

About ISRO

ISRO is the space agency of the Indian government's Department of Space, based in Bengaluru, Karnataka. Its mission is to use space technology for national growth while also conducting space science research and planetary exploration.

Antrix Corporation Limited (ACL) is ISRO's marketing arm, responsible for the promotion and commercialization of space products, as well as strategic consulting and technology transfer.

Role of ISRO in Different Fields:

- **Navigation:** Navigation services are necessary to meet the emerging demands of the Civil Aviation requirements and to meet the user requirements of the positioning, navigation and timing based on the independent satellite navigation system. Navigation is used in all means of the transportation now a days.
- **Space exploration:** Indian space programme encompasses research in areas like astronomy, astrophysics, planetary and earth sciences, atmospheric sciences and theoretical physics.
- Because of the extensive use of data from remote sensing satellites, ISRO is working in the field of comparative improvement in crop condition and increased productivity in the agriculture sector. The NDVI (Normalized Difference Vegetation Index) is a well-established measure of the health or vigour of vegetables and crops.
- ISRO technology is now being used to forecast crop production for at least eight major crops, including wheat, kharif and rabi rice, mustard, jute, cotton, sugarcane, rabi sorghum, and rabi pulses in the agriculture sector.
- In the railway and transportation, applications of space technology have recently been realised in guarding automated railway crossings, detecting obstructive artefacts on rail tracks to prevent train collisions, and other similar operations.
- Satellite imagery is also being used to track Indian borders and search for foreign infiltrations.
- ISRO and the Department of Space have now surpassed a number of other countries in terms of space exploration, and images obtained by missions such as the Mars Orbiter Mission (MOM) are now being used by even the most prestigious space centres.
- Resource mapping and exploration through imaging satellites
- ISRO with its imaging and remote sensing satellites communicate weather related updates to IMD.
- ISRO monitors and collects information about environmental changes like climate change.
- ISRO has an emerging role in education, medical field and research via satellites like EdusatI etc.

Achievements

Communication Satellites

The Indian National Satellite (INSAT) system, which began operations in 1983 with the commissioning of INSAT-1B, is one of the largest domestic communication satellite systems in the Asia-Pacific region, with nine operational communication satellites in Geostationary orbit.

It ushered in a big transformation in India's communications market, which it maintained later. Telecommunications, television transmission, satellite newsgathering, societal applications, weather forecasting, disaster warning, and Search and Rescue operations are all served by the INSAT system.

Earth Observation Satellites



ISRO has launched several operational remote sensing satellites since IRS-1A in 1988. India now operates one of the world's largest constellations of remote sensing satellites.

Varieties of instruments have been flown onboard these satellites to provide necessary data in a diversified spatial, spectral and temporal resolutions to cater to different user requirements in the country and for global usage.

The data from these satellites are used for several applications covering agriculture, water resources, urban planning, rural development, mineral prospecting, environment, forestry, ocean resources and disaster management.

Navigation Satellites

To meet the Civil Aviation requirements, ISRO is working jointly with Airport Authority of India (AAI) in establishing the GPS Aided Geo Augmented Navigation (GAGAN) system.

To meet the user requirements of the positioning, navigation and timing services based on the indigenous system, ISRO is establishing a regional satellite navigation system called Indian Regional Navigation Satellite System (IRNSS).

Space Science & Exploration Satellites

Satellites come under this category are: AstroSat, the first dedicated Indian astronomy mission aimed at studying celestial sources in X-ray, optical and UV spectral bands simultaneously. Mars Orbiter Mission (MOM), the truly maiden interplanetary mission of ISRO, launched on November 5, 2013. Chandrayaan-1, India's first mission to moon, Chandrayaan-2, second mission comprising of an Orbiter, Lander and Rover ETC.

Experimental Satellites

ISRO has launched a range of small satellites, mostly for research purposes. Remote sensing, atmospheric studies, payload creation, orbit controls, and recovery technology are all part of this experiment.

Small Satellites

Within a short timeframe, the small satellite project will provide a forum for stand-alone payloads for earth imaging and science missions. Two types of buses, the Indian Mini Satellite -1 (IMS-1) and Indian Mini Satellite -2 (IMS-2) have been designed and built to provide a flexible platform for various payloads (IMS-2).

Academic Institute Satellites

ISRO's operations, such as the creation of connectivity, remote sensing, and astronomy satellites, have had an effect on educational institutions. The launch of Chandrayaan-1 piqued universities' and institutions' interest in developing experimental student satellites.

Scramjet (Supersonic Combusting Ramjet) engine

In August 2016, ISRO has successfully conducted the Scramjet (Supersonic Combusting Ramjet) engine test.

The Scramjet engine uses Hydrogen as fuel and the Oxygen from the atmospheric air as the oxidiser.

The new propulsion system will complement ISRO's reusable launch vehicle that would have longer flight duration.

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