

**ISRO MISSION LAUNCH**

INTODUCTION

The Indian Space Research Organisation (ISRO [/ˈɪsroʊ/](https://en.wikipedia.org/wiki/Help:IPA/English))is India's national [space agency](https://en.wikipedia.org/wiki/List_of_government_space_agencies). It serves as the principal research and development arm of the [Department of Space](https://en.wikipedia.org/wiki/Department_of_Space) (DoS), overseen by the [Prime Minister of India](https://en.wikipedia.org/wiki/Prime_Minister_of_India), with the [Chairman of ISRO](https://en.wikipedia.org/wiki/Chairman_of_ISRO) also serving as the chief executive of the DoS. It is primarily responsible for space-based operations, [space exploration](https://en.wikipedia.org/wiki/Space_exploration), international space cooperation and the development of related technologies. The agency maintains a constellation of [imaging](https://en.wikipedia.org/wiki/Imaging_satellite), [communication](https://en.wikipedia.org/wiki/Communication_satellite) and [remote sensing satellites](https://en.wikipedia.org/wiki/Remote_sensing_satellites). It operates the [GAGAN](https://en.wikipedia.org/wiki/GPS-aided_GEO_augmented_navigation) and [IRNSS](https://en.wikipedia.org/wiki/Indian_Regional_Navigation_Satellite_System) [satellite navigation](https://en.wikipedia.org/wiki/Satellite_navigation) systems. It has sent [three missions](https://en.wikipedia.org/wiki/Chandrayaan_programme) to the [Moon](https://en.wikipedia.org/wiki/Moon) and [one mission](https://en.wikipedia.org/wiki/Mars_Orbiter_Mission) to [Mars](https://en.wikipedia.org/wiki/Mars).

Formerly known as the [Indian National Committee for Space Research](https://en.wikipedia.org/wiki/Indian_National_Committee_for_Space_Research) (INCOSPAR), it was set up in 1962 by then-Prime Minister [Jawaharlal Nehru](https://en.wikipedia.org/wiki/Jawaharlal_Nehru) on the recommendation of scientist [Vikram Sarabhai](https://en.wikipedia.org/wiki/Vikram_Sarabhai). It was renamed as ISRO in 1969 and was subsumed into the [Department of Atomic Energy](https://en.wikipedia.org/wiki/Department_of_Atomic_Energy) (DAE). The establishment of ISRO institutionalised space research activities in India. In 1972, the Government set up a Space Commission and the DoS, bringing ISRO under its purview. It has since then been managed by the DoS, which also governs various other institutions in the domain of astronomy and space technology.

ISRO built India's first satellite, [Aryabhata](https://en.wikipedia.org/wiki/Aryabhata_(satellite)), which was launched by the [Soviet](https://en.wikipedia.org/wiki/Soviet_Union) space agency [Interkosmos](https://en.wikipedia.org/wiki/Interkosmos" \o "Interkosmos) in 1975. In 1980, it launched the satellite [RS-1](https://en.wikipedia.org/wiki/Rohini_(satellite)) onboard [SLV-3](https://en.wikipedia.org/wiki/Satellite_Launch_Vehicle), making India the [seventh country](https://en.wikipedia.org/wiki/Timeline_of_first_orbital_launches_by_country) to undertake orbital launches. It has subsequently developed various [small-lift](https://en.wikipedia.org/wiki/Small-lift_launch_vehicle) and [medium-lift launch vehicles](https://en.wikipedia.org/wiki/Medium-lift_launch_vehicle), enabling the agency to launch various satellites and deep space missions. It is one of the six government space agencies in the world that possess full launch capabilities with the ability to deploy [cryogenic engines](https://en.wikipedia.org/wiki/Cryogenic_rocket_engine), launch [extraterrestrial missions](https://en.wikipedia.org/wiki/List_of_Solar_System_probes) and [artificial satellites](https://en.wikipedia.org/wiki/Satellite). It is also one of only four governmental space agencies in to have demonstrated unmanned [soft landing](https://en.wikipedia.org/wiki/Soft_landing) capabilities

HISTORY

Formative years

Modern space research in India can be traced to the 1920s, when scientist [S. K. Mitra](https://en.wikipedia.org/wiki/Sisir_Kumar_Mitra) conducted a series of experiments sounding the [ionosphere](https://en.wikipedia.org/wiki/Ionosphere) through ground-based radio in [Kolkata](https://en.wikipedia.org/wiki/Kolkata). Later, Indian scientists like [C.V. Raman](https://en.wikipedia.org/wiki/C.V._Raman) and [Meghnad Saha](https://en.wikipedia.org/wiki/Meghnad_Saha) contributed to scientific principles applicable in space sciences. After 1945, important developments were made in coordinated space research in India by two scientists: Vikram Sarabhai, founder of the [Physical Research Laboratory](https://en.wikipedia.org/wiki/Physical_Research_Laboratory) at [Ahmedabad](https://en.wikipedia.org/wiki/Ahmedabad), and [Homi Bhabha](https://en.wikipedia.org/wiki/Homi_J._Bhabha), who established the [Tata Institute of Fundamental Research](https://en.wikipedia.org/wiki/Tata_Institute_of_Fundamental_Research) in 1945. Initial experiments in space sciences included the study of [cosmic radiation](https://en.wikipedia.org/wiki/Cosmic_rays), high-altitude and airborne testing, deep underground experimentation at the [Kolar mines](https://en.wikipedia.org/wiki/Particle_experiments_at_Kolar_Gold_Fields)—one of the deepest mining sites in the world—and studies of the [upper atmosphere](https://en.wikipedia.org/wiki/Earth%27s_atmosphere). These studies were done at research laboratories, universities, and independent locations.

In 1950, the [Department of Atomic Energy](https://en.wikipedia.org/wiki/Department_of_Atomic_Energy) (DAE) was founded with Bhabha as its [secretary](https://en.wikipedia.org/wiki/Secretary_to_the_Government_of_India). It provided funding for space research throughout India. During this time, tests continued on aspects of [meteorology](https://en.wikipedia.org/wiki/Meteorology) and the [Earth's magnetic field](https://en.wikipedia.org/wiki/Earth%27s_magnetic_field), a topic that had been studied in India since the establishment of the [Colaba Observatory](https://en.wikipedia.org/wiki/Colaba_Observatory) in 1823. In 1954, the [Aryabhatta Research Institute of Observational Sciences](https://en.wikipedia.org/wiki/Aryabhatta_Research_Institute_of_Observational_Sciences" \o "Aryabhatta Research Institute of Observational Sciences) (ARIES) was established in the foothills of the Himalayas. The Rangpur Observatory was set up in 1957 at [Osmania University](https://en.wikipedia.org/wiki/Osmania_University), [Hyderabad](https://en.wikipedia.org/wiki/Hyderabad,_Andhra_Pradesh). Space research was further encouraged by the government of India. In 1957, the Soviet Union launched [Sputnik 1](https://en.wikipedia.org/wiki/Sputnik_1) and opened up possibilities for the rest of the world to conduct a space launch.

The Indian National Committee for Space Research (INCOSPAR) was set up in 1962 by Prime Minister Jawaharlal Nehru on the suggestion of Dr. Vikram Sarabhai. Initially there was no dedicated ministry for the space programme and all activities of INCOSPAR relating to space technology continued to function within the DAE.[IOFS](https://en.wikipedia.org/wiki/IOFS) officers were drawn from the [Indian Ordnance Factories](https://en.wikipedia.org/wiki/Indian_Ordnance_Factories) to harness their knowledge of propellants and advanced light materials used to build rockets. [H.G.S. Murthy](https://en.wikipedia.org/wiki/H.G.S._Murthy), an IOFS officer, was appointed the first director of the Thumba Equatorial Rocket Launching Station, where [sounding rockets](https://en.wikipedia.org/wiki/Sounding_rocket) were fired, marking the start of upper atmospheric research in India An indigenous series of sounding rockets named [Rohini](https://en.wikipedia.org/wiki/Rohini_(rocket_family)) was subsequently developed and started undergoing launches from 1967 onwards. [Waman Dattatreya Patwardhan](https://en.wikipedia.org/wiki/Waman_Dattatreya_Patwardhan), another IOFS officer, developed the propellant for the rockets.

1970's and 1980's

Under the government of [Indira Gandhi](https://en.wikipedia.org/wiki/Indira_Gandhi), INCOSPAR was superseded by ISRO. Later in 1972, a space commission and Department of Space (DoS) were set up to oversee space technology development in India specifically. ISRO was brought under DoS, institutionalising space research in India and forging the Indian space programme into its existing form. India joined the Soviet [Interkosmos](https://en.wikipedia.org/wiki/Interkosmos" \o "Interkosmos) programme for space cooperation and got its first satellite [Aryabhatta](https://en.wikipedia.org/wiki/Aryabhata_(satellite)" \o "Aryabhata (satellite)) in orbit through a Soviet rocket.

Efforts to develop an orbital launch vehicle began after mastering sounding rocket technology. The concept was to develop a launcher capable of providing sufficient velocity for a mass of 35 kg (77 lb) to enter [low Earth orbit](https://en.wikipedia.org/wiki/Low_Earth_orbit). It took 7 years for ISRO to develop [Satellite Launch Vehicle](https://en.wikipedia.org/wiki/Satellite_Launch_Vehicle) capable of putting 40 kg (88 lb) into a 400-kilometre (250 mi) orbit. An [SLV Launch Pad](https://en.wikipedia.org/wiki/SLV_Launch_Pad), ground stations, tracking networks, radars and other communications were set up for a launch campaign. The SLV's first launch in 1979 carried a [Rohini technology payload](https://en.wikipedia.org/wiki/Rohini_(satellite)) but could not inject the satellite into its desired orbit. It was followed by a successful launch in 1980 carrying a [Rohini Series-I](https://en.wikipedia.org/wiki/Rohini_(satellite)) satellite, making India the seventh country to reach Earth's orbit after the USSR, the US, France, the [UK](https://en.wikipedia.org/wiki/Prospero_(spacecraft)), China and Japan. RS-1 was the third Indian satellite to reach orbit as [Bhaskara](https://en.wikipedia.org/wiki/Bhaskara_(satellite)) had been launched from the USSR in 1979. Efforts to develop a [medium-lift launch vehicle](https://en.wikipedia.org/wiki/Medium-lift_launch_vehicle) capable of putting 600-kilogram (1,300 lb) class spacecrafts into 1,000-kilometre (620 mi) [Sun-synchronous orbit](https://en.wikipedia.org/wiki/Sun-synchronous_orbit) had already begun in 1978. They would later lead to the development of the [Polar Satellite Launch Vehicle (PSLV)](https://en.wikipedia.org/wiki/Polar_Satellite_Launch_Vehicle). The [SLV-3](https://en.wikipedia.org/wiki/SLV-3) later had two more launches before discontinuation in 1983. ISRO's [Liquid Propulsion Systems Centre](https://en.wikipedia.org/wiki/Liquid_Propulsion_Systems_Centre) (LPSC) was set up in 1985 and started working on a more powerful engine, [Vikas](https://en.wikipedia.org/wiki/Vikas_(rocket_engine)), based upon the French [Viking](https://en.wikipedia.org/wiki/Viking_(rocket_engine)). Two years later, facilities to test liquid-fuelled rocket engines were established and development and testing of various rocket engines [thrusters](https://en.wikipedia.org/wiki/Thrusters_(spacecraft)) began.

At the same time, another solid-fuelled rocket, the [Augmented Satellite Launch Vehicle (ASLV)](https://en.wikipedia.org/wiki/Augmented_Satellite_Launch_Vehicle), whose design was based upon SLV-3 was being developed, with technologies to launch satellites into [geostationary orbit](https://en.wikipedia.org/wiki/Geostationary_orbit) (GTO). The ASLV had limited success and multiple launch failures; it was soon discontinued. Alongside these developments, communication satellite technologies for the [Indian National Satellite System](https://en.wikipedia.org/wiki/Indian_National_Satellite_System) and the [Indian Remote Sensing Programme](https://en.wikipedia.org/wiki/Indian_Remote_Sensing_Programme) for earth observation satellites were developed and launches from overseas were initiated. The number of satellites eventually grew and the systems were established as among the largest satellite constellations in the world, with multi-band communication, radar imaging, optical imaging and meteorological satellites.

1990s

The arrival of the PSLV in 1990s was a major boost for the Indian space programme. With the exception of its first flight in 1994 and two partial failures later, the PSLV had a streak of more than 50 successful flights. The PSLV enabled India to launch all of its [low Earth orbit](https://en.wikipedia.org/wiki/Low_Earth_orbit) satellites, small payloads to GTO and hundreds of [foreign satellites](https://en.wikipedia.org/wiki/List_of_foreign_satellites_launched_by_India). Along with the PSLV flights, development of a new rocket, a [Geosynchronous Satellite Launch Vehicle](https://en.wikipedia.org/wiki/Geosynchronous_Satellite_Launch_Vehicle) (GSLV) was going on. India tried to obtain upper-stage [cryogenic engines](https://en.wikipedia.org/wiki/Cryogenic_engine) from Russia's [Glavkosmos](https://en.wikipedia.org/wiki/Glavkosmos" \o "Glavkosmos) but was blocked by the US from doing so. As a result, [KVD-1](https://en.wikipedia.org/wiki/KVD-1) engines were imported from Russia under a new agreement which had limited success and a project to develop indigenous cryogenic technology was launched in 1994, taking two decades to reach fulfillment. A new agreement was signed with Russia for seven [KVD-1](https://en.wikipedia.org/wiki/KVD-1) cryogenic stages and a ground mock-up stage with no technology transfer, instead of five cryogenic stages along with the technology and design in the earlier agreement. These engines were used for the initial flights and were named GSLV Mk.1. ISRO was under US government sanctions between 6 May 1992 to 6 May 1994. After the United States refused to help India with [Global Positioning System](https://en.wikipedia.org/wiki/Global_Positioning_System) (GPS) technology during the [Kargil war](https://en.wikipedia.org/wiki/Kargil_war), ISRO was prompted to develop its own satellite navigation system [IRNSS](https://en.wikipedia.org/wiki/IRNSS) (now NaVIC i.e. Navigation with Indian Constellation) which it is now expanding further.

21st century

In 2003, Prime Minister [Atal Bihari Vajpayee](https://en.wikipedia.org/wiki/Atal_Bihari_Vajpayee) urged scientists to develop technologies to land humans on the Moonand programmes for lunar, planetary and crewed missions were started. ISRO launched [Chandrayaan-1](https://en.wikipedia.org/wiki/Chandrayaan-1) in 2008, purportedly the first probe to verify the presence of water on the Moon, and the [Mars Orbiter Mission](https://en.wikipedia.org/wiki/Mars_Orbiter_Mission) in 2013, the first Asian spacecraft to enter Martian orbit, making India the first country to succeed at this on its first attempt. Subsequently, the cryogenic upper stage for [GSLV](https://en.wikipedia.org/wiki/GSLV) rocket became operational, making India the sixth country to have full launch capabilities.  A new heavier-lift launcher [LVM3](https://en.wikipedia.org/wiki/LVM3) was introduced in 2014 for heavier satellites and future human space missions.

On 23 August 2023, India achieved its first soft landing on an extraterrestrial body and became the first nation to successfully land a spacecraft near the [lunar south pole](https://en.wikipedia.org/wiki/Lunar_south_pole) and fourth nation to successfully land a spacecraft on [Moon](https://en.wikipedia.org/wiki/Moon) with ISRO's Chandrayaan-3, the third Moon mission. Indian moon mission, [Chandrayaan-3](https://en.wikipedia.org/wiki/Chandrayaan-3) (translated as "mooncraft" in English), saw the successful soft landing of its *Vikram* lander at 6.04pm IST (1234 GMT) near the little-explored region of the Moon in a world's first for any space programme. India then successfully launched its first sun probe, the [Aditya-L1](https://en.wikipedia.org/wiki/Aditya-L1), aboard a PSLV on September 2.

GOAL AND OBJECTIVES

The national space agency of India, ISRO's purpose is the pursuit of all space-based applications such as research, reconnaissance, and communications. It undertakes the design and development of space rockets and satellites, and undertakes explores upper atmosphere and deep space exploration missions. ISRO has also incubated technologies in India's private space sector, boosting its growth.

India's economic progress has made its space programme more visible and active as the country aims for greater [self-reliance](https://en.wikipedia.org/wiki/Self-sustainability) in space technology. In 2008, India launched as many as 11 satellites, including nine from other countries, and went on to become the first nation to launch 10 satellites on one rocket. ISRO has put into operation two major satellite systems: the [Indian National Satellite System](https://en.wikipedia.org/wiki/Indian_National_Satellite_System) (INSAT) for communication services, and the [Indian Remote Sensing Programme](https://en.wikipedia.org/wiki/Indian_Remote_Sensing_Programme) (IRS) satellites for management of natural resource

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| Agency overview | |
| Formed | 15 August 1969; 55 years ago |
| Preceding agency | * [INCOSPAR](https://en.wikipedia.org/wiki/Indian_National_Committee_for_Space_Research) (1962–1969) |
| Type | Government space agency |
| Jurisdiction | [Department of Space](https://en.wikipedia.org/wiki/Department_of_Space) |
| Headquarters | [Bengaluru](https://en.wikipedia.org/wiki/Bengaluru), [Karnataka](https://en.wikipedia.org/wiki/Karnataka) |
| [Chairman](https://en.wikipedia.org/wiki/Chairman_of_the_Indian_Space_Research_Organisation) | [S. Somanath](https://en.wikipedia.org/wiki/S._Somanath) |
| [Primary spaceports](https://en.wikipedia.org/wiki/Spaceport) | * [Satish Dhawan Space Centre](https://en.wikipedia.org/wiki/Satish_Dhawan_Space_Centre) * [Thumba Equatorial Rocket Launching Station](https://en.wikipedia.org/wiki/Thumba_Equatorial_Rocket_Launching_Station) * [Kulasekarapattinam Spaceport](https://en.wikipedia.org/wiki/Kulasekarapattinam_Spaceport) |
| Owner | [Government of India](https://en.wikipedia.org/wiki/Government_of_India) |
| Employees | 19,247 (as on 1 March 2022)[[1]](https://en.wikipedia.org/wiki/ISRO#cite_note-annualreport2022-2023-1) |
| Annual budget | Increase [₹](https://en.wikipedia.org/wiki/Indian_rupee)13,042 [crore](https://en.wikipedia.org/wiki/Crore) (US$1.6 billion) (2024-2025)[[2]](https://en.wikipedia.org/wiki/ISRO#cite_note-2) |

**Heads of ISRO**

List of Chairmen (since 1963) of ISRO.

1. [Vikram Sarabhai](https://en.wikipedia.org/wiki/Vikram_Sarabhai) (1963–1971)
2. [M. G. K. Menon](https://en.wikipedia.org/wiki/M._G._K._Menon) (1972)
3. [Satish Dhawan](https://en.wikipedia.org/wiki/Satish_Dhawan) (1973–1984)
4. [U. R. Rao](https://en.wikipedia.org/wiki/Udupi_Ramachandra_Rao) (1984–1994)
5. [K. Kasturirangan](https://en.wikipedia.org/wiki/Krishnaswamy_Kasturirangan) (1994–2003)
6. [G. Madhavan Nair](https://en.wikipedia.org/wiki/G._Madhavan_Nair) (2003–2009)
7. [K. Radhakrishnan](https://en.wikipedia.org/wiki/K._Radhakrishnan) (2009–2014)
8. [Shailesh Nayak](https://en.wikipedia.org/wiki/Shailesh_Nayak) (2015)
9. [A. S. Kiran Kumar](https://en.wikipedia.org/wiki/A._S._Kiran_Kumar) (2015–2018)
10. [K. Sivan](https://en.wikipedia.org/wiki/K._Sivan) (2018–2022)
11. [S. Somanath](https://en.wikipedia.org/wiki/S._Somanath) (2022–present)