JWST Update

Eric P. Smith
JWST Program Office
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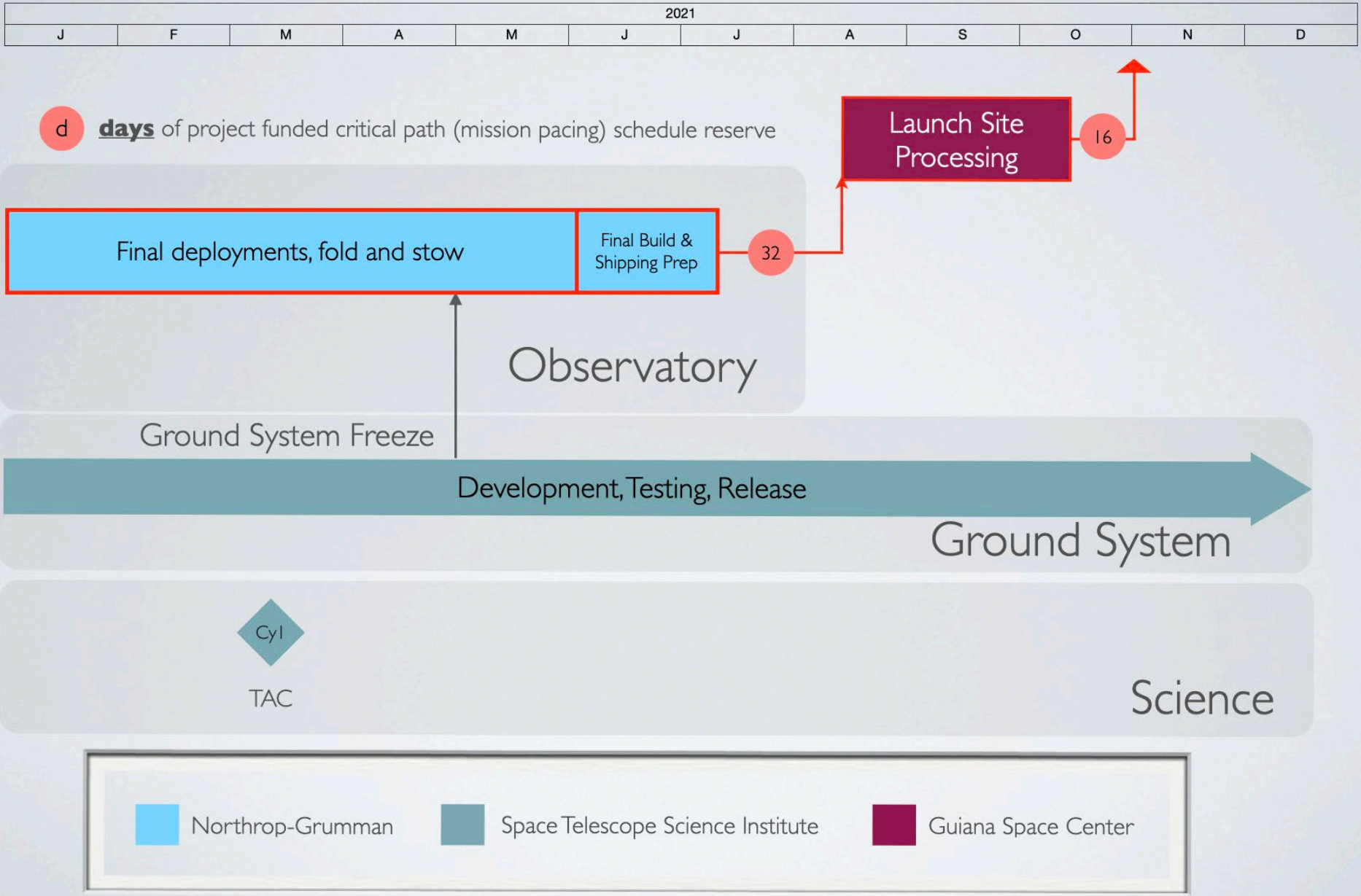
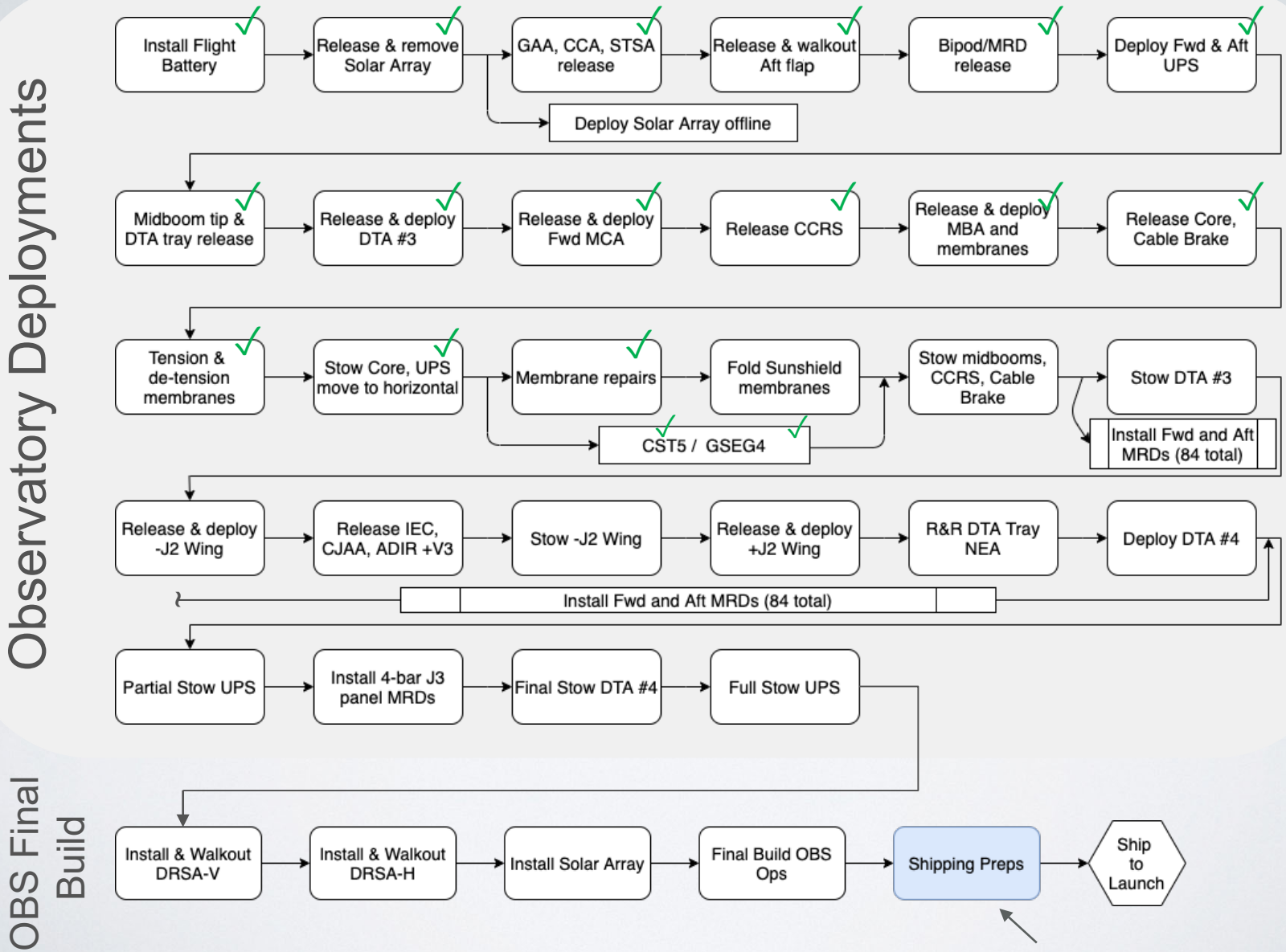
RECENT UPDATES

- Programmatic
  - NASA and Northrop continuing to work with COVID19 social distancing protocols meaning some reduced efficiencies
  - Held exit conference with GAO for their 2020 annual audit, no recommendations in the report
- Observatory
  - Completed post-environmental sunshield deployment and tensioning
  - Completed observatory functional testing
- Science and Operations
  - Ground segment testing and operations rehearsals restarted
    - Completed Launch Readiness Exercise #2, many commissioning rehearsals
    - Increasing on-site personnel with each rehearsal, consistent with COVID19 social distancing and cleaning protocols
  - Cycle 1 announcement of selections on track (more during STScI presentation)

SIMPLIFIED SCHEDULE



REMAINING I&T STEPS

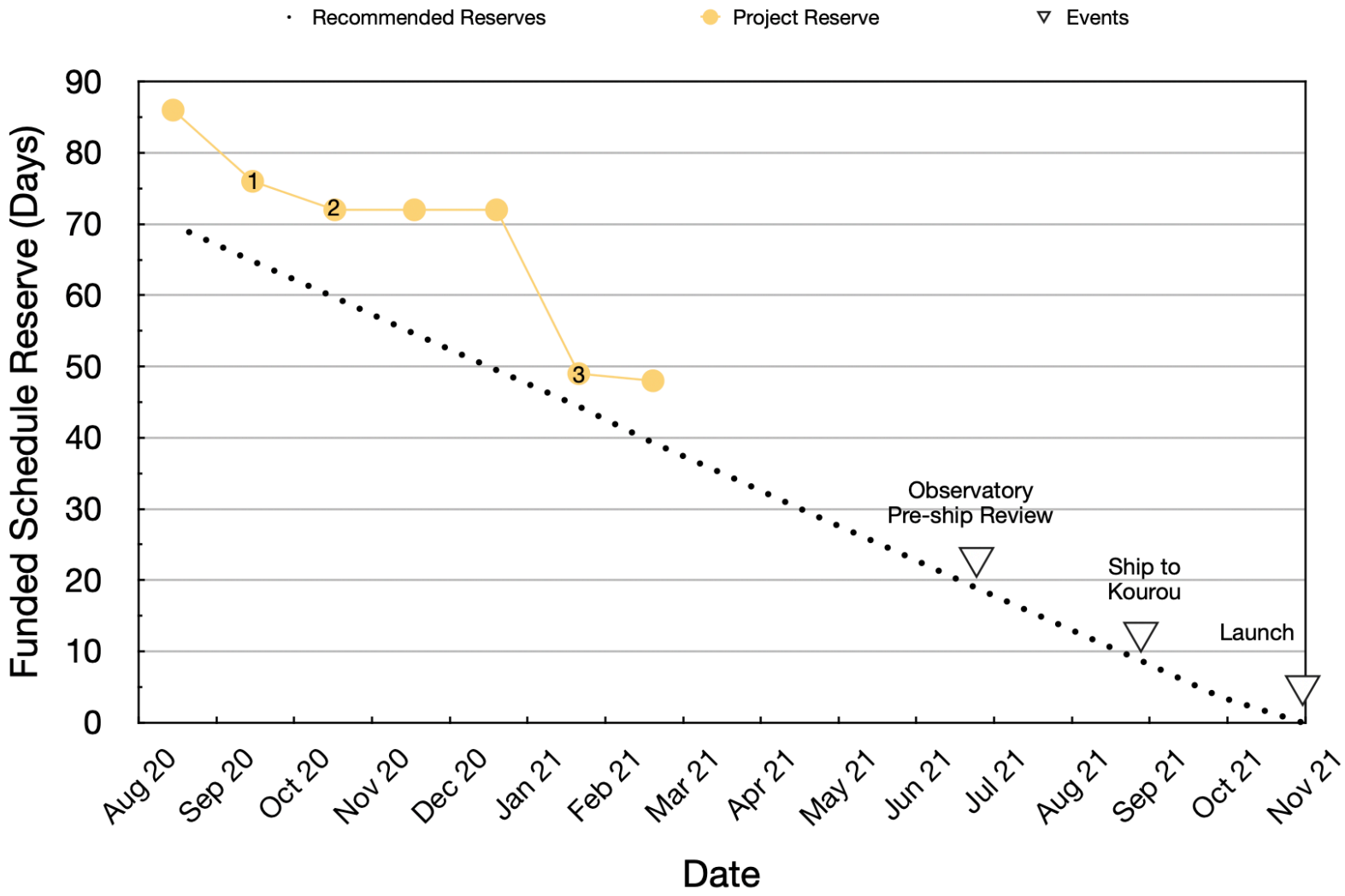


Fiscal Year 2021 JWST HQ Milestones

Month		Milestone	Comment
Oct-20	1	Complete Observatory Envronmental Testing	Completed 10/2/20
Nov-20			
Dec-20	2	Complete Post Environmental Testing Spacecraft Bus Deployments	Completed 11/12/20
Jan-21	3	Complete Post Environmental Testing Sunshield Deployments	Completed 12/16/20
Feb-21	4	Complete Comprehensive System Test #5	Completed 2/13/21
Mar-21	5	Complete Cycle 1 Geneal Observer Proposal Reviews	
	6	Sunshield Fold Complete	
	7	Launch Readiness Exercise #2	Completed 3/8/21
Apr-21			
May-21	8	Final Deployable Tower deployment	
Jun-21			
Jul-21	9	Final Observatory Stow Complete	
	10	Observatory Pre-Ship Review	
	11	Launch Readiness Exercise #4	
Aug-21	12	Operational Readiness Review	
	13	Ship Observatory to Launch Site	
Sep-21			

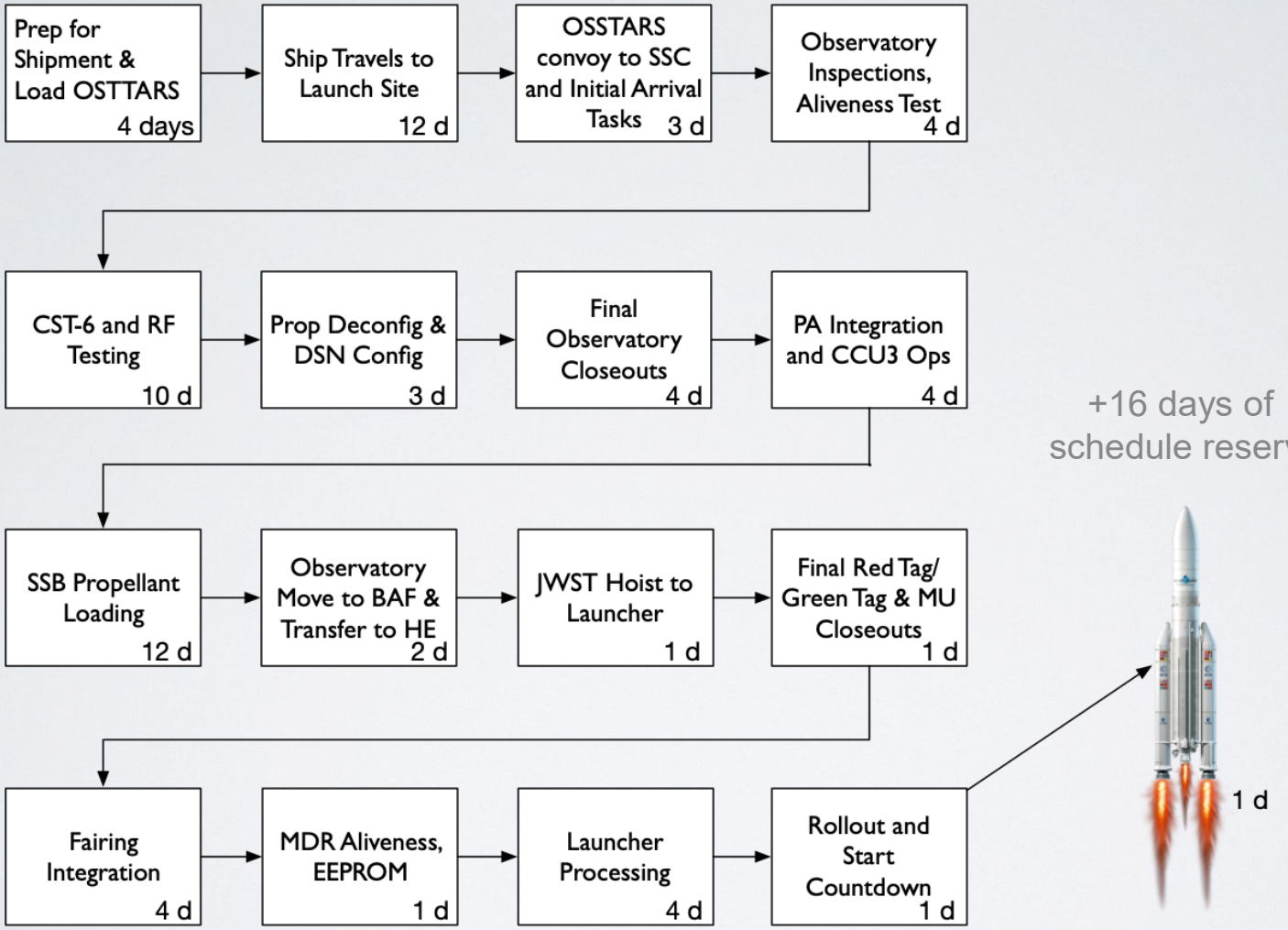
Blue font(underline) denotes milestones accomplished ahead of schedule, orange font denotes milestones accomplished late.

FUNDED SCHEDULE RESERVE



Reserve uses: (1) Bldg M4 issues, additional Z-axis vibe run, (2) Ka-band measurements, APCO adapter (3) Planned sunshield repairs and patching

KOUROU ACTIVITIES



+16 days of schedule reserve

STScI Software Status

S&OC & Subsystem Status (pending GS&O approval)						
Subsystem	Build	Development Completion Date	I&T Completion Date	Status	% of Requirements Delivered to Date	% of Requirements Verified to Date
Flight Operations Subsystem (FOS)	6.5	8/7/2020	8/21/2020	Delivered	99%	98%
	6.5.1 & 6.5.2	10/30/2020	1/6/2021	Delivered		
	7	July 2022	-	Planning		
Operations Scripts Subsystem (OSS)	8.2	12/16/19	8/31/2020	Delivered	100% (Level 4 implemented)	100% (Level 4 verified)
	8.3	9/28/2020	11/27/2020	Delivered		
	8.4	March 2021	June 2021	In Development		
Proposal Planning Subsystem (PPS)	14.13	12/10/2020	February 2021	In Test	100%	100%
	14.14	March 2021	June 2021	In Development		
	14.15	June 2021	-	-		
	14.16	September 2021	-	--		
Wavefront Sensing & Control (WFS&C) Software Subsystem	7.0	2/1/2021	April 2021	In Development	100%	100%
	7.1	July 2021	-	-		
Project Reference Database Subsystem (PRDS)	4.17	5/28/2020	6/16/2020	Sustaining Engineering Release	100%	100%
	4.18	April 2021	April 2021	In Development		
Data Management Subsystem (DMS)	7.6	9/25/2020	10/30/2020	Delivered	99%	98%
	7.7	1/29/2021	February 2021	in Testing		
	7.8	June 2021	August 2021	In Planning		
	7.9	September 2021	-	-		
S&OC Releases	R2.1		4/30/2020	Delivered	100%	98%
	R2.2		May 2021	Planning		

TECHNICAL ISSUES STATUS

S-BAND TRANSPONDER ANOMALIES

- Low Transponder 2 Transmitter Output Power
  - 1/7/21: Telemetry and measured power output at the RF Test Set are low by approximately 6dB compared to all previous nominal trend data
- Transponder 1 Receiver Looping in Reset
  - 1/9/21: During SC Power on Transponder 1 Receiver was looping in a continuous watchdog reset condition
  - Externally commanded reset did not stop the behavior
- Action Plan/Status:
  - Transponder 1: Failure cause is solder joint failure at connector J06 internal pin within the receiver module
  - Transponder 2: During test an anomalous behavior of J04 connector central pin has been found. Damage/disconnect at welded joint between substrate and ribbon
  - NGAS and NASA Failure Review Board working with the vendor on box rework plans (rewelding and resoldering)

BACKUP

Latest images here

FAIRING DEPRESSURIZATION

- Plan: Determined that the Sunshield MRDs, membranes and telescope and spacecraft hardware can tolerate 2X fairing pressure level at jettison (i.e., 0.36 Pa). This is a joint NASA and Northrop effort.
- NASA and Northrop performed independent assessments as cross-checks.
- Final coupon testing revealed more capability in the membrane material than first assumed
- Two locations on layer 5 (layer closest to the primary) have been patched (additional thickness), but all other locations were exonerated by testing.

MEMBRANE RELEASE DEVICES (MRD) & NON-EXPLOSIVE ACTUATORS (NEA)

- MRD
  - Evaluation of simultaneous ascent (mechanical, acoustic) and pressure loads show negative margins on some highly-loaded MRDs
  - Built 5 new MRDs with new material. Three were installed for Observatory environments, 2 went through a series of offline tests.
  - Resolution: All MRDs have positive margins based on either additional proof testing or replacing Collets and Stems with alternate material
- NEA
  - The NEA for one sunshield MRD failed to release when actuated using the redundant side only electrical signal.
  - The NEA fired correctly when signaled on the primary side.
  - The anomaly has been localized to the NEA portion of this actuator
  - New NEAs have been manufactured and are being installed during final observatory stow before shipping.

FASTENER RETORQUING

- Issue Description:

  Data sampling method used during installation of fasteners specified to be torqued “above run-in torque” was inadequate to capture the full range of running torques

Action Plan/Status:

Re-audit of all JWST drawings that require above run-in torque (COMPLETE)

Pre-OBS Environment Assessment (COMPLETE)

Identification of hardware rework prior to Post-OBS Deployments (COMPLETE)

Flight Exoneration (COMPLETE)

Identification of hardware rework after Post-OBS Deployments (COMPLETE)

Running Torque Flight Exoneration Review/Technical Interchange Meeting (COMPLETE)

- Expected Resolution:

  Fasteners either re-torqued or exonerated by analysis prior to Launch

  Approximately 450 were retorqued prior to environmental testing and ~120 fasteners retorqued during the final stowing process.

REMANUFACTURED DRSA-H

All 4 Deployable Radiator Shade Assembly – Horizontal (DRSA-H) panel frames are completely reassembled. Membranes are installed on two of the completed panels. All will be completed and tested (~6-May) about one month before they are needed for final integration and testing (see chart 4).

Blue underlined text indicates changes from last meeting

MILESTONE PERFORMANCE

- Since the September 2011 replan JWST reports high-level milestones monthly to numerous stakeholders

	Total Milestones	Total Milestones Completed	Number Completed Early	Number Completed Late	Deferred to Next Year	Deferred more than one quarter
FY2011	21	21	6	3	0	0
FY2012	37	34	16	2	3	3
FY2013	41	38	20	5	3	2
FY2014❖	36	23	10	8	11	10
FY2015	48	44	22	12	4	3
FY2016	45	39	25	7	6	2
FY2017	38	32	12	13	8	5
FY2018	31	18	7	2	13	13
FY2019	25	22	10	10	3	2
FY2020	17*	12	5	0	0	0
FY2021	13	5	2	0	0	0

❖ Milestone accounting in FY2014 was complicated by the government shutdown and multicomponent milestones. *Milestone reporting stopped during COVID-19 impacted months