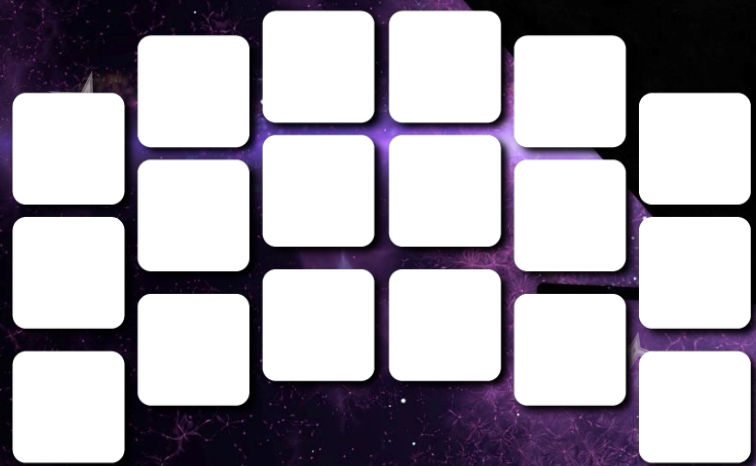


NANCY GRACE
R.ÖMAN



SPACE TELESCOPE



Roman Space Telescope:
Infrared Science for All

Rob Zellem

Roman Communications Scientist

NASA Goddard Space Flight Center



Nancy Grace Roman

NASA's First Chief of Astronomy
1925–2018

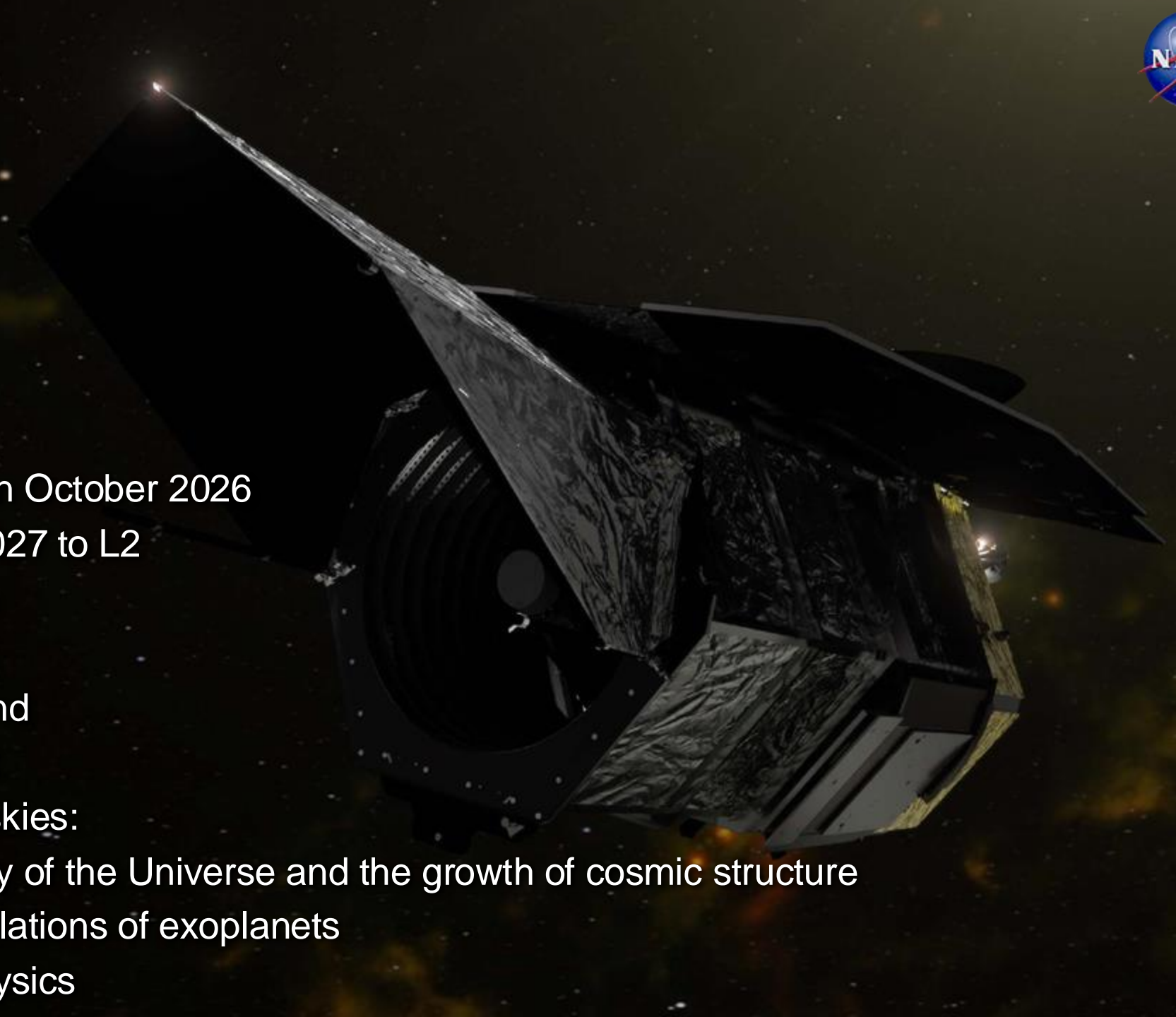


NANCY GRACE RÖMAN



SPACE TELESCOPE

- Launching no earlier than October 2026 and no later than May 2027 to L2
- 5-year minimum mission
- 2.4-m primary mirror
- Wide Field Instrument and Coronagraph Instrument
- Will survey the infrared skies:
 - the expansion history of the Universe and the growth of cosmic structure
 - search for new populations of exoplanets
 - and general astrophysics



BIG DATA

172

Terabytes

Hubble's data archive

30 years (1990–2020)

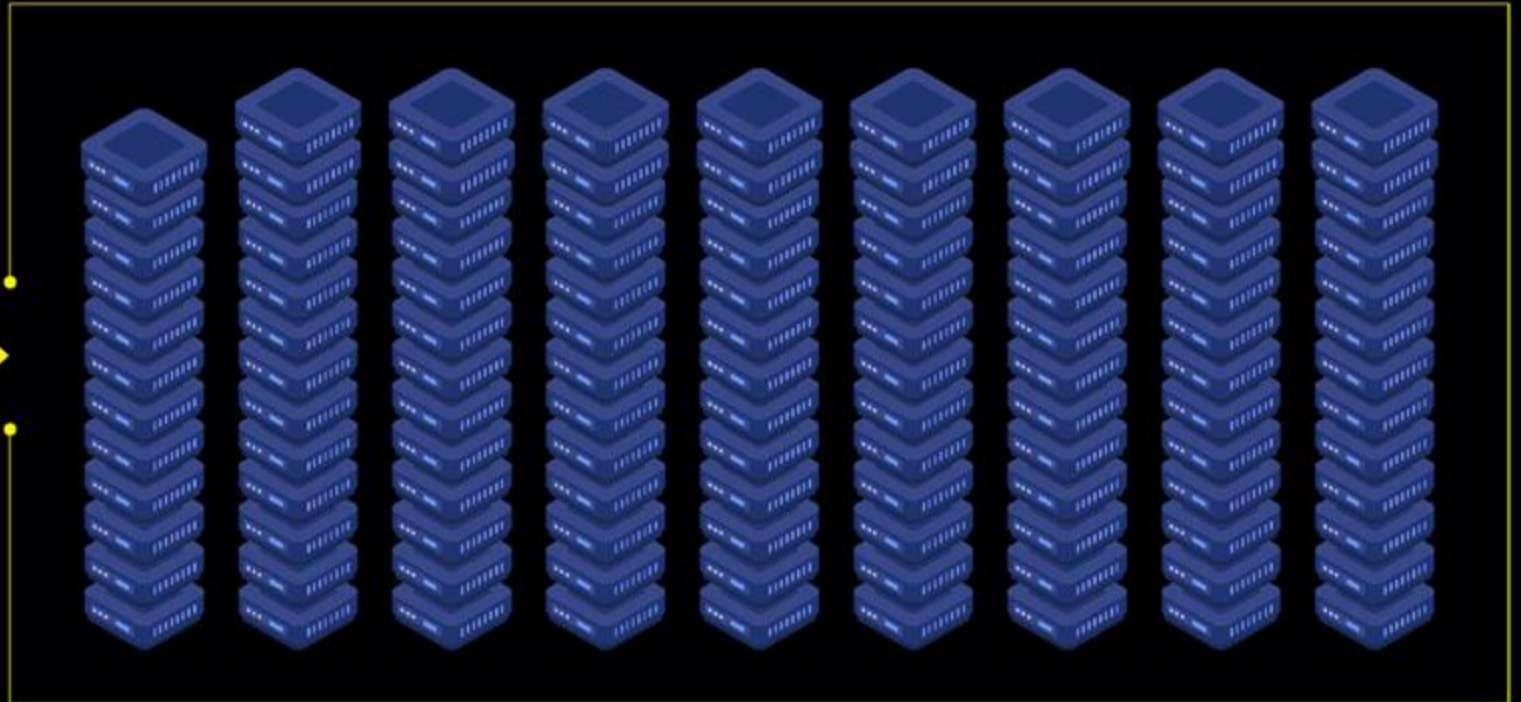


20,000

Terabytes

Roman's data archive

5 year primary mission
(projected)



(All Roman data will be publicly available)

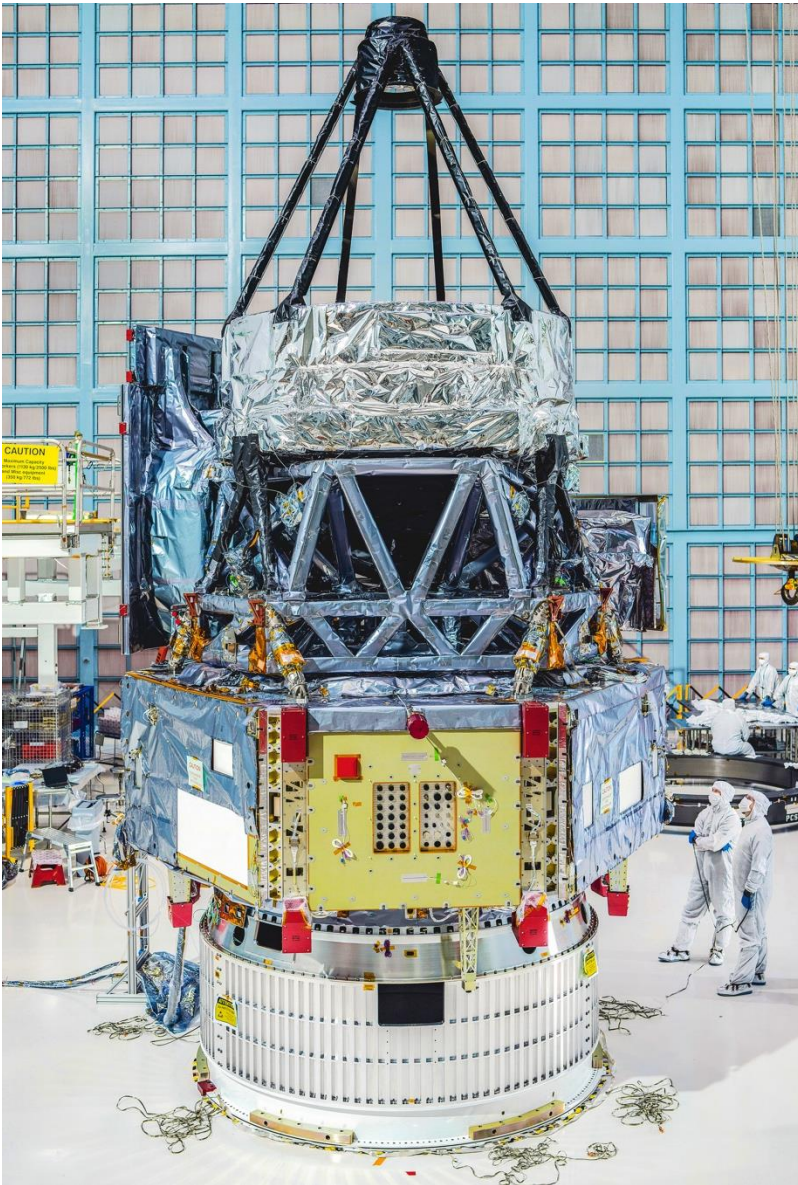
- **Roman is making excellent progress toward an October 2026 launch**
- **Systems Integration Review completed**
 - Major milestone for transition from Phase C to Phase D
 - Phase D continues to the end of in-orbit checkout
- **Mission Operations Review Passed**
 - This review assessed the status of ground systems components (e.g., the mission operations center, the science operations center, the science support center etc.) and their operational interfaces with the flight systems.
 - The review team found no issues and provided many helpful suggestions on how to ensure that the science community can hit the ground running at the start of science operations.
- **Definition of the surveys has reached a significant milestone with the delivery of reports from the definition committees**
 - These reports go to the higher-level Roman Observations Time Allocation Committee who will deliver final the report in Spring 2025.
- **Numerous engagement opportunities for the science community ramping up this year**
 - Two major opportunities for funding out or to be released this year (ROSES + first GI call)
 - Launching the Roman Science Collaboration
 - Working Groups are making meaningful and tangible contributions to the mission
- **All major hardware items now delivered to Goddard and undergoing integration**
 - Observatory integration has made significant progress over the last 3 months
 - We will shortly only have two large hardware pieces; these undergo testing separately before final integration in fall next year.

Highlights – Conclusions up front

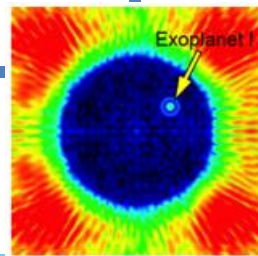
- **Roman is making excellent progress toward an October 2026 launch**
- **Systems Integration Review completed**
 - Major milestone for transition from Phase C to Phase D
 - Phase D continues to the end of in-orbit checkout
- **Mission Operations Review Passed**
 - This review assessed the status of ground systems (the operations center, the science operations center, the science support center etc.) and the science systems.
 - The review team found no issues that would prevent the mission from now to ensure that the science community can hit the ground running at the start of the mission.
- **Definition of the science data products is a key milestone with the delivery of reports from the definition committee in late 2025**
 - These reports will define the Observations Time Allocation and the data products who will deliver final the report in Spring 2026
- **Numerous opportunities for the science community ramping up this year**
 - Opportunities for funding out on the next cycle (ROSES + first GI call)
 - Working Groups are making meaningful contributions to the mission
- **All major hardware items now delivered to Goddard and undergoing integration**
 - Observatory integration has made significant progress over the last 3 months
 - We will shortly only have two large hardware pieces; these undergo testing separately before final integration in fall next year.

TL;DR: Roman is on budget and on time
Currently aiming for an October 2026 launch (NEXT YEAR!!!)
You can get involved NOW!

Roman Hardware Status



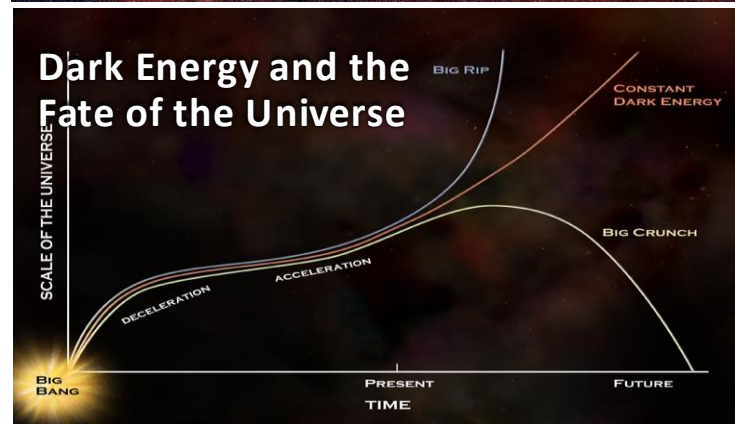
- **Wide Field Infrared surveys**
 - Imaging and spectroscopy to >26.5 AB mag
- **Expansion history of the Universe**
 - Using supernova, weak lensing and galaxy redshift survey techniques
- **Growth of Structure in the Universe**
 - Weak lensing, redshift space distortions and galaxy cluster techniques
- **Exoplanet Census**
 - Statistical census of exoplanets from outer habitable zone to free floating planets
- **General Astrophysics Surveys**
 - Devote substantial fraction of mission lifetime to peer reviewed program
- **Coronagraph technology demonstration**
 - Demonstrate exoplanet coronagraphy with active wavefront control



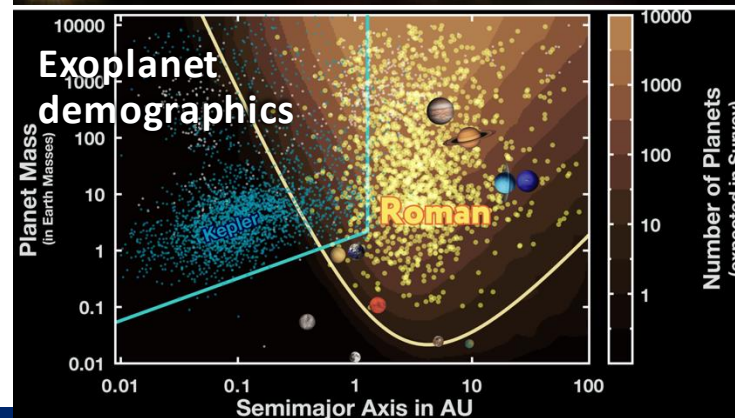
Wide-Field Infrared Surveys of the Universe



Dark Energy and the Fate of the Universe



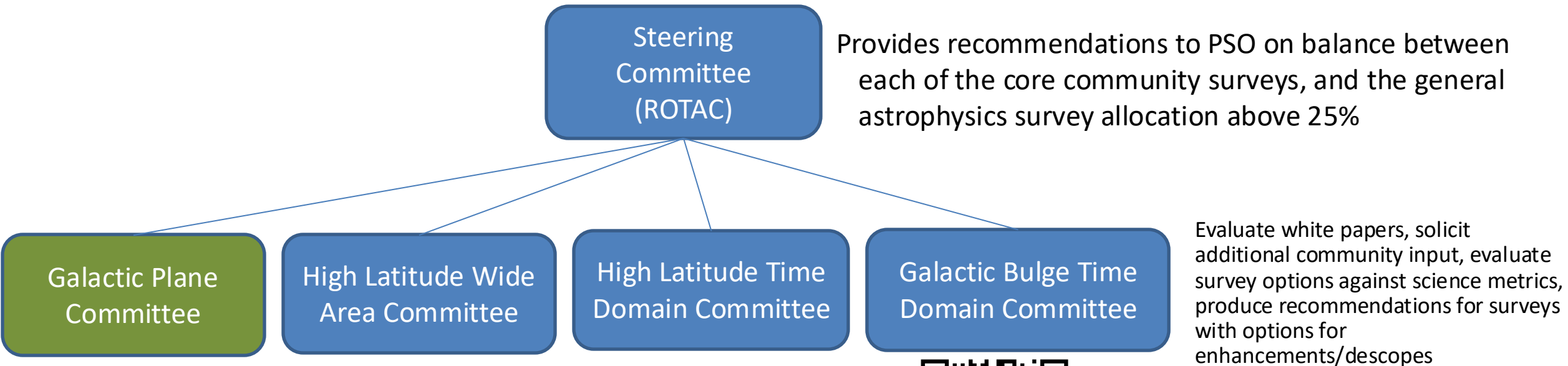
Exoplanet demographics



- **We meet Roman’s goals through the Core Community Surveys, the General Astrophysics Surveys, and the Coronagraph technology demonstration**
- **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 of deg² at high latitudes
 - Enables Type Ia supernova cosmology mission objectives
 - **Galactic Bulge Time Domain Survey**
 - ~<15 min cadence observations over few deg² towards galactic bulge
 - Enables exoplanet microlensing mission objectives
- **Minimum 25% time allocated to General Astrophysics Surveys**
 - Mostly via peer reviewed proposals and some additional community defined surveys
 - Galactic Plane General Astrophysics Survey currently being defined via community process
- **90 days for Coronagraph technology demonstration observations, within first 18 months of mission**

Astrophysics with wide-field near-IR surveys

- **Tiered committee structure to do the work of recommending survey definitions based on community input**
 - Committees include representatives of numerous science areas to be addressed by each survey (determined from white paper submissions etc.)



- **Survey committees' reports were just released**



- **The Roman Galactic Exoplanet Survey Project Infrastructure Team**
 - Develop infrastructure to enable Exoplanet microlensing
 - Led by Scott Gaudi

- **Laying the Foundation for a Comprehensive View of Transiting Exoplanets with the Galactic Bulge Survey**
 - Build the infrastructure to support transiting exoplanet science
 - Led by Elisa Quintana + Robby Wilson

- **Spots, Faculae, and Ages: The Promise of Rotation with Roman and Deep Learning**
 - Plan strategies in measuring stellar rotation periods, inferring gyrochronological ages, and distinguishing between magnetic structures on stellar surfaces.
 - Led by Jamie Tayar + Zach Claytor

- **Asteroseismology Using The Galactic Bulge Time Domain Survey**
 - Laying the foundations for studying more than a half million evolved red giant stars
 - Led by Marc Pinsonneault

Upcoming calls for proposals



- **Roman Space Telescope Research and Support Participation Opportunities**



- <https://roman.gsfc.nasa.gov/science/roses.html>

- Proposals due March 6, 2025

- **Wide Field Science (WFS)**

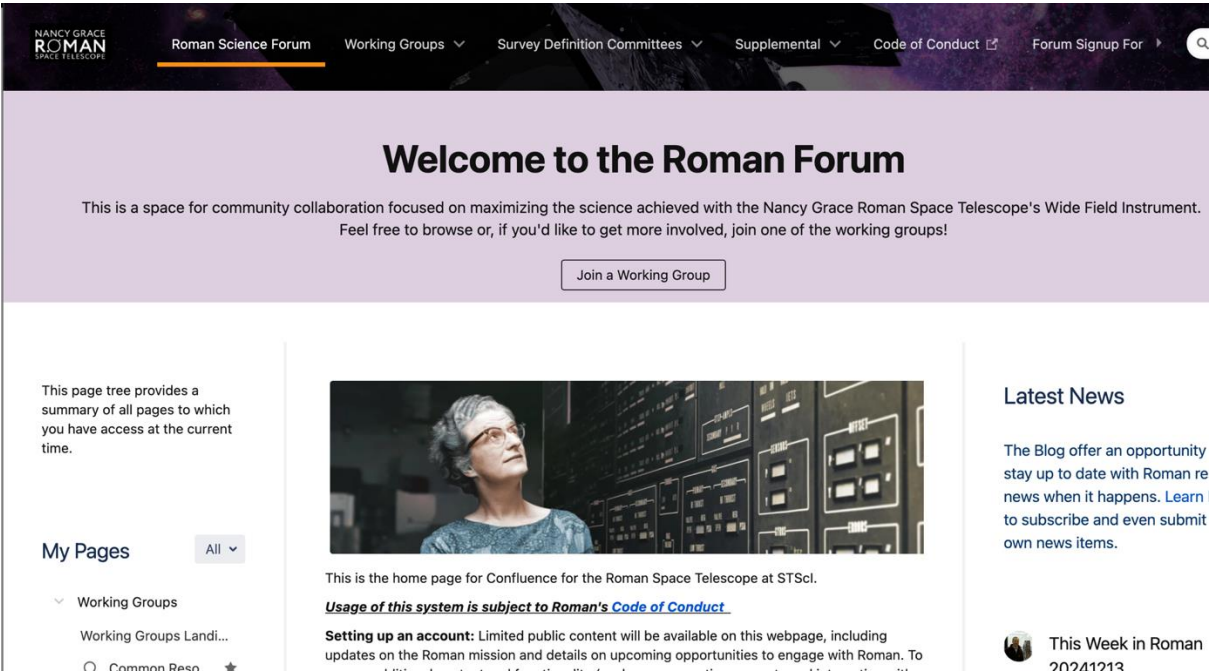
- Supports investigations that prepare for and/or enhance the science return of Roman that can be addressed with its Wide Field Instrument (WFI)
- Two different scales of project: Regular (two-year term, up to \$150K/year) and Large (two-year term, \lesssim \$500K/year)
- Expect to award \approx 12 WFS proposals with a roughly 2:1 balance of Regular:Large, subject to budgetary limits and sufficient meritorious proposals

- **Coronagraph Community Participation Program (CPP)**

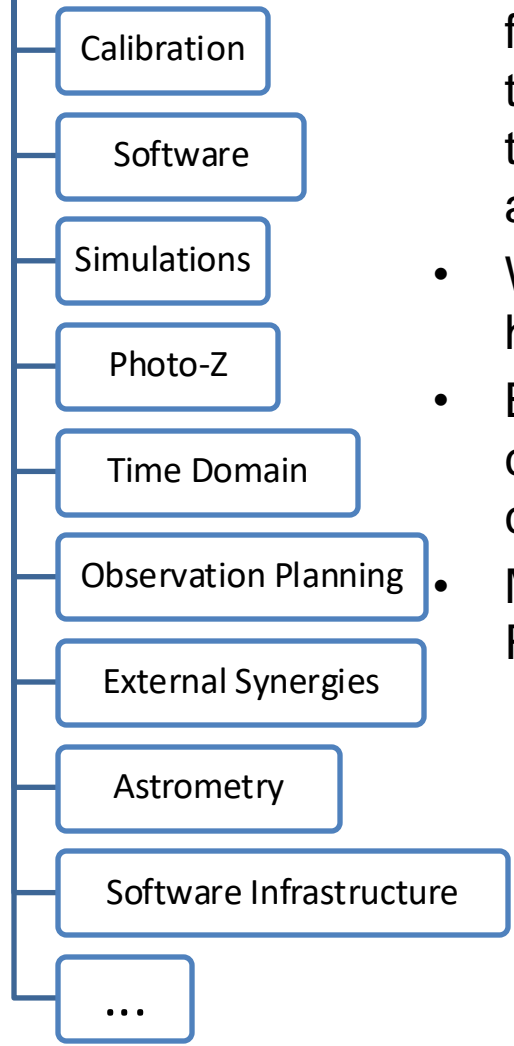
- Solicits individuals or very small teams to work with the Coronagraph Instrument team to plan and execute its technology demonstration observations.
- Selected proposals will have three-year terms; available funding can support \lesssim \$200K/year awards
- Expect to select around three CPP proposals; [PIs] members will join the single team that plans and executes Coronagraph Instrument observations

- **Roman Cycle 1 General Investigator Program**
 - We will solicit multiple program categories.
 - The largest fraction of these will be archival/data analysis/data driven/final-name-TBD. These are proposals for funding to exploit data from previously collected and planned Roman observations.
 - General Astrophysics Surveys will be solicited. We may provide guidance that programs that benefit from early execution will be prioritized in Cycle 1.
 - We are planning to also solicit theory programs
 - Expected to be released fall 2025
 - Management of the program is led by IPAC, leveraging experience on Spitzer + other programs
 - Funding available will be commensurate with other Astrophysics Flagship observatories

- The Roman Forum is a space for collaboration between members of the science community interested in the Wide Field instrument
- <https://outerspace.stsci.edu/display/RSWGS/Sign-Up+Form>



Science Working Group

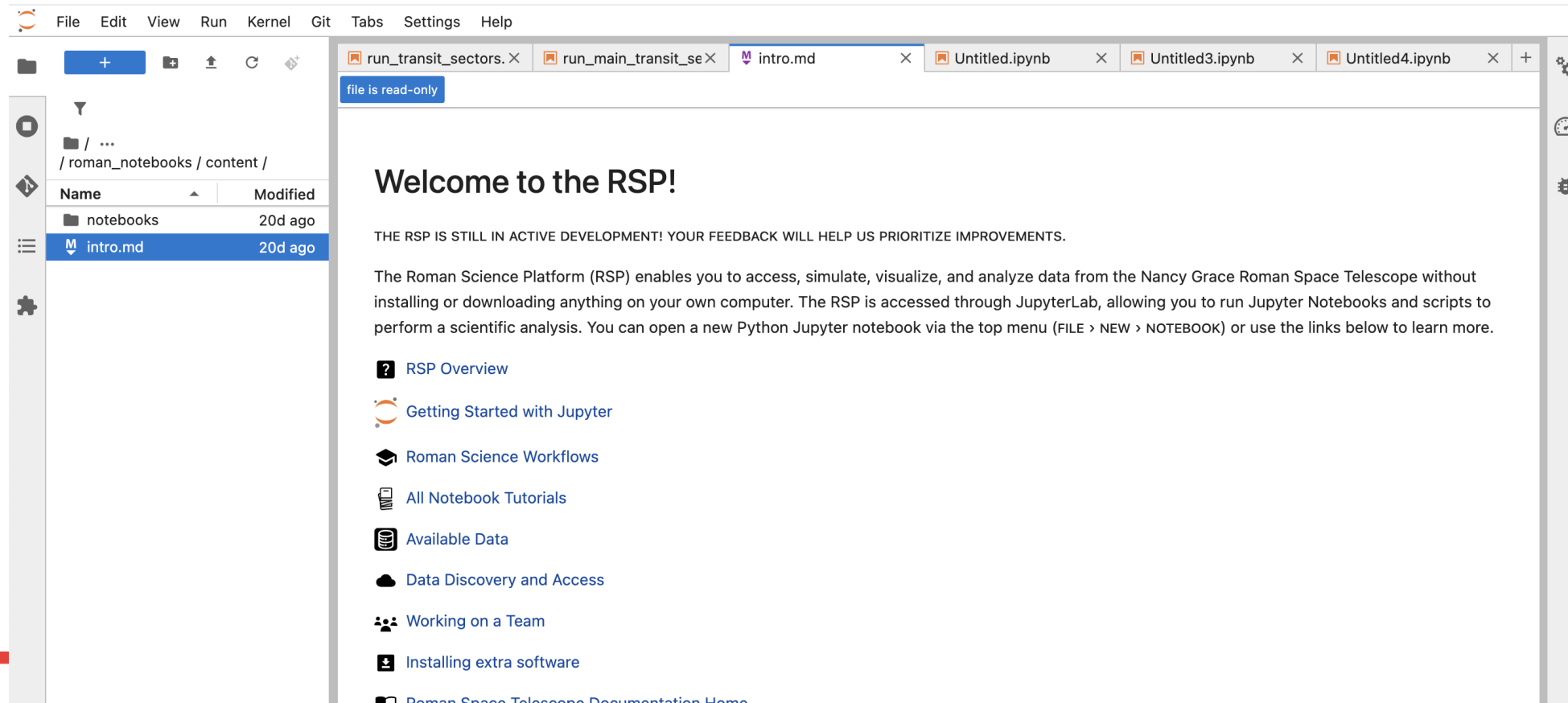


- Working groups are a forum for people to work together on topics/methods that cut across science areas
- Where actual work happens
- Brings together science community, science centers, and project
- Membership is via the Roman Forum



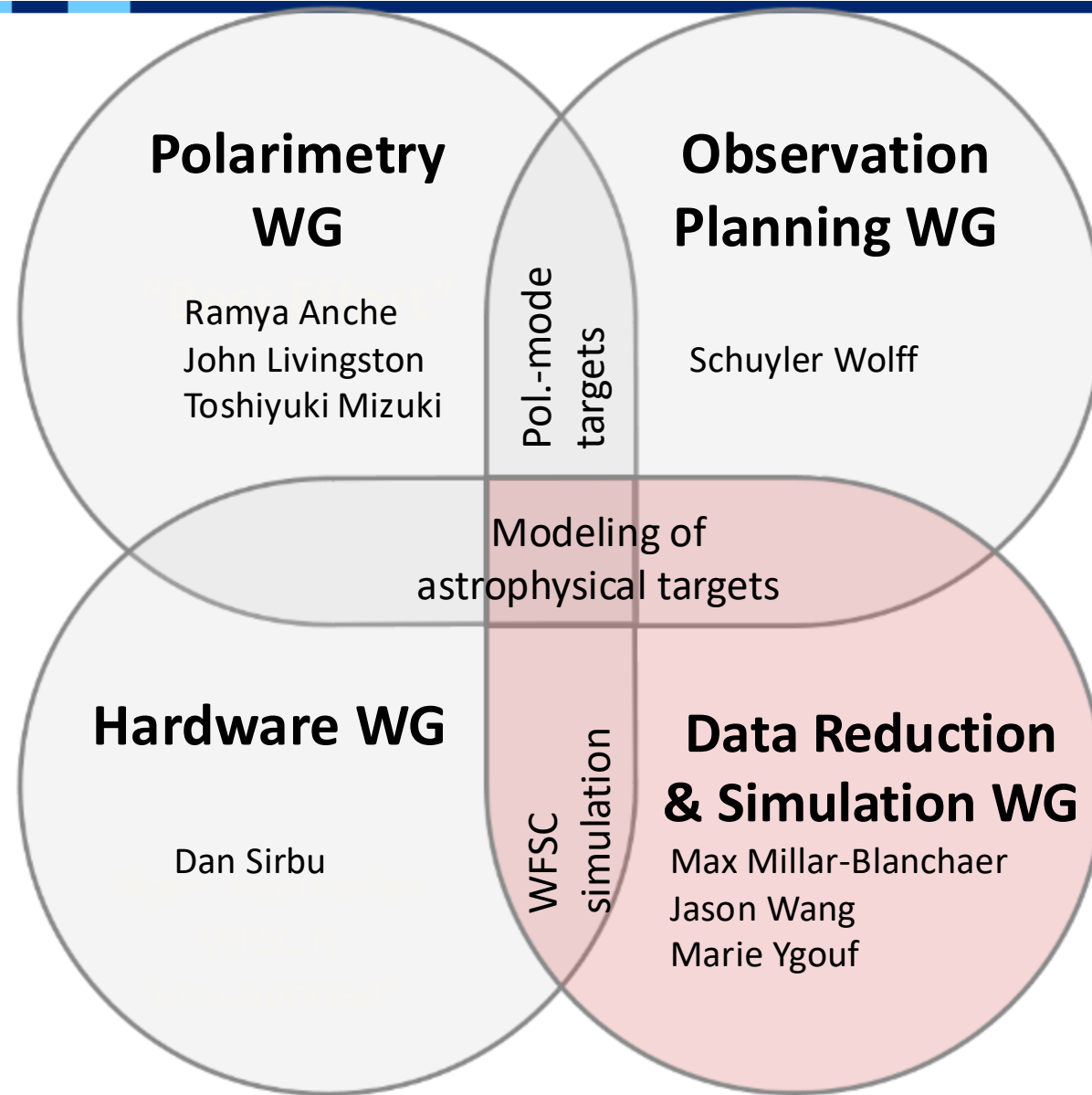
- **The goal** is to amplify the science returns from the Roman mission and the benefits of Roman science investigations to the astronomical community, by sparking collaborations and drawing on the creative insights and talents of researchers with complementary interests and expertise.
- **Membership** provides a framework and tools to support collaborative teams
- Collaboration co-spokespersons are Jessica Lu and David Weinberg
- Membership in the RSC is voluntary, and no one is required to be a member of the RSC to do science with Roman data or to apply for Roman observing time or related funding opportunities.

- **Roman Research Nexus:** Roman’s large data volumes mean it will not be feasible for most users to download and process data. The primary interface for the community to access Roman data will be a science platform, hosted in the cloud, with a Roman software environment to make it easy for people to do Roman analysis.
 - In September 2024 and Winter 2025 AAS, SOC hosted a workshop where participants got hands-on executing software on the platform



- The CPP enables US and international researchers to become integral parts of Coronagraph team
- CPP leadership is made up of NASA project team members, science leaders of funded ROSES ROSES program teams, and members selected by international partners.
- Membership covers more than 50 scientists/engineers.
- Coronagraph observation prioritization is a joint exercise between the instrument team and the CPP
- CPP are conduit for community input to observation planning

Contact Working Group (WG)
leads if you have questions



Roman Hardware Status

