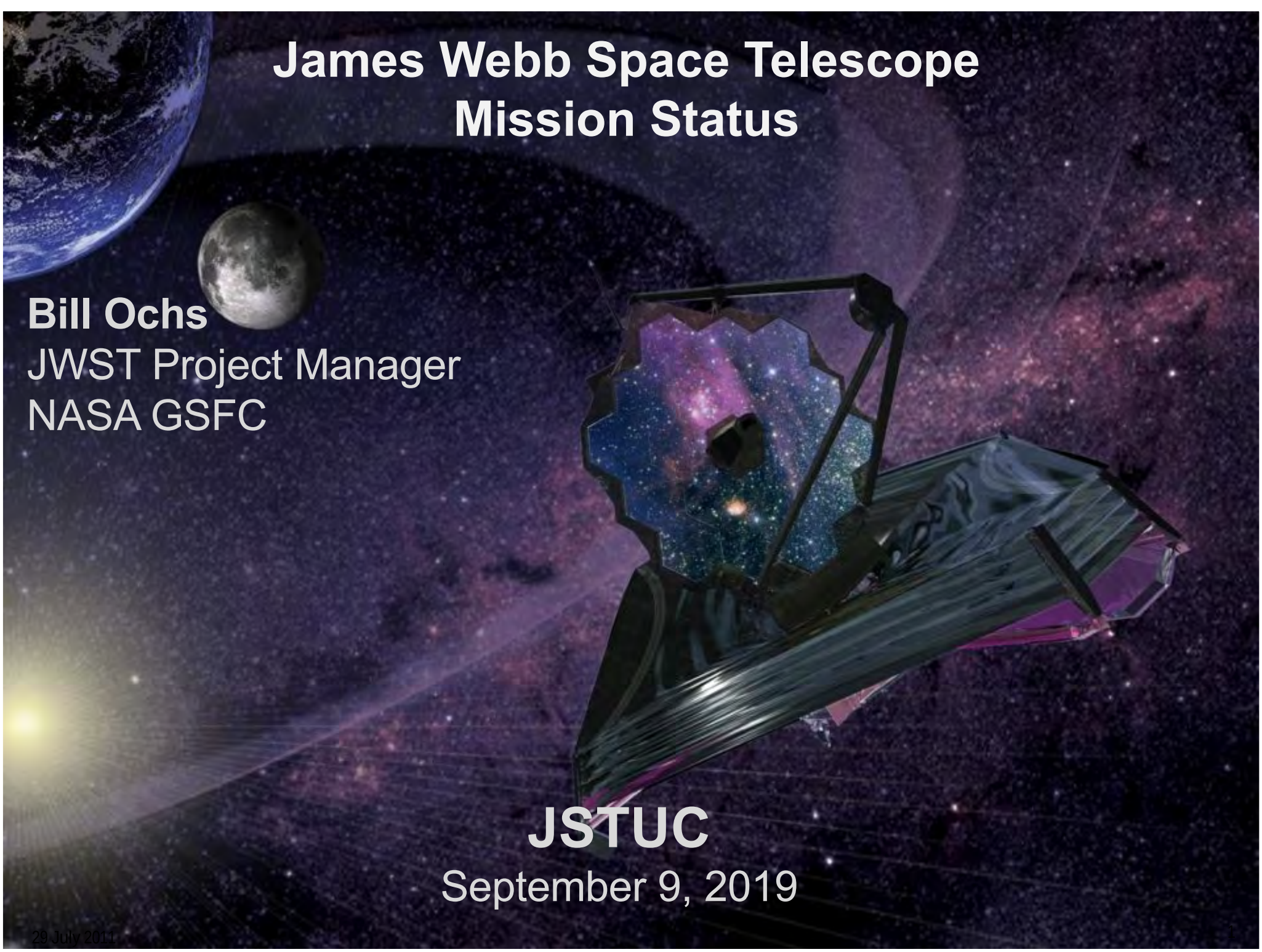
James Webb Space Telescope
Mission Status



Bill Ochs
JWST Project Manager
NASA GSFC

JSTUC

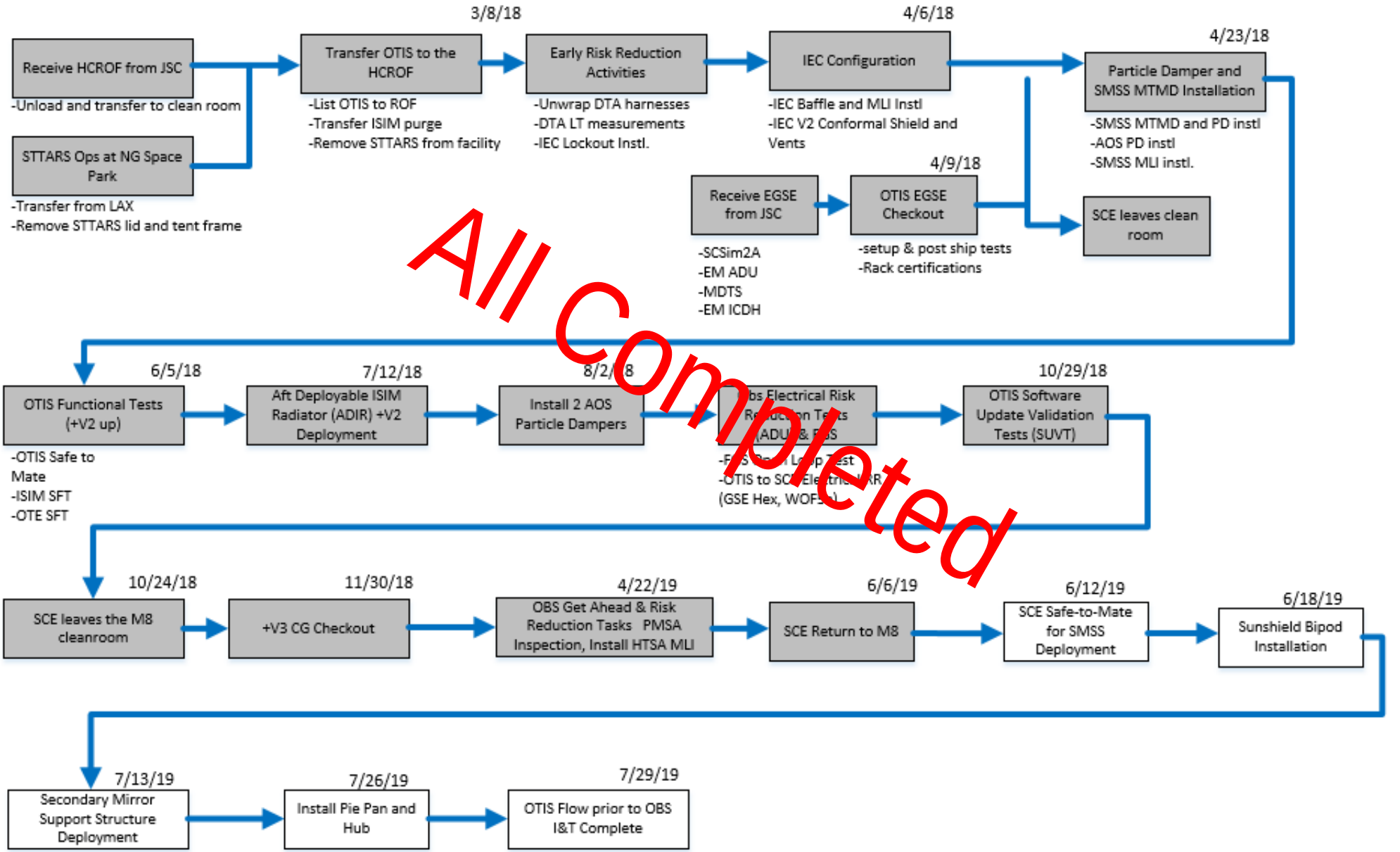
September 9, 2019

Agenda

- **Mission Status**
- **Schedule**

OTIS STATUS

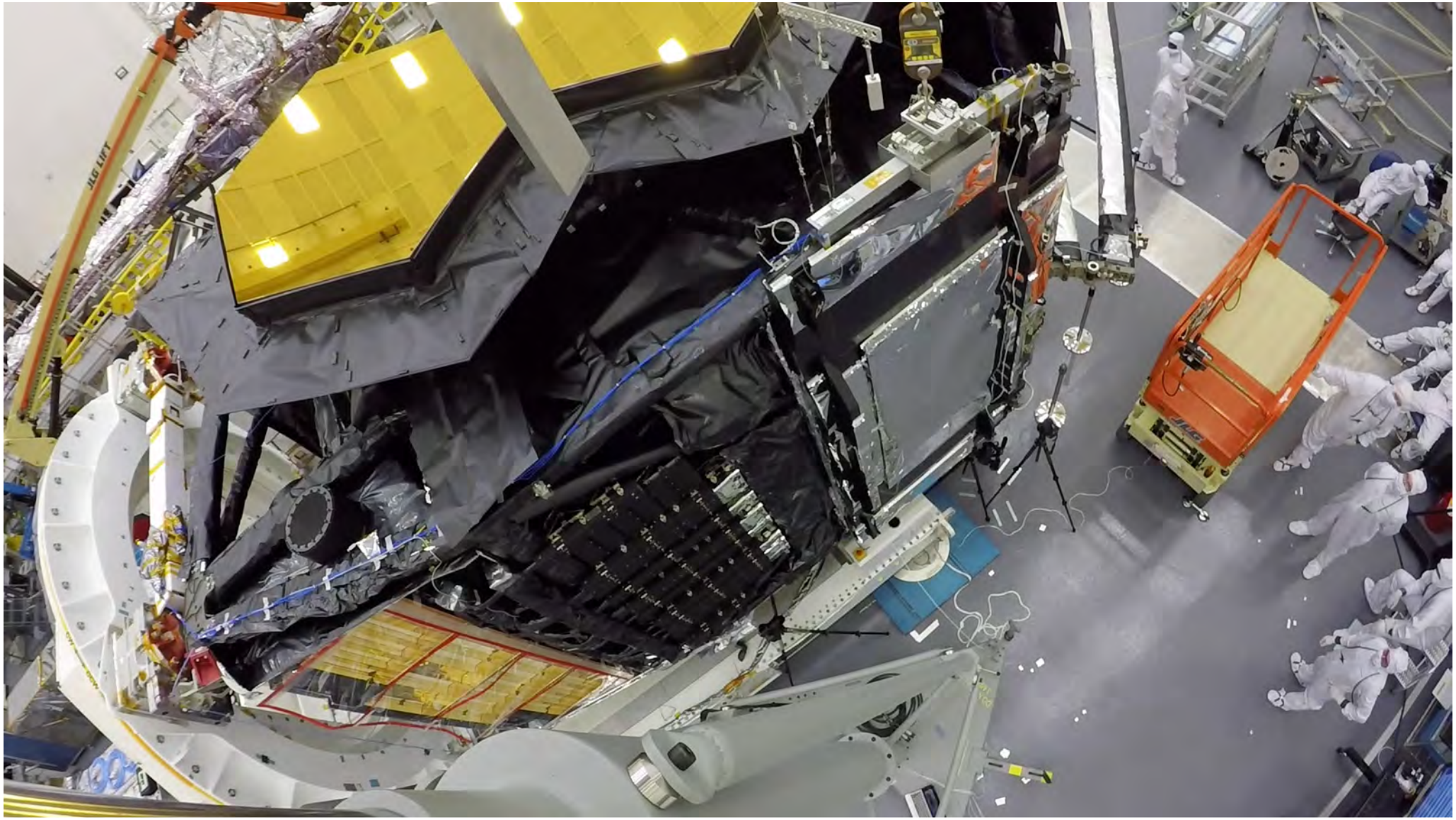
OTIS I&T @ NGAS Flow Diagram



OTIS Summary

- **Deployed the Aft Deployable ISIM Radiator**
- **Successfully completed planned risk reduction**
  - FGS ES Open Loop Test, Software Update Verification Test, etc.
  - First Observatory side by side electrical test
- **Completed Primary Mirror Cleaning**
- **Pre-Observatory I&T cryo cooler preps completed**
- **Additional DTA protective MGSE is in development as a result Overhead Deployment System checkout findings**

ADIR Post Environmental Deployment Test Video



Aft Optics System Particle Damper Installation

JWST engineers inspect the Aft Optics System (AOS) during particle damper installation

Primary Mirror Frill Inspection

JWST engineers inspect the Frill and Primary Mirror Closeouts in the M8 cleanroom at Northrop Grumman

OTIS in the M8 Cleanroom at NGAS

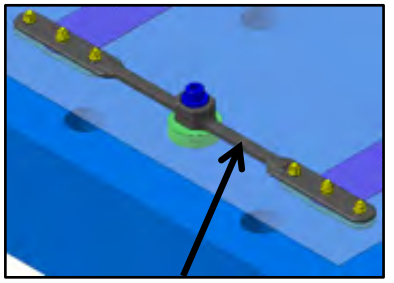
OTIS Operations in the M8 Cleanroom at NGAS

OTIS Installation into Contamination Tent

SCE STATUS

SCE Acoustic Re-Test at Acceptance Levels

- **Following SCE Proto Flight (PF) Acoustic Test, several SS Membrane Cover Assembly (MCA) batten fasteners were noted to be loose, during subsequent SCE transport**
  - SCE acoustic test performed Apr. 23 – 25 2018
  - MCA batten fasteners released due to inadequate thread engagement

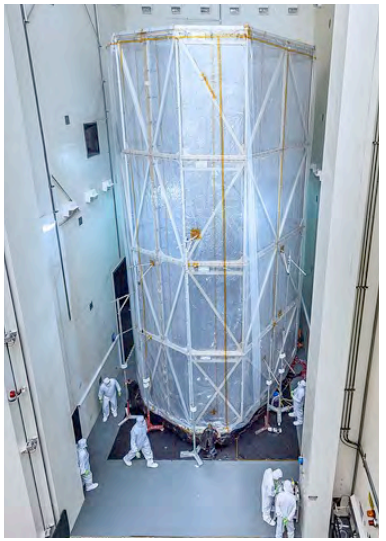


Sunshield MCA batten

- **MCA design change (fastener engagement, addition of bumpers) and disassembly of hardware prompted SCE Acoustic Re-Test to verify workmanship, provide unbroken sequence of launch environments**

- **Re-Test Performed Oct. 26 – 28 2018**

- **SCE Acoustic Re-Test was successful**



SCE in NGAS LATF

Environmental Testing Successfully Completed

- **Successfully completed all SCE Sine Vibration Testing**

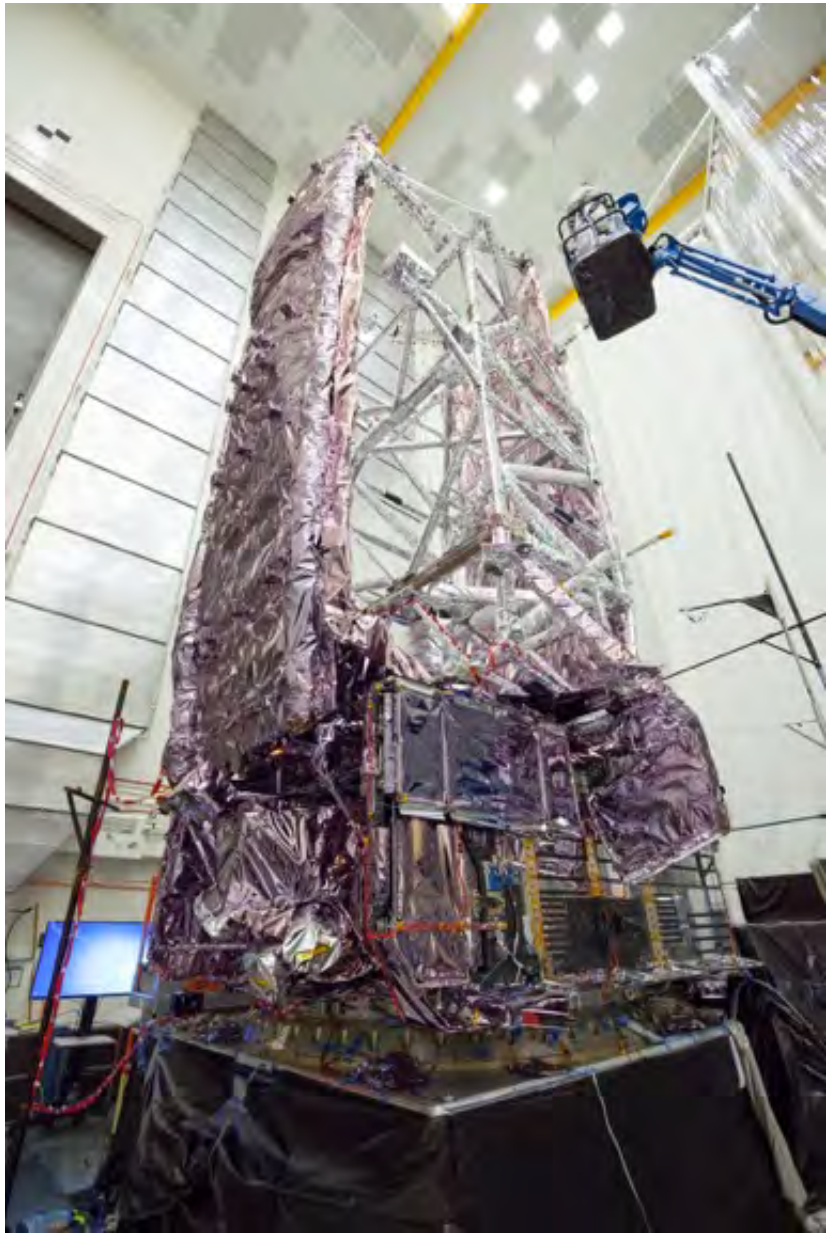
- **Excellent team work and execution performance as test progressed**
  - **Vibe Team (both NGAS and NASA personnel) worked through the shutdown and only had 4 days off between mid-December and early February**
    - 24 vibe runs in 48 days – Z axis
    - 11 vibe runs in 9 days – X axis
    - 13 vibe runs in 8 days – Y axis
    - Vibe runs include signature runs

- **Successfully completed SCE Thermal Vacuum test**
  - Thermal test results looked very good
  - Hot and Cold Comprehensive System Tests (CSTs) demonstrated predicted performance

SCE Move to Large Acoustic Test Facility

SCE Moved to Vibe Area and Contamination Cover Removal In Process

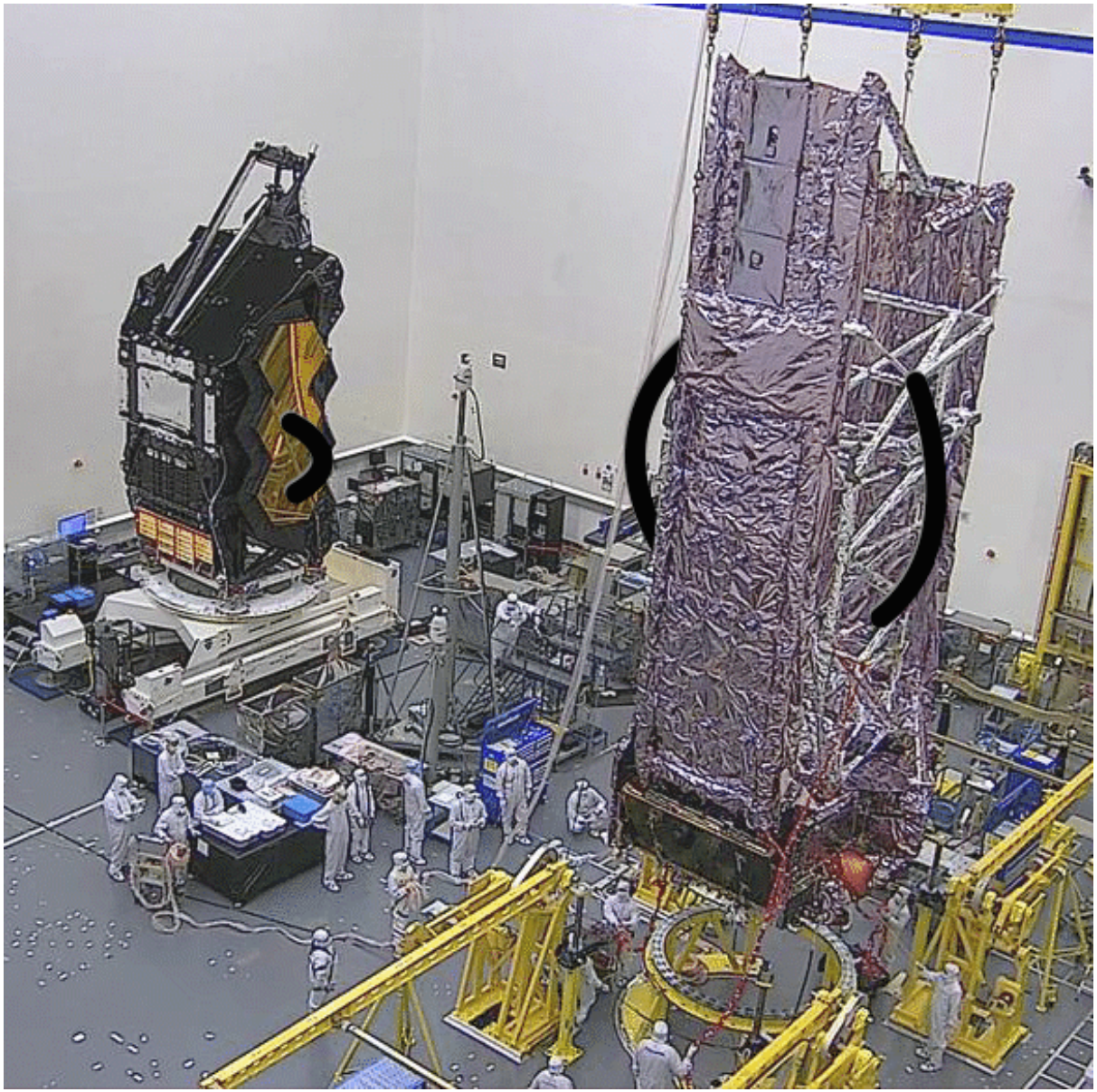
SCE Vibe Table Testing



SCE Thermal Vac Testing

SCE Move Back To Highbay

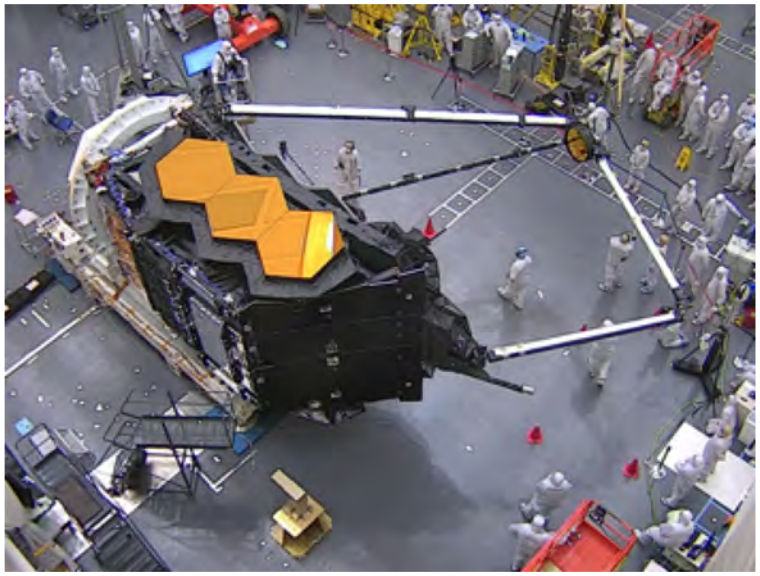
OTIS & SCE Happily Back Together In Cleanroom



OBSERVATORY I&T

Observatory Status

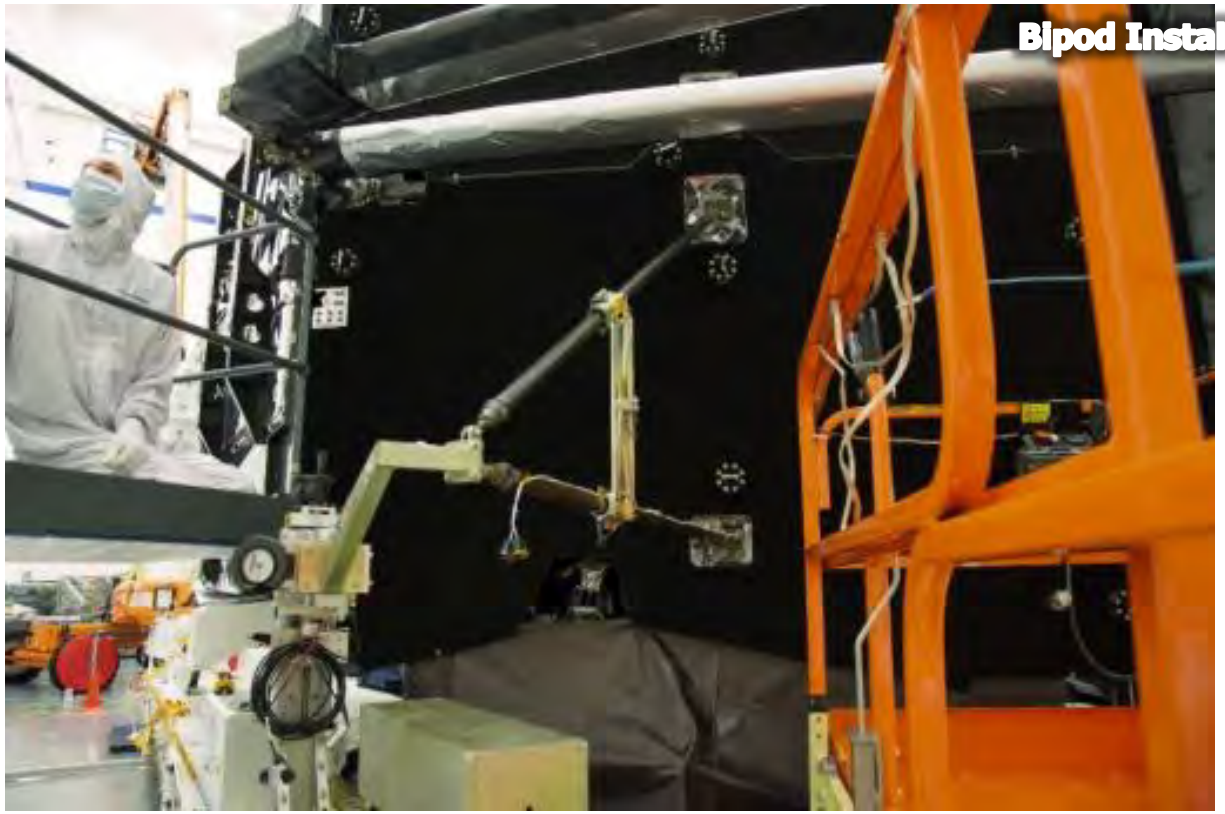
- **June**
  - **Moved SCE back to M8**
  - **Completed AFT Flap release and walk- out**
  - **Completed AFT UPS Bipod release and deployment**
  - **Demonstrated a partial panel opening option for CTP and TWTA removal on Spacecraft mock-up**



- **July**
  - **Completed FWD UPS BiPod Release and Deployment**
  - **Released ¾” NEAs and Removed OTE Simulator – End of “SCE” I&T/Start of “OBS” I&T**
  - **Completed SMSS Launch Lock Release and Two Deployment Cycles**
  - **Started Bipod Installation on OTIS**

Observatory Status

- **August**
  - **Bipods successfully installed on OTIS**
  - **Performed single cable pull testing**
  - **Finished installation of DTA hub and pie pan**
  - **FWD and AFT MCA covers released**
    - **Actuated remaining 84 MRDs on FWD and AFT MCAs**



OTIS Installed!

OBS I&T Integration Flow

As of: 8/29/19

OTIS/SCE Integration
8/5/19 – 9/12/19

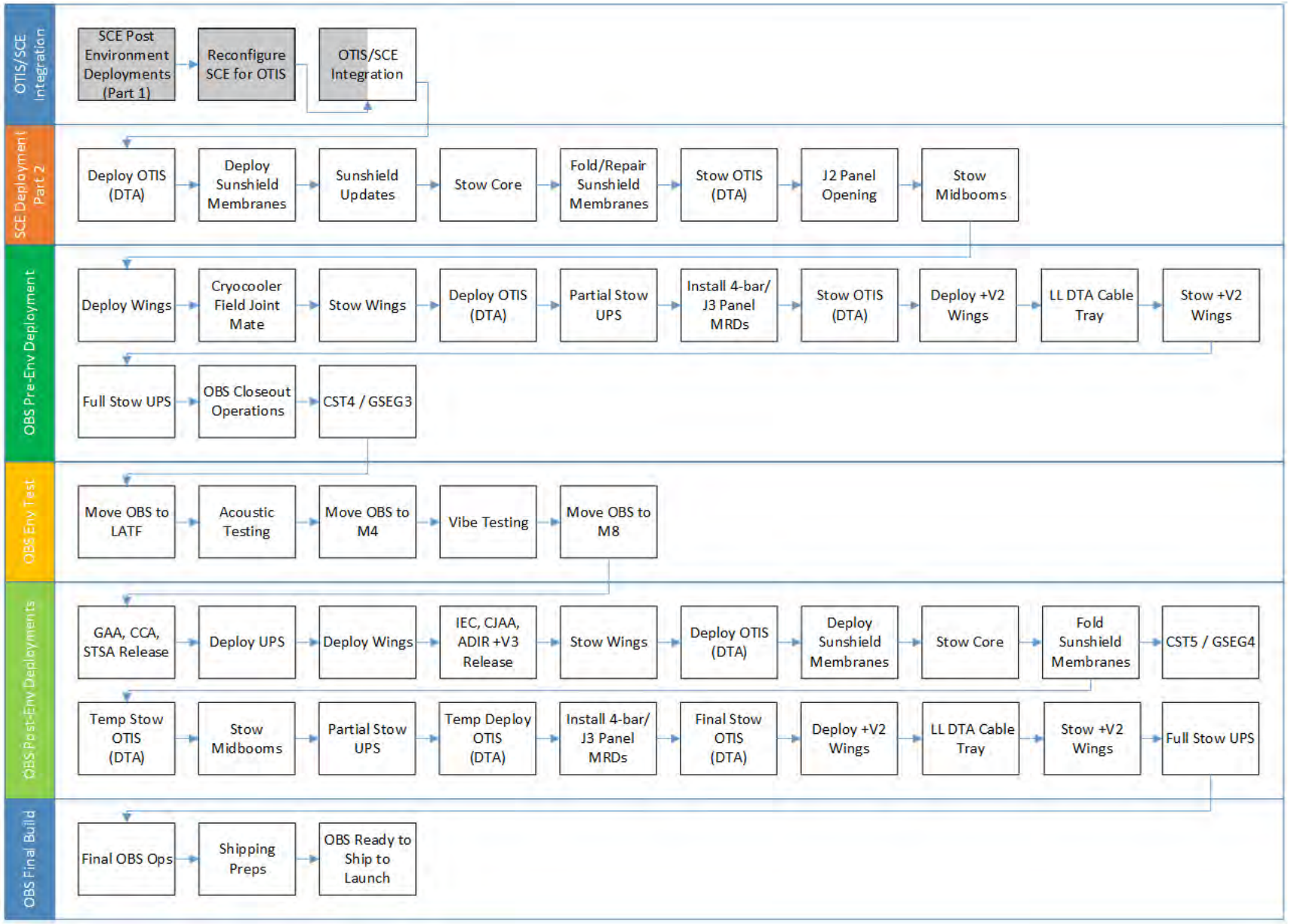
SCE Post-Environmental Deployments
9/12/19 – 2/6/20

OBS Pre-Environmental Deployment
2/6/20 – 4/18/20

OBS Environmental Test
4/18/20 – 5/28/20

OBS Post-Environmental Deployment
5/29/20 – 10/6/20

OBS Final Build
10/6/20 – 10/28/20



GROUND SYSTEM AND OPERATIONS

Science and Operations Center (S&OC) and Operations Preparations

- **S&OC Status**
  - All Observatory control, science planning and science data processing operational systems are on schedule
  - S&OC subsystems have been and will continue to be used to support integration and test
- **Testing and Exercises**
  - Continuing to conduct S&OC interface testing over operational networks
  - Maintaining operational proficiency with Launch Communications exercise #3 (LCOMM3) on September 11, which simulates the day of launch communications between and among the MOC, bMOC, DSN, TDRS and ESA's Malindi ground station
  - Completed Normal Operations Exercise #5, #6 practicing station keeping, momentum unloads and other OSS-driven activities
- **Commissioning**
  - Coordinating contingency response ops concepts with Commissioning Manager and Mission Systems Engineering
  - Aligning the commissioning timeline to the latest thermal analysis; expected completion end of 2019

Operations Product Development Status

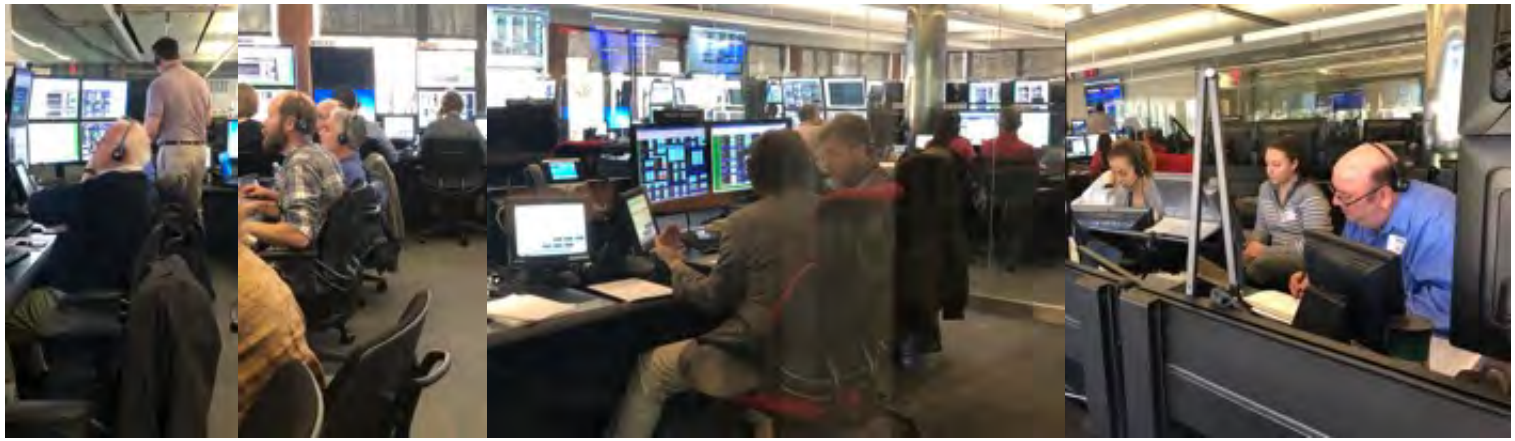
- **ISIM flight product status:**
  - 458 real-time command procedures and 244 standard operating procedures needed for flight
    - 18 products remain for flight certification

    (2 NIRCam, 11 OSS, 5 Cryocooler)
- **SC / OTE flight product status:**
  - 279 real-time command procedures needed for flight and 185 standard operating procedures
    - 18 products remain for flight certification

    (1 ops concepts change, 3 require EMTB, 14 new for Mission Systems Engineering)
- **Deployment flight product status**
  - 187 real-time command procedures needed for flight
    - Testbed/simulator certification is complete; flight certification will finish up during Observatory I&T
- **OSS flight product status:**
  - 806 scripts are required
    - Testbed/simulators certification is complete; flight certification will finish up during GSEG-3

Recent Rehearsals

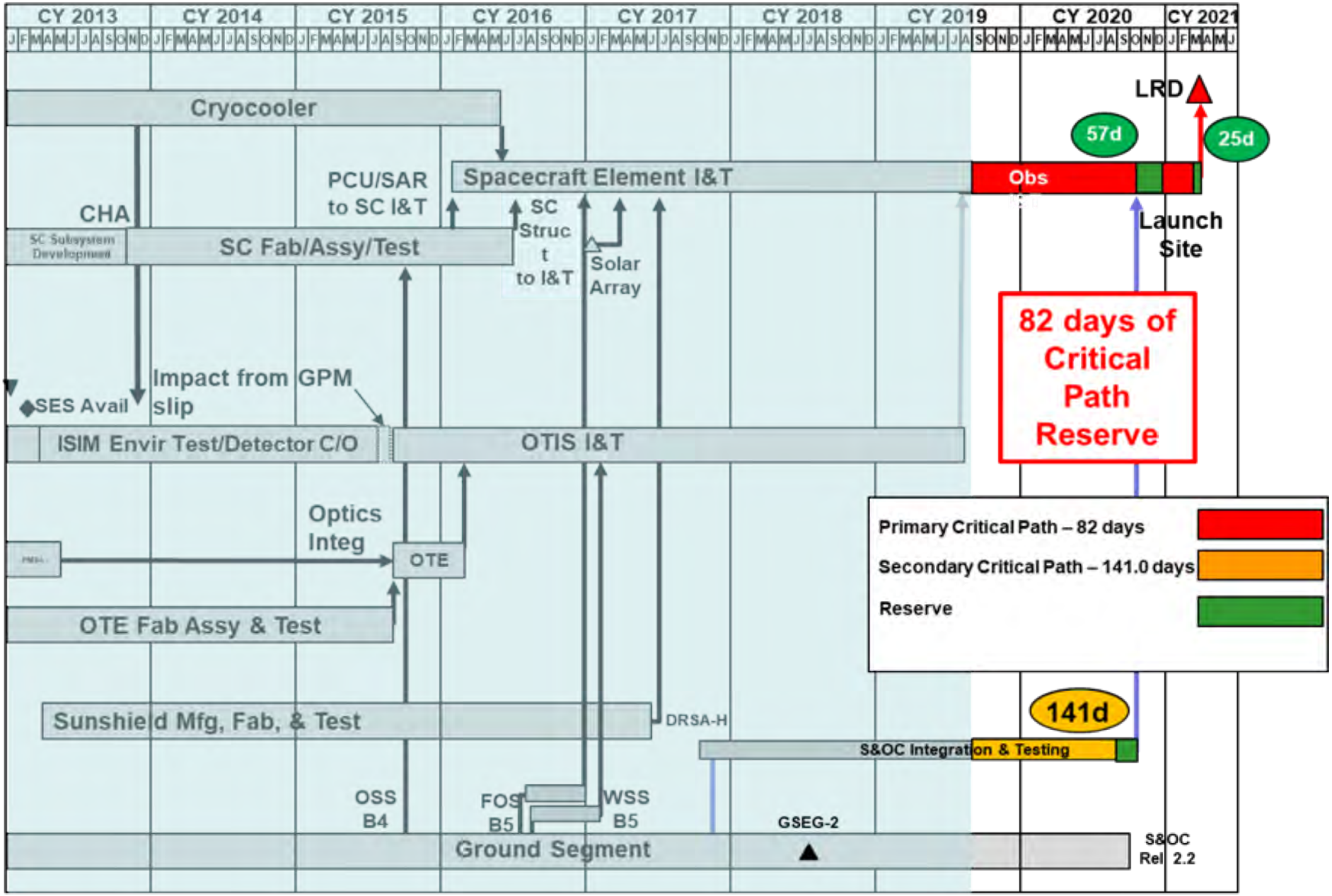
- **Science Instrument Rehearsal #2 – May 13-18 (~137 people)**
  - Familiarized MIRI and NIRSpec instrument teams with flight operations
  - Promoted interactions with other mission teams
  - Exercised data processing and interaction of the SI teams with the optics team
  - Exercised SOC pipeline handling of changes including the product management within and between SOC subsystems
  - Exercised one anomaly per instrument; practiced anomaly resolution process with the ANCO (Anomaly Coordinator)
- **Mirror Deployment Exercise #1 – June 11-12 (~75 people)**
  - Executed mirror deployments in flight-like manner
  - Executed flight procedures with light delays
  - Executed deployments with DSN station handovers and team shift handovers



SCHEDULE

JWST Schedule

Status as of: 8/31/19



CLOSING REMARKS

Closing Remarks

Great Progress Continues To Be Made

Still Have Challenges and Complex Operations Ahead