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समाचार पत्रों से चयनित अंश

Newspapers Clippings

डीआरडीओ समुदाय को डीआरडीओ प्रौद्योगिकियों, रक्षा प्रौद्योगिकियों, रक्षा नीतियों, अंतर्राष्ट्रीय संबंधों और विज्ञान एवं प्रौद्योगिकी की नूतन जानकारी से अवगत कराने हेतु दैनिक सेवा

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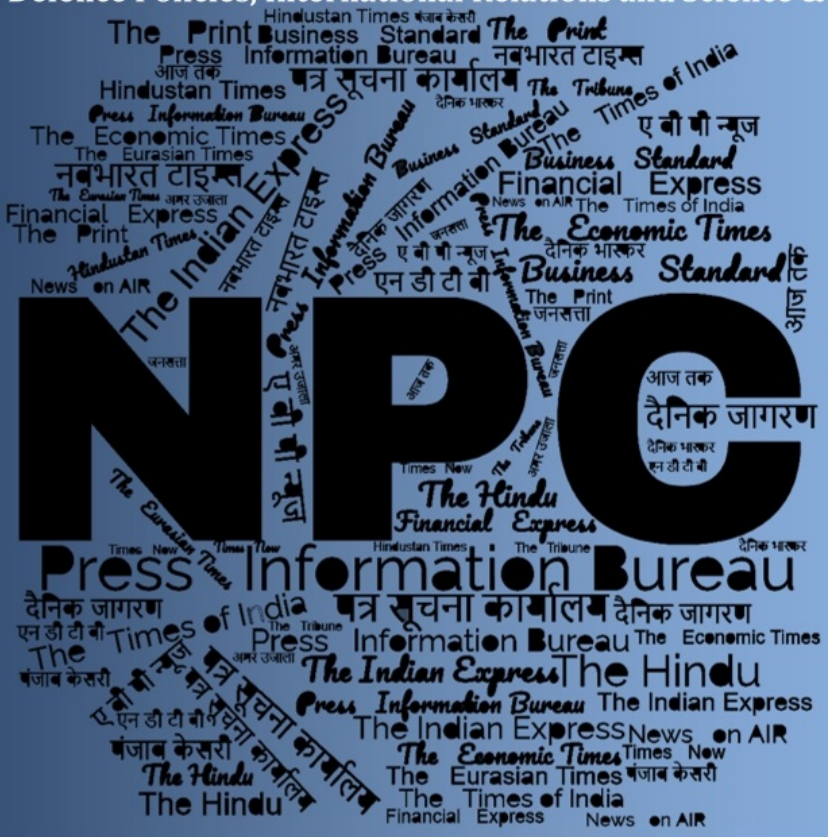

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Defence News

एससीओ में भाग लेने चीन पहुचे राजनाथ सिंह

Source: Jansatta, Dt. 26 Jun 2025

रक्षा मंत्री राजनाथ सिंह शंघाई सहयोग संगठन (एससीओ) के सम्मेलन में भाग लेने के लिए बुधवार को चीन के बंदरगाह शहर किंगदाओ पहुंचे। मई 2020 में पूर्वी लद्दाख में वास्तविक नियंत्रण रेखा (एलएसी) पर सैन्य गतिरोध के बाद दोनों देशों के संबंधों में गंभीर तनाव आने के बाद किसी वरिष्ठ भारतीय मंत्री की यह पहली चीन यात्रा है। सिंह का किंगदाओ हवाई अड्डे पहुंचने पर भारतीय राजदूत प्रदीप कुमार रावत ने स्वागत किया। पाकिस्तान समर्थित सीमापार आतंकवाद के खिलाफ भारत के कूटनीतिक हमले के अनुरूप राजनाथ सिंह गुरुवार को होने वाले एससीओ सम्मेलन में आतंकवाद पर लगाम लगाने के प्रयासों को बढ़ाने के लिए एससीओ पर दबाव डालेंगे।

शंघाई में बुधवार को किंगदाओ हवाई अड्डे पर केंद्रीय रक्षा मंत्री राजनाथ सिंह का स्वागत किया गया।

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China: Rajnath Singh arrives for SCO Defence Ministers' Meeting in Qingdao

Source: The Tribune, Dt. 26 Jun 2025

Defence Minister Rajnath Singh arrived at the venue for the Shanghai Cooperation Organisation (SCO) Defence Ministers' meeting at Qingdao, China, on Thursday.

The Defence Minister, upon his arrival, was welcomed by the Chinese Defence Minister, Admiral Dong Jun.

Singh, along with the Chinese Defence Minister Admiral Jun and other leaders, also posed for a group photograph ahead of the Defence Ministers' meeting.

Pakistan's Defence Minister Khawaja Asif had also arrived at the venue after Rajnath Singh made his entrance.

The SCO Defence Ministers' Meeting is set to be held from June 25-26.

The SCO, comprising India, China, Russia, and several Central Asian countries, focuses on promoting regional stability and security through cooperation and dialogue.

During the meeting, the leaders are expected to discuss various issues, including regional and international peace and security, counter-terrorism efforts and cooperation among the Ministries of Defence of SCO member states.

In a press release, Ministry of Defence stated, "Defence Ministry is expected to highlight India's continued commitment to the principles and mandate of the SCO, outline India's vision towards achieving greater international peace & security, call for joint & consistent efforts to eliminate terrorism & extremism in the region, and stress on the need for greater trade, economic cooperation and connectivity within SCO. He will also hold bilateral meetings with the Defence Ministers of some participating countries, including China and Russia, on the sidelines of the meeting."

The Ministry of Defence noted that India attaches special importance to the SCO in promoting multilateralism, politics, security, economics and people-to-people interactions in the region.

It further said, "SCO pursues its policy based on the principles of sovereignty, territorial integrity of nations, non-interference in internal affairs, mutual respect, understanding and equality of all member states."

SCO is an intergovernmental organisation established in 2001. India became its full member in 2017 and assumed the rotating Chairmanship in 2023.

The SCO members, besides India, include Kazakhstan, China, Kyrgyzstan, Pakistan, Russia, Tajikistan, Uzbekistan, Iran and Belarus. China has assumed the Chair of the SCO for 2025 under the theme 'Upholding the Shanghai Spirit: SCO on the Move.'

https://www.tribuneindia.com/news/china/china-rajnath-singh-arrives-for-sco-defence-ministers-meeting-in-qingdao

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Fix eludes HAL on navy, coast guard Dhruvs

Source: Hindustan Times, Dt. 26 Jun 2025

Plane maker Hindustan Aeronautics Limited (HAL) is struggling to pinpoint and fix a lingering flaw in the Dhruv advanced light helicopters operated by the navy and coast guard, and a question mark hangs over when will the locally produced choppers --- grounded for almost six months now --- return to service, officials aware of the matter said on Wednesday.

The military's advanced light helicopter (ALH) fleet was grounded following a fatal coast guard crash at Porbandar in Gujarat on January 5, but the army and air force choppers were declared airworthy after comprehensive safety checks on May 1.

HAL has instrumented two ALHs --- one each from the navy and coast guard --- to gather critical data on the performance of the helicopter's integrated dynamic system, including the transmission

system, gearbox and rotor hub, as well as test the loads some systems can withstand in different operating conditions, said one of the officials cited above, who asked not to be named.

“The data will be thoroughly analysed to determine the root cause of the problem that appears to be linked to sustained operations in a saline environment. There are no issues with the army and air force ALHs,” the official said. The navy and the coast guard together operate around 30 ALHs, designed and developed by HAL.

The 300 ALHs operated by the army and air force were cleared for flying duties based on the recommendations of the defect investigation committee (DIC).

The data obtained from the two instrumented helicopters (fitted with gauges and sensors) will be compiled and analysed by July-end, said a second official, who also asked not to be named. “That should help us identify the snag and fix it. HAL will then go back to the DIC with its findings to figure out the next steps,” he added.

The DIC consists of officials from the Bengaluru-based Centre for Military Airworthiness and Certification (CEMILAC), the Directorate General of Aeronautical Quality Assurance and HAL.

HAL had earlier broadened the scope of the investigation by involving Bengaluru-based Indian Institute of Science (IISc) to perform fatigue testing of a critical part (swashplate) in the helicopter’s transmission system to get to the bottom of the matter. This was after a high-powered panel found that a swashplate fracture caused the January 5 coast guard ALH crash in which two pilots and an aircrew diver were killed. But the reason for the breakdown of the critical component that compromised the ability of the pilots to control the helicopter could not be determined.

A fleet-wide inspection conducted after the January 5 crash revealed that some navy and coast guard ALHs were facing the same problem --- cracks in the swashplate assembly.

HT was the first to report that a detailed analysis by the Council of Scientific and Industrial Research-National Aerospace Laboratories (CSIR-NAL), Bengaluru, pointed to a swashplate assembly failure.

The ALH underwent a design review followed by a replacement of a defective control system only in 2023-24. The helicopter has been involved in around 15 accidents during the last five years, putting its safety record in the spotlight.

The coast guard suspended ALH operations following an accident last September when a helicopter crashed into the Arabian Sea near Porbandar. Then too, two pilots and an aircrew diver were killed. The grounding was for a one-time check; the three services did not ground their fleets then. The coast guard cleared the helicopters for flying a few weeks later, after a safety inspection involving HAL, CEMILAC and all coast guard units.

Last September’s accident, too, came after the design review that culminated in a critical safety upgrade on the ALH fleet. It involved installing upgraded control systems on the helicopters to improve their airworthiness. The comprehensive design review came after the ALH fleet was grounded several times in 2023 too after a raft of accidents called into question its flight safety record.

https://www.hindustantimes.com/india-news/fix-eludes-hal-on-navy-coast-guard-dhruvs-101750876633534.html

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Pakistan working on ICBMs with US in range

Source: The Pioneer, Dt. 26 Jun 2025

In a worrying development for India, Pakistan is secretly working on acquiring a long range nuclear ballistic missile. It can reach US. This comes in the backdrop of reports that Islamabad is looking to upgrade its nuclear arsenal with Beijing's help following Operation Sindoor.

A report, quoting US officials, said if Pakistan goes on to acquire an intercontinental ballistic missile, Washington would designate the country as a nuclear adversary.

Intelligence agencies in Washington, according to a report said the Pakistani military is secretively developing a nuclear tipped intercontinental ballistic missile(ICBM)that could reach the United States.

The report, quoting US officials, said if Pakistan goes on to acquire such a missile, Washington would designate the country as a nuclear adversary. Any nation possessing nuclear weapons that is considered a potential threat or opponent of the US is seen as a nuclear adversary. Presently, Russia, China and North Korea are considered adversarial to the US.

"If Pakistan acquires an ICBM, Washington will have no choice but to treat the country as a nuclear adversary. No other country with ICBMs that can target the United States is considered a friend," the report quoted US officials as saying.

Pakistan has always claimed that its nuclear programme was strictly focused on deterring India. Its policy has been focused on developing short- and medium-range missiles.

Intercontinental Ballistic Missiles (ICBMs), which can be armed with both nuclear and conventional warheads, are capable of hitting targets over 5,500 km. Presently, Pakistan has no ICBMs.

In 2022, Pakistan tested the surface-to-surface medium-range ballistic missile Shaheen-III, which can hit targets over 2,700 km, bringing a number of Indian cities under its range.

In developing an intercontinental ballistic missile, Pakistan might be looking to deter the US from trying to eliminate its nuclear arsenal.

Pakistan may also be able to prevent US from intervening on India's behalf if both the neighbouring countries clash again, if the country develops ICMBMs. The issue is being viewed with concern by the US. Last year, Washington imposed fresh sanctions related to Pakistan's long-range ballistic-missile program.

The sanctions were slapped on the National Development Complex, the state-owned defence agency overseeing the missile program, and three other firms. It froze any US property belonging to the entities and barred American firms from doing business with them.

While Pakistan called the move "biased", the US action was based on a State Department factsheet that said Islamabad sought to obtain components for its long-range ballistic-missile program.

Pakistan, which possesses around 170 nuclear warheads, is not a signatory to the Nuclear Non-Proliferation Treaty (NPT). The treaty is aimed at preventing the spread of nuclear weapons and promoting peaceful uses of nuclear energy.

The fresh development comes after the latest World Threat Assessment report by the US said Pakistan, rattled by India's Operation Sindoor, was obtaining materials and technology for developing weapons of mass destruction from China.

During last month's hostilities, India destroyed nine terror camps and targeted 11 vital airbases deep inside Pakistan.

There were reports that Pakistan fired Fatah-II, a hypersonic ballistic missile, towards India. However, the missile was intercepted by India's robust air defence systems.

Since then, several ministers, including Defence Minister Rajnath Singh, have urged the International Atomic Energy Agency (IAEA) to monitor Pakistan's nuclear arsenal.

https://www.dailypioneer.com/2025/page1/pakistan-working-on-icbms-with-us-in-range.html

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Hyd will host Rafale Engine repair centre

Source: The Asian Age, Dt. 26 Jun 2025

AGE CORRESPONDENT
NEW DELHI, JUNE 25

French aerospace and defense multinational Safran Aircraft Engines on Wednesday declared the construction of a new maintenance, repair, and overhaul (MRO) shop dedicated to the Rafale's M88 engine, in Hyderabad. "This site will be the first one to maintain M88 modules out of France, marking a key milestone in our commitment to supporting M88 export customers, especially the IAF," said the statement.

The brand-new shop will have a capacity of over 600 modules per year and is expected to generate up to 150 jobs by 2040, helping to meet the growth of M88 maintenance activities worldwide.

"We are delighted to select Hyderabad as the first export maintenance facility dedicated to the M88," said Christophe Bruneau, executive vice-president, military engines at Safran Aircraft Engines. "This project marks an important step in the development of Indian sovereignty in aerospace, while demonstrating our commitment to developing a world-class MRO ecosystem for the benefit of all M88 operators."

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Science & Technology News

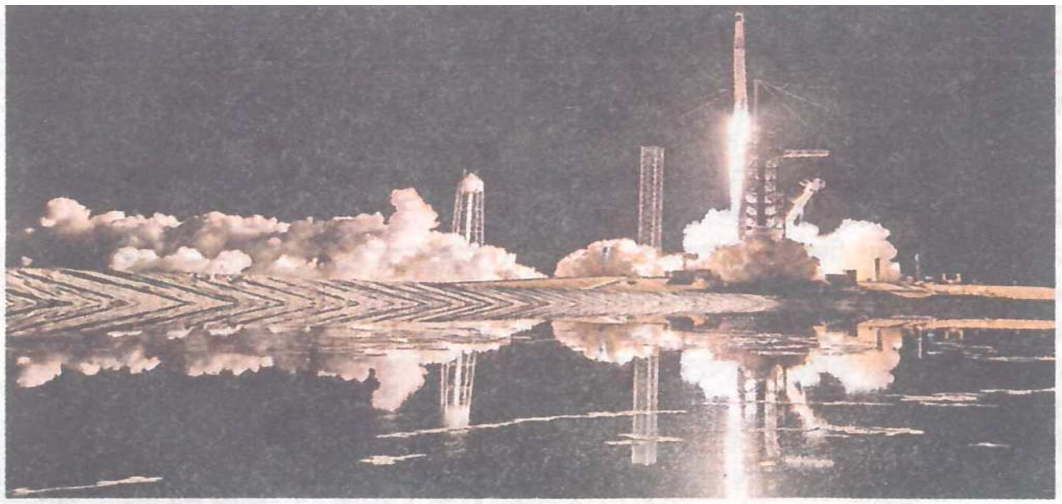
भारतीय स्वाभिमान की शुभ यात्रा

Source: Dainik Jagran, Dt. 26 Jun 2025

जागरण न्यूज नेटवर्क, नई दिल्ली: अंतरराष्ट्रीय अंतरिक्ष स्टेशन (आइएसएस) के लिए शुभांशु शुक्ला की उड़ान के साथ ही 140 करोड़ भारतीयों का स्वाभिमान सातवें आसमान पर पहुंच गया। शुभांशु शुक्ला ने एक्सिओम स्पेस द्वारा संचालित वाणिज्यिक मिशन के तहत बुधवार को तीन अन्य अंतरिक्ष यात्रियों के साथ आइएसएस के लिए रवाना होकर इतिहास रच दिया।

स्पेसएक्स के फाल्कन-9 राकेट ने दोपहर 12:01 बजे एक्सिओम मिशन के चार अंतरिक्ष यात्रियों को लेकर फ्लोरिडा के कैनेडी स्पेस सेंटर से आइएसएस के लिए उड़ान भरी, जिसका दुनिया भर के लोगों ने स्वागत किया। प्रधानमंत्री नरेन्द्र मोदी ने भारतीय शुभांशु शुक्ला और तीन अन्य देशों के अंतरिक्ष यात्रियों को लेकर रवाना हुए अंतरिक्ष मिशन 'एक्सीओम मिशन-4' के सफल प्रक्षेपण पर खुशी जताई है। उनकी अगुआई में कैबिनेट बैठक में भी एक प्रस्ताव पारित कर खुशी जताई गई। शुक्ला के माता-पिता लखनऊ स्थित सिटी मोंटेसरी स्कूल में इस ऐतिहासिक उड़ान के गवाह बने। इसी स्कूल से शुक्ला ने पढ़ाई की है।

पहले भारतीय अंतरिक्ष यात्री राकेश शर्मा की अंतरिक्ष यात्रा के 41 साल बाद किसी भारतीय की यह यात्रा हो रही है। राकेश शर्मा की ऐतिहासिक उड़ान के एक वर्ष बाद 1985 में जन्मे शुभांशु दूसरे भारतीय अंतरिक्ष यात्री बन गए हैं। शुक्ला अंतरराष्ट्रीय अंतरिक्ष स्टेशन की यात्रा करने वाले पहले भारतीय अंतरिक्ष यात्री होंगे। राकेश शर्मा 1984 में तत्कालीन सोवियत संघ के सैल्यूट-7 अंतरिक्ष स्टेशन के तहत कक्षा में आठ दिन रहे थे।



भारत के शुभांशु शुक्ला और तीन अन्य अंतरिक्ष यात्रियों को लेकर ड्रैगन अंतरिक्ष यान के साथ स्पेसएक्स फाल्कन 9 राकेट फ्लोरिडा के कैनेडी स्पेस सेंटर के लांच पैड से भरी गई उड़ान ● प्रेट्र

फ्लोरिडा के कैनेडी स्पेस सेंटर से अंतरराष्ट्रीय अंतरिक्ष स्टेशन रवाना होने के दौरान ड्रैगन अंतरिक्ष यान में सवार शुभांशु शुक्ला व तीन अन्य अंतरिक्ष यात्री ● एएनआइ

12:01 बजे दोपहर फ्लोरिडा के कैनेडी स्पेस सेंटर से भरी उड़ान, अंतरराष्ट्रीय अंतरिक्ष स्टेशन जाने वाले पहले भारतीय यात्री होंगे शुभांशु शुक्ला

28 घंटे बाद गुरुवार को भारतीय समयानुसार शाम 4 :30 बजे आइएसएस पहुंचेंगे एक्सिओम-4 मिशन के तहत चार अंतरिक्ष यात्री

प्रक्षेपण के 10 मिनट बाद अंतरिक्ष यात्रियों ने धरती का चक्कर काटना शुरू किया और शुक्ला ने अपने संदेश में कहा-41 साल बाद भारत की मानव अंतरिक्ष यात्रा में वापसी। करीब 28 घंटे की यात्रा के बाद चारों अंतरिक्ष यात्री भारतीय समयानुसार शाम 4:30 बजे अंतरराष्ट्रीय अंतरिक्ष स्टेशन पहुंचेंगे।

शुभांशु शुक्ला अमेरिकी अंतरिक्ष एजेंसी नासा की अंतरिक्ष यात्री पूर्व मिशन कमांडर पैगी व्हिटसन, हंगरी के अंतरिक्ष यात्री टिबोर कपू एवं पोलैंड के स्लावोज उज्नान्स्की-विस्नीव्स्की एक्सिओम-4 मिशन का हिस्सा हैं। यह मिशन भारत, पोलैंड व हंगरी के लिए मानव अंतरिक्ष यान की ओर वापसी को साकार करेगा।

कक्षा में पहुंचने के बाद अंतरिक्ष यात्रियों ने अपने कैप्सूल का नाम ग्रेस बताया। स्पेसएक्स ने चालक दल को बताया-जो धैर्य रखते हैं, उनके साथ अच्छी चीजें होती हैं। ग्रेस के पहले चालक दल को ईश्वर का आशीर्वाद मिले। अंतरिक्ष यात्री अंतरराष्ट्रीय अंतरिक्ष स्टेशन में 14 दिन बिताएंगे और 60 प्रयोग करेंगे।

शुभांशु शुक्ला अंतरिक्ष में भारत केंद्रित आठ अध्ययन करेंगे।

उड़ान से पहले शुक्ला ने कहा- उन्हें उम्मीद है कि वह अपने देश की एक पूरी पीढ़ी की जिज्ञासा को जगा पाएंगे। उन्होंने कहा, मैं मानता हूं कि भले ही मैं एक व्यक्ति के रूप में अंतरिक्ष यात्रा कर रहा हूं, पर यह 140 करोड़ भारतीयों की यात्रा है।

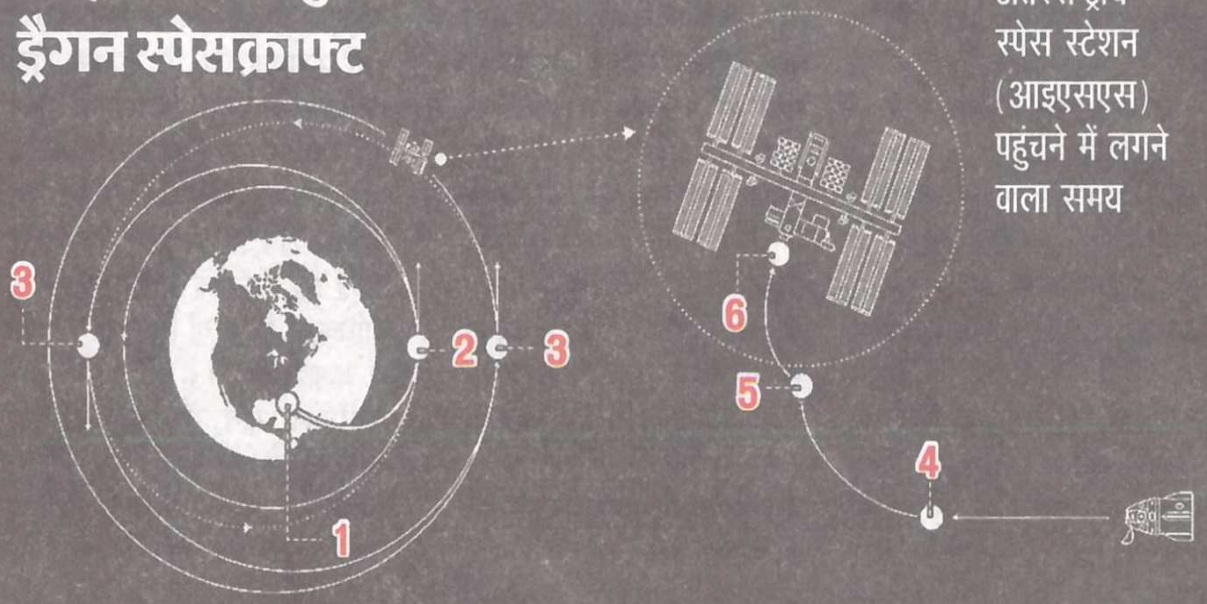
आम का रस, सब्जी-चावल साथ ले गए: अंतरिक्ष यात्रियों को हल्का सामान लेकर यात्रा करने की सलाह दी जाती है, लेकिन ये अंतरिक्ष यात्री अपने देश से जुड़ा पसंदीदा खाद्य पदार्थ भी ले जा रहे हैं, जैसे आम के रस के साथ भारतीय सब्जी और चावल, हंगरी का मसालेदार पेपरिका पेस्ट और पोलैंड का फ्रीज-फ्राइड "पिरोगी"। शुभांशु स्वादिष्ट भारतीय मिठाइयां भी ले जा रहे हैं। उड़ान भरने से पहले उन्होंने कहा-अंतरिक्ष में बहुत सारा खाना होगा। लेकिन, मैं अपने साथ आम का रस, गाजर का हलवा, मूंग दाल का हलवा ले जाऊंगा, ताकि मैं इसे साथी अंतरिक्ष यात्रियों के साथ साझा कर सकूं।

शुभ यात्रा >> पेज 10

छह चरणों में पृथ्वी से आइएसएस पहुंचेगा ड्रैगन स्पेसक्राफ्ट

7.36 किमी प्रति सेकेंड है स्पेसक्राफ्ट की अधिकतम गति

28 घंटे 29 मिनट पृथ्वी से अंतरराष्ट्रीय स्पेस स्टेशन (आइएसएस) पहुंचने में लगने वाला समय



1 लांच: फाल्कन-9 राकेट पहले चरण में स्पेसक्राफ्ट ड्रैगन को पृथ्वी की कक्षा में ले गया।

2 कक्षा सक्रियण: फाल्कन-9 से ड्रैगन दूसरे चरण के लिए अलग हुआ। इसके बाद प्रारंभिक कक्षा सक्रियण के साथ स्पेसक्राफ्ट के प्रणोदन, जीवन रक्षण और तापीय नियंत्रण प्रणालियों की जांच की गई।

3 चरणबद्ध प्रक्रिया: आइएसएस तक पहुंचने के लिए डेल्टा-वेलोसिटी कक्षा में पहुंचने से पहले ड्रैगन के थ्रस्टर्स चालू किए जाएंगे।

4 पृथ्वी की कक्षा के चक्कर लगाना: अधिकतम गति हासिल करने के लिए ड्रैगन पृथ्वी की कक्षा के कई चक्कर लगाएगा। इसी बीच अंतिरक्ष में स्थापित गंतव्य स्थल आइएसएस से संचार भी स्थापित करेगा।

5 ऐसे होगी डाकिंग: ड्रैगन, आइएसएस के लिए सापेक्ष नेविगेशन स्थापित करेगा और आइएसएस से डाक करने के लिए(जुड़ने के लिए) सही कोण पर पहुंचेगा। इसके लिए पूर्व निर्धारित जुड़ने की प्रकिया शुरू होगी।

6 चारों अंतरिक्षयात्री ड्रैगन यान से आइएसएस में प्रवेश करेंगे: ड्रैगन स्पेसक्राफ्ट, अंतिम संपर्क करेगा और आइएसएस के साथ जुड़ेगा। इसके बाद हैच (ड्रैगन से बाहर निकलने वाला दरवाजा) खोला जाएगा। यह प्रक्रिया इस अभियान की बहुत अहम चरण होगी। इसके बाद चारों अंतरिक्षयात्री आइएसएस में प्रवेश करेंगे।

14 दिन अंतरराष्ट्रीय अंतरिक्ष स्टेशन में बिताएंगे, शुभांशु शुक्ला अंतरिक्ष में भारत केंद्रित आठ अध्ययन करेंगे, कुल 60 प्रयोग होंगे

हम भारत, हंगरी, पोलैंड और अमेरिका के अंतरिक्ष यात्रियों को लेकर रवाना हुए अंतरिक्ष मिशन के सफल प्रक्षेपण का स्वागत करते हैं। ग्रुप कैप्टन शुभांशु शुक्ला अंतरराष्ट्रीय अंतरिक्ष स्टेशन पर जाने वाले पहले भारतीय बनने की राह पर हैं। वह अपने साथ 140 करोड़ भारतीयों की शुभेच्छाएं, उम्मीदें और आकांक्षाएं लेकर गए हैं। उन्हें और अन्य अंतरिक्ष यात्रियों को शुभकामना।

-नरेन्द्र मोदी, प्रधानमंत्री

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‘What a ride’: Indian in space after 41-year gap

Source: Hindustan Times, Dt. 26 Jun 2025

At 12:01PM (IST) on Wednesday, flames erupted beneath a Falcon 9 rocket at Kennedy Space Center as Group Captain Shubhanshu Shukla lifted off from American soil. “Namaskar, my dear countrymen,” the Indian Air Force officer said ten minutes later, his voice crackling from orbit — the first words spoken by the second Indian in space: “After 40 years, we have returned to space again, kya kamaal ki ride thi (what a ride this has been)”.

IAF Group Captain Shubhanshu Shukla (second from left) with his three crewmates — veteran US astronaut and commander Peggy Whitson, Polish engineer Sławosz Uznański and Hungarian researcher Tibor Kapu— aboard SpaceX’s Dragon spacecraft on Wednesday.

The mission launched Wednesday is in stark contrast to the one that took Wing Commander Rakesh Sharma to space in 1984. While Sharma had launched from the windswept steppes of Kazakhstan, aboard a Soviet Soyuz as part of Cold War space diplomacy, Shukla rode a sleek Dragon capsule named Grace built by a private American company from the swamps of Florida.

Where Sharma flew to the Soviet Salyut 7 station for a week-long mission to observe the Earth, Shukla headed to the International Space Station for a fortnight. Sharma’s tasks included Earth observation—then still a matter of deep study—while Shukla carried with him 60 experiments from 31 countries. Sharma’s mission had been an instrument of superpower politics; Shukla’s marked a breakthrough for commercial spacefaring.

Yet for all the technological and geopolitical transformation, one element remained unchanged: an Indian flag carried into orbit on an astronaut’s shoulder, bearing the weight of a billion dreams.

“The Tiranga on my shoulders tells me that I am not alone and I am with all of you,” Shukla continued in Hindi as Earth rolled beneath him at 7.5km per second. “This is not just the start of my journey to the International Space Station, but the beginning of India’s human space programme, and I would like all my countrymen to be part of this journey,” said Shukla, who represents the Indian Space Research Organisation.

The successful launch overcame a prolonged series of delays that had tested both technical systems and national patience. Originally scheduled for May 29, the Axiom-4 mission was put off five times due to issues ranging from technical problems with the Crew Dragon module to unfavourable weather conditions and a liquid oxygen leak in the Falcon 9 rocket. The final delay came from pressure concerns in the International Space Station's Russian Zvezda service module, requiring coordination between NASA and Roscosmos before clearance was granted.

The crew was in a four-week quarantine period during which they shifted their sleep regimen to adjust their circadian rhythm to match that on ISS. At Launch Complex 39A, where Apollo missions once departed for the moon, the rocket carried a crew that represented four nations returning to space after decades of absence.

Commander Peggy Whitson, America's most experienced female astronaut with 675 days in space, led the mission with Shukla as pilot and specialists Sławosz Uznański from Poland and Tibor Kapu from Hungary. A toy swan named Joy accompanied them as the mission's unofficial fifth crew member and zero-gravity indicator—a nod to the bird that represents wisdom and purity in Indian culture.

Hours before launch, with Dragon's hatch sealed at 10:22 AM (IST) and all communication checks completed, Axiom Space had posted on social media: "The seats are rotated, and the AX-4 crew is ready for launch!" The crew, quarantined since May 26 in what marked one of the longest isolation periods in modern spaceflight history, had endured weeks of preparation that included underwater escape drills and emergency scenario training.

Eight thousand miles away in New Delhi, scientists and officials gathered at Anusandhan Bhawan erupted in cheers after the launch. Union minister Jitendra Singh, flanked by Australian High Commissioner Philip Green and South Australia Governor Frances Adamson, distributed sweets.

When Shukla's message arrived from orbit, concluding with "Jai Hind! Jai Bharat," the celebration intensified.

In Lucknow, Shukla's mother Asha Shukla held back tears, lost for words as celebrations erupted around her. "Everyone is happy. These are tears of joy."

"India's ascent to the pedestal of Viksit Bharat has started via space," Singh declared, calling the mission a vindication of space pioneers Vikram Sarabhai and Satish Dhawan under Prime Minister Modi's leadership. "India is no longer a follower but an equal partner in all collaborations."

Prime Minister Narendra Modi, posting on social media as the mission proceeded, stated: "The Indian astronaut, Group Captain Shubhanshu Shukla is on the way to become the first Indian to go to International Space Station. He carries with him the wishes, hopes and aspirations of 1.4 billion Indians."

The 39-year-old pilot's journey to orbit had begun in Lucknow, where he was born before joining the Indian Air Force fighter wing in June 2006. Rising to Group Captain in March 2024, Shukla accumulated 2,000 flight hours as a combat leader and test pilot.

His selection under Isro's Human Spaceflight Programme led to rigorous year-long training at the Yuri Gagarin Cosmonaut Training Centre in Star City, Moscow, where he prepared alongside training for India's upcoming Gaganyaan programme. Hours before launch, his wife Kamna and six-year-old son Sid appeared in a pre-flight video, cheering him on with the words: "You are our hero."

The mission also drew a message from India's first astronaut. In a video recorded before launch, Rakesh Sharma offered his blessing to the new generation: "Greetings from India. Wishing all the very best to the crew. Godspeed and spend as much time as possible to look out of the window. Have a fun time, guys."

The mission carries scientific weight beyond its symbolic value. During their planned two-week stay aboard the ISS, the crew will conduct 60 experiments representing 31 countries. Shukla will oversee seven Indian-designed studies ranging from the impact of microgravity radiation on edible microalgae to examining the effect of microgravity on food crop seed growth.

Additionally, he will undertake five ISRO-NASA collaborative experiments—research that could prove crucial for future long-duration missions and space settlements.

The spacecraft is scheduled to dock with the ISS at 4:30 PM IST on June 26, following a 28-hour journey through space. The mission represents a collaborative effort between Texas-based Axiom Space, SpaceX, and NASA, marking the fourth private astronaut mission to the space station and demonstrating how commercial partnerships have transformed access to low-Earth orbit.

For India's space programme, Shukla's mission serves as a crucial stepping stone toward indigenous capabilities.

Former ISRO chairpersons S Somanath and K Sivan in past conversations told HT that the experience and learnings would directly benefit the Gaganyaan mission and plans for the Bharatiya Antariksh Station. The department of space has termed the mission strategically important, focusing on operational readiness and global integration as India positions itself as a serious contender in human space exploration.

Singh indicated that the mission's success would accelerate legislative progress on the Space Activities Bill, which has been under development since 2017 but has yet to reach Parliament. The bill calls for greater public-private partnership in India's space programmes, reflecting the collaborative model demonstrated by the Ax-4 mission and the broader shift toward commercial space ventures.

The immediate horizon holds additional milestones. Singh said the next major launch would be the Nasa-Isro Synthetic Aperture Radar mission, originally planned for February but now expected "anytime soon this year" following technical adjustments.

The NISAR mission will measure Earth's changing ecosystems, dynamic surfaces, and ice masses, providing crucial data on biomass, natural hazards, sea level rise, and groundwater across the planet with observations every six days for a baseline three-year mission.

Further ahead lies Gaganyaan, India's independent human spaceflight programme, and the complex Chandrayaan-4 mission featuring docking operations planned for 2028. Both are part of India's broader ambitions in space, from lunar exploration to establishing a sustainable human presence in orbit through its planned space station.

https://www.hindustantimes.com/india-news/what-a-ride-indian-in-space-after-41-year-gap-101750876867067.html

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Route to docking: How Dragon will put Shux & Co inside ISS

Source: The Times of India, Dt. 26 Jun 2025

Dragon capsule "Grace" separated from Falcon 9 nine minutes after launch and is now orbiting Earth at 27,000kmph. Nose cone deployed. Navigation instruments and docking sensors exposed as the spacecraft begins its precision chase of International Space Station.

Grace circles Earth once every 90 minutes. The journey isn't a straight line and docking isn't immediate. Over the next 24 to 28 hours, the capsule will execute a series of thruster burns — each timed to the second — to raise & fine-tune its orbit, aligning perfectly with the station's trajectory.

A slight delay could shift the narrow rendezvous window. Onboard systems track position in real-time using GPS, radar, and sensors, continuously updating Grace's path against that of the ISS.

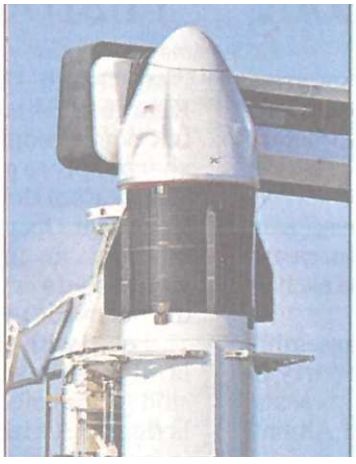
Final approach begins Thursday. Dragon will stop at predetermined waypoints, starting 400m out and moving in stages. At each halt, ground controllers and onboard software assess whether conditions are right to proceed.

At 20 metres, laser sensors and cameras take over. Grace creeps forward at just a few centimetres a second, lining up precisely with Harmony module's docking port.

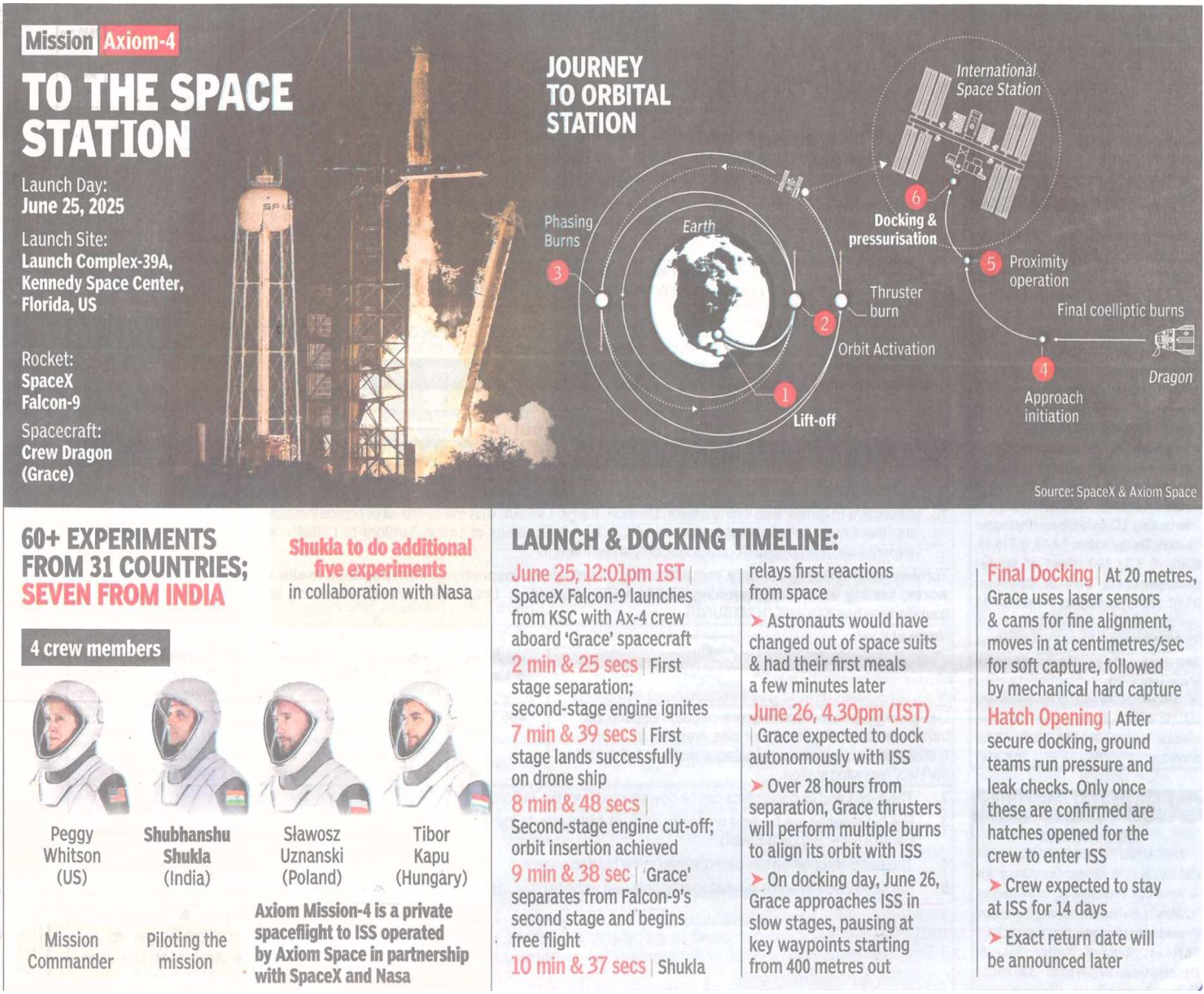
Soft capture comes first — magnetic guides gently pull the capsule into place. Then hard capture follows, as mechanical latches lock and seal the connection. Hatch opening is not immediate. Engineers on Earth conduct pressure and leak checks before approving crew transfer.

Aboard are four Axiom-4 astronauts and a fifth member — Joy, a soft, white baby swan toy serving as the mission's zero-gravity indicator. Joy carries personal meaning: chosen with Group Captain Shubhanshu Shukla's six-year-old son, Kiash — fondly called Sid — in mind.

"Our first ideas all included animals," said mission specialist Tibor Kapu. "We have one kid with the crew, Shux's kid Sid, who basically just loves animals. We wanted dinosaurs and lions, but we couldn't find the right one. We were extremely happy when we found Joy."



Dragon capsule 'Grace', which circles the planet once every 90 minutes, will over the next 24 to 28 hours execute a series of thruster burns — each timed to the second — to raise and fine-tune its orbit, aligning perfectly with the ISS's trajectory



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Axiom-4 Mission: What Shubhanshu Shukla's trip to ISS means for India's space program

Source: The Indian Express, Dt. 26 Jun 2025

Ten minutes into the launch of the Axiom-4 mission on Wednesday, Indian astronaut Shubhanshu Shukla made a short statement. He said the lift-off was not just the start of his journey to the International Space Station (ISS), but also the beginning of India's human spaceflight program. His remark might not become as memorable as Rakesh Sharma's reply 41 years ago — when asked by then Prime Minister Indira Gandhi how India looked from space, Sharma had said, "Saare Jahan Se Achcha". However, Shukla's statement and voyage to the ISS are emblematic of India's steady emergence as a major space faring nation.

New era for ISRO

Shukla's trip marks the start of a new phase in India's space program, where human spaceflight would become as routine as satellite launches. Although the Indian Space Research Organisation (ISRO) missed its ambitious aim of sending a human into space by 2022, the challenge put new energy into the space agency and forced it to work urgently on the Gaganyaan program. The project involves a series of manned missions to space.

Human spaceflight today is not just a matter of adventure. It is a strategic capability that can lead to special advantages for the countries possessing it. Space, including the Moon and potentially Mars, is opening up for scientific and commercial exploitation, and human space travel would be a key capability facilitating this. There is also the apprehension that like nuclear technology, space could also become exclusionary, with only a handful of countries controlling and regulating space travel.

ISRO has done well over the last few decades to indigenously develop crucial technologies, and demonstrate capabilities that are at par with the best in the world. With human spaceflight, ISRO would shift into new gears, and build the platform for accomplishing even bigger things in space. It has already announced plans to set up its own space station, and land humans on the Moon by 2040.

Notably, Shukla is not riding piggyback on the capabilities of others in the Axiom-4 mission. ISRO has been an equal partner in this entire exercise, starting from the planning stages. This is also evident from the fact that a large ISRO contingent, including Chairman V Narayanan, has been in the United States to see through the last stages of the mission. This team was actively involved in the troubleshooting exercises that were required in the last month during which the mission faced numerous delays due to technical glitches.

The learnings from the Axiom-4 mission can be useful for the Gaganyaan program, whose first crewed mission is expected to launch by 2027.

Consequential technology

Space is going to be one of the few extremely consequential technologies of the future along with others such as artificial intelligence, quantum, and clean energy. These are likely to have huge economic and strategic implications. Unlike other areas where India has a lot of catching up to do, space is one technology domain where the country is among the front-runners.

However, to retain that position and press its advantage, India would need to keep competing with countries such as the United States and China. Both of these countries have ambitious plans for space, including a program to send humans to the Moon to build facilities for long-term stays.

Space technologies have also opened up opportunities for the private sector to play an active role. There are attractive business opportunities in harnessing and use of space-based technologies. This is being seen in the United States, where the private sector has created a thriving space ecosystem. Despite being one of the leading space powers, India currently accounts for just about 2 per cent of the global space economy. As a result, there is a lot of opportunity for rapid growth.

Also, nothing fires the imagination of youngsters like the prospect of space travel. Therefore, India's capabilities in human spaceflight can draw a lot of younger talent to the space sector. This, in turn, can spark innovation, create employment, and boost the economy.

While Shukla's trip is a significant achievement, it would have to be utilised to benefit the space program of India.

https://indianexpress.com/article/explained/explained-sci-tech/axiom-4-mission-what-shubhanshu-shuklas-trip-to-iss-means-for-indias-space-program-10088916/

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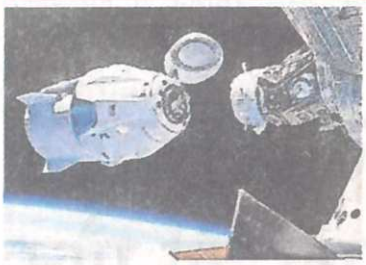
एक्सिओम-4 मिशन से अंतरिक्ष में प्रयोग करेगा इसरो

Source: Dainik Jagran, Dt. 26 Jun 2025

फ्लोरिडा, एएनआइ : एक्सिओम-4 मिशन अंतरिक्ष में कई महत्वपूर्ण शोध करने के लिए तैयार है। अनुसंधान में 31 देशों का प्रतिनिधित्व करने वाले लगभग 60 वैज्ञानिक अध्ययन किए जाएंगे। इन देशों में अमेरिका, भारत, पोलैंड, हंगरी, सऊदी अरब, ब्राजील, नाइजीरिया, यूएई और यूरोप के देश शामिल हैं। यह अब तक अंतरराष्ट्रीय अंतरिक्ष स्टेशन पर की गई सबसे अधिक शोध और विज्ञान से संबंधित गतिविधियां होंगी।

नासा और इसरो कई वैज्ञानिक परीक्षण शुरू करने के लिए सहयोग कर रहे हैं। इन अध्ययनों में मांसपेशियों का पुनर्जन्म, अंकुरित पौधों और खाने योग्य सूक्ष्म शैवाल की वृद्धि, छोटे जलीय जीवों का अस्तित्व और कम गुरुत्वाकर्षण में इलेक्ट्रानिक डिस्प्ले के साथ मानव के परस्पर प्रभाव की जांच शामिल है।



- एक्सिओम-4 मिशन के तहत अंतरिक्ष में 60 वैज्ञानिक अध्ययन किए जाएंगे
- इनमें मांसपेशियों का पुनर्जन्म, अंकुरित पौधों और खाने योग्य सूक्ष्म शैवाल की वृद्धि शामिल

मिशन के तहत इसरो के प्रयोग

फसल के बीज : इसरो का यह प्रयोग छह किस्म के फसल के बीजों पर अंतरिक्ष उड़ान के प्रभावों की जांच करेगा। मिशन के बाद बीजों को कई पीढ़ियों तक उगाया जाएगा और पसंदीदा गुण दिखाने वाले पौधों को आनुवंशिक विश्लेषण के लिए चुना जाएगा। इस परियोजना का उद्देश्य यह पता करना है कि भविष्य के मिशनों के लिए अंतरिक्ष में फसलें कैसे उगाई जा सकती हैं।

साइनोबैक्टीरिया : साइनोबैक्टीरिया जलीय बैक्टीरिया हैं, जो प्रकाश संश्लेषण कर सकते हैं। इसरो का यह प्रयोग कम गुरुत्वाकर्षण में वृद्धि दर, सेलुलर प्रतिक्रियाओं और जैव रासायनिक गतिविधि की जांच करने के लिए साइनोबैक्टीरिया के दो उपभेदों की तुलना करेगा। इसके परिणाम भविष्य में अंतरिक्ष यान के अनुकूल जीवन प्रणालियों के विकास में मदद कर सकते हैं।

अंकुरण : इसरो का यह प्रयोग फसल के बीजों के अंकुरण और वृद्धि पर अंतरिक्ष उड़ान के प्रभावों की जांच करेगा। मिशन के बाद बीजों को लंबे समय तक उगाया जाएगा और आनुवंशिकी तथा पोषण पर उड़ानों के प्रभाव की जांच होगी।

सूक्ष्म शैवाल : सूक्ष्म शैवाल भविष्य के अंतरिक्ष उड़ान के लिए संभावित रूप से उपयोगी जीव हैं जिनका उपयोग भोजन, ईंधन या यहां तक कि जीवन उपयोगी प्रणालियों में भी किया जा सकता है। इस प्रयोग में सूक्ष्म शैवाल के तीन उपभेदों को उगाया जाएगा और जमीन पर उगने वाले शैवाल की तुलना में विकास और आनुवंशिक गतिविधि पर कम गुरुत्वाकर्षण के प्रभाव की जांच की जाएगी।

मायोजेनेसिस : इसका उद्देश्य कम गुरुत्वाकर्षण में मांसपेशियों की शिथिलता के लिए जिम्मेदार कारकों की पहचान करना और चिकित्सकीय रणनीतियों का पता लगाना है। अंतरिक्ष में मांसपेशियों की हानि कैसे होती है, इसका अध्ययन कर उपचार का पता लगाया जाएगा। अंतरिक्ष यात्रियों में मांसपेशियों की हानि को रोकने के लिए इन कारकों को समझना महत्वपूर्ण है।

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Axiom-4 to carry 1st FDA-approved cancer drug for space testing

Source: The Times of India, Dt. 26 Jun 2025

The Axiom-4 mission will be carrying 'Rebecsinib', the first cancer drug with active US FDA 'Investigational New Drug' (IND) status to be tested in microgravity, marking a significant milestone in space-based pharmaceutical research.

Axiom said the experimental cancer treatment, developed by Aspera Biomedicines, targets ADAR1, a gene responsible for cancer cloning and immune evasion. Unlike previous space missions that tested research compounds, Ax-4 will carry a drug already approved for clinical trials on Earth.

"We anticipate that this monumental mission will inform the expanded development of the first ADAR1 inhibitory cancer stem cell targeting drug for a broad array of cancers," said Dr Catriona Jamieson, director of the UC San Diego Sanford Stem Cell Institute and founder of Aspera Biomedicines. Rebecsinib underwent evaluation during Axiom-2 & 3 missions.

Microgravity provides unique advantages for cancer research, with tumours growing approximately twice as fast in space. Dr Jamieson noted a doubling in growth of mini-tumours within just 10 days, effectively mimicking aggressive cancer progression in patients and enabling researchers to obtain more reliable scientific results in shorter time frames.

The mission aims to generate additional preclinical data for diverse tumour types using patient-derived tumour organoids. This accelerated testing environment allows researchers to identify better drug candidates with improved odds of success in patients, particularly those with faster disease progressions.

https://timesofindia.indiatimes.com/science/axiom-4-to-carry-1st-fda-approved-cancer-drug-for-space-testing/articleshow/122080747.cms

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Axiom-4 astronaut crew: Spacewalker, fighter pilot, skyjumper, & radiation specialist

Source: The Times of India, Dt. 26 Jun 2025

Each Axiom-4 astronaut brings unique expertise, from long-duration spaceflight to cutting-edge engineering, forging ambitious bold frontiers in private human spaceflight.

Peggy Whitson, 65 | Mission Commander

She boasts the most extensive flight record of any American or female astronaut, having spent 675 days in space across three ISS missions and Axiom Mission 2. She twice commanded ISS, performed 10 spacewalks totalling over 60 hours. The first woman to head Nasa's Astronaut Office and to command a private spaceflight, she has a doctorate in biochemistry. With 38 years of service, she now directs human spaceflight at AxiomSpace.

Shubhanshu Shukla, 39 | Mission Pilot

Shubhanshu Shukla was chosen as one of four astronauts for Isro's Gaganyaan spaceflight. Born in 1985, he was commissioned into the IAF fighter wing in 2006 and has amassed over 2,000 flight

hours. Selected in 2019 for astronaut training at Star City in Russia, Shukla completed rigorous scientific, technical and survival programmes under Russian tutors.

Slawosz Uznanski-Wisniewski, 41 | Mission Specialist

Slawosz Uznanski-Wisniewski, an engineer from Poland, earned a place in ESA's 2022 Astronaut Reserve from over 22,500 applicants. Holding dual master's degrees from Lodz University of Technology and Universite de Nantes, and a doctorate in radiation-tolerant space systems from Aix-Marseille University, he combines academic expertise with practical experience at CERN. As Reliability Expert and later engineer in charge of the Large Hadron Collider, he oversaw continuous operations of the world's most powerful particle accelerator.

Tibor Kapu, 34 | Mission Specialist

Tibor Kapu, a mechanical engineer from Hungary, was selected in 2023 for the Hungarian to Orbit programme from 247 candidates. Born in 1991, he earned bachelor's and master's degrees in mechanical engineering and polymer technology at Budapest University of Technology and Economics. His career spans automotive hybrid battery development, pharmaceutical logistics, and space radiation protection research at an aerospace firm. He's an avid skydiver with 38 jumps and half-marathon runner.

https://timesofindia.indiatimes.com/science/axiom-4-astronaut-crew-spacewalker-fighter-pilot-skyjumper-radiation-specialist/articleshow/122080100.cms

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Axiom-4 Mission: Creating our own space

-by S. Somnath (former Chairman, ISRO)

Source: The Economic Times, Dt. 26 Jun 2025

Axiom Mission 4 (Ax-4) is all set to dock at ISS today. The international crew, including India's Shubhanshu Shukla, will conduct over 60 experiments in microgravity biology, health sciences, AI and materials research. Shukla's experience will bolster India's Gaganyaan mission, slated for 2026-27, and enhance its preparedness for future human spaceflight

As Shukla begins his mission, India's scientific contributions are also making their presence felt in space.

Research: Ax-4 carries with it 7 cutting-edge research experiments, focusing on space biology and bioengineering:

1. Microalgae growth under space radiation by International Centre for Genetic Engineering & Biotechnology (ICGEB) and National Institute of Plant Genome Research (NIPGR).
2. Seed sprouting in microgravity by University of Agricultural Sciences, Dharwad, and IIT Dharwad.
3. Gene expression studies on survival and adaptation of tardigrades in space by IISc Bangalore.
4. Research on muscle regeneration under microgravity, led by inStem, on the effects of metabolic supplements.

5. Another IISc-led project examines human interaction with electronic displays in orbital environments.
6. ICGEB also contributes a study comparing nutrient utilisation in cyanobacteria using urea and nitrate in microgravity.
7. Indian Institute of Space Science and Technology (IIST) and Kerala Agricultural University (KAU) project investigates the impact of microgravity on crop growth and yield.

These diverse yet complementary studies are vital steps toward developing bioregenerative life support systems, essential for sustaining human life during long-duration space missions and future space settlements.

Strategic implications: Ax-4 supports the Gaganyaan roadmap and future missions by providing real-time exposure and hands-on experience in space medicine, orbital operations, crew management, mission planning and bioastronautics. While Shukla is in orbit, several other Indians involved in on-ground mission support will be gaining invaluable insight into managing complex space missions.

Future ready: This mission also aligns with India's BioE3 policy, which focuses on developing national leadership in biotech and space-based life sciences. In the long term, such experiences will feed into India's goal of establishing the Bharatiya Antariksh Station (BAS) by 2035 and sending a crewed mission to the moon by 2040.

The future includes a series of uncrewed test flights under the Gaganyaan programme, which will validate critical technologies and strengthen mission readiness. By the end of the decade, development of BAS is expected to begin, with its initial modules likely to launch around 2028. Together, Gaganyaan and BAS will become twin pillars of India's human spaceflight efforts, both as platforms for advanced research and hubs for international collaboration.

The global space landscape is evolving rapidly. Several commercial and national space stations are either planned or under construction. These include Axiom Space's private station, Blue Origin's Orbital Reef, StarLab (a US-Japan collaboration), Russia's proposed ROS, Nasa's Lunar Gateway, and China's Tiangong Station. These ventures reflect a shift from purely government-led missions to multi-stakeholder platforms supporting research, industry and space tourism.

To remain an active and influential participant in this new era, India must deepen its international engagements, forging partnerships with national agencies and private space firms. This will not only expand opportunities for vyomanauts to fly aboard missions beyond Gaganyaan, but also reinforce India's position as avital contributor to humanity's shared journey into space.

Ax-4 highlights the increasing importance of science diplomacy and technological exchange in a rapidly evolving, multipolar space ecosystem. For India, it rekindles the spacefaring legacy first ignited in 1984 with cosmonaut Rakesh Sharma, and now propels the nation toward a more active, independent and globally integrated role in human spaceflight.

Ax-4 is not merely a journey to ISS but also a bold leap into the future, unlocking new pathways for scientific discovery, international cooperation and the vast potential of human presence beyond Earth. It stands as a powerful symbol of how India is poised to leapfrog into the next era of space exploration, not as a follower but as a frontrunner in shaping the future of humanity in space.

Adefining trait of India's space journey has been Isro's philosophy of learning before leading. It has strategically partnered global agencies to absorb knowledge, develop expertise and build

indigenous capability. From early collaborations with the Soviet Union and Nasa to mastering satellite tech, launch vehicles, interplanetary missions and now human spaceflight, Isro has consistently transformed each international engagement into a foundation for selfreliant progress.

Ax-4 is another such milestone, an opportunity to learn from the best, and then translate those insights into India's own systems, missions and ambitions. It reinforces a model that has long defined Isro's brand: quiet resilience, scientific excellence and pursuit of sovereign strength in space.

https://economictimes.indiatimes.com/opinion/et-commentary/axiom-4-mission-creating-our-own-space/articleshow/122076299.cms?from=mdr

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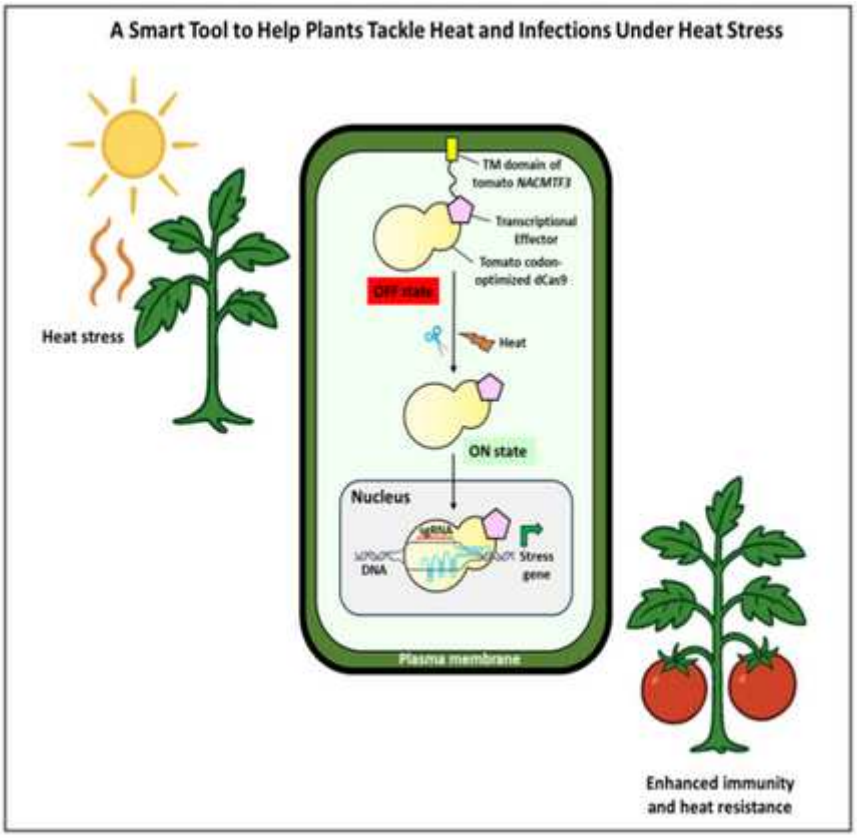
A New 'Clustered Regularly Interspaced Short Palindromic Repeats' (CRISPR) technology can help plants outsmart heat and disease

Source: Press Information Bureau, Dt. 25 Jun 2025

A smart molecular tool developed by scientists can aid plants facing rising temperatures and infections. Plants often feel stressed, especially when the weather is extreme or microbes attack. When they're stressed, their productivity decreases.

Searching for solutions that can help plants get smarter about defending themselves, researchers from Bose Institute, an autonomous institute of the Department of Science and Technology (DST), found an answer in CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats).



The diagram shows how the smart molecular tool helps tomato plants survive harsh conditions.

CRISPR tools usually work like scissors that cut DNA to create lasting changes. However, Prof. Pallob Kundu and his team used a modified version called dCas9. This version does not cut DNA. Instead, it acts like a switch that can turn genes on or off. The switch stays off until the plant experiences stress.

To develop the tool, the scientists borrowed a clever part from the tomato's own biology—a small piece of a natural protein called NACMTF3. This part, called the TM domain, works like a tether and keeps the dCas9 switch locked outside the control room (nucleus). But when under stress, for example, due to heat, the TM domain lets go off the tethering function. In a moment, the switch is released and moves into the control room, flipping on the genes that help the plant defend itself.

This research, published in the International Journal of Biological Macromolecules, can help solanaceous plants handle various stresses, such as fighting pathogens and beating the heat. The team tested this smart system in tomatoes, potatoes and tobacco and found it working efficiently—especially in tomatoes under attack by the bacterial pathogen Pseudomonas syringae, which becomes even more dangerous during heat waves. Normally, heat weakens the plant's immune system, making it more susceptible to infection. To counter this, the scientists turned on two key defense genes, CBP60g, and SARD1, exactly when the plant needed them. This helped the tomatoes fight back against the disease.

Using this tool, the team also turned on two "heat helper" genes—NAC2 and HSFA6b—only during high temperatures. These genes helped the tomato plants remain green, retain more water and stay healthy despite the heat.

With rising temperatures and unpredictable weather, farmers around the world are struggling to grow healthy crops. This smart gene switch gives plants an edge. It saves energy by acting only during danger and boosts the plant's natural defense mechanism just in time.

In the future, this technology could benefit not just tomatoes and potatoes but also eggplants, chilies and other foods crops that we rely on, paving the way toward smart agriculture.

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2139659

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