



DAILY CURRENT AFFAIRS-

1. India's Indo-Pacific Strategy
2. Global Capability Centres (GCCs): India's Growth Engine Beyond IT
3. China's Reusable Rocket Technology
4. Eärendil-1 Satellite: Orbital Sunlight Reflection Technology
5. Chinese geologists question safety of Brahmaputra dam near India

1. India's Indo-Pacific Strategy

Source: *The Hindu*

Subject: International Relations

Why in News?

- Prime Minister Narendra Modi's visit to **Indonesia, Australia and New Zealand** has reinforced India's commitment to a **free, open and inclusive Indo-Pacific**, while highlighting the need to match diplomatic initiatives with effective implementation.

Key Highlights

- It has strengthened India's strategic engagement with **Indonesia, Australia and New Zealand** under the **Act East Policy**.
- It has accelerated cooperation on **Sabang Port**, maritime security, defence, connectivity and critical minerals.
- It has advanced negotiations for a **Comprehensive Free Trade Agreement (FTA)** with Australia.

- It has expanded cooperation with Australia in **uranium supplies, critical minerals, renewable energy and defence**.
- It has enhanced maritime cooperation with New Zealand in the **South Pacific**.
- It has reaffirmed India's commitment to a **free, open, inclusive and rules-based Indo-Pacific**.

Significance

- It has strengthened India's strategic presence in the **Indian Ocean Region (IOR)** and the wider Indo-Pacific.
- It has enhanced maritime connectivity through the development of **Sabang Port** near the **Strait of Malacca**.
- It has supported resilient supply chains for **critical minerals, semiconductors and emerging technologies**.
- It has expanded defence cooperation, including **BrahMos missile exports**, joint military exercises and maritime domain awareness.
- It has reinforced India's role as a leading partner of **ASEAN**, the **Quad** and the **Indian Ocean Rim Association (IORA)**.
- It has diversified India's strategic partnerships while preserving **strategic autonomy**.

Challenges & Way Forward

- It has lagged in implementing trade, connectivity and infrastructure commitments with Indo-Pacific partners.
- It has lower trade with **ASEAN** compared to China's economic engagement.
- It has required faster completion of connectivity and maritime infrastructure projects.
- It has needed stronger economic integration through high-quality trade agreements.
- It has required greater investment in defence, logistics, digital connectivity and critical technologies to translate diplomatic commitments into tangible outcomes.

About India's Indo-Pacific Vision

- It is based on the principles of a **free, open, inclusive and rules-based Indo-Pacific**.
- It is guided by **ASEAN Centrality** and respect for **international law**, particularly the **United Nations Convention on the Law of the Sea (UNCLOS)**.

- It is implemented through initiatives such as the **Act East Policy**, **MAHASAGAR (Mutual and Holistic Advancement for Security and Growth Across Regions)**, **Quad**, **IORA** and **Indo-Pacific Oceans Initiative (IPOI)**.
- It promotes maritime security, connectivity, sustainable development, disaster resilience and economic cooperation.

UPSC Prelims MCQ

Q. With reference to India's Indo-Pacific strategy, consider the following statements:

1. ASEAN Centrality is a key principle of India's Indo-Pacific vision.
2. The Indo-Pacific Oceans Initiative (IPOI) was launched by India to promote maritime cooperation.
3. The Quad comprises India, Australia, Japan and the United States.

Which of the statements given above are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Answer: (d)

UPSC Mains Question (15 Marks)

Discuss the strategic significance of the Indo-Pacific for India's foreign policy. Examine the challenges in translating India's Indo-Pacific vision into effective economic and strategic outcomes.

2.Global Capability Centres (GCCs): India's Growth Engine Beyond IT

- India hosts over **2,100 Global Capability Centres (GCCs)** of more than **500 Forbes Global 2000 companies**, employing around **23 lakh professionals** and generating nearly **\$100 billion annually**.

- The Government is promoting expansion of GCCs into **Tier-2 and Tier-3 cities**, while experts emphasise that manufacturing growth remains equally essential for employment generation.

Global Capability Centres (GCCs): Overview

Feature	Details
Definition	Wholly-owned offshore centres established by multinational corporations to perform global business functions.
Earlier Role	Back-office support, BPO, customer services.
Present Role	Product engineering, AI, R&D, cybersecurity, cloud computing, analytics, finance, digital transformation and innovation.
Ownership	Full ownership of intellectual property, technology and business operations remains with the parent company.
Major Locations	Bengaluru, Hyderabad, Pune, Chennai, Delhi-NCR, Mumbai.

Significance for India

- It has positioned India as the **"World's Office"** through knowledge-intensive services.
- It has generated nearly **\$100 billion** in annual revenue.
- It has employed around **23 lakh professionals**.
- It has attracted substantial **Foreign Direct Investment (FDI)**.
- It has strengthened India's **services exports**, which reached **\$421.5 billion (2025-26)**, nearly matching merchandise exports of **\$446.1 billion**.
- It has generated a **services trade surplus of \$216.6 billion**, helping offset India's merchandise trade deficit.
- It has promoted innovation in **Artificial Intelligence, advanced computing, cloud technologies, cybersecurity and product development**.
- It has strengthened India's global competitiveness in the digital economy.

Major Investments

Company	Investment
AirTrunk (Australia)	\$30 billion by 2030 for AI-ready data centres and digital infrastructure.
Perdaman Chemicals & Fertilizers	\$4.5 billion urea plant in Western Australia; over 98% of plant modules manufactured in India.

Challenges and Way Forward

Challenges

- It has concentrated GCCs mainly in metropolitan cities because of better infrastructure and talent availability.
- It has limited employment opportunities for semi-skilled and low-skilled workers.
- It has highlighted India's dependence on services-led growth rather than manufacturing.
- It has made expansion into Tier-2 and Tier-3 cities difficult due to infrastructure and ecosystem gaps.

Way Forward

- It needs faster expansion of GCCs into Tier-2 and Tier-3 cities.
- It needs stronger digital infrastructure, urban infrastructure and skilled workforce development.
- It needs greater investment in **electronics, textiles, food processing, semiconductor manufacturing and labour-intensive industries**.
- It needs stronger integration of **Manufacturing + GCCs + R&D** to create balanced employment.
- It needs continued policy support through **Ease of Doing Business, PLI Scheme, Digital India and Skill India**.

Why Manufacturing Remains Important

GCC-led Growth	Manufacturing-led Growth
Generates high-skilled jobs	Generates large-scale employment for semi-skilled workforce

Contributes to services exports	Contributes to merchandise exports
Concentrated in urban centres	Can expand to smaller towns and industrial clusters
Requires specialised talent	Absorbs a wider labour force

UPSC Prelims

Q. With reference to Global Capability Centres (GCCs), consider the following statements:

1. GCCs are wholly-owned centres established by multinational corporations.
2. Modern GCCs primarily undertake only customer support and BPO functions.
3. India hosts one of the largest GCC ecosystems in the world.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 1 and 3 only
- (c) 2 and 3 only
- (d) 1, 2 and 3

Answer: (b)

UPSC Mains (15 Marks)

Global Capability Centres (GCCs) have transformed India into the "World's Office". However, balanced economic development requires simultaneous expansion of manufacturing. Discuss.

3.China's Reusable Rocket Technology

Why in News?

- China successfully achieved the **first controlled recovery of the reusable first-stage booster** of the **Long March-10B** rocket using a **sea-based net-capture system**,

marking a major milestone in reusable launch vehicle technology and strengthening its ambitions in lunar exploration and commercial space launches.

Key Highlights

Feature	Details
Rocket	Long March-10B
Launch Site	Wenchang Commercial Space Launch Site, Hainan
Recovery Method	Net-capture on a floating sea platform
Payload Capacity	16 metric tonnes to Low Earth Orbit (LEO)
Achievement	First successful recovery of China's reusable orbital-class rocket booster
Global Position	China becomes the third entity after SpaceX and Blue Origin to demonstrate reusable rocket technology

Significance

- It has significantly reduced the **cost of space launches** by enabling reuse of expensive rocket boosters.
- It has enhanced **payload capacity** through the **net-capture system**, eliminating heavy hydraulic landing legs.
- It has strengthened China's capability for **high-frequency and cost-effective satellite launches**.
- It has supported the deployment of **Large Low Earth Orbit (LEO) satellite constellations** for communication and Earth observation.
- It has accelerated China's objective of **landing astronauts on the Moon by 2030**.
- It has intensified competition with the **U.S. Artemis Programme** in the race for lunar exploration and **Moon's South Pole resources**.
- It has strengthened China's position in the global commercial launch market, challenging **SpaceX** and other Western launch providers.

India's Reusable Launch Vehicle (RLV) Programme

Component	Details
Agenc	ISRO
Technology Demonstrator	RLV-TD (Pushpak)
Objective	Develop reusable launch systems to reduce launch costs and improve access to space
Major Achievement	Successful completion of LEX-01, LEX-02 and LEX-03 autonomous runway landing experiments
Future Vehicle	Next Generation Launch Vehicle (NGLV/Project Soorya)
Reusability Method	Vertical Take-off and Vertical Landing (VTVL)
Future Applications	Gaganyaan follow-on missions, heavy-lift launches, space station missions and deep-space exploration

Challenges & Way Forward

Challenges

- It requires highly precise **autonomous landing and recovery systems**.
- It faces challenges in developing durable **thermal protection systems** for repeated atmospheric re-entry.
- It requires reliable **reusable rocket engines** with multiple ignition capability.
- It demands high structural integrity to withstand repeated launch and landing cycles.
- It involves substantial technological investment and long development timelines.

Way Forward

- It needs continued investment in **Reusable Launch Vehicle (RLV)** technologies under ISRO.
- It needs faster development of the **Next Generation Launch Vehicle (NGLV)**.
- It needs greater collaboration between **ISRO, IN-SPACe, NSIL and private space startups**.
- It needs indigenous development of advanced propulsion, materials and autonomous guidance systems.

- It needs expansion of reusable launch capability to strengthen India's commercial space sector and long-term lunar and deep-space missions.

UPSC Prelims MCQ

Q. With reference to Reusable Launch Vehicle (RLV) technology, consider the following statements:

1. Reusable launch vehicles significantly reduce the cost of space launches by recovering and reusing rocket components.
2. China's Long March-10B uses a net-capture system to recover its first-stage booster.
3. ISRO's RLV-TD (Pushpak) has successfully demonstrated autonomous runway landing capability.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) **1, 2 and 3**

Answer: (d)

UPSC Mains Question (15 Marks)

Reusable Launch Vehicle (RLV) technology is transforming the economics of space exploration. Discuss its significance for India's space programme and compare India's progress with recent global developments.

4. Earendil-1 Satellite: Orbital Sunlight Reflection Technology

Why in News?

- The **U.S. Federal Communications Commission (FCC)** has authorised **Reflect Orbital** to launch **Earendil-1**, an experimental satellite designed to reflect sunlight onto selected locations on Earth during nighttime, raising concerns over **light pollution** and its impact on **optical astronomy**.

Key Highlights

Feature	Details
Satellite	Eärendil-1
Developer	Reflect Orbital (USA)
Regulator	U.S. Federal Communications Commission (FCC)
Orbit	Non-geostationary near-polar orbit
Altitude	~625 km
Technology	Deployable steerable thin-film mirror (highly specular reflector)
Licence	Limited 2-year demonstration mission

Objectives & Applications

- It aims to **reflect sunlight** onto specific locations on Earth during nighttime.
- It aims to **extend operating hours of solar power plants** after sunset.
- It supports **search and rescue operations**, disaster response and emergency missions.
- It enhances visibility for **construction, industrial, agricultural and defence operations**.
- It serves as a **technology demonstration** for future orbital sunlight-reflection systems.

Concerns and Regulatory Safeguards

Concerns

- It may increase **skyglow** and **light pollution**, reducing visibility of the night sky.
- It may interfere with **optical astronomy** by affecting observations of faint celestial objects.
- It may pose safety risks through **temporary glare** for telescopes, aircraft and other observational systems.
- It raises concerns regarding the **commercial exploitation of outer space**.
- It may affect nocturnal ecosystems and natural biological cycles.

Regulatory Safeguards

- It has received only a **limited two-year licence** for demonstration.
- It requires coordination with **NASA**, the **National Science Foundation (NSF)** and the **National Telecommunications and Information Administration (NTIA)**.
- It must comply with prescribed **duty cycles, conjunction angles** and **orbital safety requirements**.
- It does not authorise deployment of Reflect Orbital's proposed large satellite constellation.

Significance

- It demonstrates a new application of **space-based solar reflection technology**.
- It highlights emerging challenges in balancing **commercial space innovation** with **scientific research**.
- It raises important policy questions regarding **space governance, light pollution** and **sustainable use of outer space**.
- It underscores the growing need for international norms to regulate activities affecting the **global night sky**.

UPSC Prelims MCQ

Q. With reference to the Eärendil-1 satellite, consider the following statements:

1. It is designed to reflect sunlight onto selected areas of Earth during nighttime.
2. It operates in a geostationary orbit.
3. The mission has raised concerns regarding light pollution and interference with optical astronomy.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 1 and 2 only
- (c) **1 and 3 only**
- (d) 1, 2 and 3

Answer: (c)

UPSC Mains Question (10 Marks)

Space-based technologies such as orbital sunlight reflection offer new opportunities but also raise concerns regarding environmental sustainability and scientific research.

Discuss.

5.Chinese geologists question safety of Brahmaputra dam near India

Why in News?

Chinese geologists warn active Paizhen Fault threatens structural stability of world's largest Brahmaputra dam, raising India's transboundary safety concerns.

Key Highlights:

- Chinese geologists have identified an active fault line, the **Paizhen Fault**, beneath the proposed **Medog Hydropower Station** on the **Yarlung Tsangpo** (Brahmaputra) River in Tibet.
- This mega-dam project, intended to be the world's largest, is located near the "Great Bend" of the river, approximately 50 km from India's border with **Arunachal Pradesh**.
- The study, supervised by the state-owned **China Geological Survey**, warns that the fault's activity since the **Pleistocene epoch** could compromise the dam's structural stability.
- The project, with an estimated cost of \$167.8 billion, aims to generate over 300 billion kilowatt-hours of electricity annually.
- India has consistently expressed concerns regarding China's upstream projects on the Brahmaputra, citing potential risks to water security and downstream communities.

Detailed Insights:

- The **Medog Hydropower Station** is a planned 60,000-megawatt run-of-the-river project, three times the capacity of the **Three Gorges Dam**.

- Construction officially began in July 2025, with commercial operations targeted for 2033.
- The **Paizhen Fault** is part of a network of tectonic breaks in the eastern Himalayan region, formed by the collision of the **Indian and Eurasian tectonic plates**.
- Researchers cited the magnitude 6.9 earthquake in Milin, Tibet, in 2017 as evidence of the fault's continued seismic activity.
- The study suggests that prolonged fault activity has fractured and weakened surrounding rock formations, making foundations vulnerable to damage.
- The terrain around the reservoir has a loose structure and weak cohesion, increasing the risk of landslides and slope instability, especially after water immersion or during earthquakes.
- India has formally conveyed its concerns to China, urging transparency, consultation with downstream countries, and safeguarding the rights of lower riparian states.
- The **Yarlung Tsangpo** flows into India as the **Siang River** before becoming the **Brahmaputra** in Assam and then the **Jamuna River** in Bangladesh.

UPSC Prelims MCQ

Q. With reference to the proposed Medog Hydropower Station, consider the following statements:

1. It is being constructed on the Yarlung Tsangpo River in Tibet.
2. It is planned as a run-of-the-river hydropower project.
3. The project is located near the active Paizhen Fault.

Which of the statements given above is/are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) **1, 2 and 3**
- (d) 1 only

Answer: (c)

UPSC Mains Question (15 Marks)

China's upstream hydropower projects on the Brahmaputra have significant environmental, strategic and geopolitical implications for India. Discuss.



