

James Webb Space Telescope Mission Status

The background of the slide is a composite image of space. In the top left, a portion of the Earth is visible. Below it is the Moon. The central focus is the James Webb Space Telescope, shown from a perspective that highlights its large, segmented primary mirror and the complex structure of the observatory. The telescope is set against a backdrop of a starry field with a prominent purple and blue nebula. The overall scene is illuminated by a bright light source in the bottom left, creating a lens flare effect.

Bill Ochs

JWST Project Manager

NASA Goddard Space Flight Center

Launch Vehicle TIM

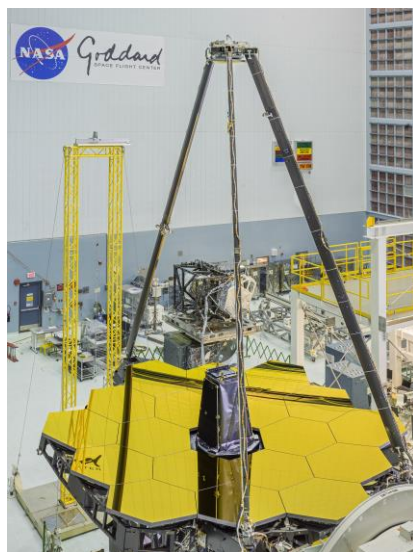
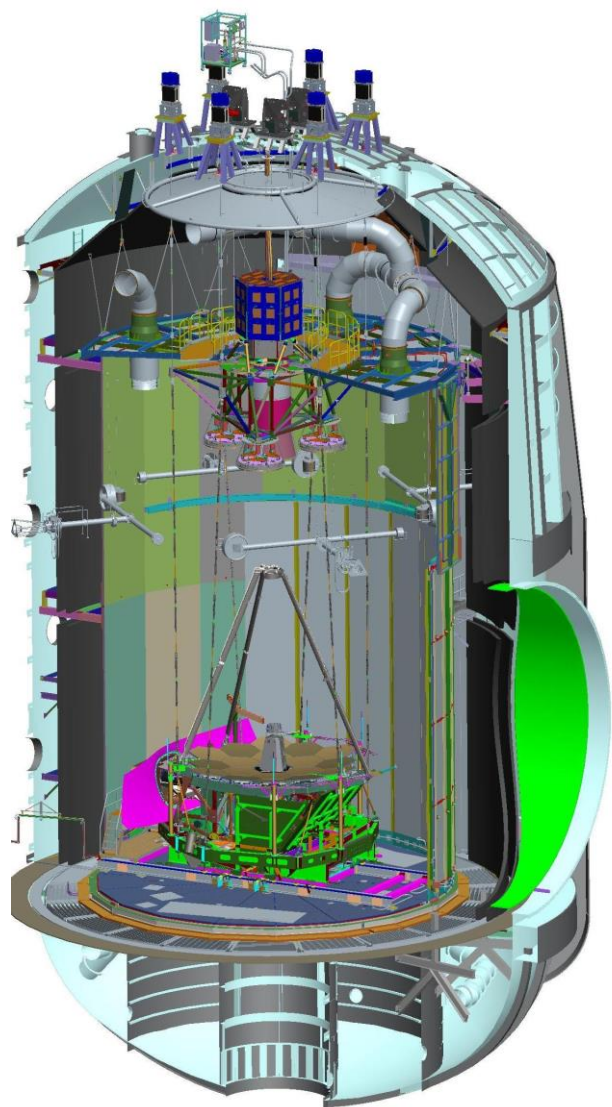
April 10-11, 2017



MISSION STATUS

OTIS

**OPTICALTELESCOPE
ELEMENT/INTEGRATEDSCIENCE
INSTRUMENTMODULE**



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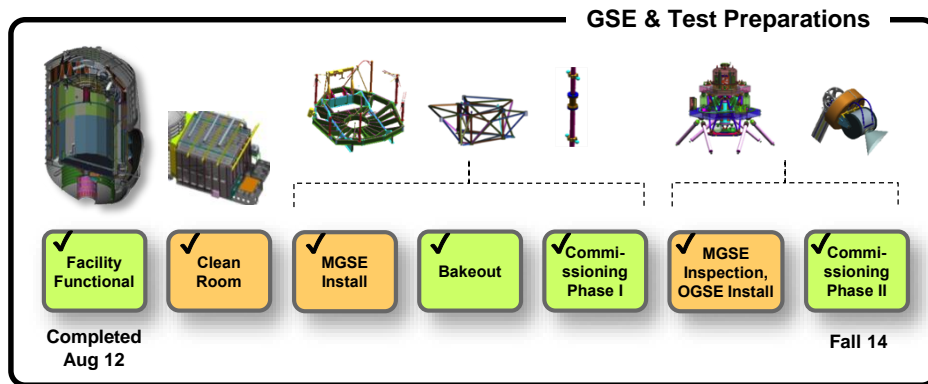




Where Are We In OTIS Flow



JWST OTIS Integration and Test

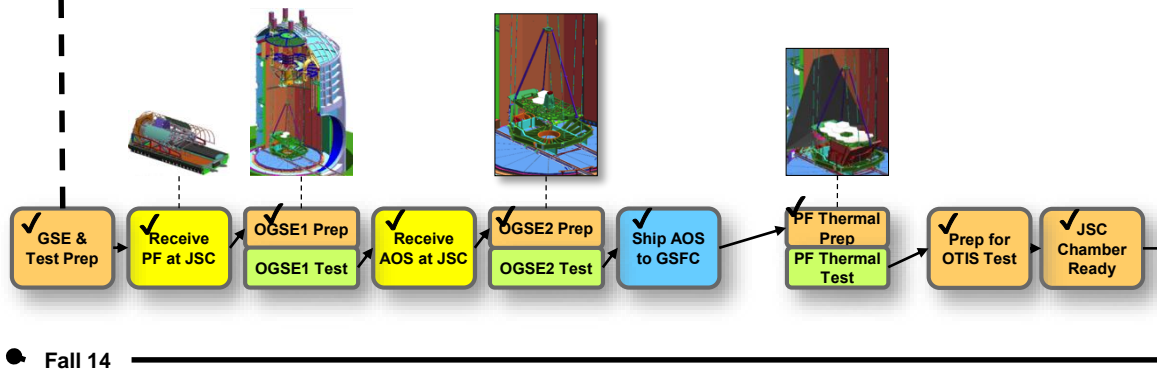


Acronym

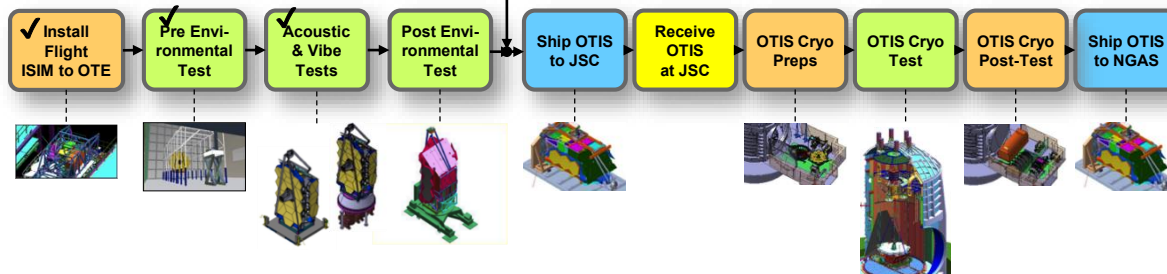
AOS	Aft-Optics Subsystem	S
GSE	Ground Support Equipment	
MGSE	Mechanical Ground Support Equipment	
NGAS	Northrop Grumman Aerospace Systems	
OGSE	Optical Ground Support Equipment	
PF	Pathfinder	

Legend

Prep & Transport	Functional / Test
Assembly / Integration	Delivery



Flight OTIS I&T





- **At GSFC:**

- OTIS Integration Complete
- Pre-Environmental Center of Curvature (COC) complete
- Vibration and Acoustics Testing Complete

- **At GSFC:**

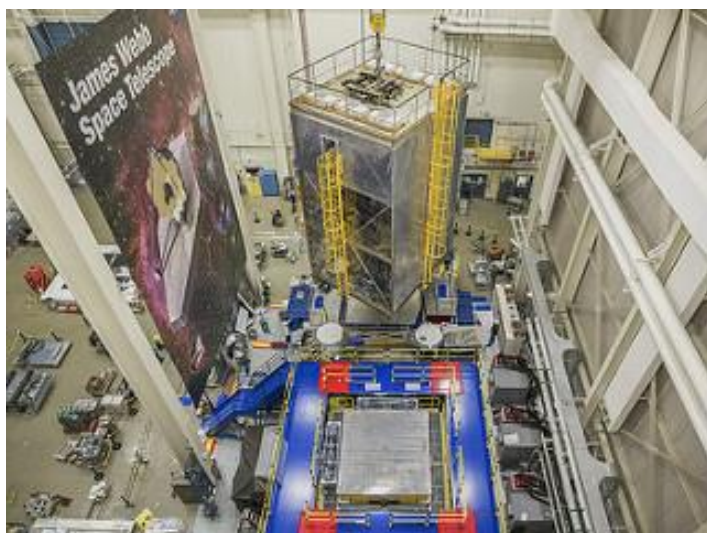
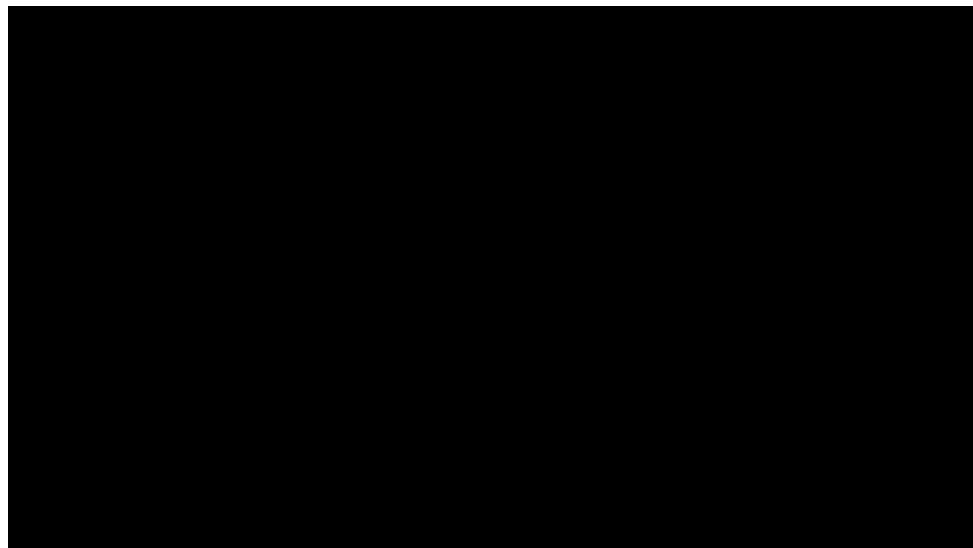
- Pre-Environmental Center of Curvature (COC) and Deployments In-Process



OTIS Vibration and Acoustics Completed



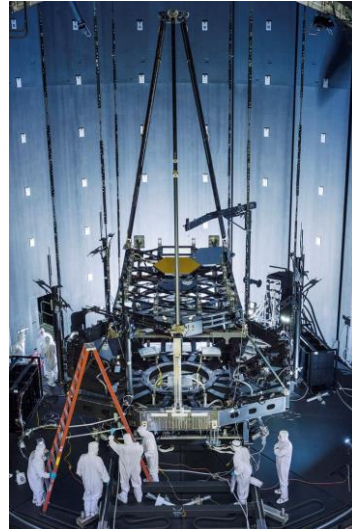
- **Vibration Testing**
 - Largest and most dynamically complex structure ever tested at GSFC successfully completed
- **Acoustics Testing**
 - Test was successfully completed



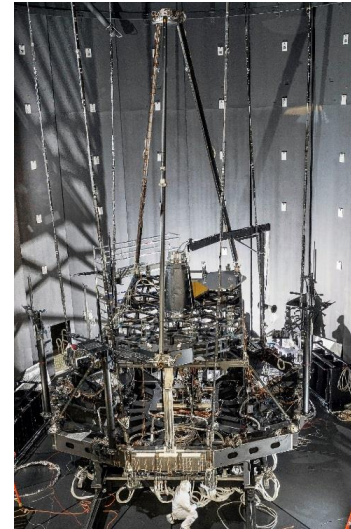
All Risk Reduction Testing Completed



Telescope Pathfinder



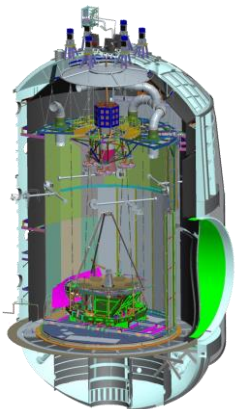
Pathfinder test 1



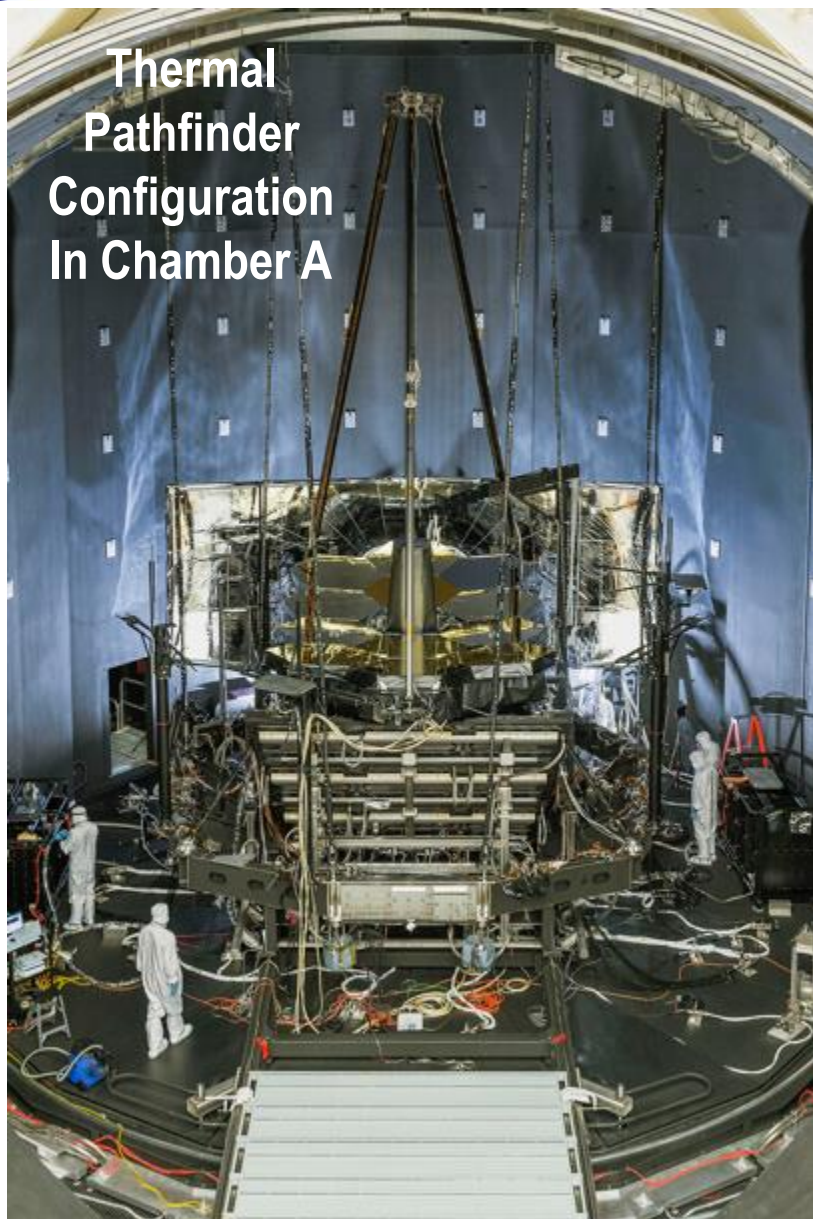
Pathfinder test 2
Aft Optics System
Installed



Pathfinder test 3
Thermal hardware installed



93 Day Flight OTIS Test This Summer!



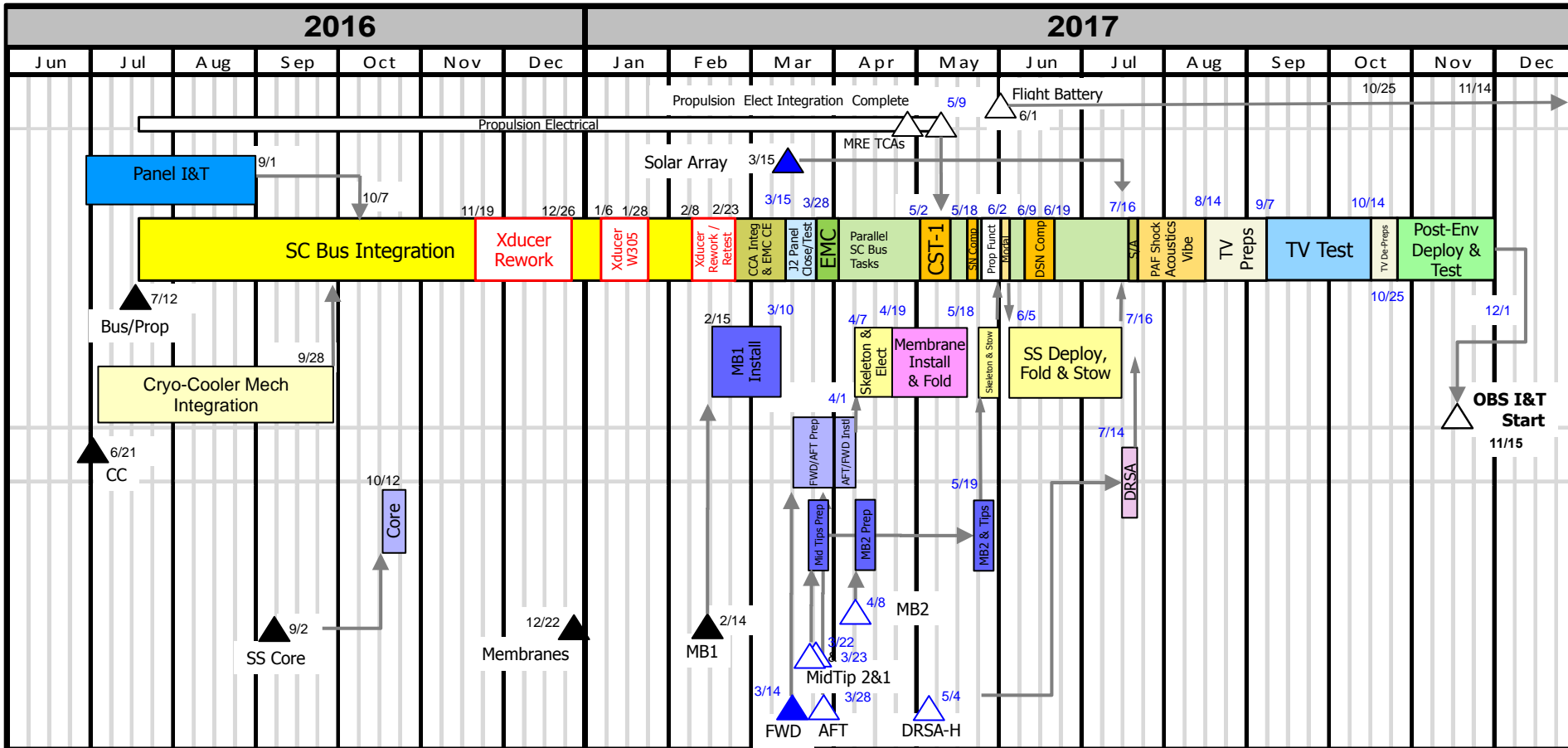
- **JSC Readiness To Receive OTIS Review successfully conducted – 3/15**
 - **Chamber meets or exceeds all requirements to create a deep space environment for meeting the optical and cryogenic testing of OTIS**
 - **Cleanroom meets all contamination requirements, and has emergency power and full environmental back-up system**
- **Hurricane preparations have been addressed and satisfied**
- **Shipping OTIS to JSC early May**



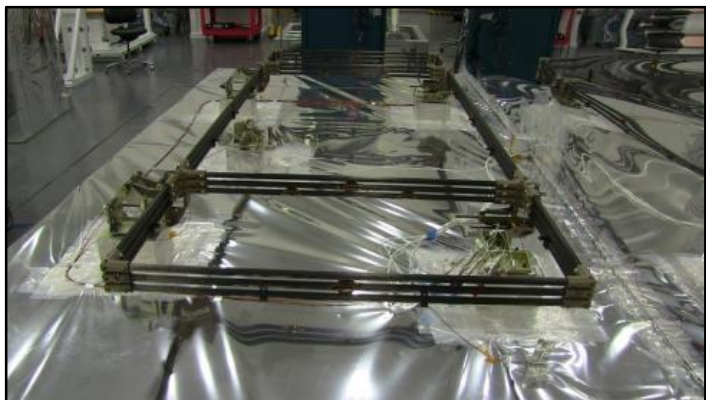
SPACECRAFT ELEMENT (SCE)



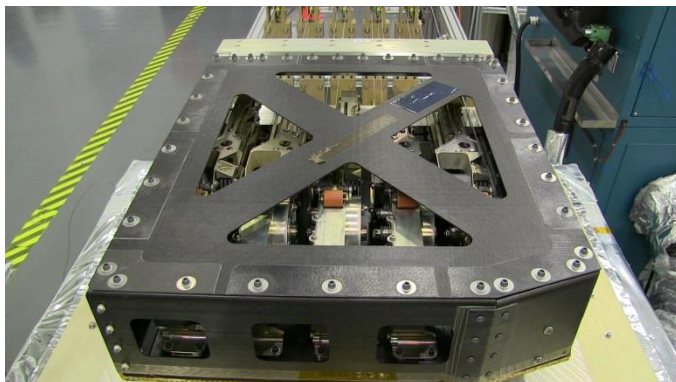
Where Are We In the Spacecraft Element Flow



- Sunshield deliveries to I&T have started
 - Hub/Rim installed on bus
 - 1 of 2 Mid-boom assemblies delivered and installed
 - Forward and Aft UPS Assemblies – complete
 - Second Mid Boom and Mid-Tip assemblies by early April
 - DRSA-H – by mid-April

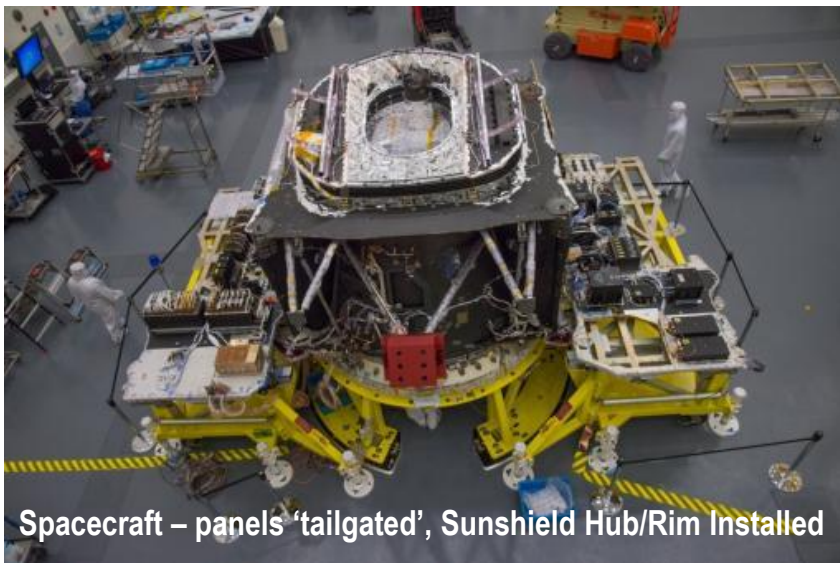


DRSA-H Deployment Testing

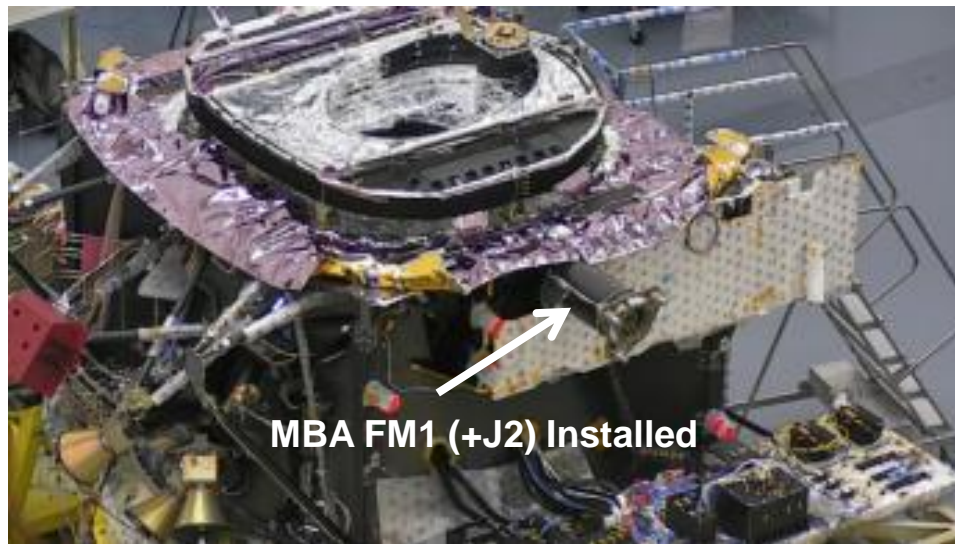


Aft Assembly Complete

MTS Vibration and Functional Testing

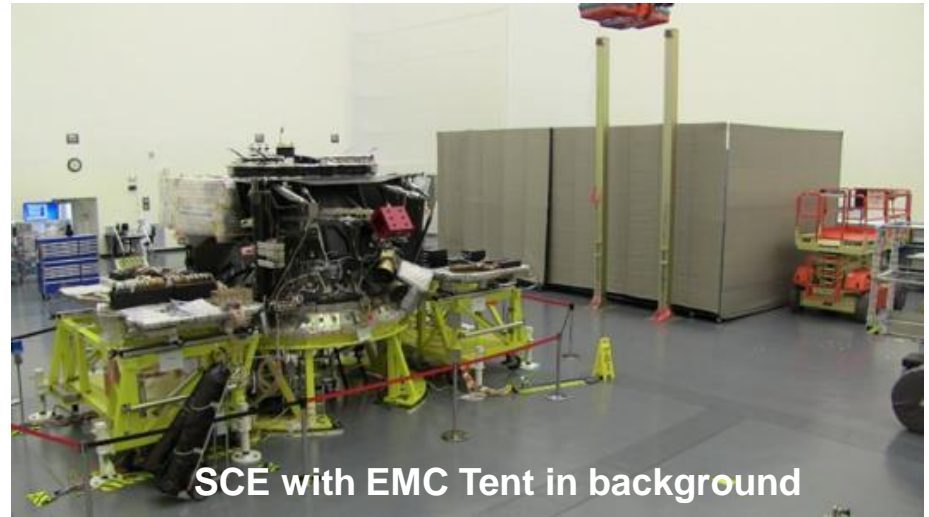


- Spacecraft bus level mechanical integration complete.
- Sunshield Hub/Rim installed.
- +/-J panels are closed
- Install antenna assembly
- Completed Conducted Emissions
- Installed Flight Mid-Boom Assembly 1
- Comprehensive System Test (CST) #1 in May



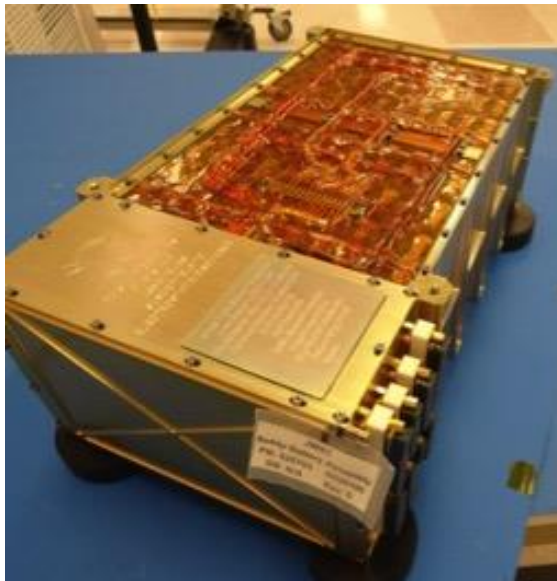


Solar Array delivered to I&T



SCE with EMC Tent in background

Flight Battery – ready for storage



Antenna Assembly – range of motion testing



GROUND SYSTEM AND OPERATIONS



Science and Operations Center (S&OC)



- **All Observatory Control, Science Planning, And Science Data Processing Operational Systems Are On Schedule**
 - S&OC subsystems have been and will be used to support Integration and Test:
 - All subsystems will be exercised during OTIS JSC testing: Wavefront Software Subsystem (WSS), Operations Scripts Subsystem (OSS), Project Reference Database Subsystem (PRDS), Proposal Planning Subsystem (PPS), Data Management Subsystem (DMS), Flight Operations Subsystem (FOS)
 - Continuing to conduct S&OC interface testing over operational networks
 - Successful tests with Deep Space Network, Space Network, Flight Dynamics Facility
 - Testing with ESA Malindi ground station is in progress
 - Mature S&OC subsystems have been integrated into a single system which enable the conduct of science
 - Guaranteed Time Observer and Early Release Science Calls for Proposals were released to the scientific community in January



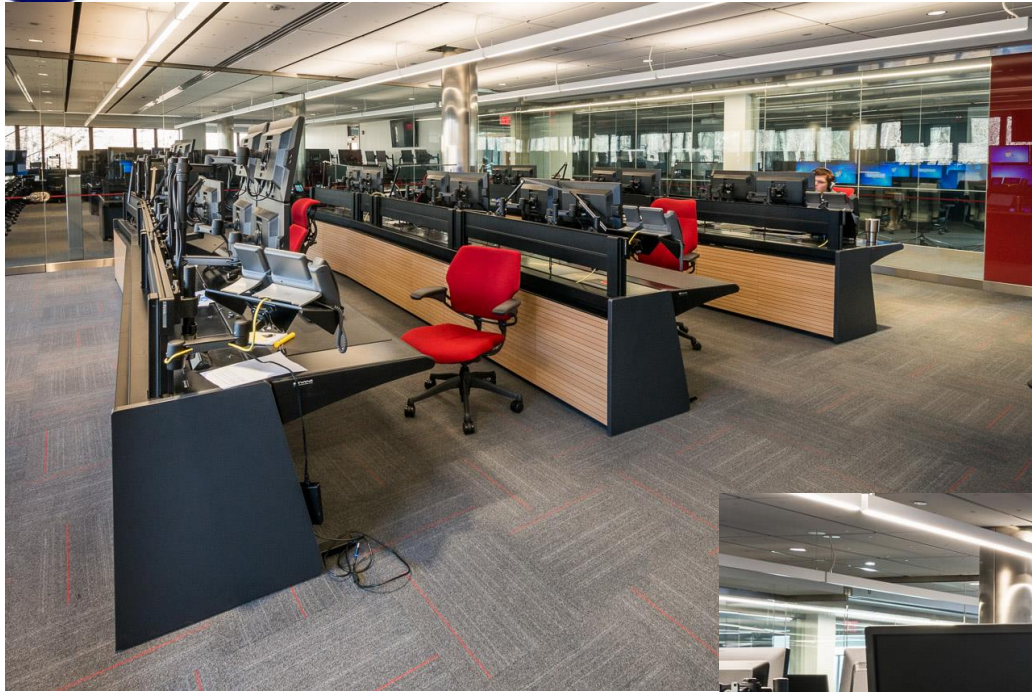
Operations Preparations



- Operational product development well underway
 - ISIM, SC/OTE, Deployment, and Operations Script Subsystems flight procedure development is proceeding on schedule
 - Includes real time, standard operating procedures and java script development
- Ops Products are used extensively during Integration and Test
- Commissioning Timeline Support
 - Nominal timeline development well underway with monthly management reviews/training
 - Completed first phase of meetings to review and analyze contingencies during commissioning
 - Emphasis now turning to development of contingency procedures, tools
- FOT training
 - FOT members have completed required classroom training on spacecraft, ISIM and science instruments and ground elements
 - Preparations underway for first Operational Readiness Exercise (ORE-1) in May



JWST Mission Operations Center





WHAT'S NEXT



JWST Road Ahead



✓ OTIS Vibration (3 axes)

✓ OTIS Acoustics

OTIS Deployment Optics Testing

OTIS Cryogenics (93 day cryo-vacuum test)

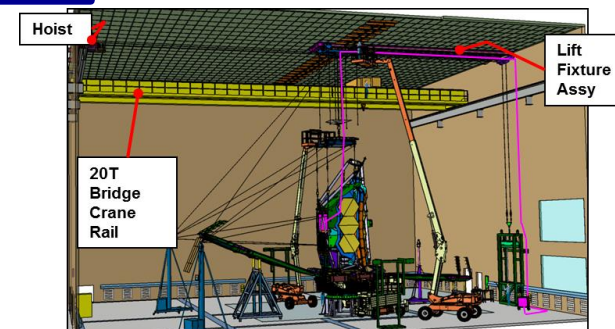
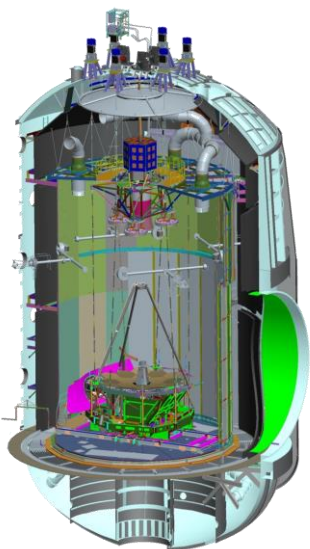
SCE Integration

SCE Electrical test

SCE Thermal Vacuum test

SCE Deployment

Observatory Integration



Observatory Vibration (3 axes)

Observatory Acoustics

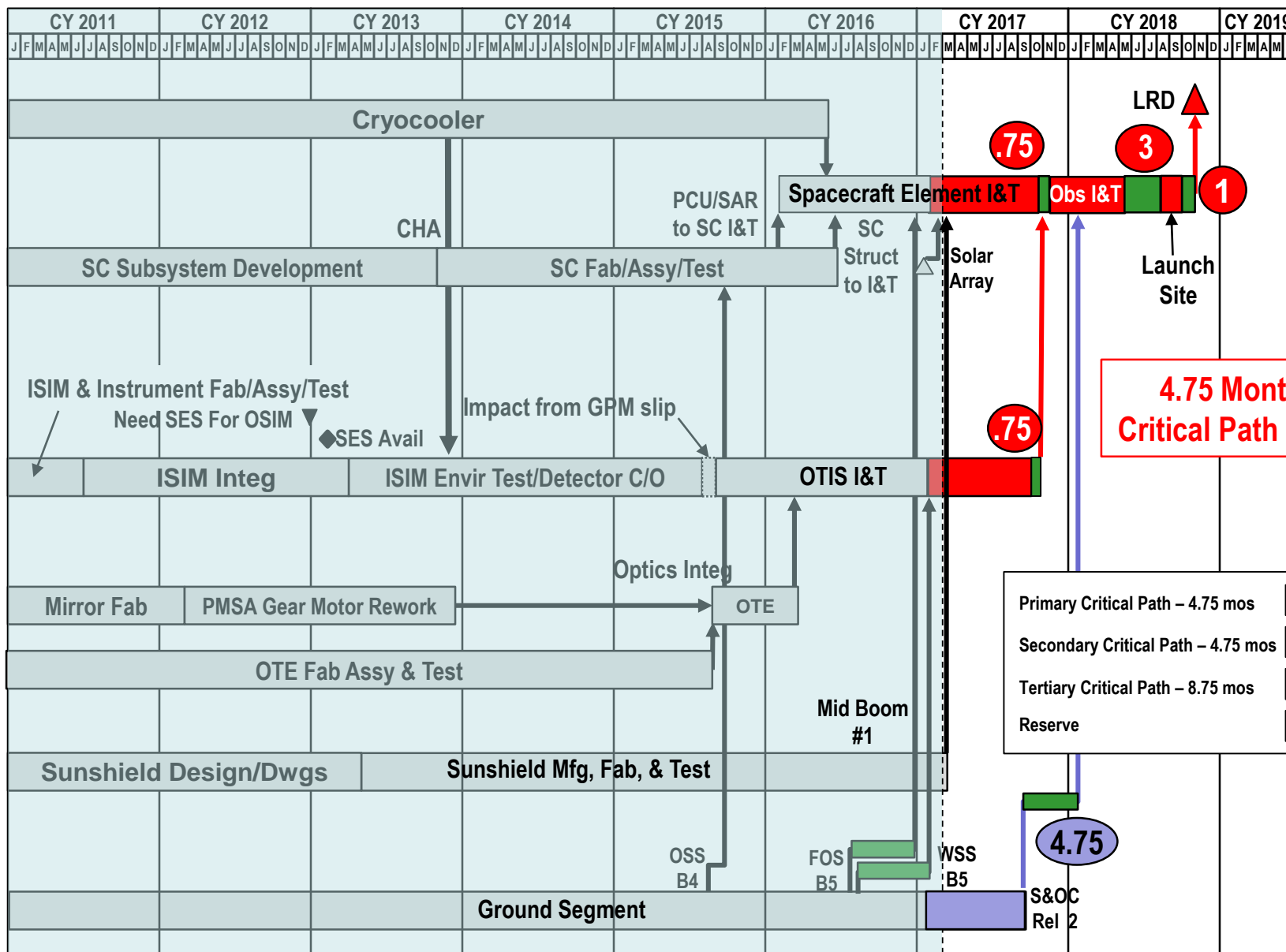
Observatory Deployment (all deployments retested)



SCHEDULE STATUS



JWST Schedule





Schedule



- **Reserves**

- Large amount of schedule reserve was expended since due to Vibe and Transducer Weld issue
- Many complex integration activities (sun shield) and tests still lay before us
- There will be delays due to the nature and complexities of the tasks ahead

- **The Big Question is “Do We Have Enough Schedule Reserve”**

- In the May/June time frame, Project will conduct a schedule risk assessment to support providing an answer



CLOSING REMARKS



Closing Remarks



Progress Continues To Be Made Across All Aspects Of JWST, But We Are Now In The Most Challenging Phase

It's All About Schedule!