

Successful Launch of Axiom Mission 4 (Ax-04) with Indian Astronaut and Ax-04 Mission Pilot Shubhanshu Shukla Onboard SpaceX's Dragon Crew Module

The Indian Space Research Organisation (ISRO) continues to make steady and determined progress on its flagship Gaganyaan mission. As part of this mission, ISRO selected four Indian Air Force test pilots and imparted comprehensive training abroad as well as in India as a preparation towards Gaganyaan missions. Currently they are part of ISRO's Human Space Flight Centre and undergoing Gaganyaan mission specific training. In February 2024, the Prime Minister personally awarded these four astronauts their wings at the Vikram Sarabhai Space Centre, celebrating their grit and reaffirming India's commitment to human space exploration. Major milestones achieved by the Gaganyaan Program include the successful demonstration of the Crew Escape System in the TV-D1 test flight, advanced hardware integration for the uncrewed Gaganyaan-1 mission, and continued astronaut training. Preparations are also in progress for subsequent abort missions. The first uncrewed test flight is targeted for the fourth quarter of 2025, with the first crewed Indian mission expected by first quarter of 2027.



Hon Prime Minister announcing
Gaganyaan Program on 15 Aug 2018
from the ramparts of Red Fort

These developments have their roots in a decisive moment of national vision—when the Hon'ble Prime Minister of India, Shri Narendra Modi ji, formally announced the Gaganyaan Programme on 15th August 2018, setting India on the path to launch its own astronauts into space using indigenous capabilities.

It was under his guidance that the foundation was laid for this joint collaboration between ISRO and the United States. During his historic visit to the U.S. in 2023 and his meeting with the then-President of the United States, this

very mission was envisioned—to send an Indian astronaut to the International Space Station as part of a broader partnership.

Today, the Indian Space Research Organisation (ISRO) is proud to announce the successful launch of the Axiom Mission 4 (Ax-04) on **25 th June 2025**. The mission lifted off from Launch Complex 39A at the Kennedy Space Centre, Florida, USA, at **12:01 Hrs IST** aboard a SpaceX Falcon 9 rocket, carrying four international crew members. The Ax-04 crew includes Commander Peggy Whitson, Pilot Shubhanshu Shukla from India, and Mission Specialists Sławosz Uznański from Poland and Tibor Kapu from Hungary.



Ax-04 Crew
(L to R) Shubhanshu Shukla (India), Peggy Whitson (USA), Sławosz Uznański (Poland), Tibor Kapu (Hungary)

The launch vehicle and the Dragon spacecraft performed flawlessly, achieving all mission milestones—from stage separation to orbit insertion—well within expected parameters. The following are the major events completed successfully culminating in the welcome ceremony of Axiom-04 crew with Expedition 73 crew onboard ISS

The following table gives the major activities completed on-board ISS by India's Astronaut till 30 June 2025

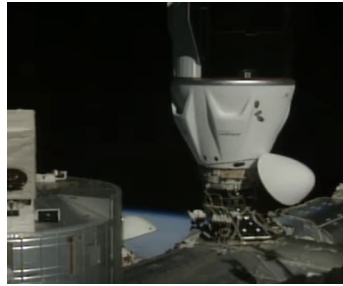
Event	Date	Time (IST)
Falcon 9 Lift-off	25 June 2025	12:01 PM
Dragon Soft docking	26 June 2025	4:02 PM
Dragon Hard docking	26 June 2025	4:16 PM
Hatch opening (after pressurization) & first step of Gaganyatri into ISS	26 June 2025	5:53 PM
Welcome ceremony with Expedition 73 crew	26 June 2025	6:45 PM

Day	Date	Major Activities
Day 1	26 June 2025	- Initial safety briefing and familiarisation - Baseline health checks and medical logging
Day 2	27 June 2025	- Orientation and tour of ISS experiment facilities - Activation of ISRO payloads and onboard equipment - First private medical conference - Shux has adapted well with the microgravity conditions - Start of biomedical and psychological monitoring
Day 3	28 June 2025	- Continued science operations with Indian experiments - Preparations for outreach session Interacted with Honourable Prime Minister Narendra Modi Ji through video call. - Discussion on national pride, unity, how India looks from space, and Indian food in space, message for India's youth - Post-event crew reflections and recording
Day 4	29 June 2025	- Regular daily planning and coordination with ground teams - Continued scientific data collection - Crew Earth Observation session during India overpass - Second private medical conference
Day 5	30 June 2025	- Redeploy algae culture bag for microalgae experiment - Participation in Human research experiment - Retrieval of Myogenesis sample from freezer - STEM demonstration & recording

The following are the images of the above events.



Dragon approaching ISS



Dragon docked to ISS



Hatch opening



Welcome ceremony



Experiment set-up



Experiment in progress



Honourable Prime Minister interacting with Gaganyatri Shubhanshu Shukla

Standing 70 meters tall, Falcon 9 is a two-stage launch vehicle designed for the reusability of the booster stage. Nine Merlin engines power Falcon 9 in its booster stage and a single



Falcon 9 on Launch pad 39A

vacuum-optimised Merlin engine in the second stage, both using liquid oxygen (LOX) and RP-1 (refined kerosene) as propellants. It generates over 7,600 kilonewtons of thrust at liftoff. This will be the second flight for the booster stage of Falcon 9 supporting this mission, which previously launched a Starlink mission. Following stage separation, Falcon 9's booster stage landed on Landing Zone 1 (LZ-1) at Cape Canaveral Space Force Station in Florida.

Crew Dragon spacecraft is also a reusable crew module for carrying astronauts into space. This is the first flight for the Dragon spacecraft supporting this mission. The Dragon capsule is

designed to safely transport up to seven astronauts, although it typically carries four. For Axiom-04, it was customised for a four-person international crew. The capsule features touchscreen controls, automatic docking with the International Space Station, and an integrated emergency escape system to protect astronauts in case of any anomaly during launch. Solar panels supply power for the spacecraft. The capsule is also equipped with an



International Space Station

advanced life support system that regulates air pressure, temperature, and oxygen levels inside. Once docked with the ISS, the capsule remains attached for the duration of the stay, serving as both a laboratory and a safe return vehicle.

The International Space Station (ISS) is a laboratory in space. Orbiting Earth at an altitude of around 400 kilometres, the ISS travels at a speed of approximately 28,000

kilometres per hour, completing one orbit every 90 minutes. Spanning the size of a football

field, it measures about 109 meters end-to-end and weighs nearly 420 tonnes. The station comprises multiple interconnected modules contributed by international partners, including the United States, Russia, Europe, Japan, and Canada. These modules serve as laboratories, living quarters, docking ports, and storage areas. With continuous human presence on board the ISS since 2000, astronauts carry out a wide range of activities—from conducting scientific experiments in microgravity across disciplines such as biology, physics, and Earth observation, to testing advanced technologies for life support and deep space missions. The station also facilitates medical research, technology demonstrations, educational outreach, and Earth-monitoring operations.

ISRO's participation in Axiom-04 Mission happened only because of the visionary leadership of the Hon'ble Prime Minister of India, Shri Narendra Modi ji. It was under his guidance that the foundation was laid for this joint collaboration between ISRO and the United States. The mission was envisaged during the Prime Minister's historic visit to the U.S. in 2023 and his meeting with the then-President of the United States to send an Indian astronaut to the International Space Station as part of a broader partnership.

An ISRO-level delegation led by the Secretary, Department of Space, Chairman, Space Commission and Chairman, ISRO, Dr. V Narayanan, visited the Johnson Space Centre (JSC) at Houston, Texas, the Kennedy Space Centre (KSC) at Merrit Island, Florida, various facilities of SpaceX, Axiom Space & Blue Origin in the first week of June 2025. The delegation met with senior leadership of multiple agencies to oversee progress and preparation, and to facilitate and enable India's participation in the Axiom-04 mission, as well as explore new cooperation opportunities in the space sector.

The launch was rescheduled multiple times due to issues such as a harness problem in Dragon, weather in the ascent corridor, leakage in the Falcon 9 booster stage, and leakage in the Zvezda Module of the ISS. The ISRO delegation played a constructive role in resolving all the issues. It made its stand clear that all problems should be resolved before clearing the launch for lift-off, considering the mission risks and safety of the crew. Considering the additional time needed to resolve all the issues, the launch scheduled on 19th June was called off. The ISRO delegation returned to India on learning the same. Later,

after all the issues were resolved, Launch was scheduled on 25 June 2025. The ISRO delegation returned to participate in the launch as well as successive events.



ISRO delegation at Johnson Space Mission Control Centre



Shubhanshu Shukla



Prashanth B Nair

Shubhanshu Shukla, an ISRO astronaut from the Gaganyaan pool, has been selected as the Mission pilot and prime crew member for the Ax-04 mission, while Prashanth B. Nair, also an ISRO astronaut from the Gaganyaan pool, has been nominated as the backup crew member for the mission.

Both Shubhanshu Shukla and Prashanth B. Nair have undergone intensive training across multiple international facilities. This includes training at NASA's Johnson Space Center, Axiom Space's headquarters in Houston, and SpaceX's Dragon mission simulators. The training modules covered are

advanced spacecraft systems, emergency protocols, scientific payload operations, microgravity adaptation, space medicine, and survival training. They also participated in NASA's National Outdoor Leadership Program (NOLPS) in the wilderness of Mexico, where the focus was on team cohesion and resilience under stress. The training reflects the highest standards of astronaut readiness, making them a proud representative of India's growing cadre of space explorers.

In the weeks leading up to the Axiom-04 mission, the crew underwent a series of pre-launch protocols and final preparations. These included intensive briefings, integrated simulations, and systems familiarisation sessions at NASA's Kennedy Space Center. As part of standard procedure, the crew entered a health stabilisation quarantine, ensuring they remained medically fit and isolated from potential sources of infection. Just prior to launch, a formal crew handover ceremony was held, where the Ax-04 crew officially assumed mission responsibilities and were ceremonially handed over to mission operations teams. These activities ensured the crew was fully prepared—physically, mentally, and operationally—for their journey to the International Space Station.

During their 14-day stay in orbit, the crew will carry out a diverse range of scientific and operational activities. These include microgravity experiments in life sciences and fluid dynamics, human physiology research, technology demonstrations for health monitoring and diagnostics, Earth observation imaging, and educational outreach sessions with students in India. The mission will also serve as a vital operational test bed for long-duration crewed missions, providing valuable insights into astronaut well-being, system behavior, and multi-agency coordination.

A suite of Indian scientific experiments is being conducted onboard the International Space Station as part of this mission, marking a significant contribution from India's research community to microgravity science. These experiments, designed by premier Indian institutions and coordinated by ISRO, span areas such as investigations into the impact of microgravity and ISS radiation on edible microalgae, the sprouting of salad seeds in space and its relevance to crew nutrition, the survival, revival, reproduction, and transcriptomic analysis of the eutardigrade *Paramacrobiotus* sp. BLR strain in space, and the effect of metabolic supplements on muscle regeneration under microgravity. Other experiments will

examine human interaction with electronic displays in microgravity and the influence of microgravity on the growth and yield of food crop seeds.

For the Indian scientific experiments flying onboard the Ax-04 mission, M/s Redwire Space, USA, is coordinating the payload integration activities. Redwire facilitated key steps, including technical validation and compliance with ISS payload requirements. Each experiment is packaged into flight-ready payload containers. Redwire is also supporting the development of hardware handling protocols, ensuring that the Indian experiments could be safely deployed and operated onboard the International Space Station, thereby enabling meaningful scientific outcomes for India's research community.

As a tribute to India's rich cultural heritage, Shubhanshu Shukla is carrying a selection of the finest of Indian handicrafts to the International Space Station. These symbolic items, designed by students of the National Institute of Design, Ahmedabad, reflect the diversity, craftsmanship, and timeless beauty of India's traditional art forms, carefully curated to represent different regions and materials. These pieces serve as cultural ambassadors in space. Their journey aboard the ISS not only celebrates India's artistic legacy but also honours the generations of artisans who continue to keep these traditions alive.

The Ax-04 mission will provide valuable inputs for ISRO's upcoming Gaganyaan mission. It offers hands-on experience in the nuances of international crew integration, medical and psychological preparation, real-time health telemetry, experiment execution, and crew-ground coordination. These insights will directly influence mission planning, safety validation, and astronaut readiness for India's first indigenous human spaceflight mission.

ISRO takes this opportunity to express deep gratitude to the visionary leadership of the Hon'ble Prime Minister of India, Shri Narendra Modi Ji, whose forward-looking decision enabled India's participation in the Ax-04 mission. His unwavering support for India's human spaceflight ambitions, and his belief in leveraging global partnerships, has brought India to this significant milestone. The Prime Minister's leadership continues to shape India's future in space as one that is collaborative, confident, and committed to peaceful exploration.

Space is a domain best explored together. The ISRO's participation in Axiom-04 mission echoes that spirit. It follows in the legacy of international cooperation that sent Rakesh Sharma to space in 1984 aboard the Soviet Soyuz. Today, four decades later, another Indian journeys to space—this time through collaboration with Axiom Space, SpaceX, and NASA. The professionalism, dedication, and scientific excellence demonstrated by all partner agencies in the lead-up to this mission have been truly inspiring. ISRO is deeply appreciative of the partnership and camaraderie shown by our counterparts around the world.

This is one small step in orbit, but a giant leap in India's pursuit of human spaceflight and scientific discovery .