+918988885050
+918988886060
www.vajiraoinstitute.com
info@vajiraoinstitute.com

YOJANA MAGAZINE ANALYSIS

(December 2023)

(Part 1/3)

TOPICS TO BE COVERED

PART 1/3

- INDIA'S MOONSHOT
- REGIONAL RAPID TRANSIT SYSTEM

PART 2/3

- INDIA'S GROWING STATURE: A RISING SUPERPOWER
- MERI MAATI MERA DESH

PART 3/3

- INDIA'S INDUSTRY SECTOR
- AGRI & RURAL DEVELOPMENT

TOPICS (PART 1/3)

- INDIA'S MOONSHOT
- REGIONAL RAPID TRANSIT SYSTEM (RRTS)

+918988885050
+918988886060
www.vajiraoinstitute.com
info@vajiraoinstitute.com

INDIA'S MOONSHOT

The Indian space programme was developed for **scientific research and applications** in the **mid- 1960s.**

Since then, the programme has expanded, with an **emphasis on societal benefits and self-sufficiency.**

Many important technologies, materials, and industrial processes have been developed by Indian scientists, who have made extensive use of in-house and external resources.

During the last 50 years, **self-reliance** has been achieved in **designing and manufacturing launch vehicles and satellites.**

The electronics for launch vehicle avionics and satellites have always been a **challenge** with imports and customisation.

LAUNCH VEHICLES

ISRO has developed a one-of-a-kind space transportation system.

It can now launch **payloads** ranging from **500 kg to 8000 kg** into **low, medium, or high earth orbit** using its **four operational launch vehicles.**

(1) POLAR SATELLITE LAUNCH VEHICLE (PSLV)

+918988885050
+918988886060
www.vajiraoinstitute.com
info@vajiraoinstitute.com

(2) GEOSYNCHRONOUS SATELLITE LAUNCH VEHICLE

(3) GEOSYNCHRONOUS SATELLITE LAUNCH VEHICLE MARK 3/LAUNCH VEHICLE MARK 3 (LVM3)

(4) SMALL SATELLITE LAUNCH VEHICLE (SSLV)

PSLV	GSLV	LVM3	SSLV
PSLV has been a **versatile launch vehicle** deployed for launching all the three types of payloads viz. **Earth Observation, Geo-stationary and Navigation.** It has got **highest success rate** and considered as **workhorse of ISRO.**	GSLV with indigenous **Cryogenic Upper Stage** has enabled the **launching up to 2 tonne** class of **communication satellites.**	The LVM3 is the next generation launch vehicle capable of launching **4 tonne class of communication satellites** and **10 tonne class of payloads to LEOs.** The vehicle was developed with **completely indigenized technologies including the C25 cryo stage.**	The newly inducted small satellite Launch vehicle (SSLV), which was developed in record time to **satisfy the requirements of the small satellite launch vehicle market,** is one of the demand-driven solutions.

+918988885050
+918988886060
www.vajiraoinstitute.com
info@vajiraoinstitute.com

TECHNOLOGICAL DEVELOPMENTS BY ISRO

- ISRO was an early developer of cutting-edge technologies like **sensors, inertial navigation, guidance, and control systems**.
    - The **success** of extremely **important missions** like the **Mars orbiter Mission** and **Chandrayaan-3** can be attributed in part to its unparalleled capacity.
- Having **in-house optics and opto-electronics** expertise has allowed for the creation of a wide range of specialised payloads for use in **earth observation and planetary exploration.**
- ISRO has dedicated groups to research and design satellites and their associated payloads.
- **Satellite systems**, including **antennas, reflectors, and radio frequency (RF)** systems, are constantly updated to meet or surpass global standards for technical progress.

MAJOR AREAS OF APPLICATION

- The foundation was laid by **National Natural Resource Management Systems (NNRMS)** in the early 1980s for the use of EO data in GIS applications at the national level, spanning all potential ministries and departments.

- The **Indian Remote Sensing** program started post that.
- Progress has been made in a wide variety of specialised areas, as evidenced by satellites like CARTOSAT, RISAT (radar imaging satellites), Resourcesat, Oceansat, and many more.
- Programmes including **MGNREGA, PMGSY, PMKSY, AMRUT, PMFBY, SVAMITVA, and UIDAI** have benefited from and are making extensive use of EO data.

MAJOR PROGRAMS BY ISRO

(1) INDIAN REGIONAL NAVIGATION SATELLITE SYSTEM/NAVIC:

NAVIC stands for **Navigation with Indian Constellation.** It provides **accurate real-time positioning** and **timing services** over **India and the region, extending approximately 1500 km around the Indian mainland.**

The **variety of services** offered by NAVIC aid in different applications like:

- vehicle tracking and fleet management,
- location-based services integrated into mobile phones,
- terrestrial navigation aid for travellers,
- time dissemination,
- disaster management, and more,
- including services to our strategic users.

(2) ASTROSAT

Astrosat, **India's first space observatory**, was launched on **September 28, 2015,** with a lift-off mass of 1515 kg, by a PSLV-C30 (XL) rocket from Satish Dhawan Space Centre, Sriharikota.

ACHIEVEMENTS:

- Almost **2,000 people from 54 different countries** have signed up to use Astrosat data.
- In September 2022, more than **275 pieces for academic journals** and **about 500 pieces** for the **GCN circular**, the **Astronomer's Telegram**, and conference papers were published using Astrosat data.

(3) MARS ORBITER MISSION:

On **5 November 2013**, the **Mars orbiter Mission** was launched, and after **300 days of travelling** between planets, it was **placed in orbit** around Mars on **24 September 2014.**

Over the course of its eight-year lifetime, the mission, which carried a total of **five scientific payloads**, made major contributions to our understanding of the **Martian atmosphere, exosphere, surface features, and so on.**

The **Mars orbiter Mission lost touch** with earth in **April 2022** because of a **protracted eclipse** after spending nearly eight years in Martian orbit and accomplishing a wide range of scientific goals on Mars and the Solar Corona.

(4) CHANDRAYAAN

- **CHANDRAYAN 1:** India's **first spacecraft**, **Chandrayaan-1**, was launched on **22 July 2008**, and it **orbited** the Moon at 100 kilometres.
- **CHANDRAYAAN 2:** India **successfully launched** their follow-up mission, **Chandrayaan-2** on **22 July 2019.** This mission consists of an **orbiter, Lander, and a rover.** Despite the **unsuccessful soft landing**, the **orbiter is still operational** and gathering data.
- **CHANDRAYAAN 3:** The **Chandrayaan-3 mission** set out to prove that a **soft-landing and roving capabilities** could be accomplished on the Moon. The Moon mission was launched on **14 July 2023**, and it made a soft landing near the Moon's **South Pole** on **23 August 2023.**

(5) ADITYA L1:

The **Aditya-L1 mission** is the **first in India** to focus solely on **solar science**. When the spacecraft reaches a **distance of around 1.5 million kilometres** from Earth, it will enter a

+918988885050
+918988886060
www.vajiraoinstitute.com
info@vajiraoinstitute.com

halo orbit around Lagrange point 1 (L1) in the sun-earth system. The satellite will enter a halo orbit around the L1 point **to ensure that its observations of the sun are unaffected by occultation or eclipse**.

In addition, this will make it **possible to track the effects of solar activity on space weather in real time.**

UPCOMING PROGRAMS

- GAGANYAAN MISSION
- NASA ISRO SYNTHETIC APERTURE RADAR
- XPOSAT MISSION
- BHARAT SPACE STATION

+918988885050
+918988886060
www.vajiraoinstitute.com
info@vajiraoinstitute.com

REGIONAL RAPID TRANSIT SYSTEM

Why in News?

Phase 1 of **Regional Rapid Transit System (RRTS)** (connecting Sahibabad to Duhai Depot) was inaugurated.

Total Length: 82 Kms (Meerut to Delhi)

Total Cost: Rs. 30,274 Crore. (US$3.8 billion)

Entire Corridor Operational by: 2025

Transit type: Semi High Speed (**Operational Speed of 160 kmph)**

THE ROUTE

+918988885050
+918988886060
www.vajiraoinstitute.com
info@vajiraoinstitute.com

SOURCES OF FUNDING

Multilateral Funding:

- **$1 billion from Asian Development Bank (ADB)**,
- **$500 million from New Development Bank (NDB)** and
- **$500 million from Asian Infrastructure Investment Bank (AIIB).**

Contribution from governments:

- From **Government of India:** 20%,
- From **Government of Delhi:** 3.22%, and
- From **Government of Uttar Pradesh:** 16.78%.