

## **ATHARVA ROBOTICS CENTER**

### **Daily News on Innovation & Technology**

02<sup>nd</sup> July, 2025

#### **Quantum AI used in world-first semiconductor fabrication**

By Evrim Yazgin, July 02, 2025

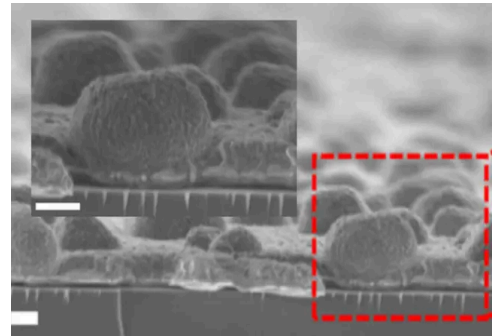
Engineers at Australia's national science agency, CSIRO, have performed a world-first use of quantum machine learning to fabricate semiconductors. The research could reshape the way future microchips are designed.



#### **Invisible to infrared: New smart coating controls heat while staying undetectable**

By Kaif Shaikh, July 01, 2025

Researchers at Finland's Aalto University have engineered a wafer-thin "cloud" metasurface that can flip between bright white and deep grey, shifting a surface from powerful daytime cooling to rapid solar heating while remaining almost invisible to infrared cameras.



#### **Amazon deploys 1 millionth robot to command world's largest moving machine force**

By Kapil Kajal, July 01, 2025

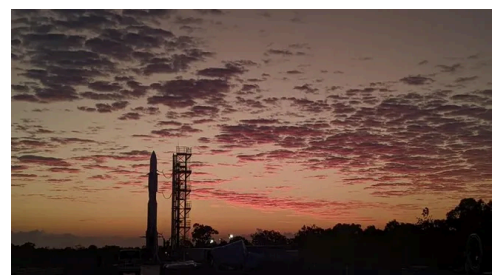
Amazon has marked a critical milestone in warehouse automation by deploying its one millionth robot. Delivered recently to a fulfillment center in Japan, the milestone underscores Amazon's position as the world's largest developer and operator of mobile robotic systems, now active in over 300 facilities worldwide.



#### **Launch of Australia's 1st orbital rocket, Gilmour Space's Eris-1, delayed again**

By Josh Dinner, July 01, 2025

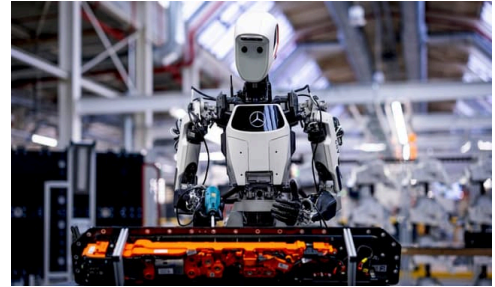
Gilmour Space has replaced Eris-1's toppled top hat and is ready for another launch attempt.



## [Humanoid robots could soon see through walls with MIT's new imaging breakthrough](#)

By Chris Young, July 01, 2025

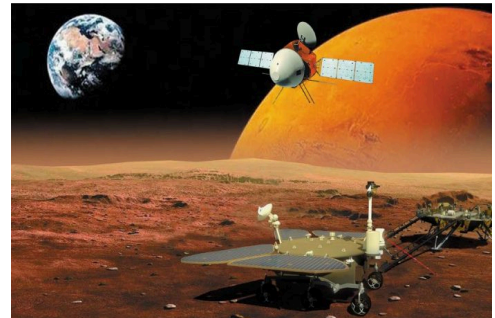
A team of MIT researchers has developed a new imaging technique that could allow quality control robots in warehouses to peer into closed boxes.



## [China to set up first international association on deep-space exploration](#)

By Daily Excelsior, July 01, 2025

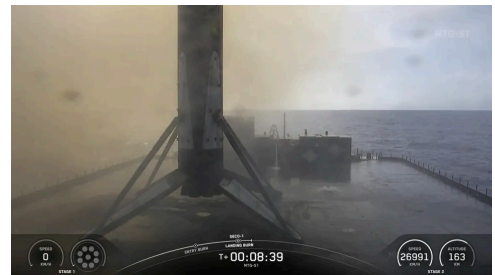
With an aim to empower other developing countries in developing deep-space technologies, China will launch the International Deep Space Exploration Association (IDSEA) on July 7.



## [SpaceX launches advanced European weather satellite, lands rocket at sea](#)

By Mike Wall, July 01, 2025

A SpaceX Falcon 9 rocket just launched an advanced European weather satellite and ached its landing on a ship at sea.



## News Articles



Source: The Times of India Newspaper, 02-07-2025

Page No 22

Link: [https://drive.google.com/file/d/1iSPdWkJ2-l6iC9IZouk\\_OJFFvSQQa36U/view](https://drive.google.com/file/d/1iSPdWkJ2-l6iC9IZouk_OJFFvSQQa36U/view)

## Axiom-4 boost for Isro's manned spaceflight plans

The recent Axiom-4 mission, featuring group captain Shubhanshu Shukla of the Indian Air Force as pilot, is far more than a symbolic gesture for India. It represents an important and strategic stepping stone for the Indian Space Research Organisation (ISRO)'s ambitious Gaganyaan manned spaceflight programme. It is also a firm indication that India is now ready to move onto a more mature space programme.

The Axiom-4 mission allows Isro to bridge the gap between extensive ground-based training and invaluable real-world experience, which is critical to the plans to send Indian *gaganyatri* into orbit.

Over the last few decades, Isro has emerged as a global leader in cost-effective satellite launches and interplanetary missions, from the iconic Chandrayaan series to the Mars Orbiter Mission. However, human spaceflight has its own unique set of challenges. It requires extreme levels of safety and reliability and a focus on the needs and limitations of the human body. This is where, most importantly, Axiom-4 provides an unparalleled opportunity for practical in-space training and exposure.

Shukla is part of the first batch of *gaganyatri*s already selected by Isro. His role as pilot in the Axiom-4 flight means he has gained firsthand experience in critical aspects of human spaceflight: living and working in almost-zero gravity, handling complex spacecraft systems, responding to contingencies, and performing intricate docking procedures at the International Space Station (ISS). This "lived experience" on a fully operational platform with a constellation of international partners is something no simulated activity can fully replicate.

The physiological adaptations to sustained microgravity, the mental aspects of confinement and ISS life, the long hours of exercise and muscle toning, the complex teamwork with a truly international crew and the nuances of real-time flight dynamics, are lessons that will be directly fed back into Gaganyaan's astronaut training modules and mission protocols. Shukla's experience in pre-launch quarantine, spacecraft ingress and egress, medical diagnostics in microgravity, and health readiness will be invaluable in the planning for Indian missions.

Moreover, the major sustained activities on this mission involves critical scientific experiments with direct relevance to Gaganyaan. India's contribution to the Axiom-4 science involves biological and genetic research payloads, developed by Isro in collaboration with leading Indian institutions. These include cultivating food crops such as mung and methi sprouts, and examining strains of cyanobacteria and microalgae to study their growth rates, cellular responses, and biochemical activity in microgravity. There is research on muscle regeneration under microgravity to identify skeletal muscle dysfunction and explore therapeutic strategies. There is a close study of the functioning of ungrads, which are among the most resilient forms of life.

Finally, there are studies of the physical and cognitive impact of using devices in microgravity to inform future spacecraft computer design.

These experiments are not merely academic, they are designed to address the very challenges Gaganyaan will face — ensuring sustainable food and oxygen, maintaining astronaut health, and understanding long-duration effects of space life on humans. The

data gathered from these experiments will be invaluable for refining Gaganyaan's environmental control and life support systems, crew health management protocols, and overall mission design.

Furthermore, the Axiom-4 mission strengthens international collaboration and knowledge transfer for the Indian community. Working alongside not just public sector partners such as the US's National Aeronautics and Space Administration (Nasa), but also private players such as Axiom Space — which will soon operate an independent space station — provides Isro with unique insights into global best practices in human spaceflight operations, safety standards, and mission management. This kind of equal partnership on a global stage also elevates India's standing as a serious and capable player in the exclusive club of human space-faring nations, rekindling the legacy of the first move in 1984 with cosmonaut wing commander Rakesh Sharma.

The next crucial phases for Gaganyaan include conducting a series of uncrewed test flights, designed to rigorously test various Gaganyaan systems, including the Crew Escape System, the Crew Module's re-entry and recovery, and the performance of the human-rated LVM3 launch vehicle. These are important for proving the safety and reliability of the entire system.



Somak Raychaudhury

One of these will carry Vyommitra, Isro's humanoid robot, to evaluate the integrated systems and environment in the crew module for suitability for human occupants.

Also being developed for Gaganyaan is the systematic and careful process of integrating the crew module, which will house the astronauts, with the service module, providing essential services like propulsion, power, and life support, is ongoing. This includes fine-tuning the human-machine interfaces and ergonomic demands based on real-world insights, which will incorporate what is learnt from the Axiom-4 mission.

As Shukla gains invaluable experience on Axiom-4, the other astronaut-designates continue their rigorous training, including simulations of all mission phases, parabolic flights for microgravity exposure, water-survival training, and extensive medical and psychological conditioning. The culmination of these efforts will be the maiden crewed Gaganyaan mission. This aims to send three Indian astronauts to a low Earth orbit (approximately 400 km), or LEO, for a duration of several days, before a safe splashdown in the Arabian Sea. This is currently targeted for the first quarter of 2027.

Beyond Gaganyaan, India's next ambition is the assembly of our own space station, the Bharatija, Antariksh Station, by 2035. The first module is expected to launch by 2028, with the full station becoming operational by 2035. This long-term vision will provide a sustained platform for scientific research, technological development, and further LEO training of Indian astronauts. India also aims to have a crewed lunar mission in 2040.

Meanwhile, Shukla and colleagues will return to Earth in the second week of July. What next? Shukla's thesis advisor at the Indian Institute of Science (IISc) in Bengaluru has publicly appealed that he should come back to IISc and finish his Masters' dissertation as soon as he can.

Somak Raychaudhury is vice-chancellor and professor of physics, Atharva University. The views expressed are personal.

Source: The Hindustan Times Newspaper, 02-07-2025

Page No 14

Link: <https://drive.google.com/file/d/1Um1Gnq-OhPnhdELIN6rlxDCKuNjnXQiH/view>



ATHARVA EDUCATIONAL TRUST'S  
**ATHARVA COLLEGE OF ENGINEERING**  
(Approved by AICTE, Recognized by Government of Maharashtra  
& Affiliated to University of Mumbai - Estd. 1999 - 2000)  
ISO 21001:2018 ISO 14001:2015 ISO 9001:2015  
NAAC Accredited A+



**ATHARVA**  
**ROBOTICS CENTER**

**ATHARVA ROBOTICS CENTER**

ATHARVA COLLEGE OF ENGINEERING, MALAD-MARVE ROAD, CHARKOP NAKA, MALAD (WEST), MUMBAI-400095