The Roman Space Telescope: the power of science and the bankruptcy of capitalism

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The Nancy Grace Roman Space Telescope, launched at dawn on Sunday from Kennedy Space Center, is now well on its way to its final orbit about 1 million miles from Earth. The observatory's solar panels and lower sun shade have been successfully deployed, and its high-gain antenna will soon come online.

Full commissioning will take three months, with the first scientific images expected early next year, the beginning of a five-year survey of the deepest mysteries in modern physics: the phenomena known as dark matter and dark energy.

The observatory is named for Nancy Grace Roman, NASA's first chief astronomer, who fought for the creation of space-based astronomy. The telescope that bears her name carries a mirror of the same 2.4-meter diameter as Hubble's and produces images just as sharp, but each exposure takes in at least 100 times more sky.

Over five years it will study more than a billion galaxies, chart up to 20 billion stars in our own Milky Way, and discover somewhere between 50,000 and 200,000 planets orbiting other stars. The onboard hardware and software are designed to send back 1.4 terabytes of data per day, a record for a NASA astrophysics mission.

Roman is part of an extended international effort to probe the very foundations of the structure and history of the universe. In the early twentieth century, the universe was discovered to be expanding everywhere, from a distinct origin now known to be about 13.8 billion years ago. From that discovery arose the question of its fate: Will the expansion continue forever, or will gravity overcome it and produce an eventual collapse?

Many surprising discoveries came from the pursuit of this fundamental question. Around 1970, it was found that galaxies are bound together by far more mass than that of their gas and stars, a "dark matter" of unknown composition that has mass and therefore gravity, but does not emit any sort of light. Studies of the most distant exploding stars, seen as they were in the early history of the universe, showed that the expansion is accelerating, driven by a repulsion operating on a cosmic scale, now termed "dark energy."

One of the most perplexing aspects of both dark matter and dark energy is that they make up the vast majority of the mass/energy of the universe. Dark matter consists of about 27 percent and dark energy about 68 percent, with the remaining 5 percent being ordinary "baryonic" matter.

Julie McEnery, Roman's senior project scientist, described the origins of the mission in a pre-launch interview on NASA's Curious Universe podcast: "In the late 90s, we realized that the universe was behaving much more strangely than we imagined, and that instead of coasting out at the constant speed forever or slowing down, it in fact is accelerating. [It was a] huge, unexpected mystery. Many scientists wanted to figure out what can we do to take the next step to understand the fundamental nature of our universe?"

A central task of the last few decades across both astronomy and physics has been to identify the concrete origins and character of these attractive and repulsive components that shape the evolution of the universe.

Measurements published last year by the Dark Energy Spectroscopic Instrument (DESI) in Arizona suggest that dark energy may be weakening over cosmic time. If true, it will impact the reigning model of the universe, in which dark energy is a fixed constant, with consequences reaching into the foundations of physics.

These questions cannot be settled by any single instrument because there are multiple ways in which the expansion of the universe is measured. Roman is designed to very carefully study a particular type of exploding star, Type Ia supernovae, which emit a known quantity of light, so that their apparent brightness is directly related to their distance. Separately, Roman will measure how the gravity of intervening matter distorts the images of hundreds of millions of distant galaxies. Combining the two, scientists can study both the expansion of the universe and the evolution of structures such as galactic superclusters and cosmic filaments.

DESI studies this structure differently, looking at sound waves from the universe's primordial plasma that are frozen into the arrangement of the galaxies. DESI also tracks the infall of material into galactic clusters. Other surveys doing similar work include HETDEX (in West Texas), 4MOST (Chile), WEAVE (Spain's Canary Islands), the Vera C. Rubin Observatory (Chile) and Euclid (a European space telescope stationed, like Roman will be, a million miles from Earth).

All told, decades of work by thousands of researchers,

technicians and engineers went into each. None were built or are operated by a single country. They represent the inherently international nature of scientific research, and the limitations that do exist express the backwardness of the nation-state system.

For decades, the standard practice of these international efforts was to enforce a proprietary period, during which scientists from a mission's sponsoring institutions held exclusive rights to publish before the raw data was released to the wider public. The European Hipparcos mission of the early 1990s, which measured the distances to more than a hundred thousand stars and recalibrated the cosmic distance scale, held its catalog for close to four years. The Planck mission's cosmological results were embargoed for more than three. Hubble's data was long withheld from the wider community for a year after each observation.

Nothing in the physics requires this. The clearest proof is Roman itself, which has no proprietary period on its large-scale surveys whatsoever, with every observation becoming public as soon as it is processed. This was written into the mission years before launch by its science definition team, which recognized that the dataset is too large for any single group to study.

The launch of Roman is testament to extraordinary developments in science, and to the technological foundations that make the mission itself possible (the semiconductor manufacturing behind its 300-megapixel infrared camera, the computing that will process and transmit 1.4 terabytes of data each day, the precision optics that can cancel the light of a star to reveal the planets beside it). All of this casts all the more starkly the irrationality of the social relations that prevail on the world Roman leaves behind.

The rocket that lifted the telescope belongs to Elon Musk, the world's first trillionaire, a racist ignoramus whose diatribes against immigrants and refugees have been combined with political and financial support for Donald Trump, the neo-Nazi AfD in Germany and other fascist parties. SpaceX was built on public money via NASA and Pentagon contracts and now trades near a $2 trillion valuation, a massive vehicle for speculation and the enrichment of the oligarchy.

And as the Roman telescope climbed out of the atmosphere Sunday morning, rescue workers in Nepal were searching flooded Himalayan valleys, where 903 people were dead by Monday's count and more than 4,000 were missing. The danger had been warned of for years. The Himalaya, warming faster than the global average, holds thousands of swelling glacial lakes above some of the poorest valleys on earth.

The satellite monitoring and valley-level warning systems that could have saved hundreds of lives are built on the same infrared and remote-sensing technologies that Roman carries into space, and cost a pittance beside any military budget. They were never built. Even now a newly formed lake of loose debris hangs, unstable, above the rescue crews, and hundreds of workers are trapped in tunnels under the ground.

In the realm of public health, the United States has confirmed 2,777 measles cases this year, the most since the disease was declared eliminated in 2000, and Pennsylvania recorded its first measles deaths in 35 years. Cases of the foodborne parasite Cyclospora have passed 17,000, roughly four times the recent annual count.

The response of the American government, and its counterparts internationally, to every social disaster has been to attack the underlying science and those who carry out the research. The Centers for Disease Control and Prevention (CDC) has cut its foodborne illness surveillance from eight pathogens to two. The National Oceanic and Atmospheric Administration, whose scientists model floods and forecast storms, fired more than 800 workers in February 2025. The Environmental Protection Agency has lost a quarter of its staff in a year and is now smaller than at any time since Reagan.

Roman itself was nearly killed four times. The first Trump administration proposed eliminating the telescope, then called WFIRST, in three budgets running, and in April 2025 a White House budget document proposed eliminating it again. At the same time, both the Republicans and Democrats have consistently voted billions to fund ICE and trillions for the military and corporate bailouts.

The knowledge, technique and organizational capacity plainly exist to contain the floods, provide universal vaccinations, rebuild infrastructure and replace coal and oil plants with renewable energy. It is the control of society's resources by a tiny financial oligarchy, and the subordination of every social decision to profit and war, that hold that capacity out of reach.

Over the coming years the Roman Space Telescope will map the universe. The task on Earth is to place the advances of science at the service of mankind: to take the oligarchy's wealth into public hands, end the wars and turn the productive forces to human need.