Brief History of ISRO

Why in news?

Chandrayaan 3's successful landing in Moon makes India the first country to reach close to lunar South Pole of the Moon, thus sparking the history of ISRO's space voyage.

To know about Chandrayaan 3, click here

How did ISRO evolve?

> *Dr.Vikram Sarabhai is known as father of Indian space programme.*

- Indian Space Research Organisation (ISRO) is the space agency of India.
- **Role-** It is involved in science, engineering and technology to harvest the benefits of outer space for India and the mankind.
- **Formation -** It was formed on August 15, 1969 and superseded *Indian National Committee for Space Research (INCOSPAR),* set up in 1962 by Dr. Vikram Sarabhai with an expanded role to harness space technology.
- Department of Space (DoS) was set up and ISRO was brought under DoS in 1972.
- **Objective-** Development and application of space technology for various national needs.
- **Space system**- ISRO has established major space systems for
    - Communication, television broadcasting and meteorological services
    - Resources monitoring and management;
    - Space-based navigation services.

Specification	Location
Headquarters of ISRO	Bengaluru, Karnataka
Launch Vehicles	Vikram Sarabhai Space Centre (VSSC), Thiruvananthapuram
Satellites	U R Rao Satellite Centre (URSC), Bengaluru
Integration and launching of satellites and launch vehicles	Satish Dhawan Space Centre (SDSC), Sriharikota
Development of liquid stages including cryogenic stage	Liquid Propulsion Systems Centre at Valiamala and Bengaluru
Sensors for Communication and Remote Sensing satellites	Space Applications Centre (SAC), Ahmedabad
Remote Sensing satellite data reception processing and dissemination	National Remote Sensing Centre (NRSC), Hyderabad

What about ISRO's Satellite Program?

- **Aryabhata-** Launched in 1975, it marked India's entry into the space era and became the forerunner of our space programme.

Satellite Type	Applications	Examples
Communication Satellites	Provide services to telecommunications, television broadcasting, satellite newsgathering, societal applications, weather forecasting, disaster warning and Search and Rescue operations.	The Indian National Satellite (INSAT) series GSAT series, KALPANA-1
Earth Observation Satellites	Agriculture, water resources, urban planning, rural development, mineral prospecting, environment, forestry, ocean resources and disaster management.	Indian Remote Sensing (IRS) series, RESOURCESAT-1, 2, 2A, CARTOSAT-1, 2, 2A, 2B, RISAT-1 and 2, OCEANSAT-2,
Navigation Satellites	Used to meet the emerging demand of positioning, navigation and timing and also civil aviation requirements.	GAGAN and IRNSS (NAVIC)

What are the ISRO's launch vehicle programs?

- They are used to carry spacecraft to space. India has three active operational launch vehicles-
  - Polar Satellite Launch Vehicle (PSLV)
  - Geosynchronous Satellite Launch Vehicle (GSLV),
  - Geosynchronous Satellite Launch Vehicle Mk-III (LVM3)
- **PSLV**- It is considered as *Work horse of ISRO*. It has been a versatile launch vehicle deployed for launching all 3 types of payloads - Earth Observation, Geo-stationary and Navigation.
- It marked India's entry into the Big Rockets league, as it could carry a payload of up to 1,000 kg.
  - Example- *Chandrayaan 1 and Mangalyaan* were launched by PSLV.
- **Configuration of PSLV-**
  - **Generic PSLV** - Six strap-ons,
  - **PSLV-CA**-the core alone configuration with no strap-ons
  - **PSLV-XL-** The most powerful one with extended strap-ons
- **GSLV**- It aimed to solve two of the biggest limitations of PSLV
  - It can deliver a payload of about 1,750 kg to a lower Earth orbit, up to an altitude of 600 km from the Earth's surface
  - It can go a few 100 kilometres higher in Geostationary Transfer Orbit (GTO), though only with a reduced payload.
- **LVM3-** It is the next generation launch vehicle. And the heaviest launch vehicle.
  - The rocket can put a 4,000 kg payload into geostationary orbits that are over 30,000 km from Earth.
  - *GSAT-19 satellite is LVM-3's 1st successful mission* launched in 2017.
- **HRLV-** The Human rated LVM3 is identified as the launch vehicle for Gaganyaan

mission, which is named as HRLV.
- **Small Satellite Launch Vehicle (SSLV)-** It is being developed with complete indigenous technologies to meet the small satellite launch market on demand driven basis.

What about the planetary explorations of ISRO?

- **Mangalyaan-** It is the *maiden interplanetary mission of the ISRO* to explore and observe Mars surface features, morphology, mineralogy and the Martian atmosphere.
- Launched in *2013*, the probe was successfully inserted into Martian orbit on September 24, 2014 in its first attempt.
- The mission was a *"technology demonstrator"* project to develop the technologies for designing, planning, managing, and operations of an interplanetary mission.
- Mangalyaan concluded its journey in *2022.*

ISRO was the 4th agency to reach the Mars orbit after Russia's Roscosmos, NASA, and ESA.

- **Moon exploration**-
  - **Chandrayaan-1** - Chandrayaan-1's orbiter detected the evidence of water on the Moon. It was launched on 2008.
  - **Chandrayaan-2-** It is India's first lander mission, it was launched in 2019.
  - **Chandrayaan-3-** The success of the mission is not only a major step forward for India's lunar programme but also showcases its capabilities and scientific advancement. It was launched in 2023

India becomes 1st country to land on Moon's South Pole and 4th country (after Russia, the U.S. and China) to land on the Moon.

To know more about the role of moon in the development of life on earth click here

To know more about the upcoming missions of ISRO click here

References

1. Indian Express- History of ISRO
2. ISRO- About ISRO

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