NASA telescope set for launch on million-mile voyage

December 25 2021

From its remote orbit, Webb is expected to beam back new clues to the origins of the Universe.

The world's most powerful space telescope is set to blast off on Saturday to its outpost 1.5 million kilometres (930,000 miles) from Earth, after several delays caused by technical hitches.

The James Webb Space Telescope, some three decades and billions of dollars in the making, will leave Earth enclosed in its Ariane 5 rocket from Kourou Space Centre in French Guiana.

UPDATE: Space telescope launched on daring quest to behold 1st stars

The launch, scheduled in a brief window after 9:20 am (1220 GMT), will send the telescope on a month-long journey to its remote orbit.

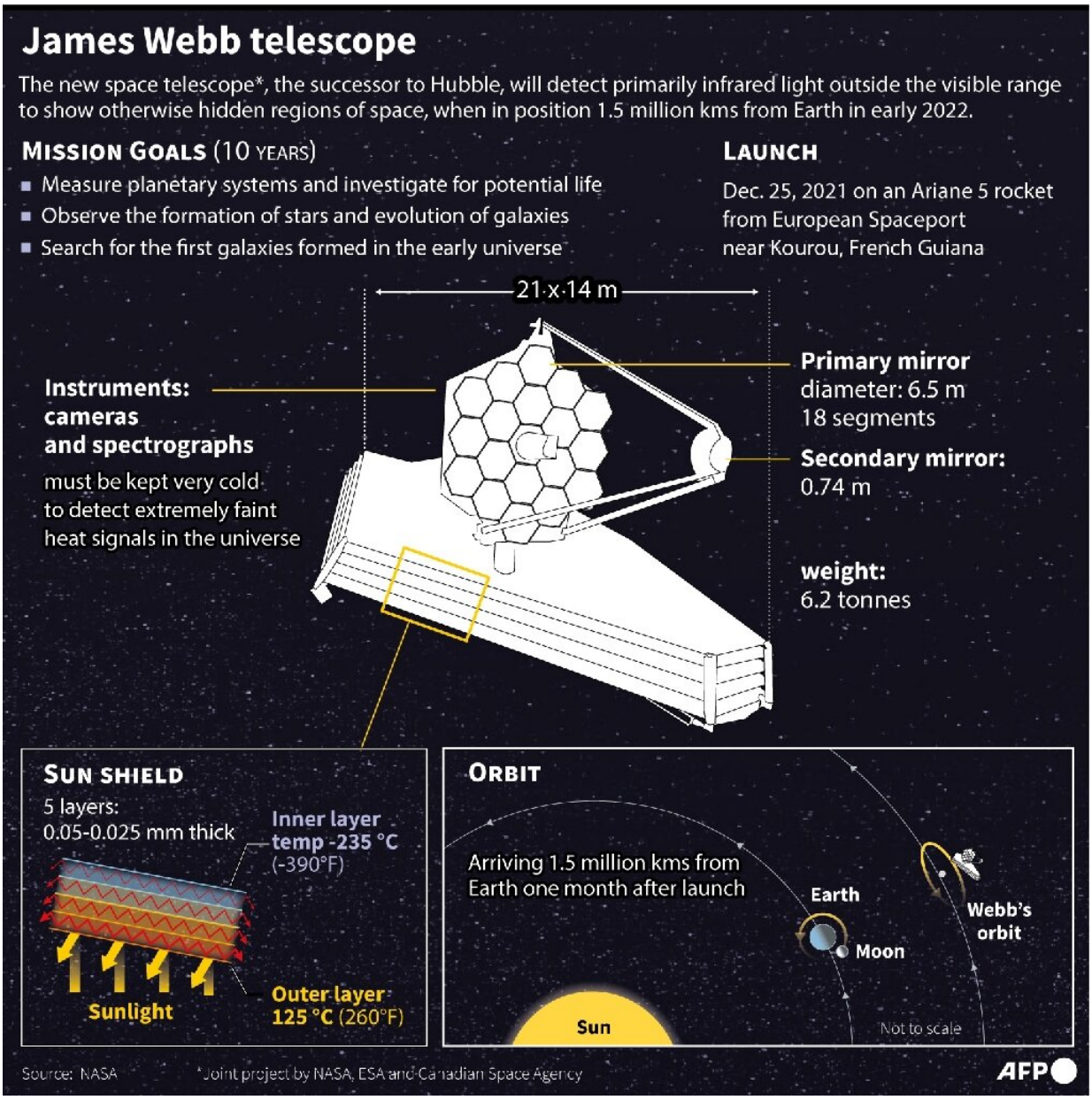
It is expected to beam back new clues that will help scientists understand more about the origins of the Universe and Earth-like planets beyond our solar system.

Named after a former NASA director, Webb follows in the footsteps of the legendary Hubble—but intends to show humans what the Universe looked like even closer to its birth nearly 14 billion years ago.

Speaking on social media, Webb project co-founder John Mather described the telescope's unprecedented sensitivity.

"#JWST can see the heat signature of a bumblebee at the distance of the Moon," he said.

All that power is needed to detect the weak glow emitted billions of years ago by the very first galaxies to exist and the first stars being formed.



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

'Exceptional measures'

The telescope is unequalled in size and complexity.

Its mirror measures 6.5 metres (21 feet) in diameter—three times the size of the Hubble's mirror—and is made of 18 hexagonal sections.

It is so large that it had to be folded to fit into the rocket.

That manoeuvre was laser-guided with NASA imposing strict isolation measures to limit any contact with the telescope's mirrors from particles or even human breath.

Once the rockets have carried Webb 120 kilometres, the protective nose of the craft, called a "fairing", is shed to lighten the load.

To protect the delicate instrument from changes in pressure at that stage, rocket-builder Arianespace installed a custom decompression system.

"Exceptional measures for an exceptional client," said a European Space Agency official in Kourou on Thursday.

The telescope is so large that it had to be folded to fit into the rocket.

Crew on the ground will know whether the first stage of the flight was successful about 27 minutes after launch.

Once it reaches its station, the challenge will be to fully deploy the mirror and a tennis-court-sized sun shield.

That intimidatingly complex process will take two weeks and must be flawless if Webb is to function correctly.

Its orbit will be much farther than Hubble, which has been 600 kilometres above the Earth since 1990.

The location of Webb's orbit is called the Lagrange 2 point and was chosen in part because it will keep the Earth, the Sun and the Moon all on the same side of its sun shield.

Webb is expected to officially enter service in June.

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