

The *Roman* Space Telescope isn't the only US observatory built from spy tech

The newest spacecraft from NASA started as a spy telescope. It's just one example of the intelligence world offering resources to astronomers.

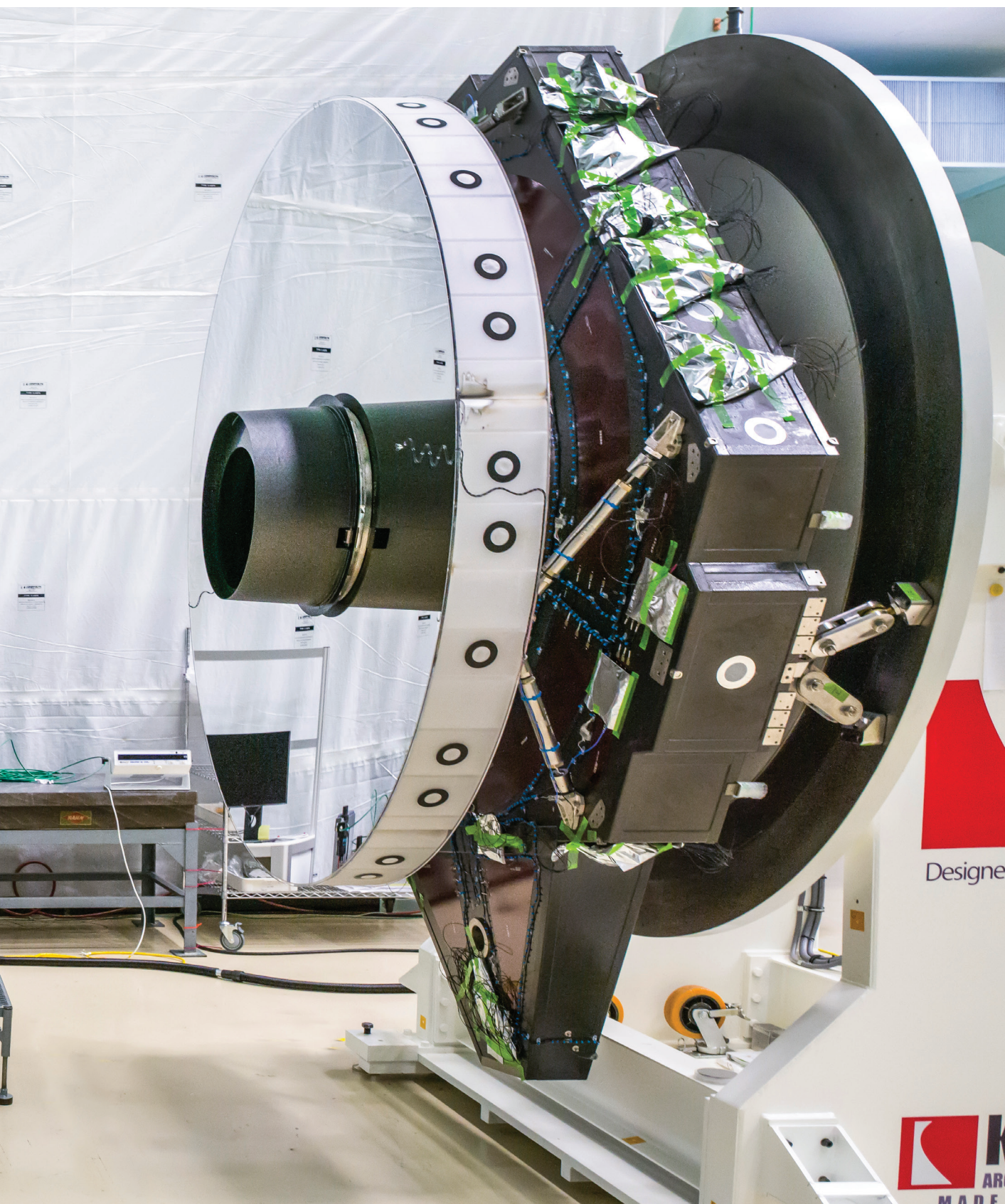
By **Jenessa Duncombe**

It sounds like a quirky fact or colorful footnote: NASA's latest space telescope came from the bones of an unused reconnaissance satellite. The donated spy tech inspired NASA to build a more expensive and more capable telescope than it had initially planned.

You'd be forgiven for stopping there, since there is plenty to say about the *Nancy Grace Roman Space Telescope* that has nothing to do with its covert origins. The telescope will probe the mystery of dark energy; its coronagraph will allow NASA to peer at exoplanets more directly than ever before. The astronomy community eagerly awaited the telescope's 30 August launch from NASA's Kennedy Space Center.

The donation illustrates a relatively unknown history of the influence of the US's shadow space agency, the National Reconnaissance Office (NRO), on astronomy. Although the government did not formally acknowledge





▲ The primary mirror on NASA's *Nancy Grace Roman Space Telescope* came from an unused spy satellite produced by the National Reconnaissance Office. (Photo by NASA/Chris Gunn/CC BY-NC-ND 2.0/Flickr.)

the NRO's existence until the 1990s, occasional knowledge transfer between it and NASA had been going on for decades. The intermittency "highlights the difficulty of cooperation between a very public, open organization, like NASA, and one whose existence was not acknowledged, like the NRO," says space historian Dwayne Day, who has three decades of experience in space policy roles.

Eyes in the sky

It was 1960. A US spy plane had just been shot down over the Soviet Union, and the US sought more covert methods of espionage. So began the NRO, a Department of Defense agency that would grow into the country's clandestine space agency. Formed just three years after NASA, the NRO had the initial goal of spying on the Soviet Union from space by using sophisticated imaging instruments. Declassified documents reveal that the NRO launched hundreds of satellites in its first two decades.

The NRO built the best space optics in the 1960s and 1970s, says Day. Cameras supplied by optics contractors like Itek and Kodak for the NRO's Corona and Gambit spy satellites delivered images so precise that planes and trucks on the ground could be resolved from more than 150 kilometers above. Notably, one of Itek's founding scientists, Duncan MacDonald, was an astronomer and physicist.

Meanwhile, NASA was focused on human spaceflight. Likely just a handful of people at the agency knew about the existence of the NRO in the 1960s, says Day, but they would have understood the NRO only in the vaguest ways.

In the 1960s, the NRO presented NASA with cameras to photograph the Moon during an Apollo mission. Cameras from the Gambit reconnaissance system had a ground resolution of about half a meter or so. "There were people at NASA who were very intrigued by this technology because it was a much bigger optical system than NASA had ever developed," says Day.

When a change of plans left the cameras unused for the Apollo mission, says Day, NASA wanted to use them to observe Earth. "That made some people at the NRO rather unhappy," he says. The NRO was fearful of its covert technology producing information available to the public. The cameras were never used, says Day.

What about the *Hubble Space Telescope*? Some have speculated about whether NASA's most famous telescope had spy origins, but Day dismisses the idea, saying that *Hubble* was not a direct copy of a reconnaissance satellite. *Hubble* scientists did take advantage of existing spy-satellite mirror-fabrication techniques, which saved the agency fabrication costs, according to a NASA historical account. "A lot of the stuff is still

classified," says Day. The NRO says on its website that it has not declassified most of its programs.

Occasionally, newly declassified documents shed light on the NRO's unexpected contributions. Astrophysicist Jonathan McDowell says that he always had been perplexed by the telescope design of the original Multiple Mirror Telescope, built in the 1970s by the Smithsonian Institution and the University of Arizona. The ground-based telescope in Arizona contained six medium-sized mirrors rather than one single larger mirror. "We were told these six mirrors fell off the back of the lorry," jokes McDowell. Later, the NRO declassified documents revealing that those mirrors were surplus from the canceled NRO Manned Orbiting Laboratory program.

The latest collaboration

NASA received a surprise offer from the NRO in 2011 of two unused spy telescopes stored in a warehouse in Rochester, New York. They came from an unspecified NRO program and were up for the taking. NASA learned that the spy telescopes had mirrors that were the same size as *Hubble*'s primary mirror but much lighter weight. "The donation appears to involve very high quality telescope assets with excellent capabilities, better than the best NASA ultraviolet/near-infrared telescopes operating in space today (e.g., the Hubble Space Telescope)," wrote NASA's advisory council in 2012.

Although the NRO has declined to name the program that the spy satellites came from, "the obvious canceled program was the Future Imagery Architecture," says Day. That program, from the late 1990s, fell apart after the contractor failed to deliver on time or on budget, according to declassified records released in 2020.

The NRO could have just thrown the spy satellites "into a shredder and not cared," says Day. But he believes people at the NRO felt that the nation spent a lot of money on them. "NASA and the NRO are both American organizations that exist to advance American interests. So why not take advantage of it?" he says. "But then, of course, it also comes with risk because people start asking questions, and [the NRO doesn't] want to provide answers."

In 2012, one of the spy telescopes, stripped of its classified equipment, became the building block for NASA's next space telescope. Nearly 15 years and roughly \$4.3 billion later, the repurposed telescope has now been launched.

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For a profile of the astronomer the satellite is named after, see David DeVorkin's 2020 PT article "How Nancy Grace Roman shaped Hubble," <https://bit.ly/nancy-roman-hubble>.