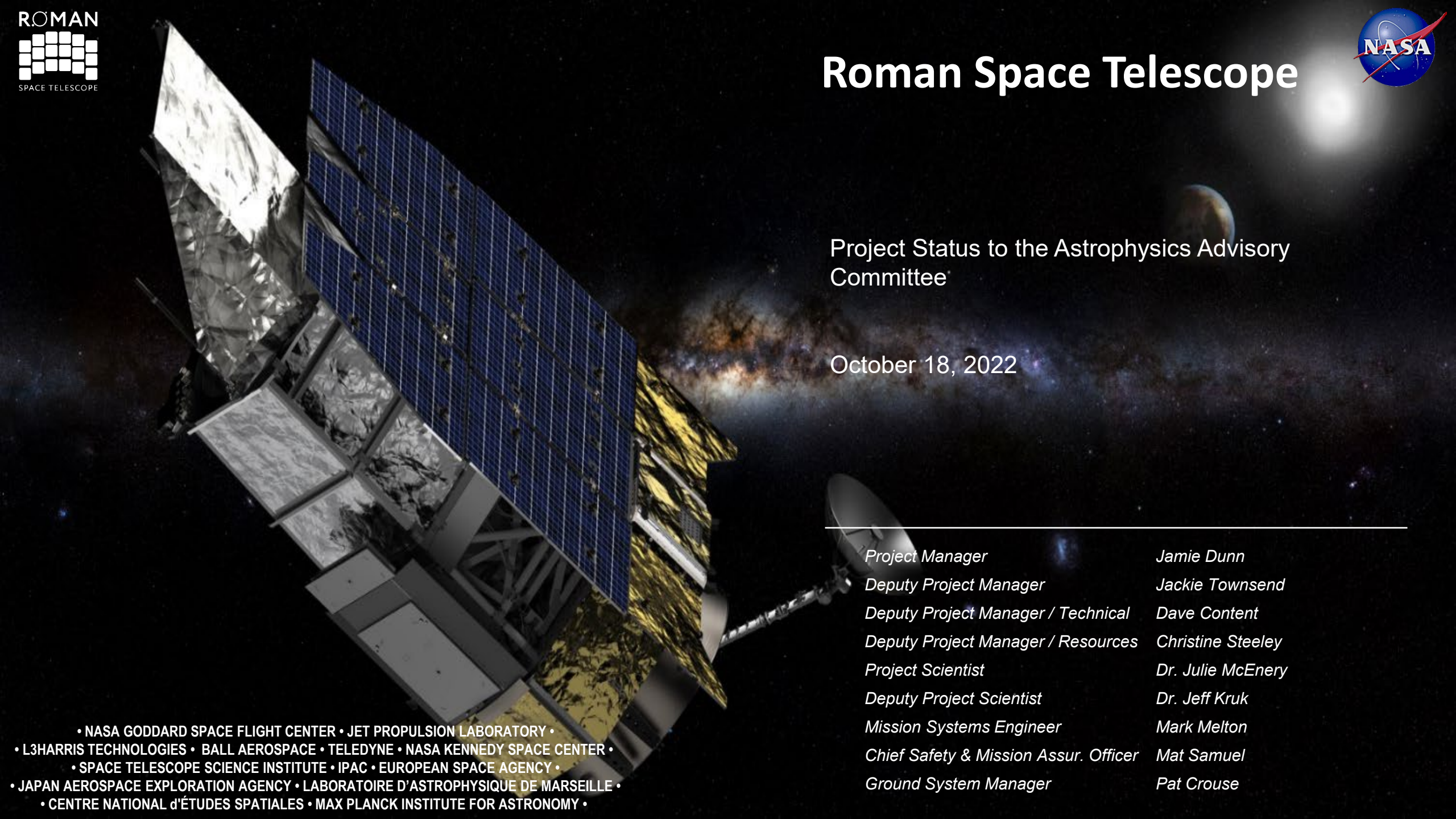


Roman Space Telescope

Project Status to the Astrophysics Advisory Committee

October 18, 2022

Project Manager	*Jamie Dunn*
Deputy Project Manager	*Jackie Townsend*
Deputy Project Manager / Technical	*Dave Content*
Deputy Project Manager / Resources	*Christine Steeley*
Project Scientist	*Dr. Julie McEnery*
Deputy Project Scientist	*Dr. Jeff Kruk*
Mission Systems Engineer	*Mark Melton*
Chief Safety & Mission Assur. Officer	*Mat Samuel*
Ground System Manager	*Pat Crouse*

• NASA GODDARD SPACE FLIGHT CENTER • JET PROPULSION LABORATORY •
• L3HARRIS TECHNOLOGIES • BALL AEROSPACE • TELEDYNE • NASA KENNEDY SPACE CENTER •
• SPACE TELESCOPE SCIENCE INSTITUTE • IPAC • EUROPEAN SPACE AGENCY •
• JAPAN AEROSPACE EXPLORATION AGENCY • LABORATOIRE D'ASTROPHYSIQUE DE MARSEILLE •
• CENTRE NATIONAL d'ÉTUDES SPATIALES • MAX PLANCK INSTITUTE FOR ASTRONOMY •

Mission Overview

Science Description

- Determine the nature of the dark energy that is driving the current accelerating expansion of the universe
- Perform statistical census of planetary systems through microlensing survey
- Survey the NIR sky
- Provide the community with a wide field telescope for pointed observations

Project Description

A NASA observatory designed to perform wide-field imaging and slitless spectroscopic surveys of the near infrared (NIR) sky for the community

Key Information

Mission Phase: C
Launch Date: October 2026
Mission Life: 5 years
Category: 1
Class: A tailored
Launch Vehicle: Falcon Heavy
Technical Authority: Goddard
Program Office/Center: ASMP/HQ

Instruments

Wide-Field Instrument (GSFC in-house and Ball Aerospace (WOMA))

Coronagraph Instrument (JPL) - technology demonstration

Partners & Contractors

Partners: ESA, JAXA, CNES, LAM, MPIA

NASA Centers: GSFC (lead), JPL, KSC/LSP

Significant Subcontractors:

- AURA/Space Telescope Science Institute
- Ball Aerospace
- L3Harris Technologies
- Teledyne Imaging Systems

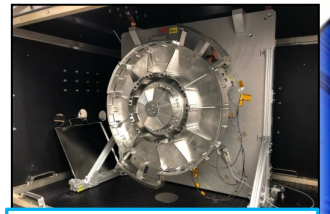
Roman Schedule	Year 2019		Year 2020				Year 2021				Year 2022				Year 2023				Year 2024				Year 2025				Year 2026				Year 2027		
	FY 2019		FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027		
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3
Major Milestones			PDR	KDP-C						CDR														SIR	KDP-D					PSR	ORR	KDP-E	LRD		

We are here

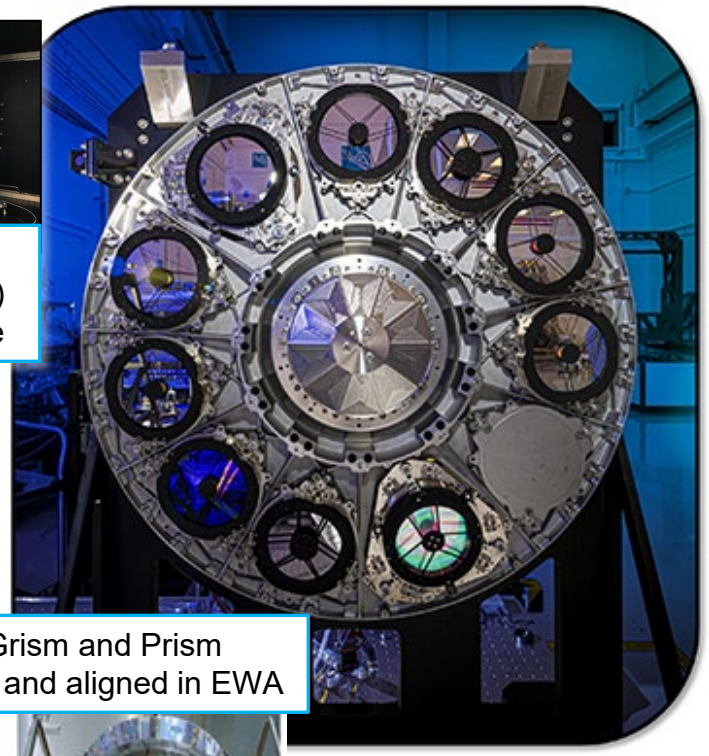
RECENT UPDATES

Wide Field Instrument (WFI) Integration Underway!

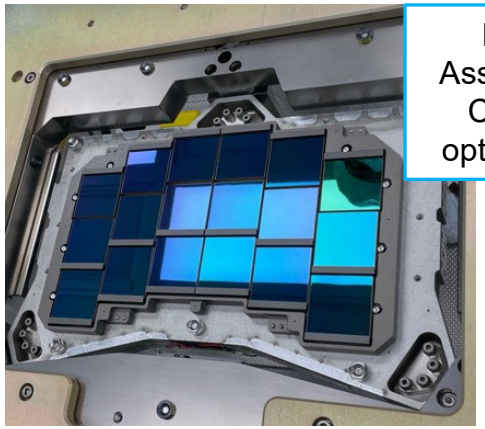
Ball and GSFC making good progress on WFI



Element Wheel Assembly (EWA) life test complete

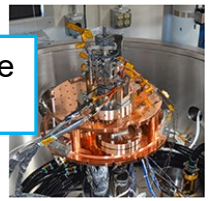


Flight Filters, Grism and Prism complete; installed and aligned in EWA

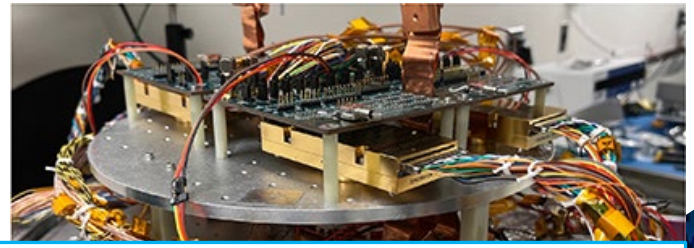


Flight Mosaic Plate Assembly with all Sensor Chip Assemblies and optical fibers is complete

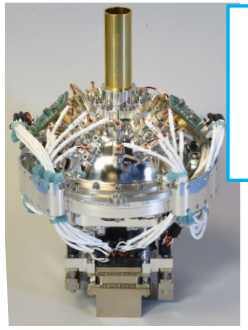
Instrument Command and Data Handling boxes complete and delivered to Ball for integration



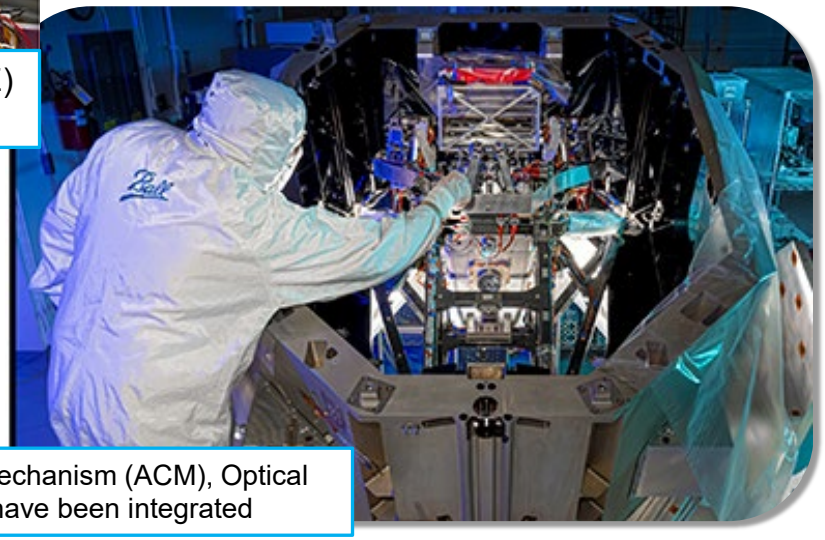
ACM actuator life test complete



First 4 Flight Sensor Control Electronics (SCE) installed and undergoing functional test

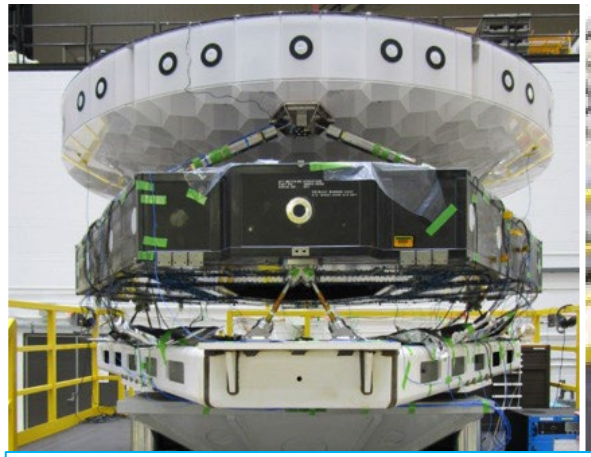


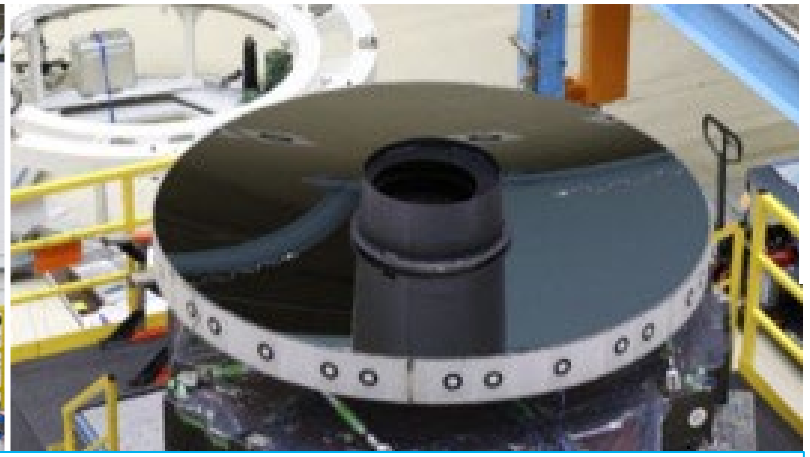
simplified Relative Calibration System (sRCS) Sphere Engineering Test Unit assembled and in test



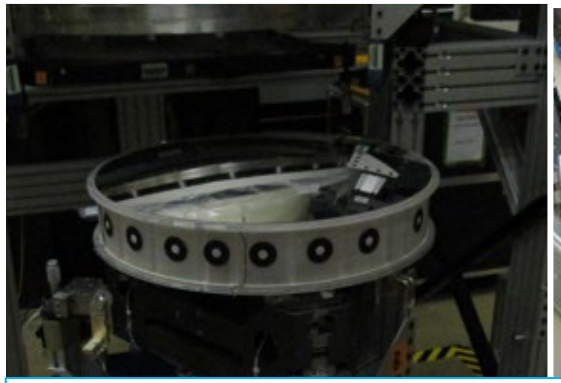
Alignment Compensation Mechanism (ACM), Optical Bench, and Enclosure have been integrated

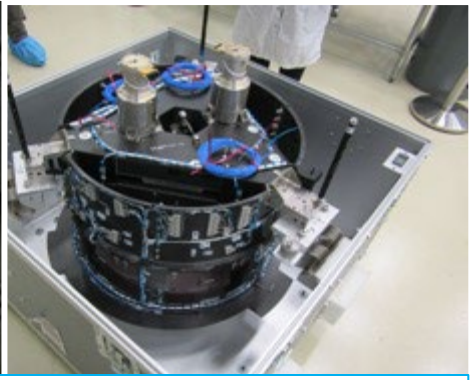
Optical Telescope Assembly (OTA) Integration Underway!



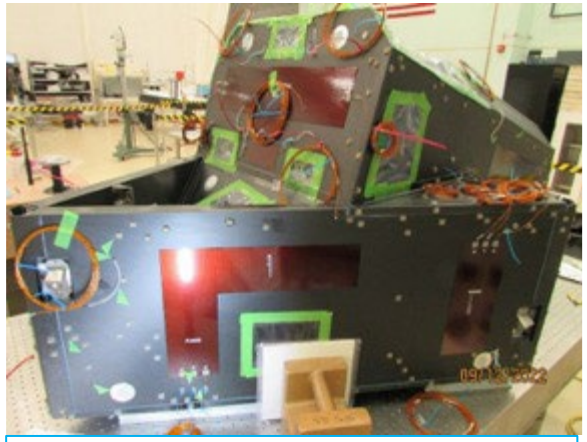


Primary Mirror Assembly (PMA) vibration testing complete!

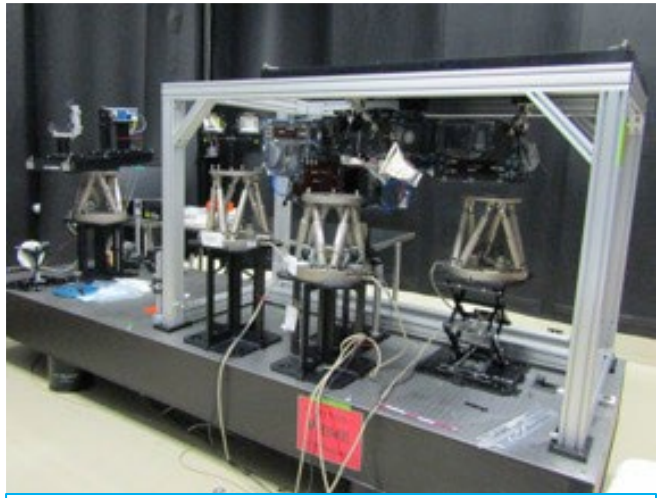




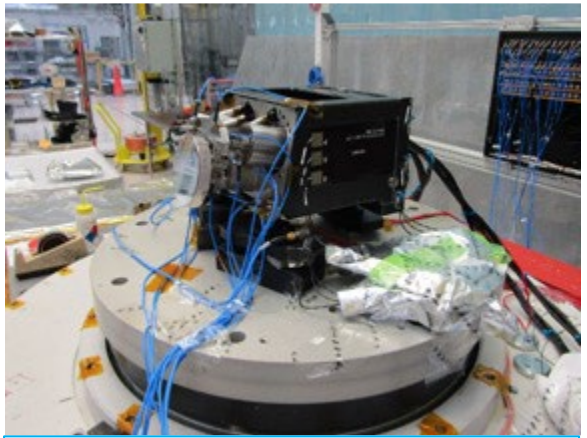
Secondary Mirror / Secondary Optical Assembly (SOA) complete



Aft Optics Structure (AOS) Thermal-electric work in progress



Tertiary Optics Module Assembly (TOMA) configured for alignment



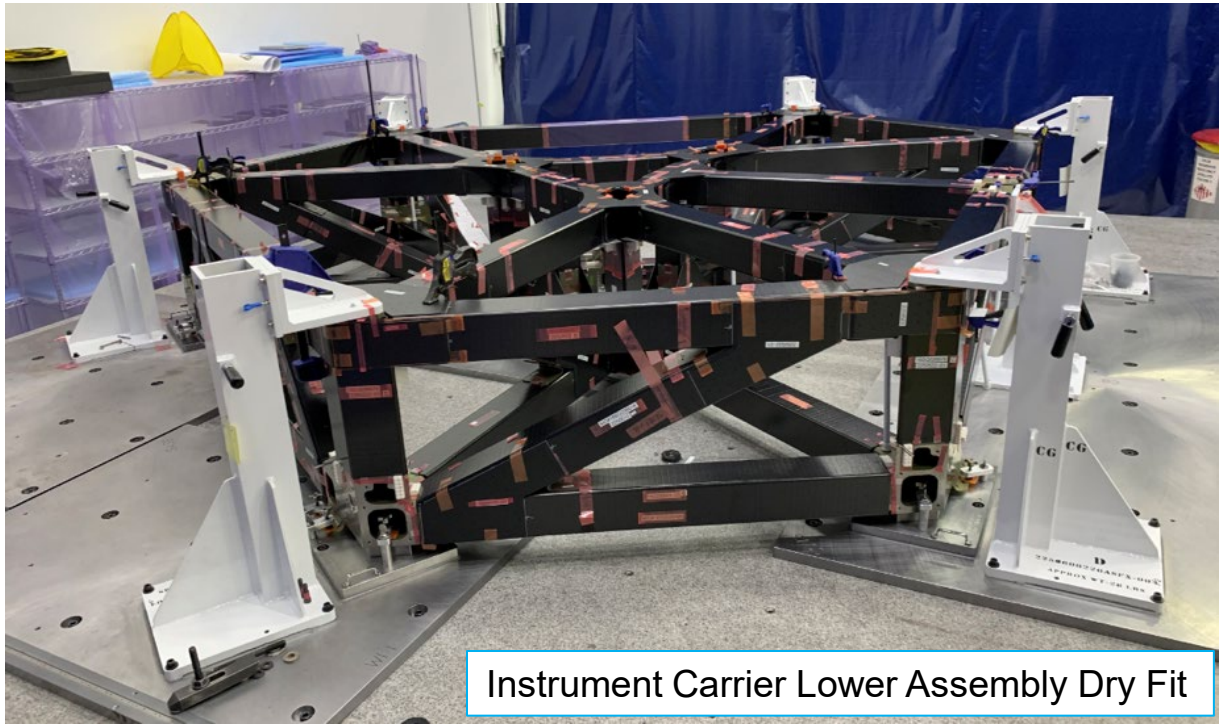
Tip Tilt Fold Assembly (TTFA) vibration testing complete

Secondary Mirror Support Tubes (SMST) complete

L3Harris in Rochester, NY, is making good progress on the OTA

Instrument Carrier Structure Assembly Underway!

- Lower structure assembly is in bonding. Nodes for upper assembly are the critical path and have been tracking to schedule
- Launch Loads Vibration Isolation System (LLVIS) Engineering Development Unit parts in fabrication
- New issue reported by Northrop Grumman indicates out-of-tolerance fittings in the partially bonded lower assembly. Repair plan is in work; rework expected to be complete within available slack

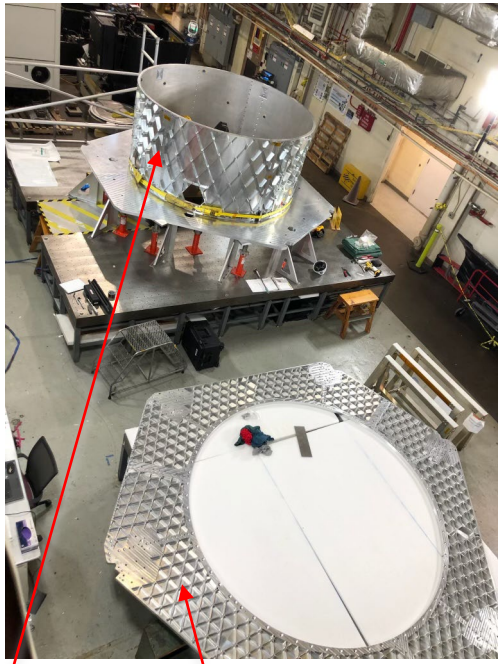


Instrument Carrier Lower Assembly Dry Fit

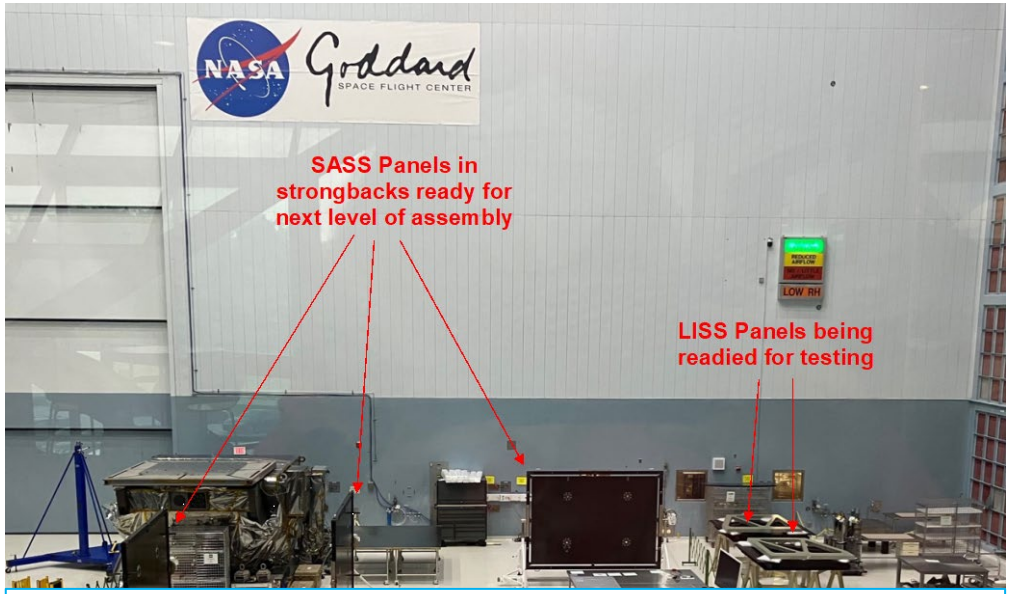
Instrument Carrier Upper Assembly
Titanium Fitting - fabrication nearly complete

Spacecraft Bus Assembly Underway!

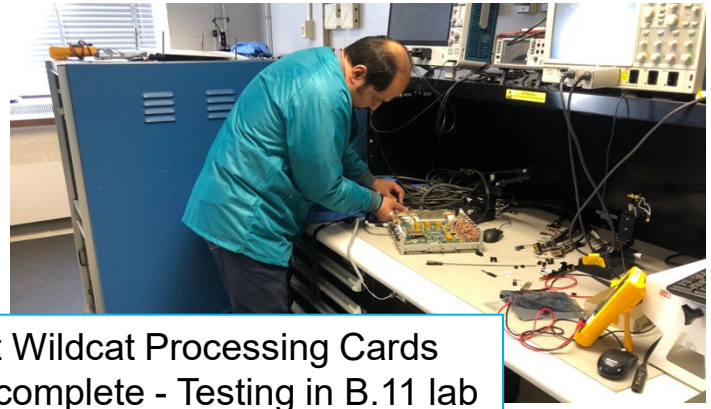
- Spacecraft structure, SASS, and LISS panels delivered
- Spacecraft Engineering Test Unit (ETU) avionics boards complete; flight builds in process
  - First flight boards complete: Flight Wildcat Processor Cards (WPC) delivered to Spacecraft and Instrument Command and Data Handling (C&DH) teams



Bottom deck (above), Central cylinder (top right), and Top deck (lower right) in B.5 high bay for Spacecraft Bus assembly



Solar Array Sun Shield (SASS) and Lower Instrument Sun Shade (LISS) Panels in the B.29 SSDIF Clean Room



Flight Wildcat Processing Cards (WPC) complete - Testing in B.11 lab

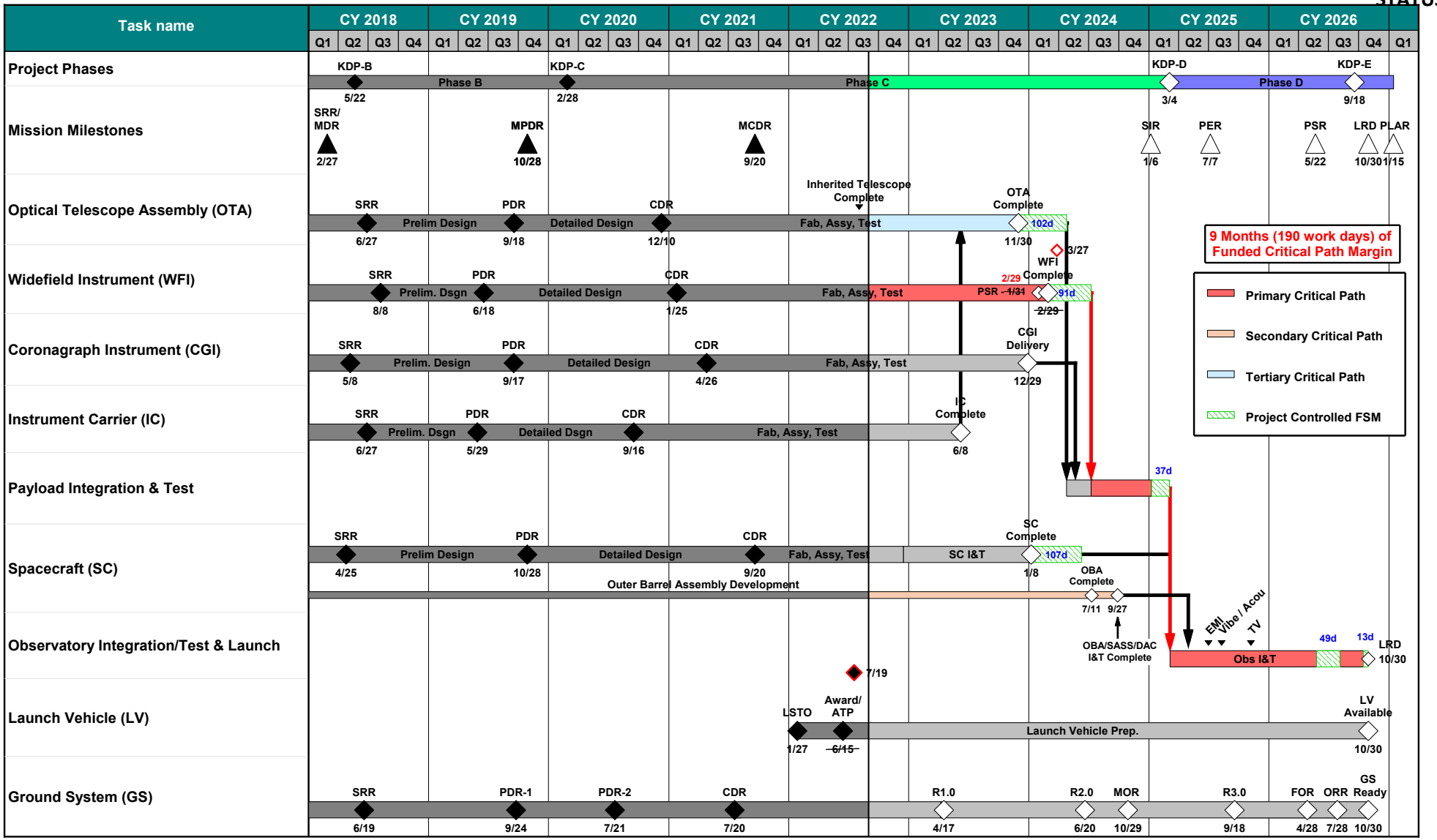
Roman Cost and Schedule Status

- **Project exited FY2022 with reserves and entered FY2023 on solid financial footing**
  - Budget and schedule impacts directly connected to COVID-19 were addressed in the 2021 budget process (COVID Replan; prior to CDR)

- **Project is in the process of addressing schedule margin erosion due to continuing supply chain delays and the resolution of technical issues**
  - Optimization of the integration and testing flow at higher levels of assembly across the project is in progress, and is anticipated to provide healthy margin to our launch date
  - Expect to finalize this by mid-December

Master Schedule

STATUS AS OF: 08-31-2022



Baseline: 1/31/2022

RST- MGMT-SCHD-0010, Rev B

JWST Lessons Applied to Cost-Capped Roman

- **Prior to Implementation**
  - Build and maintain strong science community advocacy
  - Invest in key enabling technologies early and ensure they are truly at TRL-6 by mission PDR
    - Roman detectors received nearly a decade of low-level annual investment to bring them to TRL-6 ahead of mission PDR. Flight devices were in hand by mission CDR
  - Avoid requirements over-reach and creep
- **During Implementation**
  - Avoid requirements creep (it bears repeating)
  - Have NASA serve as systems engineering lead and integrator to maximize flexibility and authority to address risks and issues
  - Forward-phased, consistent funding to avoid issues driven by lack of funding and enable early investments to buy down risks later in development
  - Continuously reassess the plans for work-to-go