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EXPANDING THE FRONTIERS OF SPACE ASTRONOMY

JWST Science & Operations Center

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Background: S&OC Subsystems Overview

S&OC & Subsystem Status						
Subsystem	Build	Development Completion Date	I&T Completion Date	Status	% of Requirements Delivered to Date	% of Requirements Verified to Date
Data Management Subsystem (DMS)	7.1	November 2017	February 2018	Completed I&T	97%	90%
	7.1.3	June 2018	August 2018	Completed I&T		
	7.2	December 2018	March 2019	In I&T		
Proposal Planning Subsystem (PPS)	14.3	May 2018	August 2018	Completed I&T	99%	97%
	14.4	September 2018	February 2019	Completed Development		
	14.5	December 2018	February 2019	In I&T		
Wavefront Sensing & Control (WFS&C) Software Subsystem	6.2	July 2018	August 2018	Completed I&T	100%	99%
	6.2.x	January 2019	February 2019	In Development		
Flight Operations Subsystem (FOS)	6.1	November 2017	February 2018	Completed I&T	98%	93%
	6.2	May 2018	August 2018	Completed I&T		
	6.3	November 2018	April 2019	In I&T		
Operations Scripts Subsystem (OSS)	7.0.1	December 2017	July 2018	Level 2 Certification Complete	99% (Level 1)	90%/63% (Level 2/Level 3)
	7.0.2	December 2017	October 2018	Completed I&T		
	8.0	October 2018 – Level 1 testing complete	June 2019	In I&T		
Project Reference Database Subsystem (PRDS)	4.15	September 2017	September 2017	Sustaining Engineering Release	100%	100%
	4.16	November 2017	December 2017	Sustaining Engineering Release		
S&OC Builds	4.2	August 2018	October 2018	Released	82%	77%
	4.3	April 2019	June 2019	In Development		



S&OC Subsystems Overview

S&OC & Subsystem Status						
Subsystem	Build	Development Completion Date	I&T Completion Date	Status	% of Requirements Delivered to Date	% of Requirements Verified to Date
Data Management Subsystem (DMS)	Launch capable (with workarounds). OTB patch is enabling to data to be generated for requirements completion/verification.					
Proposal Planning Subsystem (PPS)	ready					
Wavefront Sensing & Control (WFS&C) Software Subsystem	ready					
Flight Operations Subsystem (FOS)	ready					
Operations Scripts Subsystem (OSS)	Lien testing on-going. OTB workaround allows certification of all capabilities except Moving Targets					
Project Reference Database Subsystem (PRDS)	ready					
S&OC Builds	4.2	August 2018	October 2018	Released	82%	77%
	4.3	April 2019	June 2019	In Development		



HQ Milestones

- Conduct Wavefront rehearsal #2 Oct 2018
- Deliver Science and Operations Center build 4.2 Nov 2018*
- Conduct Science Operations Rehearsal #4 Dec 2018
- **Conduct Early Commissioning Exercise #2 Feb 2019****
- Conduct Wavefront rehearsal #3 April 2019
- Received Updated Proposals from GTOs July 2019
- Deliver Science and Operations Center build 4.3 July 2019
- Conduct Science Operations Rehearsal #5 July 2019
- Conduct Contingency Planning Rehearsal #3 Sep 2019

*Completed early

** postponed due to Gov shutdown



Background: Subsystem Highlights

Flight Operations System

- MOC regularly used for testing and rehearsals
- FOS Build 6.3 delivered and installed
- Completed plans for a pre-launch hardware refresh
- Started work on Observatory Visualization tool

Proposal and Planning System

- PPS Build 14.5 was delivered on December 18, 2018
- Many improvement to PPS scheduling coming in patch PPS Build 14.5.1
- Work on PPS Build 14.6 is in progress; due February 28, 2019

WFS&C Software Subsystem

- WSS Build 6.2 was used in WFR2
- WSS Builds 6.2.1 to include fixes and updates from WFR2 usage



Background: Subsystem Highlights

Data Management Subsystem

- Delivered Build 7.2 November 21, 2018; supports GS/Jitter analysis
- Data Analysis completed its final release Build 5; delivered December 21, 2018
- With a working OTB, DMS will soon acquire flight-like data to validate its work
- OTB now producing good data; challenge now is getting time to generate the needed data

Operations Script Subsystem

- Completing OSS Build 7.0.2 certification and OSS Build 8.0 development
- Successfully tested highest priority science parallel observations
- Working on liens and beginning Build 8 certification



Background: Rehearsal update

Completed:

- Ground Segment Test 2 (GSEG2, July 2018). Communication channels from MOC to spacecraft at NG were exercised through the DSN Emulator, in support of flight hardware reconfiguration and diagnostics
- Contingency Planning Rehearsal 1 (CPR1, October 2018). Two days long. Simulated first 8 hours of mission on the first day and NIRCam turn on and other instrument work on second day
- Wavefront Rehearsal 2 (WFR2, October 2018). 3 days and 5 shifts. OTE commissioning and some instrument activity. 10 SI and OTE programs executed and data from 8 of them processed through DMS. Science Instrument Rehearsal #1 (November 12-17).

Postponed: Science Instrument Rehearsal #2 (Jan 2019, Feb 4-9, 2019) and Early Commissioning Exercise (Jan 2019)

Upcoming: Deployment Rehearsal #1 (Feb 2019), Launch Communications exercise #2 (March 2019)



Astronomical Community Outreach

- AAS Division for Planetary Sciences (DPS) Meeting
 - “Solar System Science with JWST” Town Hall
 - STScI Booth in Exhibit Hall
 - Demos of proposal tools
- American Astronomical Society (AAS)
 - JWST updates at the STScI townhall
 - STScI booth with one-on-one experts
 - ERS presentations at NASA hyperwall
- Distributed the bimonthly JWST Observer News Roundup, Oct and Dec 2018
- New Scientific Community Engagement Plan submitted to the Project. It will account for the new launch date and audience needs
 - New consideration of March 2021 launch necessitates long-range plan for prioritizing community engagement activities over the next three years, rather than just next fiscal year
 - Now includes expanded video tutorials, symposia, ERS-lead support, and local workshops
 - We are developing a train the trainer workshop encourage local self-organization

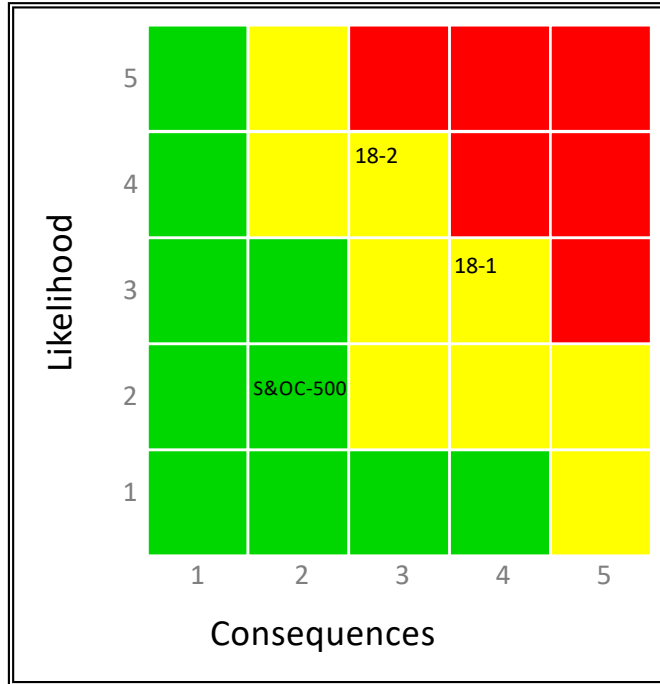


Communications and Outreach

- News Releases are planned on a monthly basis until launch. Recent ones on:
 - NASA's Webb Telescope Will Provide Census of Fledgling Stars in Stellar Nursery
 - New Virtual Reality Experience Highlights NASA's Webb Space Telescope
 - NASA's Webb Telescope Will Investigate Cosmic Jets from Young Stars
- Multimedia Products:
 - Are All Galaxies the Same? ([link](#))
 - Webb Telescope Title Sequence ([link](#))
 - Anatomy of a Stellar Jet ([link](#))
- Public Outreach Events:
 - Jan 2019 – American Astronomical Society, Public outreach student event - expected 300
 - Dec 2018 – American Geophysical Union, Webb VR public outreach - >100 interactive experiences
 - Sept. 2018 – STEM Extravaganza at Morgan State University– >600 attendees
- Released WebbVR on the Steam distribution platform on Nov. 1, 2018; >22 million impressions to date



Background: Risks



■ High Risk	5 – Very High
■ Moderate Risk	4 – High
■ Low Risk	3 – Medium
	2 – Low
	1 – Very Low

ID	Δ	Risk Title
S&OC-500	➔	Early Termination of HST Mission (in Project MSE Risk Database)
18-1	➔	OTB Reliability/availability for Mission Operations
18-2	➔	Moving Target Functionality



Concerns

Vehicle Dynamics Simulator issues in Observatory Test Bed:

The OTB issues are now essentially understood. A test-only workaround has been developed that allows us to use the OTB with most OSS scripts that were previously generating errors. The issue has also been elevated to the Project Top Ten and a potential FSW fix has been identified and is being considered for implementation.

DMS Verification:

The OTB workaround allows us to obtain most data needed to complete requirement implementation and verification. Thus, these activities have now restarted.

Communications:

- Communications continue to be a concern. We submitted our comments/feedback to a draft of the 130-page (HQ) communications plan on November 2, 2018. Final plan has not been shared with us.
- Ad hoc change to the news review cycle at HQ, which adds substantially to turn around time, occurred in Dec 2018. Change has still not been formally communicated to STScI.



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