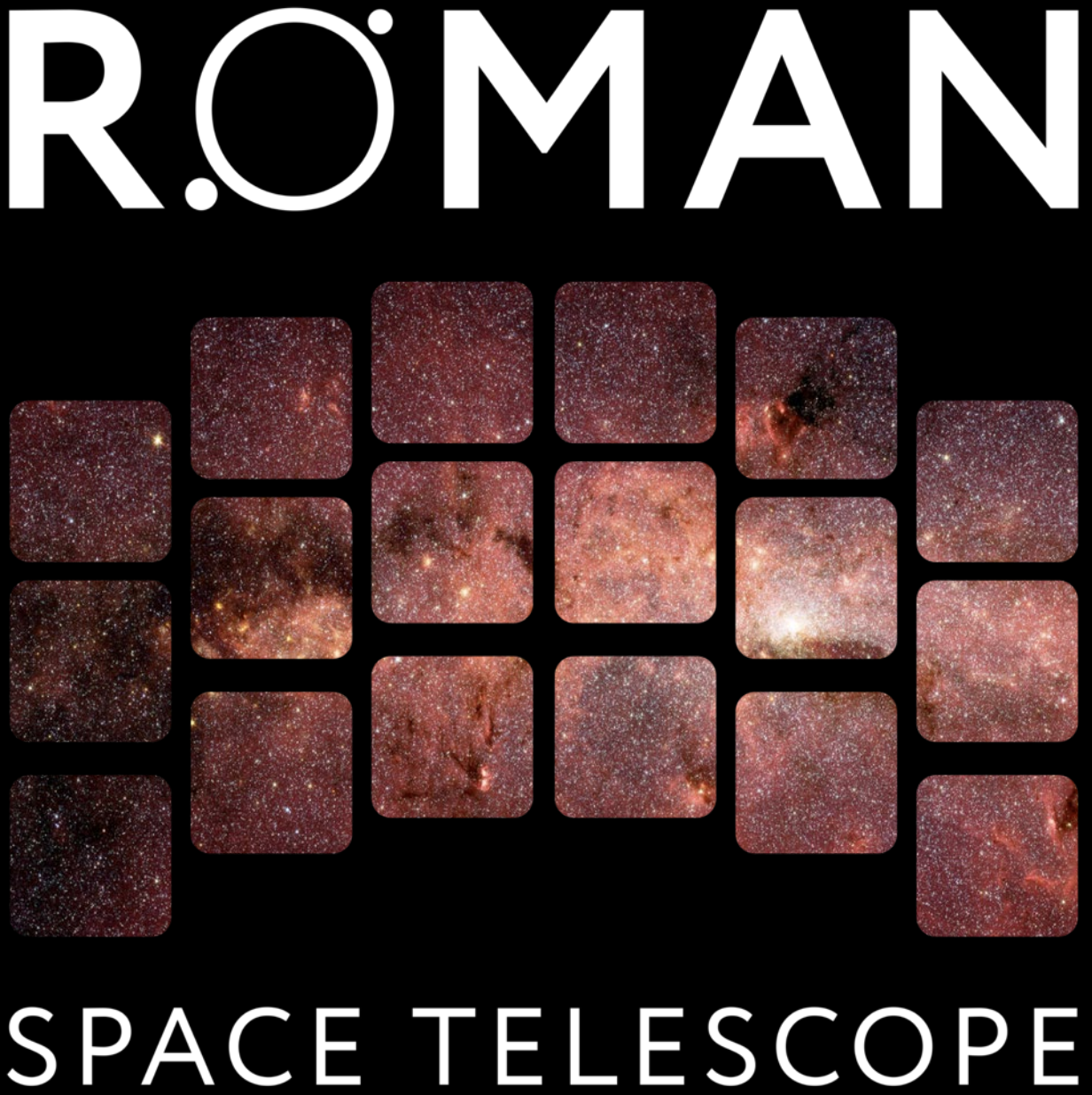
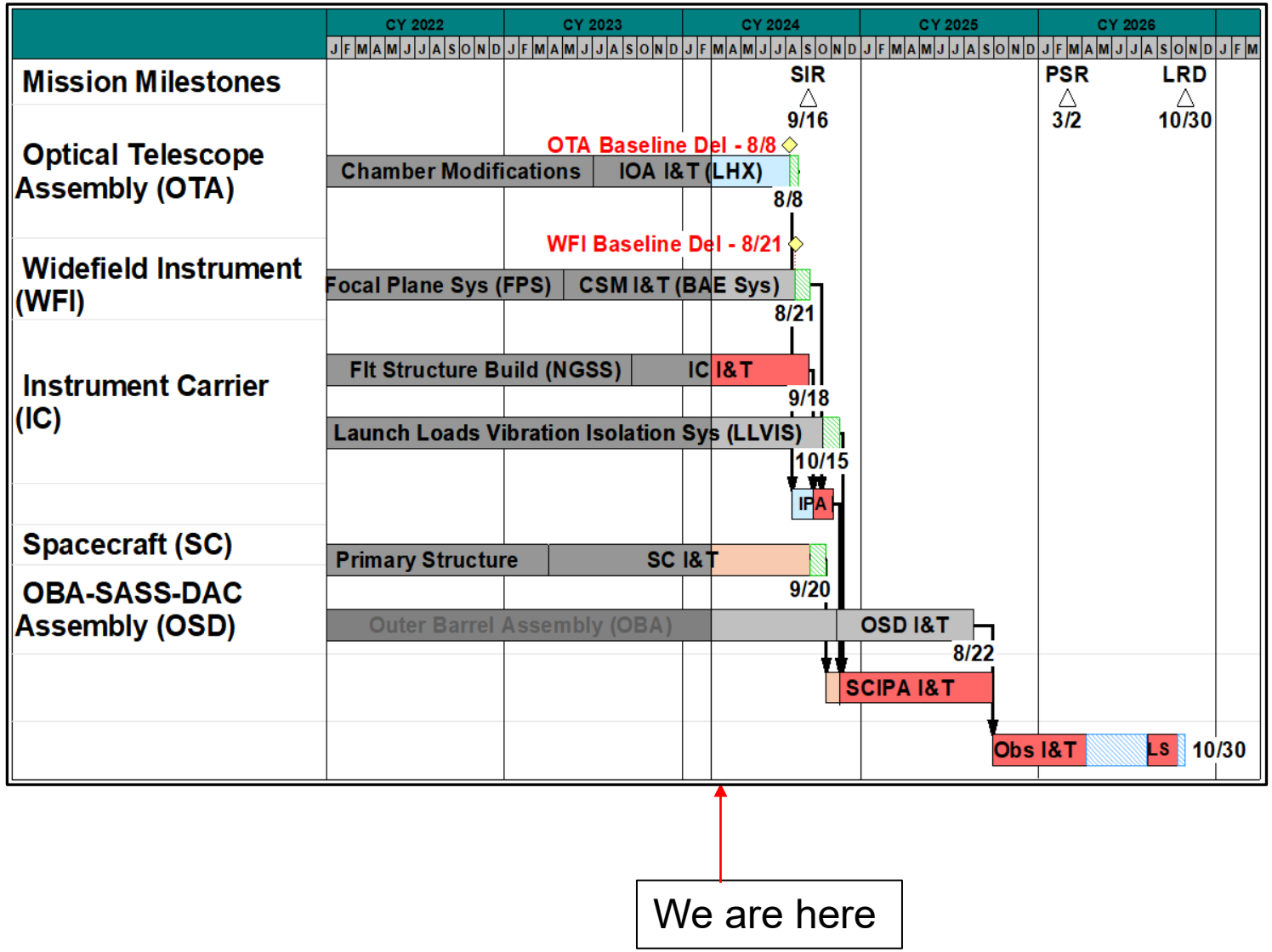
Project Status

Jeff Kruk
Roman Deputy Senior Project Scientist



Project Schedule

- Wide Field Instrument (WFI) and Coronagraph Instrument integration complete
- Optical Telescope Assembly (OTA) integration close to complete
- Spacecraft in midst of integration
- Element delivery to GSFC next summer
- Spacecraft+payload testing begins Fall 2024
- OBA – SASS – DAC integrated Fall 2025
- Final Observatory testing thereafter



Continuing to work towards launch readiness date of October 2026

Spacecraft Hardware at Goddard

SSDIF = Space Systems Development and Integration Facility

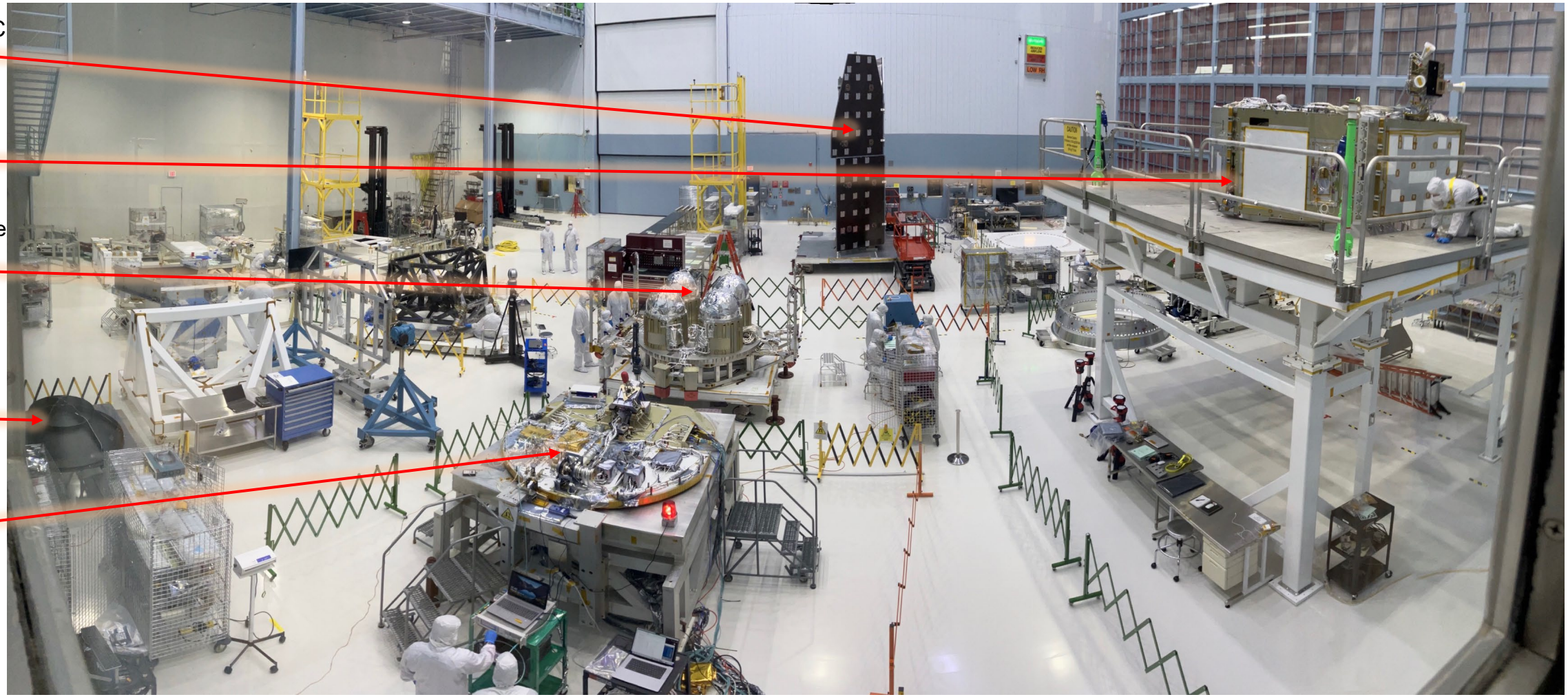
SASS-B Panels performing ambient pre-TVAC deployments

Spacecraft Bus on Pantheon

Propulsion Module preparing for integration to Bus

High-gain Antenna

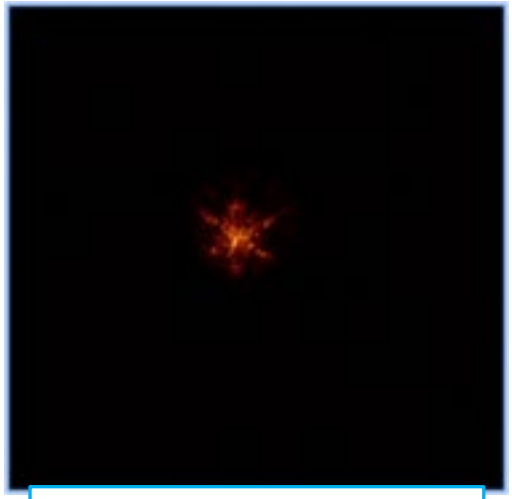
Integrating RF components to Communication Panel



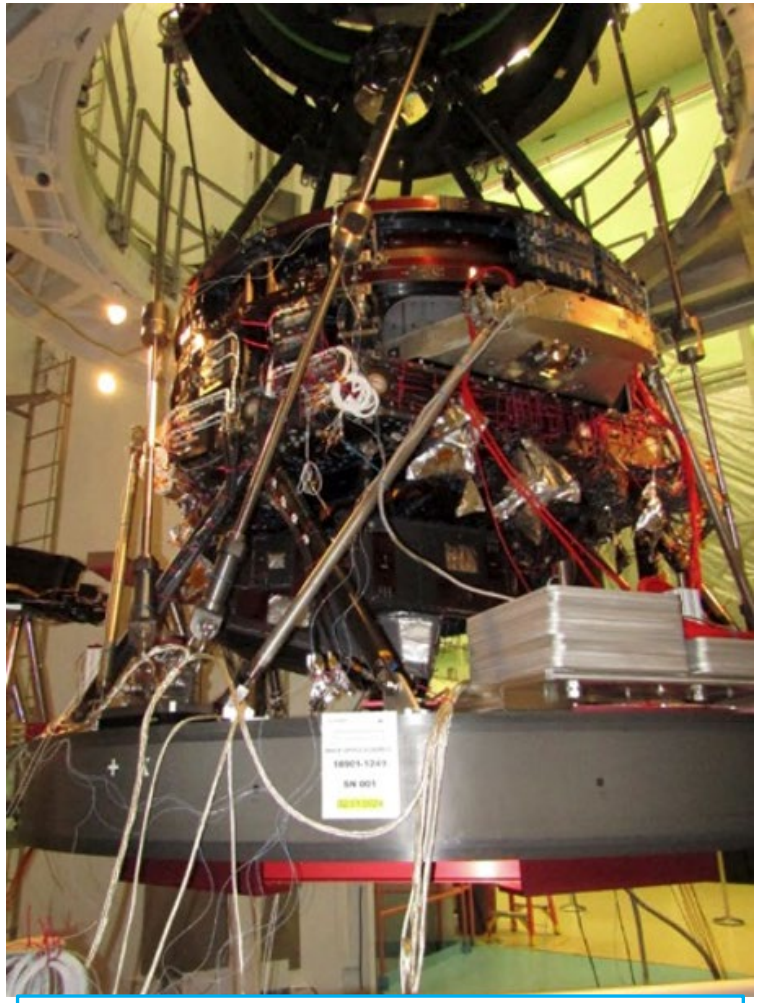
SASS = Solar Array Sun Shield
RF = Radio Frequency

Telescope

- The Optical Telescope Assembly (OTA) team completed bonding of the tertiary mirror assembly and fold mirror 2 into their final positions
- The telescope is in Chamber IIIB at L3 Harris in Rochester in preparation for transition to vacuum for the final optical test for the pre-vibe measurement



First image of a point source, i.e., the first star
Pre-optical alignment, in-air, double-pass, and known gravity sag



Imaging Optical Assembly (IOA) in Chamber IIIB

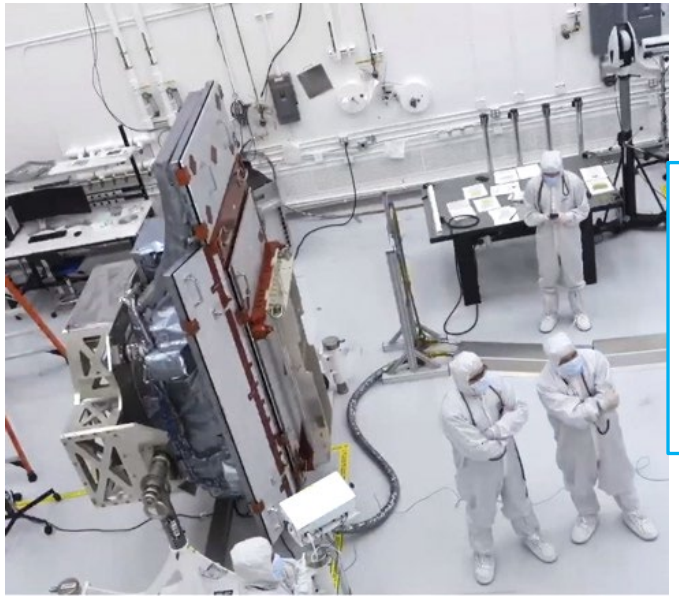
Roman Instruments

Wide Field Instrument

- Completed first round of Thermal Vacuum testing
  - Baselined performance pre-environmental testing
- Completed vibration and acoustics testing
  - Passed post vibration and acoustics Aliveness and Function tests
- WFI is in the TVAC chamber and pumpdown for the final TVAC test is imminent

Coronagraph Instrument

- CGI has completed EMI, vibration, and acoustics testing, and is currently in its final thermal vacuum test (TVAC) at JPL
  - Ambient testing demonstrated its basic (“TTR5”) required performance
- CGI remains on course for 5/15/2024 delivery to GSFC for integration
- Prep work at GSFC has ramped up, working details of handover and integration
- GSFC is now testing a software simulator of CGI in FlatSat to reduce software interface risks

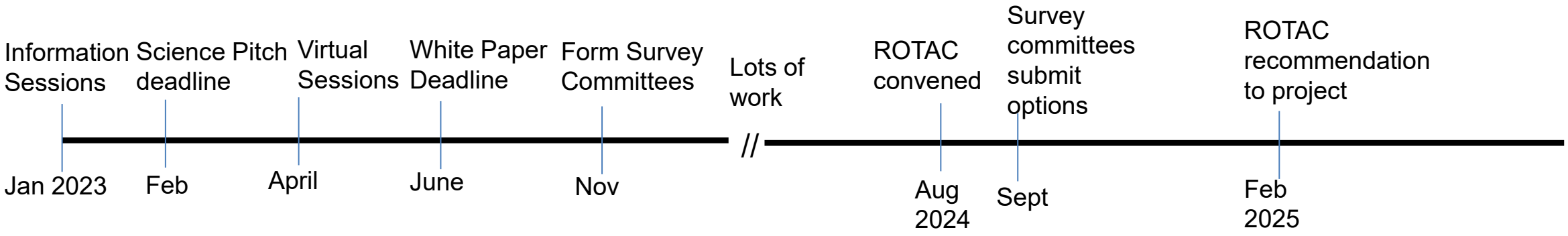


WFI has been deconfigured from vibration and acoustics testing and closed-out for thermal vacuum test

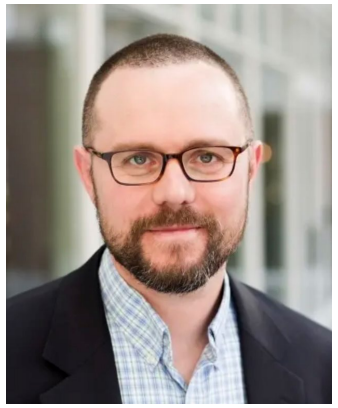
Source simulator being lifted for installation above Coronagraph

Roman Observations Planning

- **The community process to define the three Roman Core Community Surveys is well underway**
  - Survey Definition Committee membership was announced at winter AAS meeting
  - Each committee is meeting regularly and evaluating community input
  - Draft Survey designs due Fall 2024



HLWAS Definition Committee Members



Ryan Hickox
(Dartmouth, Co-chair)

Risa Wechsler
(Stanford, Co-chair)

Micaela Bagley
(UT Austin)

Keith Bechtol
(Wisconsin)

Michael Blanton
(NYU)

Chris Hirata
(Ohio State)

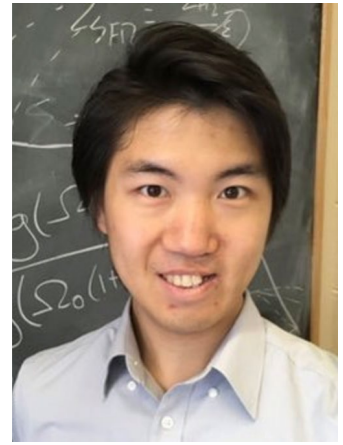
Elisabeth Krause
(Arizona)

Nikhil Padmanabhan
(Yale, GRS PIT)

Ismael Tereno
(Euclid)

Anja von der Linden
(Stony Brook Univ.)

David Weinberg
(Ohio State)



Aaron Yung
(STScI)

GBTDS Definition Committee Members

Jessie Christiansen
(NExScI/Caltech, Co-chair)

Dan Huber
(UH/USyd, Co-chair)

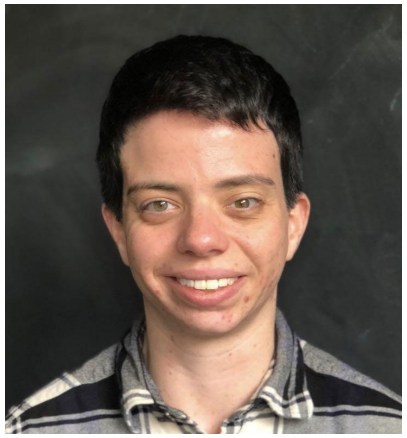
Annalisa Calamida
(STScI)

Jennifer Sobeck
(IPAC)

Matthew Penny
(LSU)

Ben Montet (UNSW)

Hans-Walter Rix (MPIA)



Kris Pardo (USC)

Jessica Lu (Berkeley)

Eduardo Martin (IAC)

HLTDS Definition Committee Members

Brad Cenko
(NASA/GSFC, Co-chair)

Masao Sako
(Penn, Co-chair)

Alessandra Corsi
(Texas Tech)

Michael Fasnaugh
(Texas Tech)

Sebastian Gomez
(STScI)

Rebekah Hounsell
(GSFC/UMBC, SN PIT)

Takashi Moriya
(NAOJ)

Gordon Richards
(Drexel)

Russell Ryan
(STScI)

Schuyler van Dyk
(IPAC, RAPID PIT)

V. Ashley Villar
(Harvard)

Early Definition Astrophysics Survey

- **Opportunity for the science community to make the case for defining a General Astrophysics Survey early (rather than waiting for the first General Investigator proposal call)**

- **20 white papers with over 340 unique authors**
  - Evaluated by review committee who were tasked to recommend whether to proceed with an early definition astrophysics survey and to rank survey concepts
    - Detailed survey design will be determined via an open community process

- **Review committee:**
  - Robyn Sanderson (Chair)
  - Ashley Villar
  - Ryan Hickox
  - Matthew Holman
  - Jessica Lu
  - Chris Hirata

- **Universal Arguments for Early Definition**
  - Broad community engagement and mobilization outside core survey science areas
  - Acquiring ancillary data, especially oversubscribed or time sensitive observations or influence choices for other surveys

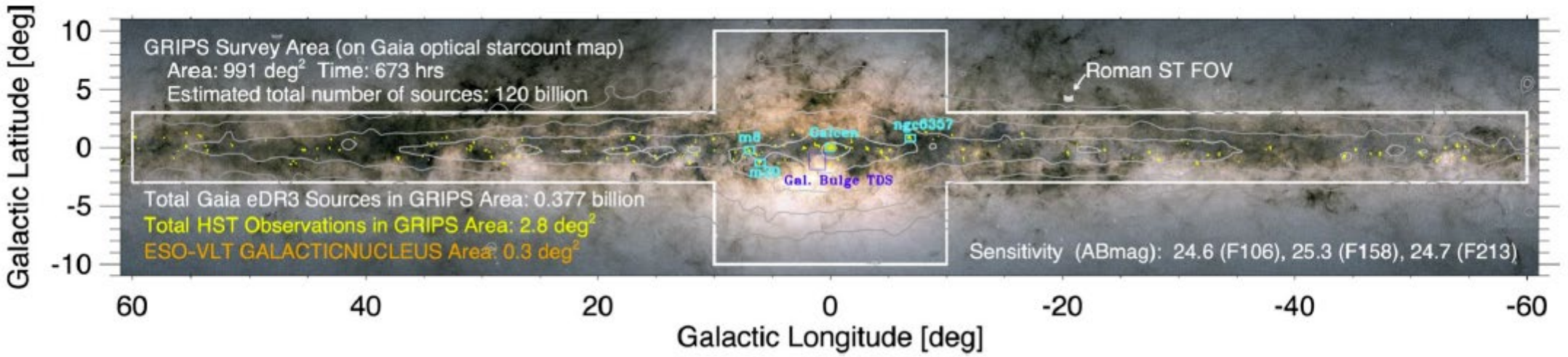
ROMAN SPACE TELESCOPE

Ranked list of Survey Concepts

Rank	Theme	Notes
1	Galactic plane	See §§3.5 for a discussion of suggested parameters.
2	Deep field + grism	Strongly recommend community process even if not early.
3	Time domain survey	Compelling motivation for early execution; should strongly consider for Cycle 1. Technical needs should be communicated with the core community survey definition teams.
3	Solar system	New discovery space, but less time-pressure than other areas.
NR	Wide field, intermediate depth	Impacts of choices on science should be communicated to the high-latitude core community survey definition team.

Given this ranking the committee also recommended several aspects of the scope for a Galactic Plane survey for consideration by the committee defining this survey. The definition committee should consider which areas of high extinction and crowding to include (especially regions where Gaia is most challenged), whether or not to include the Galactic bulge, and what aspects of the time domain are most compelling.

Galactic Plane General Astrophysics Survey



- **Roman is only observatory that could survey complete inner galaxy to depths of 23-25 mag**
  - Improves on previous GP surveys by factor of 10 in resolution and factor 20 in depth
- **Huge Potential in this largely unexplored discovery space**
  - *includes studies of the **Galaxy's structure and dynamics** in stars and dust, the environmental dependence of **star formation**, the coevolution of the **Galactic nucleus** and its resident **supermassive black hole**, the evolution and properties of **flaring and variable stars**, **compact-object binaries**, and the potential for detecting **Galactic supernovae***
- **Strong synergies with Rubin**
  - *which could provide high cadence coverage at visible wavelengths*
- **Reasons to define survey now:**
  - *Such a survey would require a high level of coordination between stakeholders across multiple disparate subfields of astrophysics that have traditionally interacted relatively little*
  - *Enable development of coordinated surveys at other wavelengths to amplify science yields*

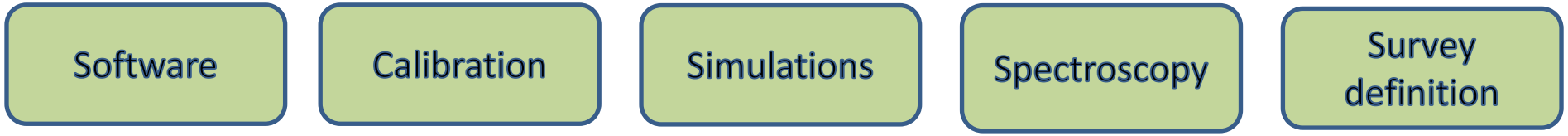
Coordinating and engaging science community

- **Planning beta testing of Roman Science Platform in Summer 2024**
  - Goal is for a small set of users explore the current functionality of the RSP and provide feedback
- **Workshop on Roman Astronomers Proposal Tool on April 2**
- **Monthly Roman Forum**
  - Project/mission updates and discussions
- **Monthly Roman Virtual Lecture series**
  - Science presentation relevant to Roman
- **Roman Science Conference**
  - Next conference: “How Roman Observations Will Confront Theory”, hosted by IPAC July 9-12, 2024

Working together with the Science Community

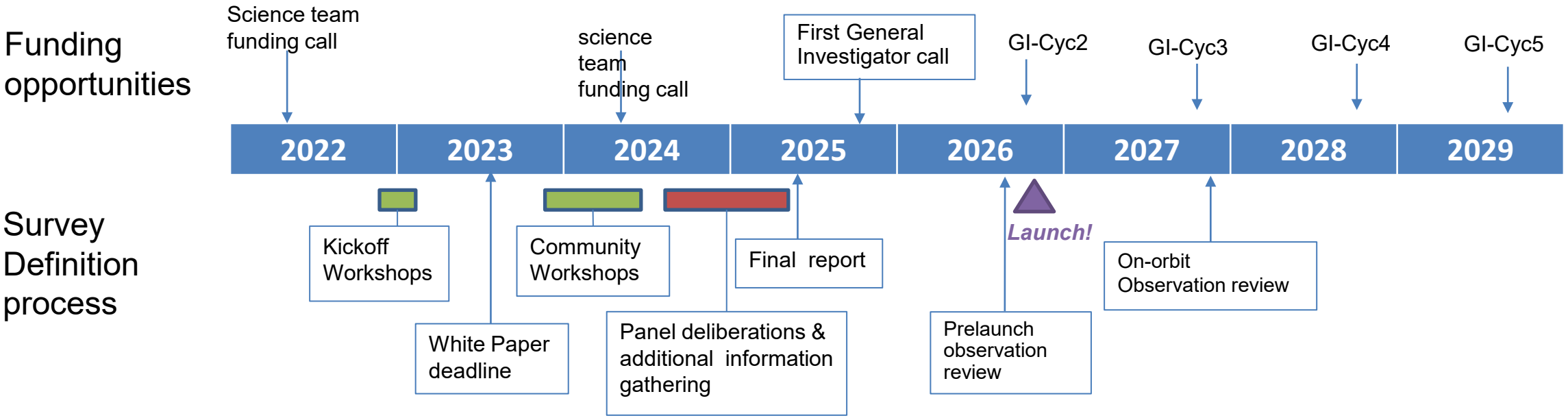
- **Goal: lower barriers for access to Roman science by providing opportunities to engage with Roman independently of proposal selection**

- **Technical working groups that cut across all science areas**
  - Forum for people to work together on topics/methods that cut across science areas
  - Brings together Science community, science centers, and project
  - Have been very successful over past 5 years, recently broadened access, will add new groups soon



- **Community-led Science Collaboration**
  - Enable people to engage with Roman science independently of NASA-selection
  - Facilitate the formation of quasi-independent community-led collaboration

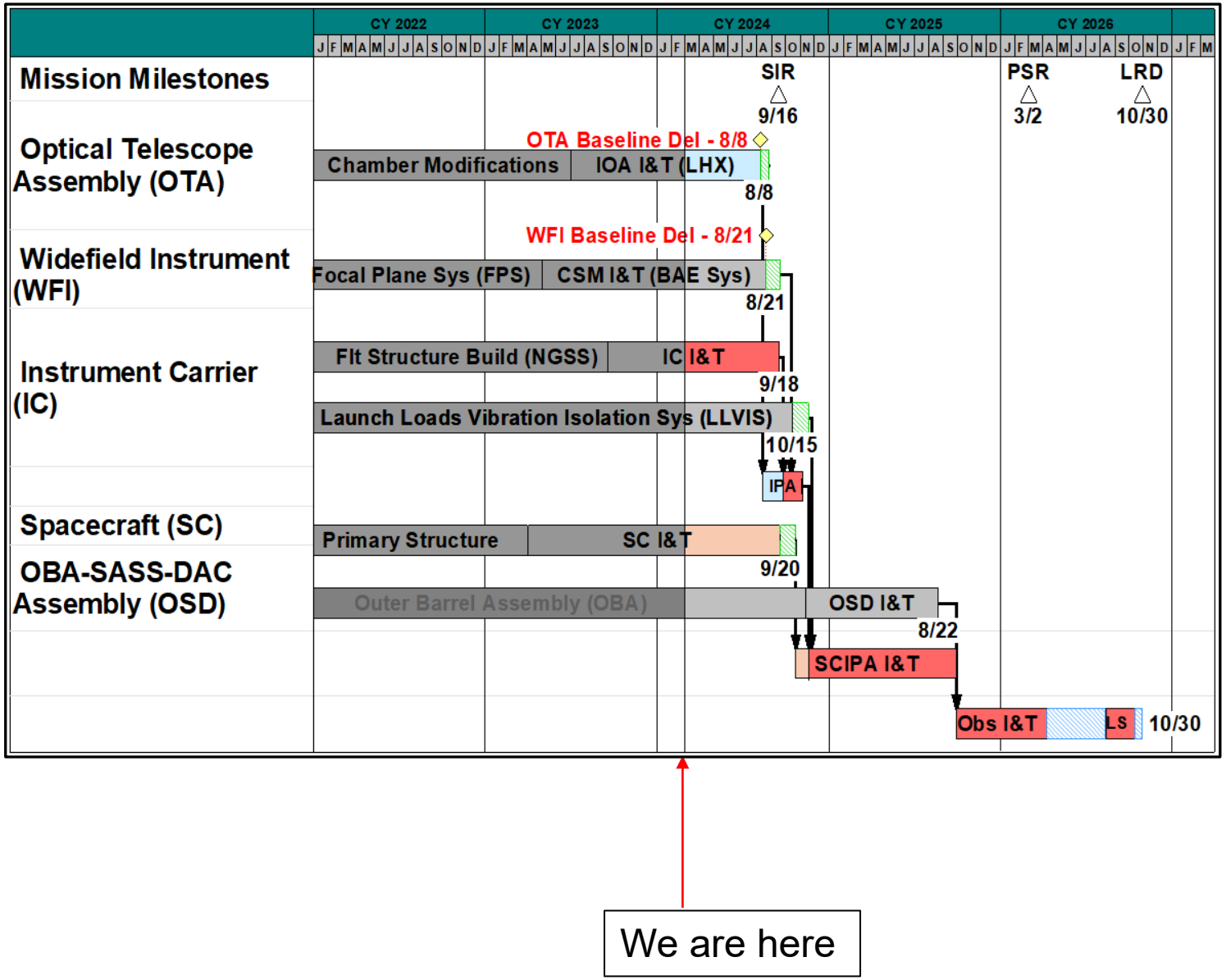
The Road Ahead UPDATE?



- **Developed plans to engage and support the community in partnership with the science centers (IPAC and STScI) and with the guidance and advice of our two independent advisory committees**
- **Expansion of joint working groups will enable strong connections between the Roman project, the science centers and the science community as mission implementation continues**

Project Schedule – Looking ahead

- **Systems Integration Review**
  - Nominal start of Observatory integration
- **Mission Operations Review**
  - October 2024
  - Demonstrate the operations concept meets mission requirements
  - Roughly same time CCS committees present initial survey concepts
- **MOR – 6 months**
  - Snapshot of progress to-date to circulate throughout project so everyone can be planning to common assumptions in preparation for MOR



Backup

Roman Observations

- **Three Core Community Surveys address the 2010 Decadal Survey science goals while providing broad scientific power**
  - **High Latitude Wide Area Survey**
    - Wide area multiband survey with slitless spectroscopy
    - Enables weak lensing and galaxy redshift cosmology mission objectives
  - **High Latitude Time Domain Survey**
    - Tiered, multiband time domain observations of 10s deg^2 at high latitudes
    - Enables Type Ia supernova cosmology mission objectives
  - **Galactic Time Domain Survey**
    - ~<15 min cadence observations over few deg^2 towards galactic bulge
    - Enables exoplanet microlensing mission objectives
- **Minimum 25% time allocated to General Astrophysics Surveys**
- **90 days for Coronagraph technology demonstration within first 18 months of mission**