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Introduction

As many of you have now become familiar with WWL Group's Annual THEMED DESKTOP calendars, some of our friends globally generally get curious to know the theme of the calendar, just around October every year and will ping our teams

This is what keeps us motivated to deliver the best themes every year, which can attract the discerning readers. For TEAM WWL, whether it is delivering Supply Chain Solutions or any other thing, we simply say, YOU DECIDE, WE DELIVER . Well there is a large team of Space Scientists and their community of passionate, dedicated, never say die professionals who delivers literally out of the planet. Yes, you guessed it right, the theme of this year's calendar is dedicated to our own pride of the Nation, Indian Space Research Organisation (ISRO) and their accomplishments over the years and their endeavour to take human tribe beyond the EARTH and much beyond. We salute every member of our SPACE MISSION who have put INDIA on top of the world consistently, without making much noise.

On the side lines, we are super excited to launch our MASCOT for the group which essentially defines what do we stand for as a company that endeavours to deliver Excellence in the Supply Chains of our customers globally. What's more, the Mascot defines the different attributes of our customised solutions, the service delivery standards that drives Worldwideans, the cultural fabric that we have stitched over the past two decades and values for which the Group exists. Going forward, we trust that our MASCOT will speak and communicate, while every Worldwidean delivers the CUSTOMER PROMISES continuously.

Wishing you all a happy and prosperous NEW YEAR 2024!

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WORLDWIDE LOGISTICS (INDIA) PRIVATE LIMITED

OUR OFFICES

LOCATION	ADDRESS	TELEPHONE NO	E-MAIL
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** We have a Satelite branch at Jodhpur

Disclaimer:

The contents of this calendar are sourced from several publicly available data online. Our intent is to celebrate these persons through our calendar and reach it to our audience. In doing so, we have collected information about these from various domains / open source. WWL does not take any responsibility for the veracity of the contents and indemnifies itself from any / every claim(s) arising out of the above, in any form from anyone.

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ISRO & Its Humble Beginnings

ISRO is the national space agency of India. Started in 1962 as INCOSPAR (Indian National Committee for Space Research), it grew over the years under different Govt agencies. Currently, it operates as the primary research and development arm of the Department of Space (DoS), which is directly overseen by the Prime Minister of India, while the Chairman of ISRO also acts as the executive of DoS.

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 & 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.

ISRO is one of the six government space agencies in the world that possesses full launch capabilities, can deploy cryogenic engines, can launch extra-terrestrial missions and operate a large fleet of artificial satellites. ISRO is also one of the four government space agencies to have soft landing (uncrewed) capabilities.

ISRO built India's first satellite - Aryabhata, which was launched by the Soviet space agency Inter kosmos in 1975. In 1980, ISRO launched satellite RS-1 onboard SLV-3, making India the 7th country capable of undertaking orbital launches. SLV-3 was followed by ASLV, which was subsequently succeeded by the development of many medium-lift launch vehicles, rocket engines, satellite systems and networks enabling the agency to launch hundreds of domestic and foreign satellites and various deep space missions for space exploration. ISRO has the world's largest constellation of remote-sensing satellites and operates the GAGAN and IRNSS (NavIC) Satellite Navigation systems. It has three missions to the moon and one to Mars so far.

ISRO's programmes have played a significant role in the socio-economic development of India and have supported both civilian and military domains in various aspects including disaster management, telemedicine and navigation and reconnaissance missions. ISRO's spin-off technologies also have founded many crucial innovations for India's engineering and medical industries. With each successive achievement, ISRO is forging ahead in its quest to make India a leading player in the field of space exploration.

Indian PM Modi has announced that the Chandrayaan-3 landing site would be named Shiv Shakti Point, a reference to Shiva, a principal deity in Hinduism, and Shakti, which honors the role of women scientists on the mission.

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JANUARY 2024

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FEBRUARY 2024

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ISRO's Associated Facilities

Among its several subsidiaries and Centres associated with ISRO, the below mentioned ones are prominent.

* **Dr. Vikram Sarabhai Space Centre** (Thiruvananthapuram) – Main technical centre and venue for development of SLV series.

* **Liquid Propulsion Systems Centre** (Thiruvananthapuram & Bengaluru) - handles design, development, testing and implementation of liquid propulsion control packages, liquid stages and liquid engines for launch vehicles and satellites.

* **UR Rao Satellite Centre** (Bengaluru) - venue of 8 successful spacecraft projects and is also one of the main satellite technology bases of ISRO.

* **ISRO Propulsion Complex** (Mahendragiri) - It handles testing and assembly of liquid propulsion control packages, liquid engines, and stages for launch vehicles and satellites.

* **Satish Dhawan Space Centre** (Sriharikota) - The Sriharikota facility is the main launch base for India's sounding rockets.

* **TERLS:** Thumba Equatorial Rocket Launching Station (Thiruvananthapuram) - It is used to launch sounding rockets.

* Antrix Corporation – Marketing arm of ISRO

* **Indian Institute of Remote Sensing** - IIRS is a premier training and educational institute set up for developing trained professionals in the field of remote sensing, geoinformatics and GPS technology for natural resources, environmental and disaster management.

* Apart from the above, there are also several other facility centres across the country for Research, Testing, Construction & Launch, Tracking & Control, human resources development and Commercial centres.

Rakesh Sharma was the 1st Indian astronaut who embarked on an unparalleled journey through space in 1984. His cosmic voyage unfolded through a joint collaboration between ISRO and the Soviet Interkosmos Space program, alongside two Soviet cosmonauts. His mission lasted 21 days and 40 minutes.

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FEBRUARY 2024

JANUARY 2024

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MARCH 2024

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Story of Progress – 1950s to 1980s

In India, space research began in 1920s with the studies conducted by the scientists SK Mitra, C V Raman and Meghnad Saha. In 1940s and 1950s ,space related activities started gaining attention nationwide.

After 1945, important developments were made in coordinated space research in India by two scientists: Vikram Sarabhai, founder of the Physical Research Laboratory at Ahmedabad and Homi Bhabha, who established the Tata Institute of Fundamental Research in 1945. Initial experiments in space sciences included the study of cosmic radiation, high-altitude and airborne testing, deep underground experimentation at the Kolar mines (one of the deepest mining sites in the world) and studies of the upper atmosphere. These studies were done at research laboratories, universities, and independent locations.

In 1950, the Department of Atomic Energy (DAE) was founded with Homi J. Bhabha as its secretary. It provided funding for space research throughout India. In 1954, the Aryabhata 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, Hyderabad. Space research was further encouraged by the Government of India.

In 1972, 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 programme for space cooperation and got its first satellite Aryabhata in orbit through a Soviet rocket.

In April 1975, first Indian Satellite, Aryabhata was launched into space. It marked a milestone in India's space programme because it was completely designed in the country and launched from a Russian facility. The first experimental satellite vehicle was launched namely Satellite launch Vehicle-3 (SLV-3) which makes ISRO sixth nation in space program. SLV-3 launched second time with Rohini.

Liquid Propulsion Systems Centre was set up in 1985 and started working on a more powerful engine, Vikas. Two years later, facilities to test liquid-fuelled rocket engines were established and development and testing of various rocket engines thrusters began.

During this time, another solid-fuelled rocket Augmented Satellite Launch Vehicle (ASLV) based upon SLV-3 was being developed, and technologies to launch satellites into Geostationary orbit. ASLV had limited success. Alongside, technologies for the Indian National Satellites System of communication satellites and the Indian Remote Sensing Program for earth observation satellites were developed. 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.

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MARCH 2024

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FEBRUARY 2024

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APRIL 2024

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Story of Progress – 1990s & Beyond

The arrival of PSLV (Polar Satellite Launch Vehicle) in 1990s became a major boost for the Indian space programme. PSLV is the third generation launch vehicle of India. It is the first Indian launch vehicle to be equipped with liquid stages. With the exception of its first flight in 1994 and two partial failures later, PSLV had a streak of more than 50 successful flights. PSLV enabled India to launch all of its low Earth orbit satellites, small payloads to GTO and hundreds of foreign satellites. Along with the PSLV flights, development of a new rocket, a Geosynchronous Satellite Launch Vehicle (GSLV) was going on. India tried to obtain upper-stage cryogenic engines from Russia's Glavkosmos but was blocked by the US from doing so. A project to develop indigenous cryogenic technology was launched in 1994, taking two decades to reach fulfilment. ISRO has also developed its own Satellite Navigation System - IRNSS which it is now expanding further.

In 2003, developing technologies to land humans on the Moon and programmes for lunar, planetary and crewed missions were started. ISRO launched Chandrayaan-1 in 2008, purportedly the first probe to verify the presence of water on the Moon, and the 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 rocket became operational, making India the 6th country to have full launch capabilities. A new heavier-lift launcher LVM3 was introduced in 2014 for heavier satellites and future human space missions.

On 23rd August 2023, India achieved its first soft landing on an extra-terrestrial body and became the 1st nation to successfully land a spacecraft near the Lunar South Pole with ISRO's Chandrayaan-3, the third Moon mission. It saw the successful soft landing of its Vikram lander 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 L-1, aboard a PSLV on 2nd September, 2023.

As we gaze into the future, the prospects are rife with promise. Upcoming missions such as Aditya L1 and Gaganyaan hold the potential to reshape our understanding of the cosmos, enhance technological capabilities, and solidify India's position as a prominent player in the realm of space exploration. The legacy of Chandrayaan Mission 3's success reverberates through these endeavours, propelling India toward even greater accomplishments and fostering collaboration that transcends borders, ideologies, and the limits of our terrestrial realm.

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APRIL 2024

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MARCH 2024

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MAY 2024

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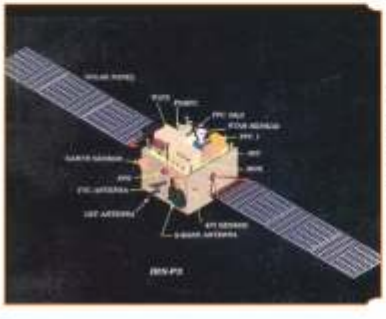
Satellites Series



The IRS Series:

IRS are India's earth observation satellites. They are the largest collection of remote sensing satellites for civilian use in operation today, providing remote sensing services. All the satellites are placed in polar Sun-synchronous orbit and provide data in a variety of spatial, spectral and temporal resolutions to enable several programs, to be undertaken relevant to national development. They support a wide range of applications including optical, radar and electronic reconnaissance for Indian agencies, city planning, oceanography and environmental studies.

The INSAT Series:

This is used for the country's telecommunication system. It is a series of multipurpose geostationary satellites built and launched, to satisfy the telecommunications, broadcasting, meteorology and search-and-rescue needs. Since the introduction of the first one in 1983, INSAT has become the largest domestic communication system in the APAC Region. These satellites have been used by the Indian Armed Forces as well. GSAT-9 or "SAARC Satellite" provides communication services for India's smaller neighbours.

GAGAN Satellite Navigation System This is used by Civil Aviation Ministry as part of the Satellite-Based Communications, Navigation, Surveillance and Air Traffic Management plan for civil aviation.Navigation with Indian Constellation (NavIC)

IRNSSwith an operational name NavIC is an independent regional navigation satellite system developed by India. It is designed to provide accurate position information service to users in India as well as the region extending up to 1,500 km from its borders, which is its primary service area.

Other satellites Kalpana-1 (MetSat-1) is ISRO's first dedicated meteorological satellite.

Indo-French satellite SARAL ("Satellite with ARgos and ALtika") is a cooperative altimetry technology mission, used for monitoring the oceans' surface and sea levels.

Three bacteria species that have a high resistance to the UV-rays were found in the earth's upper stratosphere, in 2009 by ISRO.

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MAY 2024

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APRIL 2024

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JUNE 2024

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Launch Vehicles

During the 1960s & 1970s, India initiated its own launch vehicles owing to geopolitical and economic considerations. In the 1960s–1970s, the country developed a sounding rocket, and by the 1980s, research had yielded the SLV-3 and the more advanced ASLV, complete with operational supporting infrastructure.

Satellite Launch Vehicle (SLV)

SLV-3 was the first space rocket to be developed by India. The initial launch in 1979 was a failure followed by a successful launch in 1980 making India the sixth country in world with orbital launch capability. The development of bigger rockets began afterwards.

Augmented Satellite Launch Vehicle (ASLV)

ASLV was another small launch vehicle released in 1980s to develop technologies required to place satellites into geostationary orbit. ISRO did not have adequate funds to develop ASLV and PSLV at once. Since ASLV suffered repeated failures, it was dropped in favour of a new project.

Polar Satellite Launch Vehicle (PSLV)

PSLV is the 1st medium-lift launch vehicle which enabled India to launch all its remote-sensing satellites into Sun-synchronous orbit. Besides two partial failures, PSLV became the primary workhorse for ISRO 50+ launches placing hundreds of Indian and foreign satellites into orbit.

Geosynchronous Satellite Launch Vehicle (GSLV)

GSLV was envisaged in 1990s to transfer significant payloads to geostationary orbit.

Launch Vehicle Mark-3 (LVM)

LVM-3 alias GSLV Mk III, is the heaviest rocket in operational service. Equipped with a more powerful cryogenic engine and boosters than GSLV, it has significantly higher payload capacity and allows to launch all its communication satellites. LVM3 is expected to carry India's first crewed mission to space and will be the testbed which will power India's heavy-lift rockets in the future.

Small Satellite Launch Vehicle (SSLV)

SSLV is a small-lift launch vehicle developed by ISRO with payload capacity to deliver 500 kg to low Earth orbit for launching small satellites, with the capability to support multiple orbital drop-offs.

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JUNE 2024

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MAY 2024

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JULY 2024

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Chandrayaan Series

Chandrayaan-1 in 2008 was India's first lunar mission. It carried various scientific instruments and made significant contributions to lunar research. The mission confirmed the presence of water on the moon's surface and discovered evidence of widespread water ice in the permanently shadowed regions of the lunar poles.

India's second lunar mission in 2019 comprised an orbiter, lander (Vikram), and a rover (Pragyan). Although the lander faced a soft landing failure, the orbiter continues to operate successfully. Chandrayaan-2 aimed to study lunar topography, mineralogy, elemental abundance, lunar exosphere, and signatures of water ice. The mission's instruments detected evidence of water molecules on the lunar surface and also discovered several new lunar craters.

Chandrayaan-3 is India's second attempt to soft-land on the Moon after the partial failure of Chandrayaan-2. The mission includes a lander-rover set and will communicate with the orbiter from the previous mission. On 23rd August 2023, ISRO became the first space agency to successfully land a spacecraft on the lunar south pole region, and only the fourth space agency ever to land on the Moon. Since the landing, India has released some early findings from the lander and its mobile rover, named Pragyan, along with photos of the vehicles exploring the Moon's alien charcoal-color landscape.

Early science results from the mission include the detection of a seismic "event" on the Moon, and the first measurements of the plasma environment near the lunar surface close to the south pole. Instruments on the rover have detected sulfur in the lunar crust at the landing site. It's always exciting to see a place human eyes have never seen before, and India's triumph with Chandrayaan 3 is worth celebrating.

The Moon landing is just the latest in a string of successes in space research for India, which has a thriving rocket program with a family of four launch vehicles, its own regional satellite navigation network, and nearly 10 years ago sent an orbiter to Mars. If India can notch another success in its space program in the next few years, the country could become the fourth nation capable of sending its astronauts into low-Earth orbit.

In the year 2012, ISRO launched its 100th space mission and used the PSLV-C21 rocket which placed two satellites in the Earth's orbit.

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JULY 2024

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JUNE 2024

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AUGUST 2024

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Mars Orbiter Mission

The Mars Orbiter Mission (MOM), informally known as Mangalyaan (Mars Craft) was launched into Earth's orbit on 5th November 2013 and has entered Mars orbit on 24th September 2014. India thus became the first country to have a space probe enter Mars orbit on its first attempt. It was completed at a record low cost of $73 million.

The mission was a "technology demonstrator" project to develop the technologies for designing, planning, management, and operations of an interplanetary mission. Mangalyaan operated for seven and a half years, observing Martian landscapes and studying their composition using its five scientific instruments.

In the Geocentric phase, the MOM was placed in an orbit around Earth by PSLV, which was not powerful enough to place the MOM directly on to Mars transfer orbit, and the spacecraft was injected into a highly elliptical parking orbit around Earth. The MOM's closest point to Earth in this orbit (the perigee) was 250 KM and the farthest point was 23,500 KM (the apogee).

ISRO had performed five orbit-raising manoeuvres on its Mars Orbiter, raising the apogee (farthest point from Earth) of the spacecraft to over 1.92 lakh km, before it performed the mother of all slingshots. The probe completed six orbits around Earth before the last slingshot, which requires precise calculations to eliminate the risk of missing the new orbit.

Despite being designed for a life-span of six months as a technology demonstrator, the Mars Orbiter Mission has lived for about eight years in the Martian orbit with a gamut of significant scientific results on Mars as well as on the Solar corona, before losing communication with the ground station, as a result of a long eclipse in April 2022. ISRO deliberated that the propellant must have been exhausted, and therefore, the desired attitude pointing could not be achieved for sustained power generation. It was declared that the spacecraft is non-recoverable, and attained its end-of-life. The mission will be ever regarded as a remarkable technological and scientific feat in the history of planetary exploration.

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AUGUST 2024

WEEK	Sun	Mon	Tue	Wed	Thu	Fri	Sat
31					1	2	3
32	4	5	6	7	8	9	10
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JULY 2024

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SEPTEMBER 2024

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Pioneers of Indian Space

How did a young nation like India manage to set up its space mission as early as 1962, while facing difficulties in managing the basic needs of a large population? There have been several luminaries on the firmament of Indian space research, few of them are listed below.

Dr. Vikram Sarabhai (1919 – 1971)

The "father of the Indian space program" Dr. Vikram Sarabhai, was an eminent scientist and visionary who played a crucial role in establishing ISRO and laying the foundation for space research and development in India. Under his leadership and guidance, ISRO launched its first satellite, Aryabhata, in 1975, marking India's entry into the space age. His efforts and vision were instrumental in shaping India's space program and inspiring generations of scientists and engineers. His legacy continues to influence India's space endeavors to this day.

Satish Dhawan (1920 – 2002)

Satish Dhawan was an Indian mathematician and aerospace engineer, widely regarded as the father of experimental fluid dynamics research in India. He was one of the most eminent researchers in the field of turbulence and boundary layers, leading the successful and indigenous development of the Indian space programme. Dhawan also set up India's first supersonic wind tunnel at Indian Institute of Science. He carried out pioneering experiments in rural education, remote sensing and satellite communications. His efforts led to operational systems like INSAT, a telecommunications satellite; IRS, the Indian Remote Sensing satellite; and the PSLV, that placed India in the league of space faring nations.

Dr. APJ Abdul Kalam (1931 – 2015)

Kalam was an Indian aerospace scientist and statesman, who served as the President of India from 2002-2007. He spent the next 4 decades as a scientist at DRDO and ISRO. Kalam was known as the Missile Man of India for his work on the development of ballistic missile and launch vehicle technology. He also played a pivotal organisational, technical, and political role in India's Pokhran-II nuclear tests in 1998. Kalam also served as the Chief Scientific Adviser to the PM and Secretary of the DRDO.

Prof. UR Rao (1932 – 2017)

UR Rao was the chairman of ISRO. Under his guidance, beginning with the first Indian satellite "Aryabhata" in 1975, over 18 satellites including Bhaskara, APPLE, Rohini, INSAT-1 and INSAT-2 series of multipurpose satellites and the IRS 1A & 1B were designed, fabricated and launched, providing communication, remote sensing, and meteorological services. He was the 1st Indian to be inducted into the Satellite Hall of Fame, Washington in 2013.

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SEPTEMBER 2024

WEEK	Sun	Mon	Tue	Wed	Thu	Fri	Sat
36	1	2	3	4	5	6	7
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AUGUST 2024

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OCTOBER 2024

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Applications of Space Technology

Satellites find multiple applications in the current times. Some of the areas are:

Tele Communication – India has a wide network of communication satellites in orbit which provides connectivity to remote areas of the country. INSAT provides services like television broadcasting, telemedicine and disaster management.

Remote Sensing – India has a fleet of earth observation satellites that provide high-resolution images of the earth's surface for various applications like land use mapping, resource management, and environmental monitoring.

Navigation – IRNSS provides precise positioning and timing information to users in India and the surrounding regions.

Weather Forecasting & Disaster Mgmt – India's meteorological satellites provide real-time weather data, which helps in accurate weather forecasting. Satellite data is used during natural disasters like floods, earthquakes and cyclones.

Agriculture – Data obtained from earth observation satellites is used for crop monitoring & assessment, soil moisture estimation & drought prediction.

Defence – ISRO provides satellite-based services to the Indian Defence forces for surveillance, reconnaissance and communication.

Academic – Many institutions use satellites for educational applications. It is also used to conduct large-scale video broadcasts resulting in significant improvement in rural education.

Commercial - India's launch vehicles are regularly used to deploy the country's satellites and payloads from international and commercial customers. ISRO recently started an initiative to commercialize its rockets by turning over responsibility for manufacturing and launch operations to the private sector.

Outreach - ISRO has influenced educational institutions by its activities like making satellites for communication, remote sensing and astronomy. So far, 14 satellites have been designed, fabricated and developed by various Universities / Academic Institutes, with guidance and support from ISRO.

India has been using the NavIC (Navigation with Indian Constellation) for its operations. With this, it makes India one of the top 5 countries to own a navigation system. Furthermore, Reusable Launch Vehicles (RLV) are space shuttles from ISRO, which have been built most economically and can be reused as space shuttle.

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OCTOBER 2024

WEEK	Sun	Mon	Tue	Wed	Thu	Fri	Sat
40			1	2	3	4	5
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SEPTEMBER 2024

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NOVEMBER 2024

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Unique Achievements by India

India is catching up on the space programs of the USA and China, it has moved closer to Europe and Russia and could be on par with Japan, when you take into account several factors: access to space, space exploration, military space projects, and applications like communications, navigation, and remote sensing from orbit. India's orbital-class rockets only flew about one time per year until the early 2000s. Since then, India has ramped up its launch rate, reaching seven orbital flights on a couple of occasions, an annual record that India is poised to shatter soon. Last year, the country had launched its rockets 7 times. India's expendable rockets have notched 54 successful launches in 57 tries since 2011—a success rate of nearly 95 percent, about the same as all European and Japanese rockets and slightly better than Russian launch vehicles in the same period.

ISRO, by successfully demonstrating its unique and cost-effective technologies, has gained place among the elite space agencies in the world over the years. Let's take a look at the string of successful missions that ISRO has accomplished over the years.

1. Satellite Launch Vehicle - The SLV project was launched under the able guidance of APJ Abdul Kalam, which was an achievement in the early 1970s.

2. Chandrayaan - In 2008, the first space mission to the moon was made by India with the launch of Chandrayaan.

3. Mars Orbiter Mission - India was able to reach mars successfully at its very first attempt. Notably, only 3 other space organizations have been able to achieve this – the NASA, the European Space Program and the Soviet Space Program.

4. GLSV MK3 - ISRO launched GLSV MK3 in 2014 which is a crew capsule that can take human beings to space.

5. Launching 104 Satellites together - ISRO launched 104 satellites using a single rocket from Srihari Kota spaceport in Andhra Pradesh. These satellites were from various countries like UK, US and Germany.

6. GSLV-F09 - ISRO launched GSLV-F09 in the year 2017. GSLV Mark-II made use of Cryogenic Upper Stage. It helped to provide one of the biggest communication networks in South Asia.

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NOVEMBER 2024

WEEK	Sun	Mon	Tue	Wed	Thu	Fri	Sat
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OCTOBER 2024

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DECEMBER 2024

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Future Projects & Vision

Aditya L-1

Another milestone mission for India's space program is Aditya-L1, a solar observatory. This spacecraft was launched on 2nd Sept. 2023, which travel to an orbit around the L1 Lagrange point nearly a million miles (1.5 million kilometres) on the Sunward side of the Earth, where Aditya-L1 uses a solar telescope and coronagraph to observe the Sun and a suite of sensors to measure the solar wind.

Gaganyaan

Gaganyaan is a crewed orbital spacecraft intended to demonstrate the nation's human spaceflight capabilities, conduct experiments in microgravity, and pave the way for future space exploration missions, and put Indian astronauts back in space. The target for the first crewed mission involved the development of a new spacecraft (after which the mission was named) which would carry a crew of two to three astronauts into low Earth orbit (LEO) and bring them back safely. The first crewed mission is now expected to take place in 2024 or 2025.

Scramjet (Supersonic Combustion Ramjet) engine

In August 2016, ISRO successfully conducted the Scramjet engine test. It uses Hydrogen as fuel and Oxygen from the atmospheric air as the oxidizer. ISRO's Advanced Technology Vehicle (ATV), an advanced sounding rocket, was the solid rocket booster used for the test of Scramjet engines at supersonic conditions. The new propulsion system will complement ISRO's reusable launch vehicle that would have a longer flight duration.

ISRO is developing and operationalising more powerful and less pollutive rocket engines so it can eventually develop much heavier rockets. It also plans to develop electric and nuclear propulsion for satellites and spacecrafts to reduce their weight and extend their service lives. Long-term plans may include crewed landings on Moon and other planets as well.

ISRO is also having its hands full with several exciting projects in the future like semi-cryogenic engine, methalox engine, modular heavy vehicles and reusable launch vehicles.

ISRO did not have an official logo until 2002. The one adopted consists of an orange arrow shooting upwards attached with two blue coloured satellite panels with the name of ISRO written in two sets of text, orange-coloured Devanagari on the left and blue-coloured English on the right.

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DECEMBER 2024

WEEK	Sun	Mon	Tue	Wed	Thu	Fri	Sat
49	1	2	3	4	5	6	7
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NOVEMBER 2024

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LIST OF GOVERNMENT HOLIDAYS

Month	Date	Day	Festivals
January	26	Friday	Republic Day
March	08	Friday	Maha Shivaratri
	25	Monday	Holi
	29	Friday	Good Friday
April	11	Thursday	Idu'l Fitr
	21	Sunday	Mahavir Jayanti
May	23	Thursday	Buddha purnima
June	17	Monday	Id-ul-Zuha
July	17	Wednesday	Muharram
August	15	Thursday	Independence day
	26	Monday	Janmashtami
September	16	Monday	Milad-un-Nabi
October	02	Wednesday	Gandhi Jayanti
	12	Saturday	Dussehra
	31	Thursday	Diwali
November	15	Friday	Guru Nanak's Jayanti
December	25	Wednesday	Christmas

*** For Specific WWL List of Holidays visit our website at www.go2wwl.in**