GSAT-6A Launch by GSLV F08

Why in news?

\n\n

The GSLV F08 launched the GSAT 6A communication satellite into its orbit, from the Satish Dhawan Space Centre at Sriharikota.

\n\n

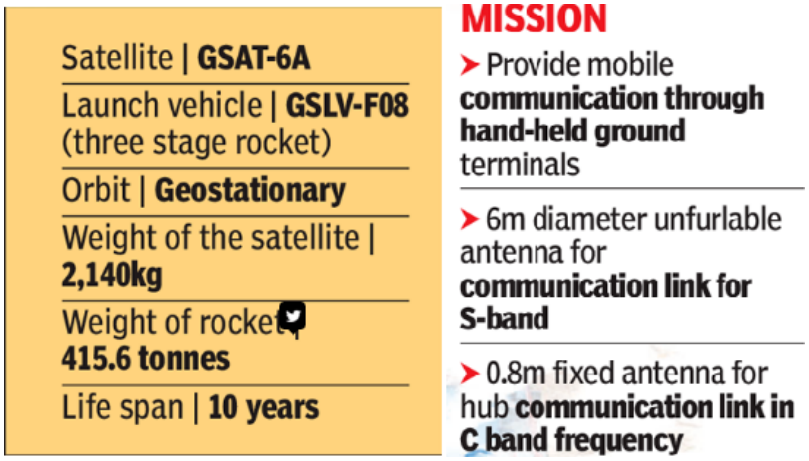
What is GSAT-6A for?

\n\n

\n
- GSAT-6A, similar to its predecessor GSAT-6, is a high power **S-band communication satellite**.
\n
- It has a mission life of around **10 years**.
\n
- The satellite has a **six-metre wide antenna** that would unfurl once it is in space.
\n
- The antenna, meant for **S-band communication**, is 3 times broader than those generally used in ISRO satellite.
\n
- This feature facilitates mobile communication for the country through **handheld ground terminals**.
\n
- The smaller antenna in other communication satellites requires larger ground stations.
\n
- The GSAT-6A is intended to provide communication services through **multibeam coverage**.
\n
- The satellite would also provide services to the Indian **Armed Forces.**
\n
- The GSAT-6A was successfully placed in **GTO** (Geo-stationary Transfer

Orbit).
\n
- Soon after separation from GSLV, the two solar arrays of GSAT-6A were automatically deployed in quick succession.
\n
- The **Master Control Facility** (MCF) at **Hassan** in Karnataka assumed control of the satellite.
\n

\n\n



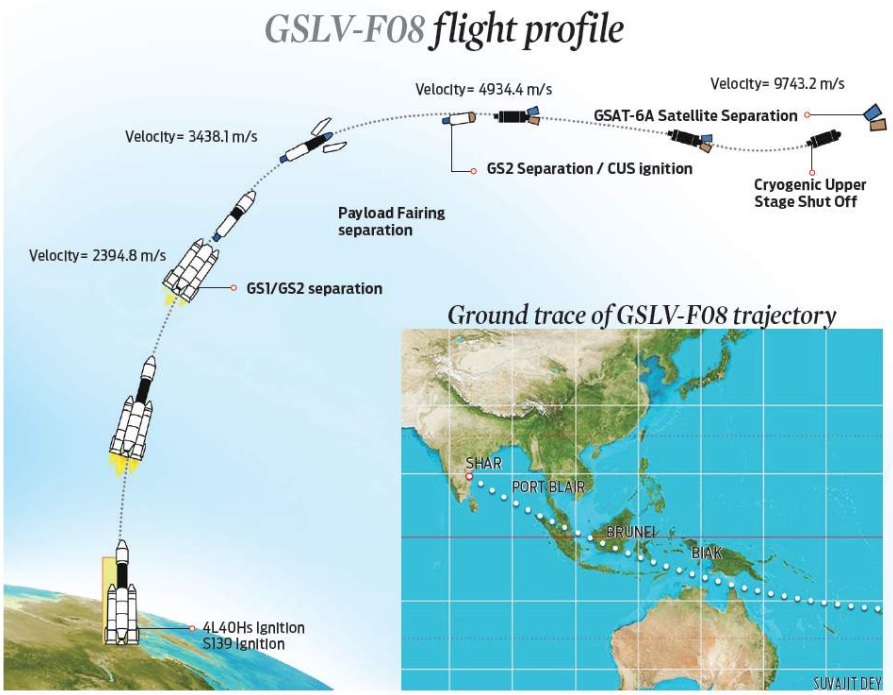
\n\n

What is the significance?

\n\n

\n
- **Launch** - The launch took ISRO a step towards realising its second Moon mission Chandrayaan 2 planned for October 2018.
\n
- The launch was the 12th satellite launched on board the GSLV rocket.
\n
- This is the fifth consecutive success for a GSLV equipped with an indigenously developed **Cryogenic Upper Stage engine**.
\n
- **GSLV** - The GSLV F08 is an improved and a fully operational version of ISRO's heavy-lift GSLV Mk II rocket series.
\n
- The GSLV, specifically the GSLV F10, is the designated rocket to fly India's second mission to the Moon, the Chandrayaan 2.
\n
- In the absence of heavy-lift rocket technology, India has been relying on France for launching its communication satellites.
\n

\n\n



\n\n

\n

- **Vikas Engine** - Vikas engine powered the rocket’s second stage.
\n
- The performance of the vehicle is enhanced with an improved Vikas engine.
\n
- The improved engine has increased the thrust by 6%, thereby enhancing payload capability of the vehicle by 50%.
\n
- The second stage also had electromechanical actuation system replacing electrohydraulic actuation system.
\n
- This is to enhance the reliability of the rocket.
\n
- These improvements to the vehicle would be incorporated into GSLV’s future missions, including Chandrayaan-2.
\n

\n\n

Why is the cryogenic stage significant?

\n\n

\n

- The indigenous cryogenic stage on the GSLV is the third stage, and uses liquid hydrogen as fuel and liquid oxygen as oxidiser.
\n

- **Challenge** - Cryogenic engine uses propellants at extremely **low temperatures.**
\n
- The resultant and associated thermal and structural problems make cryogenic stage a very complex system.
\n
- **Benefits** - Cryogenic engines provides more thrust for every kg of propellant it burns.
\n
- It is a highly efficient rocket stage as the efficiency is better when compared to solid and earth-storable liquid propellant stages.
\n
- Cryogenic engines also keep fuel loads relatively low.
\n
- **GSLV** - Cryogenic engines provide unprecedented thrust to GSLV rockets in their final stages.
\n
- Nearly 50% of the power for GSLV rockets as they push into space comes from the cryogenic stage.
\n

\n\n

How did the cryogenic technology evolve in India?

\n\n

\n
- India had first ventured on the path of obtaining cryogenic technology in 1992.
\n
- It had a two-pronged strategy of purchasing cryogenic engines from Russia, and acquiring the technology from the US.
\n
- But following the 1998 nuclear tests and the sanctions that followed, the US denied India cryogenic technology.
\n
- ISRO used 7 cryogenic engines sold by Russia for the early phase of its GSLV programme that began in 2001.
\n
- Parallelly, India ventured into developing an indigenous technology.
\n
- GSLV launches with Russian engines, including early operational flights, had mixed results, with only 2 flights going perfectly to plan.
\n
- The first GSLV flight with an indigenous cryogenic upper stage failed on

April 15, 2010.
\n
- But India is now among 6 nations, along with the US, Russia, France, Japan and China, to possess cryogenic engine technology.
\n

\n\n

What lies ahead?

\n\n

\n
- ISRO is still in the process of developing a fully operational GSLV Mk III rocket.
\n
- This can carry satellites weighing more than 4 tonnes to space.
\n
- The cryogenic upper stage in the GSLV Mk III rocket uses the C25 engine.
\n
- This is an improvement on C20 cryogenic engines used in the GSLV Mk II rockets.
\n
- A GSLV Mk III D2 rocket is scheduled to fly a GSAT 29 communication satellite to space in its second mission soon in the year.
\n

\n\n

\n\n

Source: Indian Express

\n