# INTRODUCTION:

India has established a strong infrastructure for executing its space program me. They include facilities for the development of satellites and launch vehicles and their testing; launch infrastructure for sounding rockets and Satellite Launch vehicles; telemetry, tracking and Command Window, data reception and Processing Systems for remote sensing. A number of academic and research institutions as well as industries participate in the Indian Space Programme. Several Indian industries have the expertise to undertake sophisticated jobs required for space systems.

Among them SDSC SHAR is one of India's primary space center subordinated to Vikram Sarabhai Space Center Indian Research Organization –department of Space, founded by Government of India and involved in the launch complexes provide complete support for vehicle assembly, fuelling, checkout and launch operations.

The Centre has two operational orbital launch pads. SHAR is ISRO's satellite launching base and additionally provides launch facilities for the full range. The Vehicle Assembly, Static Test and Evaluation Complex (VAST, previously STEX) and the Solid Propellant Space Booster Plant (SPROB) are located at SHAR for casting and testing solid motors. The site also has a Telemetry Tracking & Control centre, Liquid Propellant Storage and Servicing Facilities (LSSF), the Management Service Group and Sriharikota Common Facilities. The launch complex was commissioned in 1990. It has a 3,000 tonne, 76.5 m high Mobile Service Tower (MST) which provides the SP-3 payload clean room.

The solid propellant space booster plant (SPROB) processes large size propellant grains for the satellite launch vehicles. The Static Test & Evaluation Complex (STEX) tests and qualifies different types of solid motor for launch vehicles. The closed centre at SHAR houses computers and data processing, closed circuit television, real-time tracking systems and meteorological observation equipment. It is linked to three radars located at Sriharikota and the five stations of ISRO's Telemetry, Tracking & Command Network.

The propellant production plant produces composite solid propellant for rocket motors of ISRO using ammonium perchlorate (oxidiser), fine aluminium powder (fuel) and hydroxyl terminated polybutadiene (binder). The solid motors processed here include those for the first stage booster motor of the Polar Satellite Launch Vehicle (PSLV) — a five segmented motor of 2.8 m diameter and 22 m length, weighing 160 tons with a thrust level of 450 tons.

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# LAUNCH PAD1:

The modern First Launch Pad was built in the early 1990s for the POLAR SATELLITE LAUNCH VEHICLE. It has also been used by Geosynchronous SATELLITE LAUNCH VEHICLE. The twentieth launch from the pad - a PSLV-XL with IRNSS-1A - occurred on 1 July 2013.

The individual stages of PSLV or GSLV, their subsystems and the spacecraft are prepared and checked out in separate facilities before they are sent to launch pad for integration A-76-meter tall mobile service tower (MST) facilitates the vertical integration of the vehicle. The foldable working platforms of MST provide access to the vehicle at various elevations. A massive launch pedestal, made up of steel plates, acts as the base on which the vehicle is integrated.

The spacecraft is integrated to the vehicle in a clean room, set up inside the MST. However, in the case of GSLV, the spacecraft is interfaced with the payload adopter and then encapsulated in the heat shield in the preparation facility itself. The encapsulated assembly is moved to the launch pad for integrating with the 3rd stage of GSLV. The umbilical tower houses the feed lines for liquid propellants and high-pressure gases, checkout cables, and chilled air duct for supplying cool air to the satellite and equipment bay.

# LAUNCH PAD 2:

The Second Launch Pad of the Satish Dhawan Space Centre is a rocket launch site in Sriharikota, India. It is the second of two launch pads at the centre. The Second Launch Pad or SLP was designed, supplied, erected & commissioned by MECON Limited a Govt of Indian Enterprise, located at Ranchi (Jharkhand, India) during the period March,1999 to December 2003.

As per the integrate, transfer and launch (ITL) concept, based on which the launch pad and the associated facilities are designed, the entire vehicle is assembled and checked-out on a mobile pedestal in the Vehicle Assembly Building (VAB) and then moved in vertical position to the launch pad on a roll track.

Other facilities include, Solid Stage Assembly Building (SSAB) connected to the Vehicle Assembly Building (VAB) by a rail track, Technical Complex-2 (TC2), Spacecraft Preparation Facility, Range Instrumentation facilities comprising tracking, telemetry and tele-command systems.

## TELEMETRY AND TRACKING CENTER:

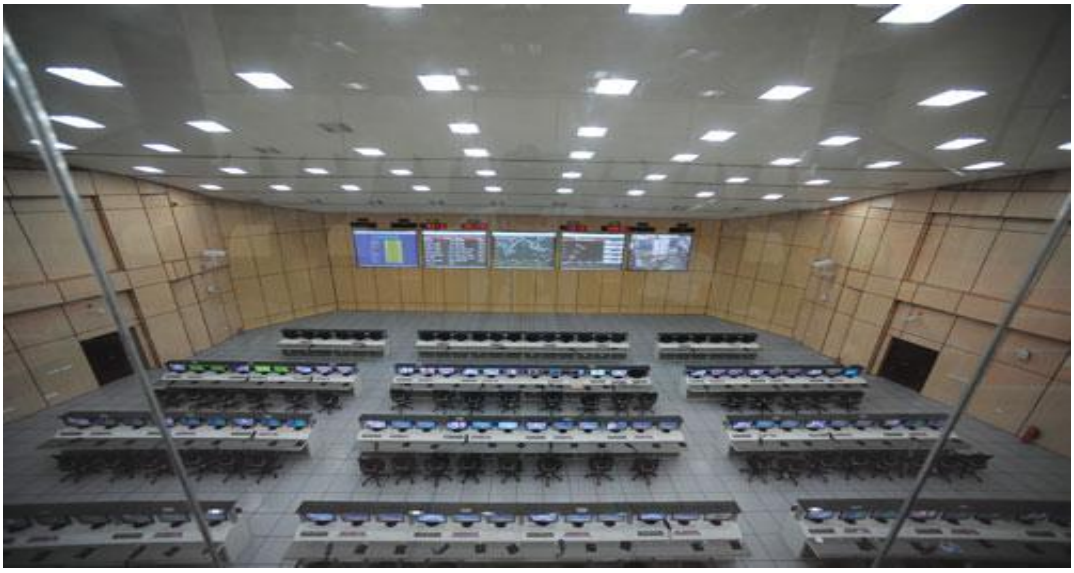

ISRO Telemetry, Tracking and Command Network (ISTRAC) provides mission support to low-earth orbit satellites as well as launch vehicle missions. ISTRAC has its headquarters and a multi-mission Spacecraft Control Centre at Bangalore. It has a network of ground stations at Bangalore, Lucknow, Sriharikota, Port Blair and Thiruvananthapuram in India besides stations at Mauritius, Bearslake (Russia), Brunei and Biak (Indonesia).

ISTRAC activities are organised into network operations, network augmentation, mission operation and spacecraft health monitoring, communications and computers and control centre facilities and development projects. Programme planning and reliability groups support ISTRAC activities

## MISSION CONTROL ROOM:

For meeting the GSLV-MkIII launch requirements and future missions of ISRO, a new Mission Control Centre (MCC) with state-of-the-art facilities, has been realised at SatishDhawan

space center (SDSC) SHAR. The MCC, situated about 6 Km away from the launch complex, monitors and conducts the launch operations during the pre-countdown and countdown phases until the injection of the satellite into orbit. It is linked to all the ground stations through communication links for voice, video and data transmission. The launch preparations on the vehicle are monitored from MCC, using a multi channel Closed circuit room System (CCTV). The important facilities at MCC include Mission Control Hall, Launch Control Centre, Real time Network, VIP Gallery, Video Conference, Mission Executives rooms, Commentator rooms, etc…



major subsystems of the new MCC

- Data Processing Systems
- Real Time Network
- Wide Screen Display Systems,
- executives and all other important personnel involved in decision making sit at respective consoles during countdown phase, till lift-off
- Electronic Interfacing Systems (Timing, Communications, CCTV and Data Links)

Altogether, there are 38 consoles, arranged in 4 rows. Each console is of 3-bay open type and has the following hardware systems installed in it. It has VIP gallery

**Launch Control Centre:**

A Launch Control Centre (LCC) is realised in the ground floor to take care of Vehicle Checkout operations. LCC is configured as two control halls, namely, LCC1 and LCC2, to take care of parallel operations from both the launch pads. Sixteen consoles are provided in each entity to carry out the vehicle checkout operations. Specialists' display consoles have also been set up here to offer vehicle data to experts and specialists from centres related to launch vehicle development.

**Features of LCC**

- LCC 1 & LCC 2 are identical in hardware configuration and are easily configurable for PSLV, GSLV/GSLV-Mk III launches from any of the two launch pads
- Network Interface
- Data Analysis PC of each console is connected to an independent data network
- Hard-line multiplexing system for reducing hard line requirements between LCC & remote systems
- Display nodes for data presentation to system experts
- All Hardware interfaces are provided with dual redundancy
- System Time of all consoles synchronized

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**SPACE MUSEUM:**

The museum has full-scale model of PSLV and PSLV heat shield on its premises. The museum also has scaled down (one fifth in size) models of GSLV, GSLV Mk-III and ATV. The display panels on various ISRO projects and their applications, the static / dynamic models of spacecrafts and rockets give good understand of the 'space technology in general and ISRO in particular.

Space Museum provides a tell-tale account of the Indian Space Programme from its infancy. The story of the Indian Space Programme is unfurled in six sections, comprising of history, education, technology, applications, global and the future. A movie theatre with surround sound system screens specially tailored movies on Indian Space Programme.


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Thanking you sir,

Yours sincerely,

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