

India vies for elite role in space with Mars trip

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In this Thursday, Oct. 31, 2013 photo, Chairman of the Indian Space and Research Organization (ISRO) K. Radhakrishnan holds a model of Mars orbiter at his office in New Delhi, India. India is aiming to join the world's deep-space pioneers with a journey to Mars that it hopes will showcase its technological ability to travel our solar system while seeking solutions for everyday problems on Earth. (AP Photo/Altaf Qadri)

India is aiming to join the world's deep-space pioneers with a journey to Mars that it hopes will showcase its technological ability to explore the solar system while seeking solutions for everyday problems on Earth.

With a Tuesday launch planned for Mangalyaan, which means "Mars craft" in Hindi, India will attempt to become only the fourth country or group of countries to reach the red planet, after the Soviet Union, United States and Europe.

"We have a lot to understand about the universe, the solar system where we live in, and it has been humankind's quest from the beginning," said K. Radhakrishnan, chairman of the Indian Space and Research Organization.

India sees its Mars mission primarily as a "technology demonstration," Radhakrishnan said. "We want to use the first opportunity to put a spacecraft and orbit it around Mars and, once it is there safely, then conduct a few meaningful experiments and energize the scientific community."

Radhakrishnan admits the aim is high. This is India's first Mars mission, and no country has been fully successful on its first try. More than half the world's attempts to reach Earth's planetary neighbor—23 out of 40 missions—have failed, including missions by Japan in 1999 and China in 2011.

If India can pull it off, it will demonstrate a highly capable space program that belongs within an elite club of governments exploring outer space.

Mangalyaan is scheduled to blast off Tuesday from the Indian space center on the southeastern island of Shriharikota, the start of a 300-day, 780 million-kilometer (485 million-mile) journey to orbit Mars and survey its geology and atmosphere.

Five solar-powered instruments aboard Mangalyaan will gather data to help determine how Martian weather systems work and what happened

to the water that is believed to have once existed on Mars in large quantities. It also will search Mars for methane, a key chemical in life processes on Earth that could also come from geological processes. None of the instruments will send back enough data to answer these questions definitively, but experts say the data are key to better understanding how planets form, what conditions might make life possible and where else in the universe it might exist.

Some of the data will complement research expected to be conducted with a spacecraft NASA will launch later this month, the Mars Atmosphere and Volatile Evolution mission, nicknamed MAVEN.



In this Thursday, Oct. 31, 2013 photo, Chairman of the Indian Space and Research Organization (ISRO) K. Radhakrishnan speaks during an interview at his office in New Delhi, India. India is aiming to join the world's deep-space pioneers with a journey to Mars that it hopes will showcase its technological ability to travel our solar system while seeking solutions for everyday problems on Earth. (AP Photo/Altaf Qadri)

"We're pulling for India," said Bruce Jakosky, project leader for the U.S. spacecraft. "The more players we have in space exploration the better."

If successful, the two new orbiters would join three already circling Mars—NASA's Mars Reconnaissance Orbiter and Mars Odyssey, and the European Space Agency's Mars Express. On the Martian surface, NASA's Curiosity and Opportunity rovers are rolling across rocky terrain.

Radhakrishnan said that although sending a spacecraft to Mars would bring India immense prestige, "we are doing this for ourselves. The main thrust of space science in India has always been people-centric, to benefit the common man and society."

India, as well known for its endemic poverty and hunger as for its technological prowess, has used research in space and elsewhere to help solve problems at home, from gauging water levels in underground aquifers to predicting cataclysmic storms and floods.



In this Wednesday, Oct. 30, 2013 photo, Indian technicians inspect the Polar Satellite Launch Vehicle (PSLV – C25) at the Satish Dhawan Space Center at Sriharikota, in the southern Indian state of Andhra Pradesh. India is aiming to join the world's deep-space pioneers with a journey to Mars that it hopes will showcase its technological ability to explore the solar system while seeking solutions for everyday problems on Earth. (AP Photo/Arun Sankar K.)

India's \$1 billion-a-year space program has helped develop satellite, communication and remote sensing technologies that are being used to measure coastal soil erosion, assess the extent of remote flooding and

manage forest cover for wildlife sanctuaries. They are giving fishermen real-time data on where to find fish and helping to predict natural disasters such as a cyclone that barreled into India's eastern coast last month. Early warning information allowed Indian officials to evacuate nearly a million people from the massive storm's path.

Indian scientists also have led at least 30 research missions to Antarctica, despite being nearly 12,000 kilometers (7,500 miles) from the icy continent. They are working to expand mineral mining in the deep sea, designating that as a priority area for scientific research. And in 2008, the Indian Space and Research Organization successfully launched a lunar orbiter, Chandrayaan-1, which discovered evidence of water on the Moon.

Its advances have helped raise the international profile of the world's largest democracy of 1.2 billion people. India is lobbying for a permanent seat on the U.N. Security Council, a move it says would better reflect new realities in a fast-changing world needing more technological solutions.

Mangalyaan was developed from technology tested during the recent lunar orbiter mission. An evolved version of India's domestically developed Polar Satellite Launch Vehicle, with extended rockets, will take Mangalyaan into an elliptical arc around the Earth.



In this Wednesday, Oct. 30, 2013 photo, Central Industrial Security Force (CISF) personnel walk near the Polar Satellite Launch Vehicle (PSLV – C25) at the Satish Dhawan Space Center at Sriharikota, in the southern Indian state of Andhra Pradesh. India is aiming to join the world's deep-space pioneers with a journey to Mars that it hopes will showcase its technological ability to explore the solar system while seeking solutions for everyday problems on Earth. (AP Photo/Arun Sankar K.)

The satellite's thrusters will then begin a series of six small fuel burns, moving it into higher orbit before it slingshots toward the red planet.

The 1,350-kilogram orbiter is expected to reach its designated orbit Sept. 24, 2014, and will be joined above Mars by MAVEN.

"I know I'm an absolute wreck with ours coming up in two weeks," Jakosky said. "... There are 10,000 things that need to go right in order for it to succeed, and it can take only one thing going wrong for it to fail."

Mangalyaan is expected to have at least six months to investigate the planet's landscape and atmosphere. At its closest point it will be 365 kilometers (227 miles) from the planet's surface, and at its furthest—80,000 kilometers (49,700 miles).

India's space enthusiasts say the \$73 million Mars mission will be a step toward understanding the natural world, inspiring children to go into research science and advancing science and technology in ways that help common people cope with a changing environment. Learning more about alien weather systems, for example, might reveal more about our own.

"To visit another planet is a fantastic thing, the biggest thing," said space scientist Yash Pal, a former chairman of the country's University Grants Commission who was not involved in developing the Mars mission. "If you can afford airplanes and war machines you can certainly spend something to fulfill the dreams of young people."

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