

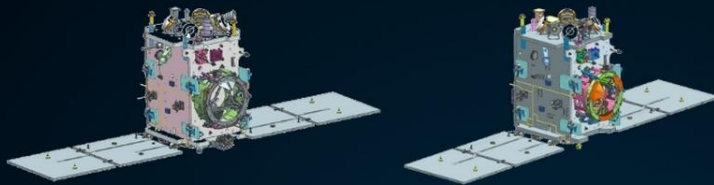
1. Space Docking and Undocking

Why now?

Nearly two months after ISRO successfully docked two satellites in space, it carried out an undocking procedure recently. This makes India the fourth country — after the US, Russia, and China — to boast docking-undocking capabilities.

ISRO's SpaDeX mission successful

ISRO's successful execution of the Space Docking Experiment (SpaDeX) marks a historic accomplishment, making India the fourth country, following the USA, Russia, and China, to achieve this feat.



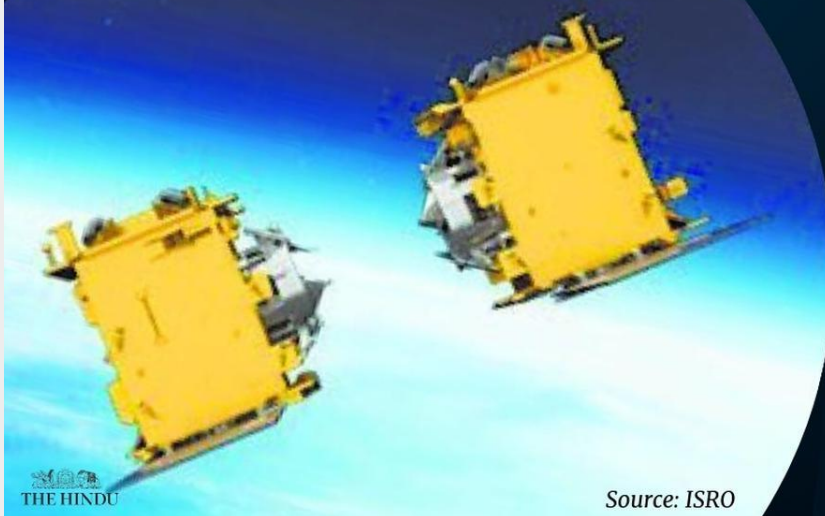
• SDX01 (Chaser)

• SDX02 (Target)

Two satellites used for the Space Docking Experiment (SpaDeX)

Mission objective:

Develop and demonstrate the technology needed for spacecraft rendezvous, docking and undocking using two small satellites in a low-Earth circular orbit.



THE HINDU

Source: ISRO

PSLV C60:
Lunch vehicle



What is space docking?

As the name suggests, space docking is essentially a process by which two fast-moving spacecraft are put into the same orbit, progressively brought closer, and finally joined together. It is an extremely complicated process.

To demonstrate this capability, ISRO launched the experimental Spadex mission on December 30, 2024. This comprised launching two 220-kg satellites — SDX01 (Chaser) and SDX02 (Target) — in a 470 km circular orbit. From an initial distance of 20 km in space, these two were progressively brought together and then joined using their extended locking mechanism.

After docking, ISRO scientists demonstrated power sharing capabilities between the two satellites, and were able to command it as a single composite structure.

The undocking manoeuvre was carried out after two months following extensive on-ground simulations. It also went off without a hitch.

Why does this matter?

This capability is essential for missions with heavy spacecraft that cannot be launched from Earth in one go. Weight is among the biggest limiting factors in what we can or cannot send to space. This is why things are often sent to space in parts, to be assembled while in space. This is how the International Space Station (ISS) was built.

The docking-undocking process is also essential to carry astronauts and supplies to a space station.

When was the first space docking carried out? By whom?

Amidst the Cold War era Space Race, the United States became the first country to demonstrate space docking capabilities in 1966. The first autonomous docking — where a spacecraft finds its target and attaches by itself without any astronauts or commands from the ground — was demonstrated by the erstwhile USSR, when it brought together Kosmos 186 and Kosmos 188 spacecraft in 1967.

China, the only other country to have the capability, demonstrated unmanned docking in 2011, and a crewed docking capability a year later.

Relevance: GS Prelims & Mains Paper III; Science & Technology

Source: Indian Express

2. Mudumal megalithic menhirs

Why in News?

The Mudumal megalithic menhirs in Telangana's Narayanpet district will soon be the second UNESCO World Heritage Site in the state, after being one six Indian sites to be added to the tentative list by the World Heritage Centre in 2025.

What are menhirs?

A menhir is a standing or an upright stone, which is usually tapered at the top. It is man-made, in that it is sculpted and placed by humans, and usually quite large — the largest surviving menhir, the Grand Menhir Brisé or the Great Broken Menhir in Brittany, France, once stood at 20.6 m tall.

The term 'menhir' is derived from the Brittonic "maen" meaning "stone", and "hîr" meaning "long."



Telangana's 3,000-year-old Menhirs now on UNESCO list

Mudumal Megalithic Menhirs in Narayanpet district have been officially included in India's Tentative List for UNESCO World Heritage recognition, announced on recently.

How old are menhirs? Why were they erected?

The ones in Europe were originally associated with the Beaker culture who lived during the late Neolithic and early Bronze Age — roughly 4,800 to 3,800 before present (BP). But the oldest European menhirs are today dated to as early as 7,000 BP. The ones in Mudumal, dated to roughly 3,500 to 4,000 before present (BP), are the oldest known menhirs in India.

Menhirs can either be found alone, or as a part of a larger complex of prehistoric megaliths, simply, large stone structures. While the exact purpose of many

megalithic sites is debated, they likely served ceremonial functions. Some were markers of graves, while others might have served some astronomical purposes.

The Mudumal site has been described as a "megalithic astronomical observatory" by the UNESCO dossier. "Some menhirs are aligned with the rising and setting sun during the summer and winter solstices, suggesting their use as an ancient observatory."

Why do some old stones deserve UNESCO recognition?

Two reasons.

First, they give us insight into the ingenuity of early humans. Not only do these tonnes-heavy stones need a solid understanding of physics to be sculpted and move to precise locations, the precision of their placement itself tells us how much our ancestors knew about astronomy and solstices.

Second, they give us insight into how the cultures who built them saw and understood the world. The effort taken to build these megalithic structures tells us that they were undoubtedly

meaningful to the people who built them. This in turn can help us better understand these cultures who have left no written material for the historical record.

Relevance: GS Prelims; Culture

Source: Indian Express

3. Global intelligence chiefs converge in Delhi meet

Fourth conference of global intelligence and security chiefs

Global challenges and intelligence-sharing mechanisms, as well as immigration and extradition, were among a host of issues discussed at the fourth conference of global intelligence and security chiefs hosted by National Security Adviser Ajit Doval. The meeting had over 28 attendees, according to official sources.



Participation

Around 20 countries were represented at the conference. The chiefs of the Five Eyes countries, comprising Australia, Canada, New Zealand, the United Kingdom, and the U.S., were all present.

The visit of Canadian spy chief Daniel Rogers has come as India looks to reset its with Ottawa after a deep freeze in bilateral relationship over Hardeep Singh Nijjar

murder case.

About the Conference

The conference is organised by the country's external intelligence agency, the Research and Analysis Wing (RAW) and the National Security Council Secretariat (NSCS) that reports to Mr. Doval.

The meet was held for the first time in April 2022 a day before the start of the Raisina Dialogue, India's flagship conference on geopolitics and geo-strategy, organised by the Ministry of External Affairs in collaboration with the Observer Research Foundation. This year annual three-day Raisina Dialogue is scheduled from March 17 to 19.

Relevance: GS Prelims; International Organisations

Source: The Hindu

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