New Rocket Launchport in Tamilnadu

For Prelims: New Rocket Launchport in Tamilnadu, **Indian Space Research Organisation (ISRO)**, Satish Dhawan Space Centre (SDSC) SHAR (Sriharikota Range), **Small Satellite Launch Vehicle (SSLV).**

For Mains: New Rocket Launchport in Tamilnadu, Achievements of Indians in science & technology.

Source: IE

Why in News?

Recently, the Indian Prime Minister laid the foundation stone of the second rocket launchport of the **Indian Space Research Organisation (ISRO)** at Kulasekarapattinam in Tamil Nadu.

What is the Need for a New Launchport?

- **Capacity and Overburdening:**
  - The opening of the space sector to private players is expected to lead to a significant increase in commercial launches.
  - This surge in demand could potentially overwhelm existing launch facilities, such as the **Satish Dhawan Space Centre (SDSC) SHAR (Sriharikota Range)** in Sriharikota.
  - Therefore, establishing a new launch port ensures that there is sufficient capacity to accommodate the increased number of launches without overburdening existing facilities.
- **Diversification of Launch Services:**
  - By dedicating the SDSC SHAR primarily for **bigger and heavy-lift-off missions**, and creating the Kulasekarapattinam launchport for smaller payloads, the ISRO can **diversify its launch services.**
  - This specialisation allows for **more efficient utilization of resources** and infrastructure tailored to specific mission requirements.
- **Support for Private Players:**
  - The establishment of a new launchport provides **private players with dedicated infrastructure** to develop space-qualified subsystems, build satellites, and launch vehicles.
  - This encourages private investment and participation in the space sector, fostering innovation and competition.

What is the Significance of Kulasekarapattinam Launchport?

- **Geographical Advantage:**
  - Geographically, scientifically, and strategically, the Kulasekarapattinam launchport provides a **natural advantage to ISRO's future launches** pertaining to the **Small Satellite Launch Vehicle (SSLV).**
  - Allowing a **direct southward and smaller launch trajectory** for the lightweight SSLVs carrying less fuel, the Kulasekarapattinam facility will boost **ISRO's attempts to enhance payload capacities.**

- **Optimised Trajectory:**
  - Launches from Kulasekarapattinam can follow a **straight southward flight path**, as opposed to the **longer trajectory followed by launches** from the Satish Dhawan Space Centre (SDSC) SHAR, which necessitates skirting eastwards around Sri Lanka **(dogleg manoeuvring).**
  - This optimised trajectory **minimises fuel consumption,** particularly crucial for SSLVs with limited onboard fuel capacity.
- **Equatorial Location:**
  - Like the SDSC SHAR, Kulasekarapattinam is **also situated near the equator.**
  - Launch sites near the equator benefit from the **Earth's rotation, which imparts a significant velocity boost** to rockets during liftoff.
  - This boost in **velocity allows for increased payload capacity,** particularly advantageous for missions aiming for geostationary orbit.

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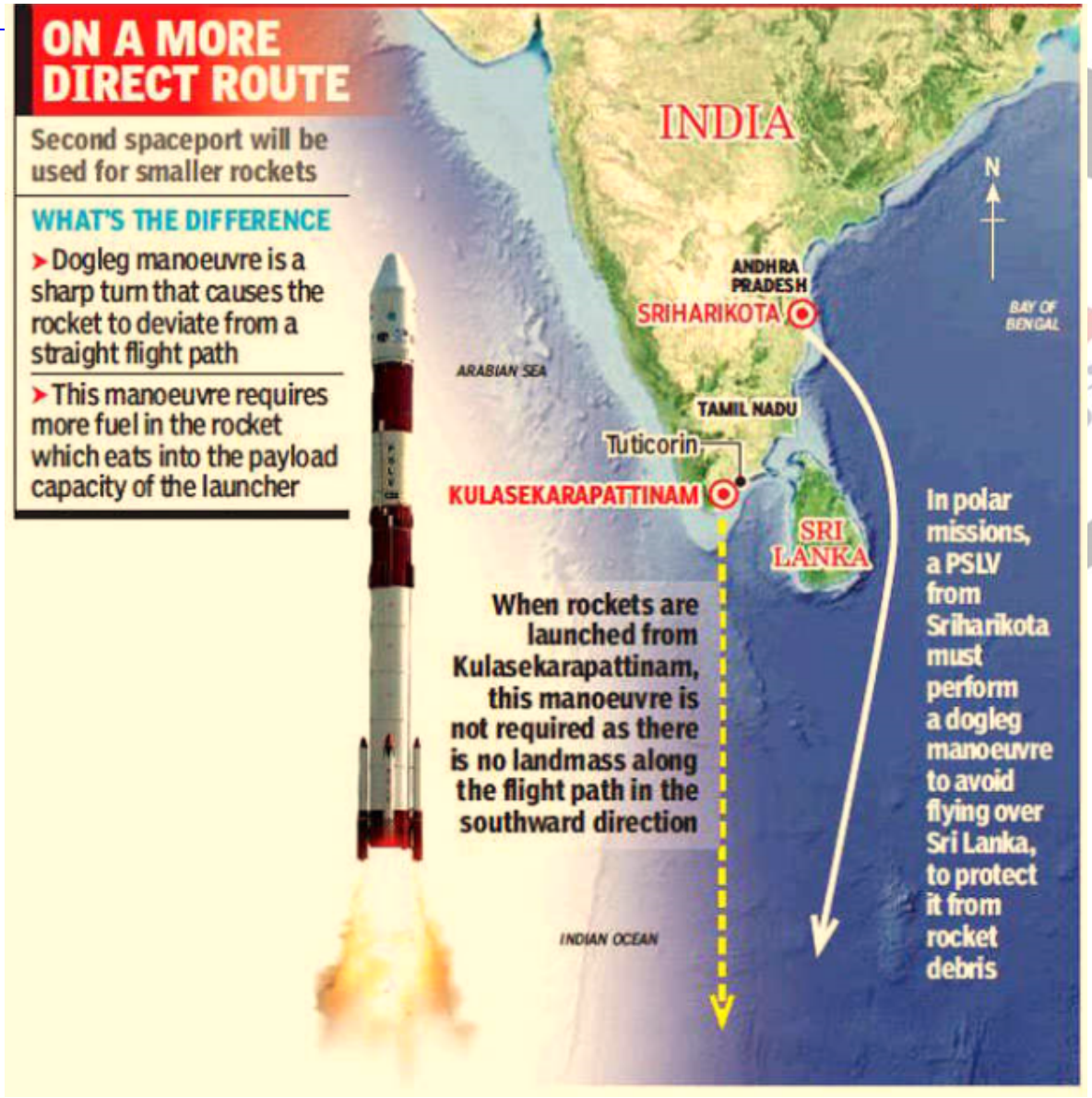

What is a Small Satellite Launch Vehicle?

- **About:**
  - **Small Satellite Launch Vehicle (SSLV)** is a three stage Launch Vehicle configured with three Solid Propulsion Stages and a liquid propulsion-based Velocity Trimming Module (VTM) as a terminal stage.
    - SSLV is capable of launching 500kg satellites in 500km planar orbit from Satish

Dhawan Space Centre (SDSC).
        - A **planar orbit, also known as a low Earth orbit (LEO),** is an orbit around the Earth that lies close to the Earth's equatorial plane. In this type of orbit, the satellite's path forms a **relatively flat plane around the Earth..**
- **Key Features:**
    - Low cost,
    - Low turn-around time,
    - Flexibility in accommodating multiple satellites,
    - Launch demand feasibility,
    - Minimal launch infrastructure requirements, etc.
- **Significance:**
    - **The Era of small satellites:**
        - Earlier, the bigger satellite payloads were given importance, but as the sector grew many players emerged like Businesses, government agencies, universities, and laboratories began to send satellites.
            - Mostly all of them fall in the category of small satellites.
    - **The Rise in Demand:**
        - The demand for the launch of small satellites has increased at a rapid pace in the last eight to ten years, due to the ever-growing need for space-based data, communication, surveillance, and commerce.
    - **Saves cost**:
        - Satellite manufacturers and operators do not have the luxury of waiting months for space on a rocket or paying exorbitant trip charges.
            - Therefore, Organizations are increasingly developing a constellation of satellites in space.
            - Projects like **SpaceX's Starlink and One Web** are assembling a constellation of hundreds of satellites.
        - **Business Opportunity:**
            - With the rise in demand, the rockets could be launched frequently with less cost, this provides a business opportunity for space agencies like ISRO **to tap the potential of the sector** as most of the demand comes from companies that are launching satellites for commercial purposes.
- **Journey of SSLV:**
    - In August 2022, the first SSLV mission (SSLV-D1) encountered failure when it attempted to **deliver two satellites, EOS-02 and** AzaadiSat.
    - However, six months later, in February 2023, ISRO succeeded with its second attempt, SSLV-D2.
        - The rocket effectively placed **three satellites into a 450 km circular** orbit after a 15-minute journey. Both launches **took place from SHAR.**

What are the Features of SHAR?

- SHAR is situated along the **east coast of Andhra Pradesh** and is located 80 km off Chennai.
    - It currently provides launch **infrastructure to all ISRO missions.**
- It is equipped with a **solid propellant processing setup,** static testing, and launch vehicle integration facilities, telemetry services, tracking and command network to oversee the launch, and a mission control centre.
- SHAR has two launch complexes that are **routinely used to launch the** Polar Satellite Launch Vehicle (PSLV), the **Geosynchronous Space Launch Vehicle (GSLV)** and the Geosynchronous Satellite **Launch Vehicle Mk-III (renamed as LVM3).**
- The maiden launch of the First Launch Pad, built in the early 1990s, was in September 1993.
- Operational since 2005, the **Second Launch Pad saw its maiden launch in May 2005.**

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. With reference to India's satellite launch vehicles, consider the following statements: (2018)

1. PSLVs launch the satellites useful for Earth resources monitoring whereas GSLVs are designed

mainly to launch communication satellites.
2. Satellites launched by PSLV appear to remain permanently fixed in the same position in the sky, as viewed from a particular location on Earth.
3. GSLV Mk III is a four-staged launch vehicle with the first and third stages using solid rocket motors; and the second and fourth stages using liquid rocket engines.

Which of the statements given above is/are correct?

(a) 1 only
(b) 2 and 3
(c) 1 and 2
(d) 3 only

Ans: (a)

Mains

Q. What is India’s plan to have its own space station and how will it benefit our space programme? **(2019)**