

UNIT 42 – UPSC - Awareness in the field of Space

Space is increasingly considered as a catalyst for economic growth, social wellbeing and sustainable development. Space knowledge is a basic tool for technology-based planning and decision making. Space awareness assists to understand the probable of space applications and its benefits to society. It is important to gather stakeholders support to accomplish the objectives of space technology programs and their sustainable development. Space science is the study of all things in outer space. This is also known as astronomy, but recently astronomy has come to be regarded as a separation of wider space science, which has grown to include other related fields, such as to know issues related to space travel and space exploration, space archaeology and science performed in outer space.



Historical development of space

In India, there is immense growth in the area of space science.

Despite of numerous hurdles, India has effectively advanced space technology and has applied it fruitfully for its rapid development and currently is offering a variety of space services globally. In the decade of 1960s, space research was conducted by India mainly with the help of sounding rockets. The Indian Space Research Organisation (ISRO) was established in 1969. Space research activities were provided additional boost with the formation of the Space Commission and the Department of Space by the government of India in 1972. ISRO was brought under the Department of Space in the same year. In the decade of 70s, scientists did experimentation during which experimental satellite programmes like Aryabhata, Bhaskara, Rohini and Apple were conducted. The success of those programmes, led to period of operationalization in 1980s during which operational satellite programmes like INSAT and IRS came into being. Presently, INSAT and IRS are the major programmes of ISRO.

India's advancement in space has been very systematic starting with experimental satellites such as Aryabhata, Bhaskara, Apple and Rohini. It performed satellite application experiments like SITE, STEP and Apple application programme. According to business reports, India has developed a sophisticated space technology system since past few decades that plays vital role in many sectors such as agriculture to medicine.

The Indian Space Research Organisation (ISRO) has launched more than 70 satellites since the space programme was set up in 1969 for various scientific and technological applications, including mobile communications, meteorological observations, telemedicine, tele-education, disaster warning, radio networking, search and rescue operations, remote sensing and scientific studies of the space. India has acquired reputation in space science at global level. It has understood modern space technology and its various applications for the benefit of society. New space technology is being utilised for telecommunications, television broadcasts, weather watch and for providing information relating to agriculture, forests, water resources and minerals to mention a few. In the past three decades ISRO has built an infrastructure sector of space programme, construction and operation of satellites and their launch vehicles, ground station and sensors. ISRO has also collaborated with other Indian institutions and over 250 private industries.

To launch its spacecraft indigenously, India has vigorous launch vehicle programme, which has matured to the state of offering launch services to the outside world. Antrix, the commercial arm of the Department of Space, is marketing India's space services at international scale. Successful co-operation with other space faring nations, international organisations and the developing world is one of the main features of India's space programme.

The most important breakthrough of the Indian Space Programme during the year 2005-2006 was the successful launch of PSLV-C6. On 5 May 2005, the ninth flight of Polar Satellite Launch Vehicle (PSLV-C6) from Satish Dhawan Space Centre (SDSC) SHAR, Sriharikota successfully placed two satellites the 1560 kg CARTOSTAR-1 and 42 kg HAMSAT into a predetermined polar Sun Synchronous Orbit (SSO). After getting continual success, the success of PSLV-C6 confirmed the reliability of PSLV and its capability to place payloads weighing up to 1600 kg satellites into a 600 km high polar SSO. The successful launch of INSAT-4A, most powerful satellite built by India so far, on 22 December 2005 was the major occasion in 2005-06 (archive.india.gov.in). The most appreciable ISRO project is sending its spacecraft to mars as PSLV-C25/Mars Orbiter Mission.

One distinctive feature of space technology development is the unique space environment in which these technologies must function. Logistics, cost, and security considerations also make it indispensable to reduce mass, increase reliability and lifetime, and decrease launch size and operating power consumption of the systems. Another multidimensional aspects of space technology development is utilization of computer simulations of the systems in the simulated space environment.

Space applications support both private and government users of space services. They are useful for business because they offer satellite communications like VSAT business communication systems, mobile telephones and data, direct-to-home TV, satellite radio, wideband data services, etc., remote sensing including mapping, agriculture, resource management, land use, etc., and a growing set of industries that provide positioning, navigation, and timing services based on the Global Positioning System (GPS) and other related capabilities.

It is established that Space research has the capabilities to bring changes to human living by initiating developments in science and offer opportunities to new information. Actually, space exploration has many benefits to humans. Satellites help to locate minerals and fossil fuels. People have been able to harness solar energy due to knowledge of the sun. Scientists are involved in exploring if the process by which heat and light energy is produced by the sun, can be replicated on Earth to generate energy for human use. Through space exploration, human may be able to

find new energy sources. This field paves the path for the study of cosmic radiations and their effects and uses. Satellites help humans in predicting weather and natural calamities. Satellite communication, TV, radio, and GPS are among the other advantages of space exploration.