Prepare for Panoramic Views:
THE ROMAN SPACE TELESCOPE FACT SHEET

Prepare to be wowed! The Nancy Grace Roman Space Telescope will survey enormous regions of the sky—often repeatedly—in near-infrared light. Roman will uncover transient events like supernovae and stellar flares, identify new planets in our Milky Way galaxy, and show us an untold number of distant galaxies. Roman will have approximately the same size and shape as the Hubble Space Telescope, along with an expansive field of view that is 200 times greater than Hubble's infrared view.

Core Surveys

Showing us wider, deeper, and repeated views of the cosmos

The majority of Roman's science observations will be dedicated to three surveys designed to accelerate a broad range of astronomical investigations—and will be fully defined by researchers worldwide. Roman will gather data regularly for each, and the mission will release data as quickly as possible to the worldwide research community.

High Latitude Wide Area Survey

Region: Above and beyond the Milky Way
Planned Data: Images and spectra
Type: Large spatial maps

This survey will help researchers better describe what dark energy and dark matter are, and understand the fundamental nature of the universe. It will also detail everything in its view—covering all of astrophysics. Roman will look up and well beyond the Milky Way to observe a broad field that will show us more than 1 billion distant galaxies. These images will be paired with spectra to identify the distances to every galaxy in the field.

High Latitude Time Domain Survey

Regions: Above and beyond the Milky Way
Planned Data: Images and spectra
Type: Spatial maps and time-lapse

Roman will repeatedly observe the same region of the sky over several months to find and study fleeting events. Are they rare? We'll soon find out! Teams will stitch these observations together to create "movies" that will reveal a wealth of transient objects, like exploding stars (supernovae), stars being swept into black holes, and neutron star mergers. This survey will also deliver high-resolution details about every object in these observations.

Galactic Bulge Time Domain Survey

Region: Core of the Milky Way
Planned Data: Images
Type: Spatial maps and time-lapse

Roman will capture deep imaging of the heart of our galaxy. By taking several observations each hour for several months, this survey will help researchers track how hundreds of millions of stars change in brightness over time. They'll also be able to pinpoint distant worlds, rogue planets, and isolated black holes. This survey may unveil more than 100,000 additional exolanets, and provide new details about the interiors of stars (asteroseismology). Broad areas of Milky Way science will be covered in these rich data sets.

General Astrophysics Surveys

At least a quarter of Roman's science time is reserved for investigations that can't be done with the mission's core surveys. Astronomers from all over the world will have the opportunity to propose cutting-edge research and conduct extraordinary science.

Covering All of Astrophysics

Planets by the thousands, stars by the billions, galaxies by the millions

Roman is designed to explore everything from our outer solar system to the edge of the observable universe. It will reveal billions of cosmic objects and shine a light on mysterious phenomena with its vast and deep surveys.

Bundles of Distant Planets

Are planetary systems like our own common, rare, or unique? Roman will find more than a thousand planets orbiting far from their host stars by using a quirk of gravity called microlensing. This technique will uncover a population of planets further from their host stars than previous exoplanet surveys and potentially discover 100,000 planets with the transit technique. Roman will also enable the discovery of small rocky and icy bodies in our own solar system.

New Insights into Stars

There is still so much we don't know about how stars form, how they affect one another in dense star forming regions, and the role they play in the development of galaxies over time. Roman's surveys will capture billions of stars, allowing us to understand their properties on galactic scales.

Many More 'Mile Markers'

Roman will unveil thousands of supernovae, including a special kind called type Ia that serve as "standard candles" because they peak at about the same intrinsic brightness. Scientists can use them to measure distances and trace cosmic expansion over time, providing key insights into how the mysterious dark energy influences the evolution of our universe.

Tracing Galaxies Across Time

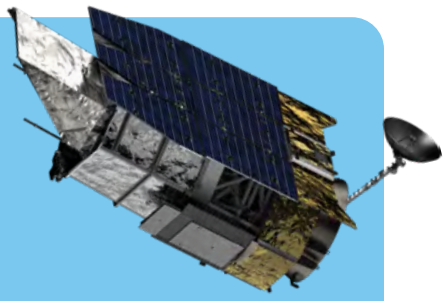
Roman will reveal precise positions, shapes, and sizes of hundreds of millions of both bright and faint galaxies. It will also examine how their images have been distorted by intervening mass (made of both normal and dark matter). Their three-dimensional distributions will provide key insights into how dark matter and dark energy shaped the cosmos over the history of the universe. Astronomers will use these observations to map the dark universe and explore how it has changed over cosmic time.

Exploring the Dynamic Universe

Roman's wide field of view and higher observational efficiency will produce time-domain surveys that will help researchers measure our constantly changing universe far more precisely.

At a Glance

Specs and Capabilities



Launch Date: No later than May 2027

Primary Mirror Size: 2.4 meters (7.9 feet) in diameter

Wide Field Instrument: 300-megapixel camera made up of 18 detectors

Coronagraph Instrument: Test demonstration instrument that blocks stars' light to observe orbiting planets

Location: Sun-Earth Lagrange point 2 (L2), about 1.5 million kilometers (1 million miles) from Earth

Field of View: 200 times greater than Hubble's infrared view

Survey Speed: Can deliver surveys 1,000 times faster than Hubble

Wavelength Range: Visible to near-infrared light

The Teams Behind Roman

The Nancy Grace Roman Space Telescope is managed at NASA's Goddard Space Flight Center in Greenbelt, Maryland, with participation by NASA's Jet Propulsion Laboratory and Caltech/IPAC in Southern California, the Space Telescope Science Institute in Baltimore, foreign partners, and science teams comprising scientists from various research institutions. The primary industrial partners are Ball Aerospace and Technologies Corporation in Boulder, Colorado, L3Harris Technologies in Melbourne, Florida, and Teledyne Scientific & Imaging in Thousand Oaks, California.

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Dive more deeply into Roman's science:
roman.gsfc.nasa.gov
stsci.edu/roman/news-and-events/press

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