

Science Diplomacy Alert

A fortnightly newsletter on S&T, Science Policy and Diplomacy

India-EU Cooperation in Deep Space Exploration: A Brief Overview

Focus



In a first endeavour of its kind, ISRO recently launched the Proba-3 mission for the EU on 3 December 2024. This effectively marks an important milestone within India-EU cooperation in deep space exploration. Anupama Vijayakumar writes on the substance and scope of this cooperation.

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SCIENCE POLICY & DIPLOMACY

International S&T Cooperation



[US China Extend Agreement on S&T](#)

The United States of America and China signed a protocol to amend the U.S.-PRC Science and Technology Agreement and extend it for five years. The Agreement covers basic research; however it does not facilitate the development of critical and emerging technologies.

[UK and Switzerland Announce 16 Million Pounds for Science Cooperation](#)

Healthcare, life sciences, clean energy and quantum sensors have been identified as priority areas for collaboration. The projects bring together UK and Swiss businesses, research institutes and universities.

[G20 2025: South Africa Releases Concept Note and Calendar](#)

The document announces the setting up of three task forces on: inclusive economic growth, food security and AI, data governance and STI for innovation.

[Civil Nuclear Cooperation: Uzbekistan Signs Agreement With IAEA](#)

The two countries adopted a joint roadmap on "expanding multidimensional cooperation in peaceful atom development", which shall focus on areas including training high-skilled personnel and joint nuclear projects.

Emerging Tech & Governance



[UK Publishes Priority List of 10 Critical Minerals for 2024](#)

The Critical Minerals Assessment evaluated 82 raw materials to identify 34 critical minerals including Gallium, Germanium, Silicon, Magnesium, Tellurium and Indium.

[China Bans Export of Critical Minerals to the USA](#)

The ban prevents the export of Gallium, Germanium and Antimony which have military applications from reaching US markets.

[Expert Body Advises EU to Lead Global Governance Regime on Solar Geoengineering](#)

The recommendations on Solar Radiation Management technologies were proposed by the EU Scientific Advice Mechanism. While highlighting the risks emanating from SRMs, the EU was advised to focus on emissions reduction mechanisms to combat global warming.

Events & Meetings

UN Convention to Combat Desertification Meeting Held in Riyadh

The annual Conference of Parties was held during 2-13 December, 2024. The theme for this year has been identified as “Our Land, Our Future”.

Global Plastic Pollution Treaty Talks Conclude

The talks were held in Busan, South Korea during 25 November-1 December 2024. The event saw over 200 nations try to arrive at a legally binding agreement to address millions of tonnes of plastic waste.

India Internet Governance Forum Held in New Delhi

The meeting held during 9-10 December 2024 was supported by the Ministry of Electronics and Information Technology (MeitY) and the National Internet Exchange of India (NIXI). The participants deliberated upon crucial aspects related to internet governance and India’s role in the same.

Geosmart India Conference Held in Hyderabad

Held during 2-5 December, the conference was attended by personnel from government, industry and international space agencies. It focused on how the integration of geospatial tech with Digital Public Infrastructure can foster economic growth.



INDIAN SCIENCE NEWS

ISRO Launches EU’s Proba-3 Satellite

The pair of satellites was launched aboard a PSLV-C59 rocket and would study the Sun’s corona by creating artificial eclipses.

Largest Speech Translation Dataset for Indian Languages Launched

Named BhashaAnuvad, the Dataset has been launched by AI4Bharat. This would help programmers and users “to address India-specific challenges like code-switching and dialectal diversity”.

IIT Jodhpur Researchers Evolve New Framework to Reduce Bias in AI Systems

The framework scores datasets on the ‘fairness, privacy, and regulatory’ scale and is tailored to the Indian context. It can be employed in creating responsible AI datasets.

JNU Researchers Pioneer Novel Breakthrough for Malaria, Covid-19 Treatment

JNU’s Special Centre for Molecular Medicine, identified a human protein, Hsp70. In collaboration with Russian researchers, a molecular inhibitor which can target Hsp70 to treat multiple infections has also been developed.

India, Italy Strengthen S&T Cooperation

In a meeting held in New Delhi, two countries deliberated on ways to bolster cooperation in areas including space, AI, advanced manufacturing, clean energy and quantum technologies.

Japan to Cooperate With the State of Rajasthan on Manufacturing, Renewable Energy

Japan committed to boosting cooperation with the state in fields including manufacturing, auto industry and renewable energy, with a special focus on Rajasthan’s vast solar energy potential.

Ministry of New and Renewable Energy Introduces Curbs on Solar Cells Imports

A new order from the Centre has brought solar cells under the Approved List of Models and Manufacturers (ALMM). This further means that “only specific models from approved manufacturers can be supplied to government-supported projects beginning 1 June, 2026”.

Indian Astronomers Make Discovery on Planetary Evolution Three Sun Solar System

Researchers at the National Institute of Science Education and Research (NISER), Odisha utilised advanced radio telescopes in Chile’s Atacama Desert to detect molecular emissions from the GG Tau A system.

India-EU Cooperation in Deep Space Exploration: A Brief Overview

Anupama Vijayakumar,
Consultant, RIS

Space cooperation has historically been an integral component of science and technology cooperation between Europe and India. The cooperation draws from an extensive past experience of collaborations involving the Indian Space Research Organisation (ISRO), European Space Agency (ESA) and the national space agencies of EU member-states. ISRO has signed more than 60 Memoranda of Understanding with European Countries, with France being “the most active partner”. Cooperation with the ESA has intensified over the past couple of years, culminating in ISRO successfully launching Europe’s Proba-3 mission on 3 December 2024.

Both Europe and India are invested in ensuring that outer space is utilised for peaceful purposes, given their growing reliance on space assets for both economy and military. Viewing space as a strategic priority in the current geopolitical context, both the EU and India wish to counter various threats to space assets from, especially as the United States, China and Russia are engaged in a space arms race. In this background, the EU and India have started to view space cooperation as an area of mutual benefit, while prioritising areas including environmental monitoring, space governance and space commerce. However, deep space exploration in recent years has emerged as the mainstay of bilateral space cooperation. This article elaborates the priority areas and key ventures within India-EU cooperation in deep space exploration.

Deep Space Communications

Spacecraft rely on ground stations as they navigate themselves through outer space. This essentially allows operators to be in touch with the spacecraft while allowing them to keep track of risks along the way. Both space agencies and private players often rely on other organisations to deploy their spacecraft. Deep space communications in a way have evolved “to foster international spaceflight collaboration”. This is one area where India-EU cooperation is growing strong, especially as India is starting to undertake interplanetary missions.

Along with NASA, ISRO relied on ESA for supporting the Chandrayaan-3 lunar landing mission launched in 2023. While ESA’s 15-metre deep space antenna in Kourou helped track the spacecraft in the immediate days following its launch, the Goonhilly Earth Station located in the United Kingdom was purportedly involved in Chandrayaan-3’s propulsion and lander modules, along with facilitating lunar surface operations. ESA supported India with the deployment of its Aditya L1 Solar Probe through providing deep space communication services and validating critical flight dynamics software. In addition to ground facilities including 35-metre deep space antennas in Australia, Spain and Argentina, the mission was also supported by Kourou station in French Guiana with coordinated support from Goonhilly Earth Station in the UK.

On 4 December 2024, the ISRO signed a technical supporting agreement with the ESA for India’s upcoming Gaganyaan-1 human

spaceflight mission. As per the terms of the agreement, The Network Operations Centre at ESA’s ESOC mission control centre in Germany will coordinate a series of radio antennas in the global European Space Tracking network to enable ISRO to track, monitor and command the Gaganyaan crew module throughout each mission”. ESOC is expected to begin the compatibility testing for Gaganyaan’s radio equipment to ensure that it can transmit and receive communications from ESA’s space antenna in Kourou.

Cooperation in Solar Astronomy

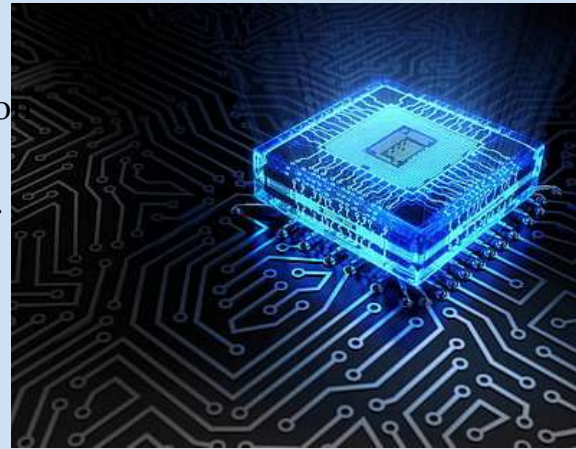
Both India and the EU have sought to contribute to knowledge on solar astronomy through various collaborative projects. In a first instance of its kind, ISRO launched the Proba-3, which ESA terms, “the world’s first precision formation flying mission”. Proba-3 Consists of two satellites, Coronagraph Spacecraft (CSC) and the Occulter Spacecraft (OSC) which separated after launch. The Occulter shall maneuver to block the sun’s light to cast the shadow on the Coronagraph, allowing the latter to take detailed images of the sun’s corona. The demonstration mission additionally aims to “validate strategies, guidance, navigation and control and other algorithms, such as relative GPS navigation”. Meanwhile, ESA’s ground stations are also downlinking the bulk of the data gathered by ISRO’s Aditya-L1. In the second quarter of 2025, both Proba-3 and Aditya L1 would purportedly work together to make solar observations.

Google Unveils Willow Quantum Chip

The problem: Error correction is a major concern in quantum computing. This is because the qubits (basic unit of computation in quantum computers) exchange information with their environment, making it difficult to facilitate precise computing.

Willow: According to Google, “the more qubits we use in Willow, the more we *reduce errors*” It can perform calculations that a normal computer takes 10 septillion years in a mere matter of five minutes.

Future Prospects: The chip significantly boosts the scope of what can be achieved through advances in AI. Google expressed optimism that the Willow generation of chips can demonstrate a first "useful, beyond-classical" computation on today's quantum chips that is relevant to a real-world application.



Japanese Researchers Develop Biodegradable Plastic



The problem: Marine plastic waste and pollution has been a persistent challenge for the past several decades and poses huge challenges to marine biodiversity and the environment.

The Biodegradable Plastic: Developed by Researchers at the RIKEN Centre for Emergent Matter Science, the new plastic can dissolve in seawater and soil. The plastic is composed of food-safe components and can be employed in a variety of applications.

Potential Applications: The plastic can be utilised in eco-friendly packaging solutions, while reducing hazardous impact on the environment. It can also be employed in manufacturing medical devices and equipment.

INSIGHTS & RESOURCES

India Internet Governance Forum Held in New Delhi

The India Internet Governance Forum (IIGF) 2024 was held on December 9-10, 2024 in New Delhi. The event was supported by the Ministry of Electronics and Information Technology (MeitY) and the National Internet Exchange of India (NIXI). The forum focuses on bridging the digital divide, enhancing trust and safety in the online environment, and leveraging advanced technologies for nation-building while emphasizing the need for a secure, inclusive, and ethically governed Internet. The discussions revolved around issues on

- *Empowering Connections*, emphasizing enhanced access, inclusion, and digital rights to bridge the digital divide.
- *Legal and Regulatory Frameworks* to create balanced, growth-oriented policies that strengthen Internet governance.
- *Responsible AI*, promoting the ethical and effective use of artificial intelligence for societal benefit.

- *Building a Greener and Sustainable Internet* highlighting energy-efficient practices and environmental sustainability in the digital realm, and

- *Trust and Safety* which will address measures to enhance cybersecurity and boost user confidence in the online environment.

These comprehensive discussions will unite stakeholders from various sectors to tackle pressing challenges and harness opportunities in Internet governance.

New IAEA Technical Cooperation Achievements Report Launched

The International Atomic Energy Agency Director General launched a three-volume report during the National Liaison Office Meeting, *Prospects and Achievements of the IAEA Technical Cooperation Programme in the 21st Century*.

- The report provides an overview of the work of the International Atomic Energy Agency's technical cooperation programme during the past two decades in around 150 countries, including at least 35 least developed countries.

- The three volume publication examines the programme's achievements, presenting country overviews and case studies, programme facts and figures, and the findings of a survey conducted to measure the impact of the technical cooperation programme in the 21st century.

- The publication also covers the wide scope of technical cooperation programme activities, from regional, thematic and Member State perspectives, to build capacity in the safe, secure and peaceful application of nuclear science and technology, and outlines how this contributes to the achievement of the Sustainable Development Goals.

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