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National & International News

ISRO's Innovative Approach to Zero Orbital Debris

Context:

- ISRO's PSLV-C58/XPoSat mission has achieved a remarkable feat by leaving virtually no debris in Earth's orbit.
- This achievement is attributed to the innovative use of the PSLV Orbital Experimental Module (POEM), developed by the Vikram Sarabhai Space Centre (VSSC).

POEM:

- POEM is powered by solar panels and a lithium-ion battery mounted on the fuel tank of the rocket's fourth stage.
- It is equipped with a dedicated navigation, guidance, and control (NGC) system, including four Sun sensors, a magnetometer, and gyroscopes, which communicate with ISRO's NavIC satellite constellation for navigation.
- POEM also features helium control thrusters and a telecommand system for ground station communication.

Key points:

- This achievement is significant due to the escalating issue of space debris, particularly in low Earth orbit (LEO).
- LEO debris consists of spacecraft fragments, rockets, defunct satellites, and fragments from anti-satellite missile tests, posing risks to operational satellites.
- ISRO's Space Situational Assessment Report 2022 noted a significant increase in the number of objects placed in space, highlighting the urgent need for effective debris mitigation strategies.

Concerned Laws:

- While there are no international laws specific to LEO debris, most space-faring nations adhere to the Space Debris Mitigation Guidelines 2002 set by the Inter-Agency Space Debris Coordination Committee (IADC), endorsed by the U.N. in 2007.
- Aim: to reduce accidental collisions, break-ups during operations, intentional destruction, and post-mission break-ups.



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	<ul style="list-style-type: none"><li>• They discourage the <b>long-term presence of spacecraft and launch vehicle orbital stages in LEO and limit their impact on the geosynchronous orbit (GEO).</b></li></ul> <p><b>Various initiatives:</b></p> <ul style="list-style-type: none"><li>• Various space agencies have implemented <b>strategies to address space debris.</b></li><li>• <b>NASA's Orbital Debris Program, initiated in 1979, focuses on reducing orbital debris and developing technologies</b> for tracking and removing existing debris.</li><li>• The <b>European Space Agency (ESA)</b> has adopted a <b>'Zero Debris charter,'</b> aiming for zero space debris by <b>2030</b> and advocating for its adoption by other agencies.</li><li>• <b>Japan's Commercial Removal of Debris Demonstration (CRD2)</b> project is another effort to tackle the issue of space junk.</li></ul>
<p><b>Right to sleep</b></p>	<p><b>Context:</b></p> <ul style="list-style-type: none"><li>• The Bombay High Court rejected a plea from a 64-year-old businessman regarding his arrest by the Enforcement Directorate (ED), criticizing the ED for making him wait overnight and recording his statement, thereby <b>depriving him of the 'right to sleep' under Article 21 of the Constitution.</b></li></ul> <p><b>Key points:</b></p> <ul style="list-style-type: none"><li>• The court emphasized that the <b>'right to sleep' is a fundamental human need and depriving someone of it violates their human rights, affecting their health and cognitive skills.</b></li><li>• It directed the agency to issue guidelines on the timings for recording statements under Section 50 of the <b>Prevention of Money Laundering Act (PMLA).</b></li></ul>
<p><b>Credit-Deposit Ratio</b></p>	<p><b>Context:</b></p> <ul style="list-style-type: none"><li>• The <b>March 2024 report by CareEdge</b> highlighted that <b>banks' credit-deposit (CD) ratio has reached a decadal high, standing at around 80 percent.</b></li><li>• This ratio reflects the percentage of deposits banks have raised that have been lent out, indicating liquidity and credit risks for banks.</li></ul> <p><b>About:</b></p> <ul style="list-style-type: none"><li>• The <b>currency deposit ratio</b>, on the other hand, reveals the <b>proportion of currency that individuals hold compared to aggregate deposits.</b></li><li>• When the cash deposit ratio increases, the money multiplier decreases.</li></ul>



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	<ul style="list-style-type: none"> <li>• Similarly, an increase in deposit rates encourages depositors to deposit more, <b>reducing the Cash to Aggregate Deposit ratio and increasing the Money Multiplier.</b></li> </ul>
<p><b>Jiadhal River</b></p>	<p><b>Context:</b></p> <ul style="list-style-type: none"> <li>• The Jiadhhal River, a tributary of the Brahmaputra River in northern India, is facing the adverse effects of climate change, disrupting its once tranquil flow.</li> </ul> <p><b>Key points:</b></p> <ul style="list-style-type: none"> <li>• <b>Originating in the sub-Himalayan mountains of Arunachal Pradesh at an altitude of 1247m</b>, the river courses through a narrow gorge in <b>Arunachal Pradesh before entering the plains of Assam's Dhemaji district</b>, where it flows in braided channels.</li> <li>• It finally meets the <b>Brahmaputra near Selamukh in Lakhimpur district.</b></li> <li>• However, due to the construction of an embankment over the Kherkutiya Suti of the Brahmaputra, <b>the river now merges with the Subansiri River.</b></li> <li>• Spanning a total length of <b>187 km</b>, the river's <b>topography transitions from hilly terrain in the upper basin (Himalayan range) to a plain area in the middle and downstream.</b></li> <li>• The Jiadhhal River's catchment area covers 1053.20 sq.km., <b>with 696.80 sq. km. in Assam and 356.4 sq. km. in Arunachal Pradesh.</b></li> <li>• It receives heavy rainfall, leading to a significant silt load from its <b>1346 sq. km catchment area during the rainy season.</b></li> <li>• This results in the considerable rise of its riverbed as the silt deposits on its bed in the plains.</li> <li>• Known for <b>its frequent course changes and devastating floods</b>, the Jiadhhal River exemplifies a <b>flashy river, causing floods with a sudden, high discharge over a short time (a few hours to a day) and carrying a high sediment load and debris.</b></li> </ul>
<p><b>Operation Meghdoot</b></p>	<p><b>Context:</b></p> <ul style="list-style-type: none"> <li>• The Indian Army <b>commemorated 40 years of 'Operation Meghdoot' on the Siachen Glacier</b>, a milestone in its strategic presence there.</li> <li>• This operation has seen significant technological and logistical advancements.</li> </ul>



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### Operation Meghdoot's History:

- Launched on April 13, 1984, by the Indian Army and Indian Air Force (IAF), it marked a pivotal moment in securing the strategically crucial region dominating Northern Ladakh.
- IAF helicopters had been operating in the area since 1978, including the first landing of an IAF helicopter on the glacier in October 1978.

### Operation Meghdoot's Unique Significance:

- Launched in 1984, 'Operation Meghdoot' secured the Siachen Glacier, involving the first assault on the world's highest battlefield.
- Indian troops gained control of the entire Siachen Glacier as a result of this operation.
- The Siachen Glacier now boasts state-of-the-art medical infrastructure, including telemedicine nodes established by ISRO.
- The Indian Army acknowledged the sacrifices of its brave soldiers and the immortal spirit that characterizes its long deployment in Siachen.

### Improved Living Conditions and Connectivity:

- Recent initiatives have focused on improving connectivity, leading to advancements in the supply chain.
- This ensures that personnel stationed at forward posts in the Northern and Central Glaciers now have access to fresh rations and vegetables.
- The use of heavy-lift helicopters and logistic drones has significantly improved the supply of essential resources to personnel stationed at isolated posts, especially during harsh winter conditions.

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