What is TSAT-1A?

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About TSAT-1A

- It is an optical sub-metre-resolution **Earth observation satellite**.
- It was built by **Tata Advanced Systems Limited (TASL)** in **collaboration with** Latin American company **Satellogic Inc,** following a collaboration agreement between the two companies in late November 2023.
- TSAT-1A was assembled in TASL's Assembly, Integration, and Testing (AIT) plant at its Vemagal facility in Karnataka.
- It was **launched bySpaceX's Falcon 9 rocket** from the Kennedy Space Center, Florida, in the US.
- **Features:**
    - TSAT-1A's core strength lies in its ability to **capture military grade imagery** of Earth's surface with **sub-meter resolution.**

    - It is equipped with both **multispectral and hyperspectral imaging capabilities**. This technology allows TSAT-1A to collect data across a wide range of wavelengths within the electromagnetic spectrum, providing a deeper and more nuanced understanding of land, water, and various natural resources.
    - TSAT-1A boasts **greater collection capacity**, a wider **dynamic range** (the ability to capture detail in both very bright and very dark areas), and **low-latency** delivery of data.
- This satellite will be **used by Indian defense forces** to **gather discreet information,** and this information will be **shared with friendly nations**.
- It can enable defence forces to enhance their preparedness, response capabilities, and strategic decision making.

While India has a few military spy satellites built by ISRO, this is the **first such initiative in the private sector.**

Q1: What is hyperspectral imaging?

Hyperspectral imaging is the capturing and processing of an image at a very large number of wavelengths. Whereas multispectral imaging might evaluate an image in three or four colors (red, green, blue and near-infrared (NIR), for example), hyperspectral imaging breaks the image down into tens or hundreds of colors. This allows for the identification of objects and materials by analyzing their unique spectral signatures.

Source: TASL announces successful deployment of sub-metre resolution optical satellite TSAT-1A