

Nancy Grace Roman Space Telescope

Quick Facts

NASA's Nancy Grace Roman Space Telescope will pair a large field of view with crisp infrared vision to survey deep, vast swaths of sky. While the mission was designed with particular science goals in mind, Roman's panoramic views will offer practically limitless opportunities for astronomers to explore all kinds of cosmic topics. From detecting new planets across our galaxy to mapping the invisible universe, very little will be beyond Roman's reach.

Field of View: Roman's uniquely wide views will capture huge swaths of the sky in exquisite detail. Each Roman image will capture a patch of the sky bigger than the apparent size of a full moon. Over the first five years of observations, Roman will image more than 50 times as much sky as Hubble covered in 30 years. Roman will gather data up to 1,000 times faster than Hubble, adding up to 20,000 terabytes (20 petabytes) over the course of its five-year primary mission.

Dark Universe: The universe is being held together and governed by an invisible substance (dark matter) and a mysterious force (dark energy). Little is known about either since astronomers have had to piece together sparse clues. Roman will help us understand both better by creating the most comprehensive 3D map of the universe, including hundreds of millions of galaxies. Measuring dark matter's pull and dark energy's push across the cosmos will bring scientists closer than ever before to solving both mysteries. Astronomers could soon learn what dark matter is made of and understand the unseen forces at play in the universe, potentially uncovering new fundamental physics.

Exoplanets: In the search for other worlds, planets like our own remain very difficult to detect. Many of the thousands of exoplanets now known are either far larger or orbit dizzyingly close to their host star, or both. Roman will use multiple detection methods to add around 100,000 new exoplanets, including analogs to nearly every planet in our solar system, to the nearly 6,200 currently known. Roman will also study atmospheres of perhaps 1,000 sweltering giant planets and test new direct imaging technologies to photograph worlds and dusty disks around nearby stars with detail up to a thousand times better than possible with other observatories. By photographing smaller, older, and colder planets than direct imaging usually reveals, Roman will bring us a giant leap closer to imaging planets like Earth.

Target Launch Date: fall 2026 (with a commitment to launch by May 2027)