

UAE's 'Hope' probe to be first in trio of Mars missions

February 7 2021, by Dana Moukhallati



The UAE's "Hope" probe, the first Arab space mission, expected to reach Mars' orbit on Tuesday, blasted off from Japan in July 2020

The first Arab space mission, the UAE's "Hope" probe, is expected to reach Mars' orbit on Tuesday, making it the first of three spacecraft to

arrive at the Red Planet this month.

The United Arab Emirates, China and the United States all launched projects to Mars last July, taking advantage of a period when the Earth and Mars are nearest.

If successful, the wealthy Gulf state will become the fifth nation to ever reach Mars—a venture timed to mark the 50th anniversary of the unification of the UAE—with the China mission due to become the sixth the following day.

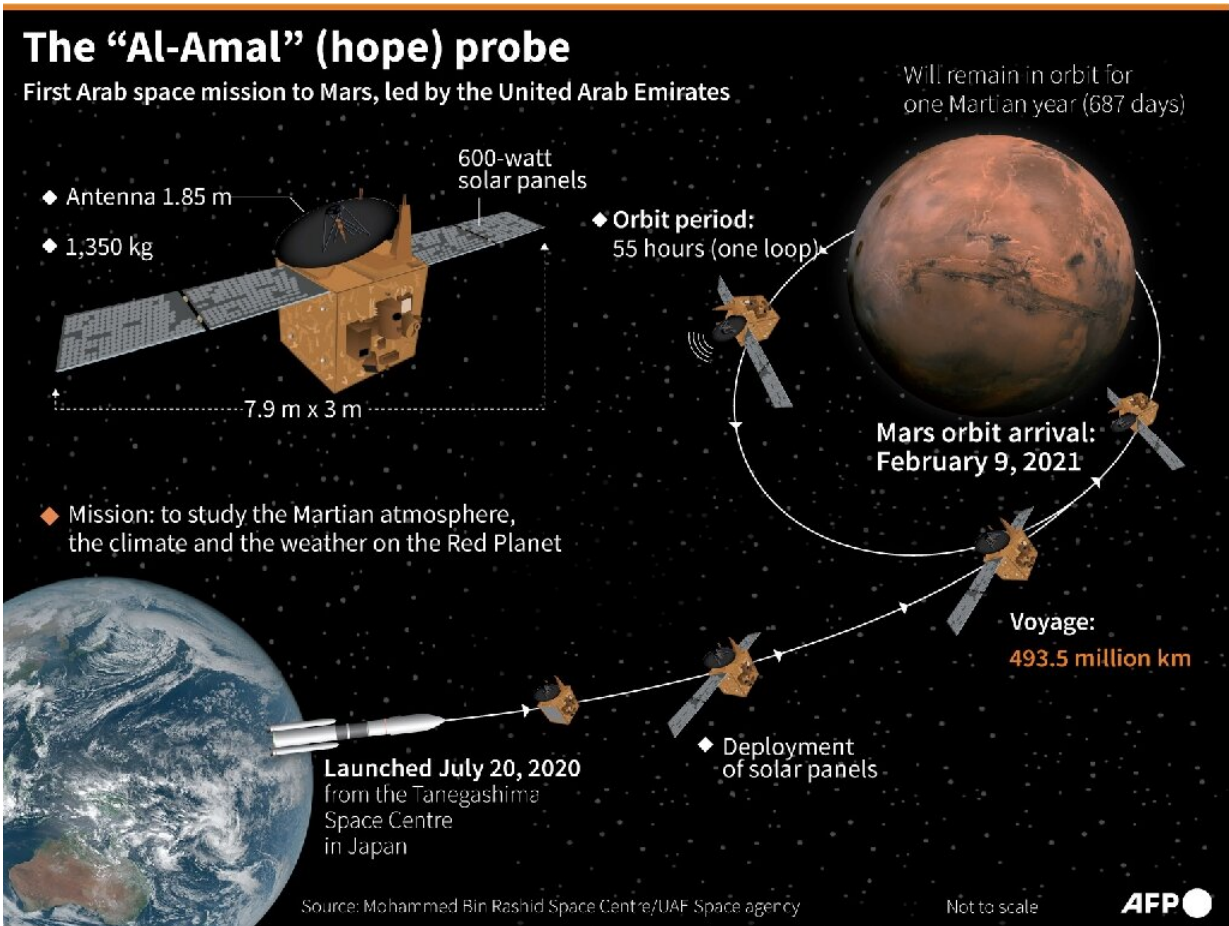
Landmarks across the UAE have been lit up in red at night, government accounts emblazoned with the #ArabstoMars hashtag, and on the big day Dubai's Burj Khalifa, the world's tallest tower, will be at the centre of a celebratory show.

"Hope", known as "Al-Amal" in Arabic, will orbit the planet for at least one Martian year, or 687 days, while the Tianwen-1 from China and the Mars 2020 Perseverance rover from the US will both land on Mars' surface.

Only the US, India, the former Soviet Union and the European Space Agency have successfully reached the Red Planet in the past.

Risky manoeuvre

After blasting off from Japan last July, the Hope mission now faces its "most critical and complex" manoeuvre, according to Emirati officials, with a 50-50 chance of successfully entering a Mars orbit.



Key data on the UAE's "Al-Amal" hope probe and its journey to Mars

The spacecraft must slow significantly to be captured by Martian gravity, rotating and firing all six of its Delta-V thrusters for 27 minutes to reduce its cruising speed of 121,000 kilometres (about 75,000 miles) per hour to about 18,000 kph.

The process, which will consume half of its fuel, will begin on Tuesday at 1530 GMT and it will take 11 minutes for a signal on its progress to reach ground control.

Omran Sharaf, the UAE mission's project manager, said it was a "huge honour" to be the first of this year's missions to reach Mars.

"It is humbling to be in such auspicious and skilled company as we all embark on our missions," he said. "It was never a race for us. We approach space as a collaborative and inclusive effort."

While the Hope probe is designed to provide a comprehensive image of the planet's weather dynamics, it is also a step toward a much more ambitious goal—building a human settlement on Mars within 100 years.

While cementing its status as a key regional player, the UAE also wants the project to serve as a source of inspiration for Arab youth, in a region too often wracked by sectarian conflicts and economic crises.

Hope will use three scientific instruments to monitor the Martian atmosphere, and is expected to begin transmitting information back to Earth in September 2021, with the data available for scientists around the world to study.



Dubai's Burj Khalifa, the world's tallest skyscraper, has been lit up in red to celebrate the UAE's Mars probe

Close behind

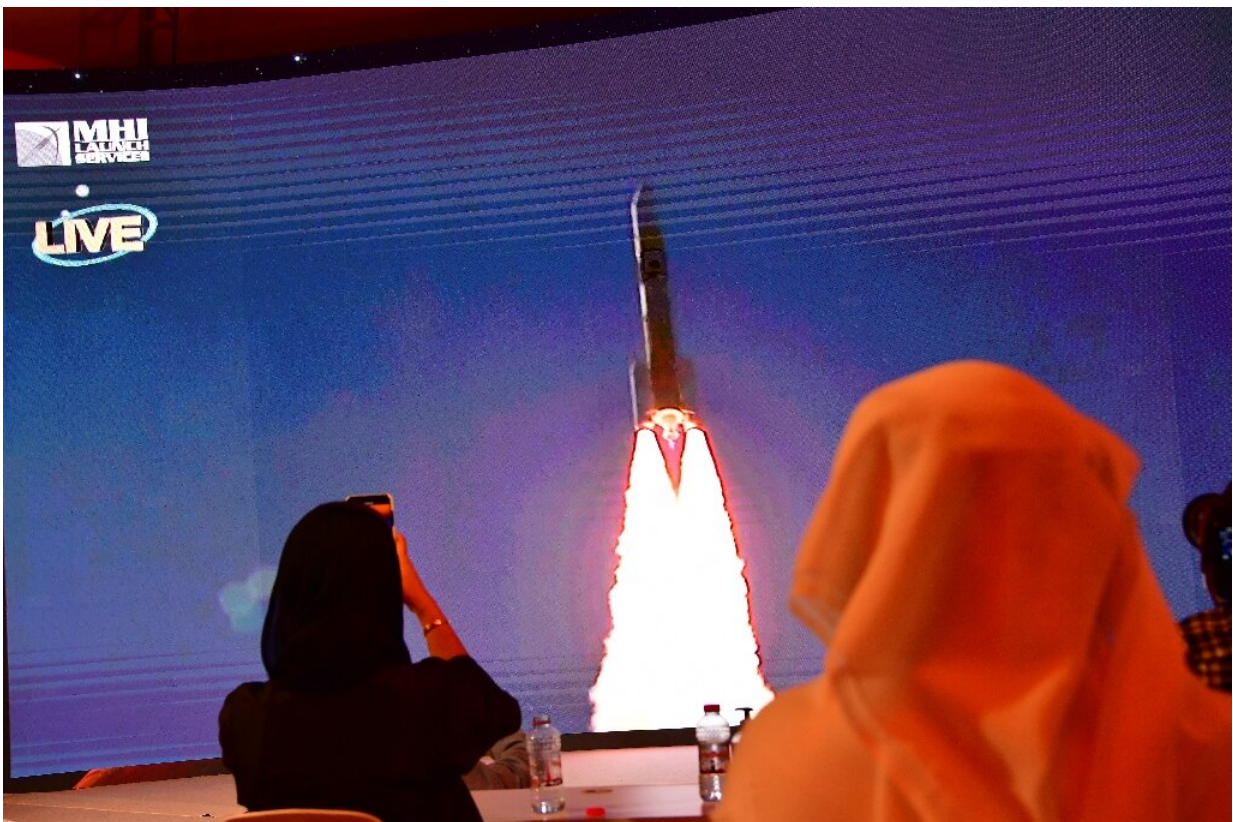
China's Tianwen-1, or "Questions to Heaven", has already sent back its first image of Mars—a black-and-white photo that showed geological features including the Schiaparelli crater and the Valles Marineris, a vast stretch of canyons on the Martian surface.

The five-tonne Tianwen-1 includes a Mars orbiter, a lander and a solar-powered rover that will for three months study the planet's soil and atmosphere, take photos, chart maps and look for signs of past life.

China hopes to land the 240-kilogramme rover in May in Utopia, a massive impact basin on Mars. Its orbiter will last for a Martian year.

Tianwen-1 is not China's first attempt to reach Mars. A previous mission with Russia in 2011 ended prematurely when the launch failed.

NASA's Perseverance, which is set to touch down on the Red Planet on February 18, will become the fifth rover to complete the voyage since 1997—and all so far have been American.



The "Hope" probe known as "Al-Amal" in Arabic will orbit Mars for at least one Martian year, or 687 days, and is designed to provide a comprehensive image of the Red Planet's weather

It is on an astrobiology mission to look for signs of ancient microbial life and will attempt to fly a 1.8 kilogramme helicopter-drone on another world for the first time.

Perseverance, capable of autonomously navigating 200 meters (650 feet) per day, will collect rock samples that could provide invaluable clues about whether there was ever past life on Mars.

About the size of a small SUV, it weighs a metric tonne, has 19 cameras and two microphones—which scientists hope will be the first to record sound on Mars.

The mission is set to last at least two years.

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Citation: UAE's 'Hope' probe to be first in trio of Mars missions (2021, February 7) retrieved 21 September 2023 from <https://phys.org/news/2021-02-uae-probe-trio-mars-missions.html>

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