

SPACE SECTION

Shubhanshu Shukla: The Pilot Who Carried 1.4 Billion Hopes Into Orbit

Lt. Gen. AK Bhatt (r)

THE ICON RETURNS: REKINDLING A DORMANT DREAM

On a cold January morning in 1984, the entire nation held its breath as Rakesh Sharma soared into space aboard the Soviet Soyuz T-11. His iconic journey as part of the space station program, immortalized by the PM's question "How does India look from space?" and his poignant reply, "Saare Jahan Se Achcha" (Better than the whole world), etched itself into our collective memory. But as decades passed, that proud memory slowly dimmed, becoming a distant echo, until now.

With the historic AXIOM-4 mission, Group Captain Shubhanshu Shukla has rekindled that dormant pride. His voyage aboard the SpaceX Dragon spacecraft "Grace," which lifted off from NASA's Kennedy Space Centre on June 25, 2025, has reinvigorated that dream, breathing new life into India's human spaceflight narrative. Within 10 minutes of liftoff, the Dragon capsule entered Earth's orbit, and Gp Captain Shukla addressed India in Hindi: "Kya kamaal ki ride thi!" (What an amazing ride!), calling the moment the start of India's human space program. With the Indian Tricolor on his shoulder, he emphasized that he carried the hopes of 1.4 billion Indians to the stars. He returned not just as an astronaut, but as a living testament to India's re-emergence on the global human spaceflight journey. The Indian Air Force rightly noted this mission as a moment of déjà vu, a reaffirmation of India's continually expanding horizons.

AX-4: A GLOBAL ENDEAVOR

Gp Captain Shukla was not alone on this pioneering mission. He was part of a distinguished international crew aboard the Axiom Mission 4:

- Commander Peggy Whitson (USA): An Axiom Space employee and a veteran former NASA astronaut, Whitson holds the record for the most cumulative time in space by an American astronaut. Her role as commander brought invaluable experience and leadership, overseeing complex operations and numerous scientific endeavors. She was there to demonstrate Axiom's capabilities in private human spaceflight and to continue her extensive scientific work in microgravity.
- Mission Specialist Sławosz Uznański-Wiśniewski (Poland): Representing the European Space Agency (ESA) and Poland, Uznański-Wiśniewski's participation marked Poland's return to human spaceflight



"Jai Hind! Jai Bharat! Kya kamaal ki ride thi!"

— Shubhanshu Shukla, moments after entering orbit.

after a significant gap. His mission focused on various European scientific experiments, primarily in materials science and human physiology, contributing to a broader understanding of the effects of long-duration spaceflight.

- Mission Specialist Tibor Kapu (Hungary): As Hungary's second astronaut, Kapu's mission was also a significant national milestone. His primary objectives included conducting experiments in areas such as plant biology to understand better how to grow food in space and advanced materials research, showcasing Hungary's growing scientific prowess in microgravity.

Each crew member brought unique expertise and national scientific objectives, making Ax-4 a truly collaborative international endeavour. The Ax-4 research team carried out a total of 60 studies from 31 different countries, highlighting global scientific cooperation in space.

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“This is not just about science. It’s about symbolism and National Pride. It tells every Indian child that our place is in Space too.”

— Lt Gen AK Bhatt (Retd)

WHY A PILOT? THE UNQUESTIONABLE EDGE IN SPACE

One common question that arose was, Why was Gp Captain Shukla, a test pilot, chosen for this mission instead of a seasoned scientist or an ISRO engineer?

It’s true that modern spacecraft, such as the SpaceX Dragon capsule, are highly automated, known for their autonomous docking capabilities and control via ground stations. The age of manually piloted rockets might seem long past. The Crew Dragon, which can carry up to 7 people, is equipped with a control panel featuring three touchscreens for easier management. It stands 8.1 meters tall and is 4 meters wide.

However, this argument misses a fundamental, unquestionable fact: in the realm of exploration, especially when venturing into the unknown, there is no substitute for human adaptability and the ability to respond to unexpected situations. And when it comes to unforeseen circumstances, high-grade, best-in-class pilots possess an unparalleled ability to react swiftly, calmly, and effectively to emergencies.

Look no further than the Apollo 13 mission. When an oxygen tank exploded, threatening the lives of the astronauts, it was the quick thinking, problem-solving skills, and procedural flexibility of the highly trained pilot-astronauts that, in conjunction with an efficient ground control, ultimately saved the crew. While systems are automated, the human element, particularly a pilot’s ingrained crisis management and systems understanding, remains paramount.

Gp Captain Shukla, as an Indian Air Force test pilot, embodies this critical skill set, bringing a level of operational resilience that is indispensable for human spaceflight, particularly for a nation embarking on its crewed mission. Over the years, he logged over 2,000 flying hours across a wide variety of aircraft, including the Su-30 MKI, MiG-29, Jaguar, and An-32, becoming one of India’s most accomplished test pilots.

SHUBHANSHU’S UNIQUE PERSONAL TOUCHES:

- **Space Playlist:** “Yun Hi Chala Chal” from Swades
- **Cultural Showcase:** Carried Indian snacks and yoga routines

TRAINING: THE ROAD TO SPACE IS NOT FOR THE FAINT-HEARTED

In 2019, Gp Capt Shukla was selected for India’s Gaganyaan astronaut corps and began intensive space training in Russia and Bengaluru. He trained for over a year at the Yuri Gagarin Cosmonaut Training Center, preparing to survive in hostile environments, master orbital mechanics, and operate spacecraft systems. His call sign “Shux” is now etched into history.

Training included Microgravity adaptation, Survival training, Robotics, EVA simulation, biomedical systems management, international protocols, and experiment handling.

This was no ceremonial ride; it was earned through rigorous selection, relentless preparation, and remarkable mental resilience.

ISRO’S STRATEGIC MASTERSTROKE: PAVING THE WAY FOR GAGANYAAN

ISRO’s active role in Ax-4 was a strategic masterstroke, a deliberate and significant investment of approximately ₹550 crore (about \$65 million) for Gp Captain Shukla’s seat. This wasn’t a cost, but a critical investment for invaluable experience and to accelerate India’s indigenous Gaganyaan program.

- **Invaluable Experience & Training Validation:** Gp Captain Shukla’s mission provided ISRO with real-time data on human physiological responses in microgravity and operational insights into ISS systems. This hands-on experience, unattainable through simulations alone, allowed ISRO to ‘plug the 1% uncertainty’ in its Gaganyaan systems and validated the rigorous training imparted to our Gaganyaan astronaut-designates.
- **Indigenous Experiments:** A cornerstone of ISRO’s efforts was the seven microgravity experiments designed by Indian institutions. Gp Captain Shukla meticulously conducted these, along with five experiments for NASA’s human research program. These included:
 - **Myogenesis:** Studying muscle atrophy in microgravity to develop interventions for muscle health.
 - **Sprouts:** Cultivating ‘moong’ and ‘methi’ seeds for future long-duration missions and sustainable food sources. Gp Captain Shukla turned into a ‘farmer in space.’
 - **Voyager Tardigrade:** Examining the resilience of an Indian strain of tardigrades in space.

- **Languages Spoken in Orbit:** Hindi, English, Russian

Quote from his Sister: “He packed halwa so that even space could taste like home.”

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“This is not just a seat in a capsule. It’s India’s ticket to the future of human spaceflight. As the Director General of ISpA, I see Shukla’s mission as a catalytic moment, a clear signal to government, industry, and youth alike: India’s space age is here. Let’s embrace it. Let’s lead it.”

- **Space Microalgae:** Investigating microalgae for potential life support systems, food, and fuel.
- **Voyager Displays:** Assessing human interaction with electronic displays and cognitive load in space. The data and samples from these experiments are now being analyzed by ISRO, directly informing the design and safety protocols of Gaganyaan and the upcoming Bharatiya Antariksha Station (BAS).
- **Operational Readiness:** ISRO’s dedicated high-level delegation and Mission Operations Team, led by ISRO Chairman and Secretary of the Department of Space, Dr. V Narayanan, was deployed to Kennedy Space Center. This team gained critical exposure to international crewed mission coordination, working hand-in-hand with NASA and Axiom flight controllers. Notably, the ISRO team insisted on fully resolving an oxygen leakage issue in the Falcon 9 booster stage engine bay before launch, ensuring the mission’s safety and success.

INSPIRING THE NEXT GENERATION: GEN Z, GEN ALPHA, AND BEYOND

Gp Captain Shukla’s mission offers a potent narrative for the generations of today and tomorrow, Gen Z and Gen Alpha. In an era of instant gratification and digital immersion, seeing a fellow Indian in space, actively performing cutting-edge science, brings the abstract concept of space exploration to tangible reality.

His public interactions, including video calls with PM Narendra Modi and students, showcasing life on the ISS and emphasizing the beauty of Earth without borders, will undoubtedly ignite a “space fever” across the nation. This mission will not only inspire future engineers and scientists at ISRO, but also inspire them. But also, it will attract the brightest minds to allied fields, including robotics, AI,

advanced materials, and even space law and policy. It tells them: “The sky is not the limit; it’s just the beginning.”

For fellow astronaut-designates in the Gaganyaan program, Gp Captain Shukla’s experience is an invaluable precursor. He has paved the way, sharing critical insights into the real challenges and triumphs of living and working in microgravity, which no simulator can truly replicate. His journey has solidified their resolve and provided a tangible glimpse into their impending historic missions.

CONCLUSION: NOT THE END, JUST THE BEGINNING

As India prepares to launch its astronauts on an indigenous spacecraft by 2027, the spirit of Gp Captain Shukla’s journey will serve as a vital experience. His mission has not just added a name to India’s space legacy; it has charted a clear course for our future in the cosmos, inspiring a nation to reach for the stars with renewed vigour and confidence. The future of Indian human spaceflight is not just bright; it’s boundless.

From the narrow runways of fighter jets to the silent corridors of the ISS, Group Captain Shubhanshu Shukla has flown more than a mission; he’s carried a national dream.

This moment is not a destination, but a launchpad. It will guide Gaganyaan, inspire startups, energize young minds, and define the next phase of India’s space story.

Lt Gen AK Bhatt PVSM UYSM AVSM SM VSM (r), presently the Director General of the Indian Space Association (ISpA), is a highly respected former military leader with over 39 years of service in critical positions, including Director General Military Operations during the Doklam standoff. In his current role, Lt Gen Bhatt has been instrumental in positioning ISpA as the leading industry body advocating for India’s private space sector. Since its inauguration by Prime Minister Narendra Modi on October 11, 2021, ISpA has profoundly influenced national space policy, championing reforms, nurturing public-private collaborations, and encouraging indigenous advancements across satellite manufacturing, launch services, and space-based applications.