UAE's Hope mission is about to reach Mars and the stakes are high

By Maajah Dizaei
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Tomorrow, history and the hopes of the Arab world will hang on the endurance and independence of six engines charged with steering an SUV-sized spacecraft into orbit around Mars.

The United Arab Emirates (UAE) launched that spacecraft, dubbed Hope, in July 2020, lofting its first interplanetary mission a little more than a decade after becoming a spacefaring nation at all. Now, after a smooth seven-month cruise, the UAE is preparing for Hope's arrival at the Red Planet on Feb. 9. It's a complex maneuver that requires the spacecraft to complete an intense engine burn with no support from the mission's engineers, who are left anxiously awaiting bulletins that the solar system's geometry delays by 10 minutes.

"What that means is 27 minutes of burning fuel, of using our thrusters, of the spacecraft undergoing one of the toughest challenges that it's been designed for," Sarah Al Amiri, chairperson of the UAE Space Agency, said during a virtual event hosted on Feb. 1 by the U.S.-UAE Business Council, a nonprofit organization based in Washington, D.C.

"The UAE has led the Arab world to new frontiers in deep space for the first time in history," Mohammed bin Rashid Al Maktoum, vice president and prime minister of the UAE and ruler of the Emirate of Dubai, said in a statement. "Our space mission carries a message of hope and confidence in Arab youth."

Hope is a mission for those youth, who demographically dominate in the UAE and the Middle East, Al Amiri has emphasized throughout the spacecraft's journey. "Youth were being used and radicalized within the region," she said. "People just wanted opportunities and wanted to be able to apply themselves positively for growth."

Space exploration made an appealing rallying cry. "This is what space is all about; it takes out of it the context of nationality background," Al Amiri said. "You become a species more than anything else."

And although Hope is a science mission, the data it will gather has never been the UAE's top priority. The country, which marks its 50th anniversary this year, built its economy on oil. But oil won't last, and the longer it does, the more havoc the climate crisis will wreak on the hot and arid UAE.

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"Youth were being used and radicalized within the region," she said. "The only place that we're able to look at [as], perhaps, in some form, a future of Earth, is our next-door neighbor."
Although coronavirus case counts in the UAE have only risen since Hope’s launch, the pandemic is no argument to back away from space exploration, Al Amiri said. Mission personnel who designed the spacecraft with international collaborators in part over Zoom long before the pandemic began were ready for some of the challenges of remote work.

“2020 has given us a heightened, even, sense of awareness of what needs to happen,” she said. “As much as the time has been challenging, it has taught us as a nation how to be more resilient.”

Also, resilience alone won’t see Hope through its crucial maneuver tomorrow; the mission will need some good fortune as well. Hope’s engineers have practiced the maneuver as much as they can, on Earth and during the spacecraft’s cruise, Al Amiri said, but nothing can match the reality of Mars orbit insertion.

Half of Mars missions fail, after all, many of them here. “We knew the stakes entering into this; we knew it from the very first day we started working on this program,” Al Amiri said at a separate preview event hosted on Jan. 20 by the University of Colorado Boulder’s Laboratory for Atmospheric and Space Physics, a leading partner on the mission. “It’s not something that we’ve shied away from.”

To succeed, Hope’s six engines must burn half the spacecraft’s fuel in 27 minutes to slow the probe from 75,000 mph to 11,000 mph (121,000 kph to 18,000 kph). Mission personnel can’t do anything during the maneuver but watch.

If something goes wrong, at best, Hope will stumble onto a new and fruitless path around the sun. And back on Earth? “We continue on,” Al Amiri said of the UAE’s space agency, which is already planning a technology mission to the moon and putting a century-long Mars strategy in place.

“It’s not a one-off program; it is not something that you quit after,” she said. “We’ve had a taste of planetary exploration, and I think we will continue delving in for more.”

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