ISRO's Space Tech Transfer for Daily Applications

For Prelims: IN-SPACe, Indian Space Research Organisation, Chandrayaan-3, LiDAR

For Mains: Space Technology and its Applications in Daily Life, Technological Transfer on Economic Growth

Source: IE

Why in News?

The **Indian National Space Promotion and Authorization Centre (IN-SPACe)**, has identified 166 technologies developed by the **Indian Space Research Organisation (ISRO)** for **space missions** that can be transferred to industries for **non-space applications**.

- The move is expected to benefit various sectors, including automotive, construction, and logistics, thereby enhancing **daily lives.**

How Will ISRO's Space Tech Impact Various Industries?

- **Automotive Industry:**
  - **Collision Avoidance Systems:** The software and algorithms developed for **Chandrayaan-3's** landing can be adapted to **prevent car collisions,** improving **vehicle safety.**
  - **Airbag Deployment: Pressure sensors** used in launch vehicles to **monitor propellants** can be repurposed to determine **optimal airbag deployment** times, enhancing **passenger safety.**
  - **3D LiDAR Camera:** Originally developed for space navigation, **3D LiDAR Camera** generates **3D images** with depth information and can assist in **hazard detection, pedestrian safety, and autonomous driving.**
  - **Sensors:** Niche sensors developed by ISRO can reduce costs in automotive and industrial applications by localizing production and reducing dependency on imports.
- **Healthcare:** The **3D LiDAR Camera** can be used for **accurate body measurements** to predict **lifestyle diseases** or for advanced imaging solutions in medical diagnostics.
- **Construction and Infrastructure:** ISRO's **NRCM-204**, a highly corrosion-resistant coating, protects metals from harsh environments, including acidic corrosion.
  - This can be used in **construction to protect metal structures** and in the automotive industry to prevent vehicle corrosion.
  - Vibration Management Systems originally designed to **protect satellite electronics from vibrations during launch**, this technology can be adapted for seismic isolation in buildings, making them safer during earthquakes.
- **Electronics Devices:** ISRO's **Benzoxazine polymer** is suitable for encapsulating **electronic components** and printed circuit boards.
  - It offers stability across various temperatures and excellent flame-retardant properties.

- **Logistics and Retail:** The LiDAR camera can be used to measure parcels accurately, optimizing packaging and reducing shipping costs.
    - It can also be utilized for people counting in crowded places like markets and events, aiding in crowd management and safety.
- **Energy and Transportation:** ISRO's cost-effective **Lithium-Ion Battery Technology** can accelerate the adoption of **electric vehicles,** supporting cleaner and more sustainable transportation systems.

What are the Benefits of Space Tech Transfers?

- **Boosting India's Manufacturing**: Domestic production of sensors, batteries, and LiDAR-based systems can reduce **dependence on imported automotive and electronic components**, supporting **India's self-reliance (Atmanirbhar Bharat)** while lowering costs and boosting local industries.
- **Industrial Competitiveness:** Indian startups and MSMEs in **aerospace, healthcare, and construction** can leverage these technologies to develop innovative products, fostering entrepreneurship.
- **Public Safety and Urban Management:** With the growing incidents of **stampedes** at major public events in India, crowd monitoring solutions using LiDAR can assist in law enforcement, disaster management, and efficient urban planning.

Indian National Space Promotion and Authorization Centre (IN-SPACe)

- IN-SPACe is a single-window, **independent, nodal agency** that functions as an autonomous agency in the **Department of Space (DOS)**.
- It was formed following the **space sector reforms in 2020** to enable and facilitate the participation of private players.
- IN-SPACe **promotes, authorizes, and supervises** space activities of non-governmental entities, including building launch vehicles, providing space services, sharing ISRO's infrastructure, and establishing new space facilities.
- IN-SPACe bridges ISRO and private entities, assessing space resource utilization and addressing the needs of private players, including research institutions.

Read more: **Impact of Space Missions on Indian Economy**

Drishti Mains Question:

ISRO's space technology transfers to the private sector have the potential to revolutionize multiple industries. Discuss the implications of such transfers.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Mains

Q. Discuss India's achievements in the field of Space Science and Technology. How the application of this technology helped India in its socio-economic development? **(2016)**