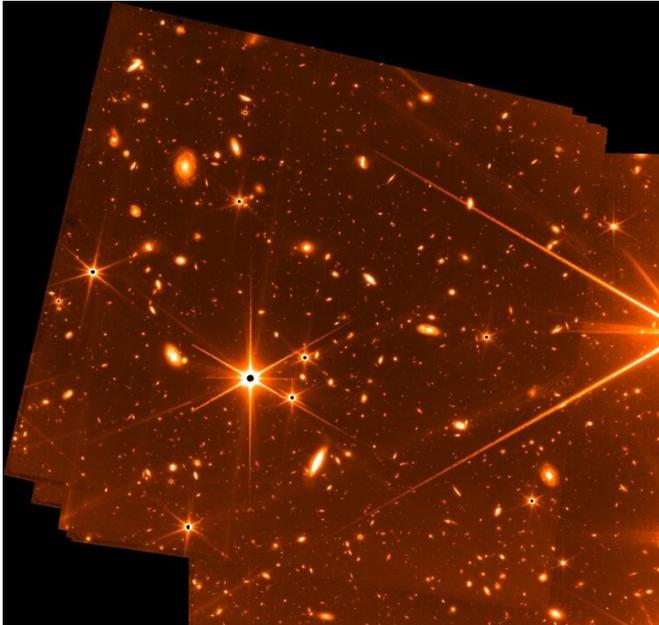


Webb telescope to reveal earliest galaxies after Big Bang

11 July 2022, by Issam AHMED



This handout image released on July 6, 2022 by NASA, CSA and FGS shows a Fine Guidance Sensor test image which was acquired in parallel with NIRCam imaging of the star HD147980 over a period of eight days at the beginning of May.

NASA's James Webb Space Telescope is poised to reveal some of the earliest galaxies that formed after the Big Bang, the White House said Monday, as anticipation builds for the powerful observatory's first images.

President Joe Biden will unveil the images during a livestreamed event starting at 5:00 pm (2100 GMT).

"The high resolution images will show light captured from galaxies that are more than 13 billion years old," White House spokeswoman Karine Jean-Pierre said.

US [space](#) agency NASA revealed last week

Webb's first targets included distant galaxies, bright nebulae and a faraway giant gas planet.

The rest of the first wave of images are set to be released by NASA on Tuesday.

Webb's infrared capabilities are what make it uniquely powerful, allowing it to both pierce through cosmic dust clouds and detect light from the earliest stars, which has been stretched into [infrared wavelengths](#) as the universe expanded.

This lets it peer further back in time than any previous telescope, to the period shortly after the Big Bang, 13.8 billion years ago.

"When I first saw the images... I suddenly learned three things about the Universe that I didn't know before," Dan Coe, a Space Telescope Science Institute (STSI) astronomer and expert on the early Universe, told AFP. "It's totally blown my mind."



Carina Nebula is famous for its towering pillars that include "Mystic Mountain," a three-light-year-tall cosmic

pinnacle captured in an iconic image by the Hubble Space Telescope, until now humanity's premier space observatory.

First targets

An international committee decided the first wave of images would include the Carina Nebula, an enormous cloud of dust and gas 7,600 light years away.

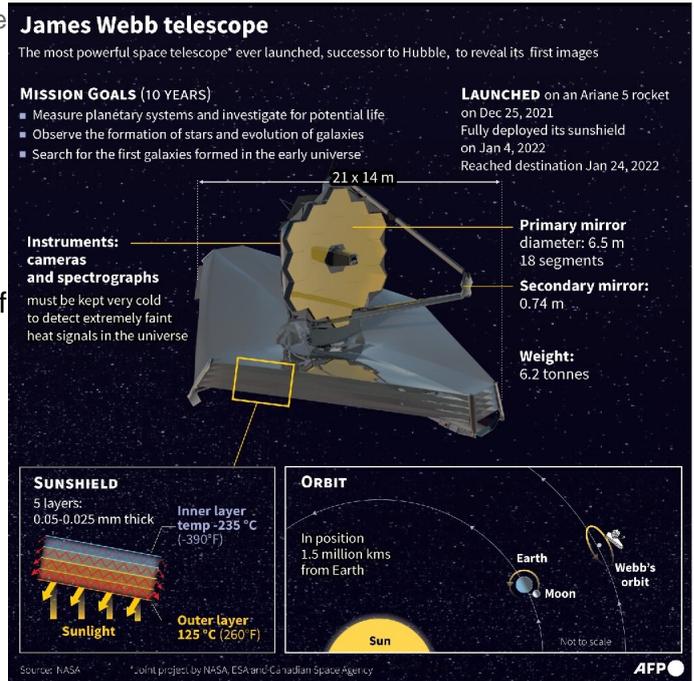
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Webb has also carried out a spectroscopy—an analysis of light that reveals detailed information—on a faraway gas giant called WASP-96 b, which was discovered in 2014.

Nearly 1,150 [light-years](#) from Earth, WASP-96 b is about half the mass of Jupiter and zips around its star in just 3.4 days.

Nestor Espinoza, an STSI astronomer, told AFP that previous exoplanet spectroscopies carried out using existing instruments were very limited compared to what Webb could do.

"It's like being in a room that is very dark and you only have a little pinhole you can look through," he said of the prior technology. Now, with Webb, "You've opened a huge window, you can see all the little details."



Graphic of the James Webb space telescope, successor to Hubble.

Million miles from Earth

Launched in December 2021 from French Guiana on an Ariane 5 rocket, Webb is orbiting the Sun at a distance of a million miles (1.6 million kilometers) from Earth, in a region of space called the second Lagrange point.

Here, it remains in a fixed position relative to the Earth and Sun, with minimal fuel required for course corrections.

A wonder of engineering, the total project cost is estimated at \$10 billion, making it one of the most expensive scientific platforms ever built, comparable to the Large Hadron Collider at CERN.

Webb's primary mirror is over 21 feet (6.5 meters) wide and is made up of 18 gold-coated mirror segments. Like a camera held in one's hand, the structure must remain as stable as possible to achieve the best shots.

Charlie Atkinson, chief engineer on the James

Webb Space Telescope program at lead contractor Northrop Grumman, told AFP that it wobbles no more than 17 millionths of a millimeter.

After the first images, astronomers around the globe will get shares of time on the telescope, with projects selected competitively through a process in which applicants and selectors don't know each others' identities, to minimize bias.

Thanks to an efficient launch, NASA estimates Webb has enough propellant for a 20-year life, as it works in concert with the Hubble and Spitzer space telescopes to answer fundamental questions about the cosmos.

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