

India's First Indigenous Optical Inter-Satellite Link (OISL)

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Why in News?

Bengaluru-based deep-tech startup Astrogate Labs unveiled India's first indigenous Optical Inter-Satellite Link (OISL) terminal at the Bengaluru Space Expo.

Optical Inter-Satellite Link (OISL)

- OISL uses Free Space Optical Communication (FSOC) via high-precision laser beams.
- It is to allow satellites within a constellation to communicate directly with one another without routing data back to ground stations first.
- It replaces conventional Radio Frequency (RF) links, overcoming bandwidth limits and spectrum congestion while enabling secure, high-speed, low-latency connectivity.
- Allows data to hop across orbital networks instantly, mirroring architectures like SpaceX's Starlink optical mesh network.

Key Technical Highlights

- **AstroLink Micro**- Astrogate demonstrated **AstroLink Micro, a 10 Gbps** space-to-ground laser communication terminal.
- **Core Subsystems**- The OISL terminal leverages indigenous building blocks:
 - **PAT System**- High-precision Pointing, Acquisition, and Tracking systems.
 - **Optical Modems & Gimbals** - Stabilized coarse-tracking gimbals for maintaining laser locks between moving satellites.
- **Proven Technology Readiness**- Astrogate's underlying space-to-ground laser terminals have already reached **Technology Readiness Level 8 (TRL 8)**.
- **ISRO Validation** - Astrogate previously supplied satellite-to-ground lasercomm hardware to ISRO.
- It also completed cross-compatibility testing with the University of Western Australia's **TeraNet** mobile optical ground station.

Significance

- **Sovereign Capability**- Establishes end-to-end indigenous ownership of optical communication layers for future Low Earth Orbit (LEO) constellations.
- **Primary Target Markets**
 - **Satellite Backhaul** - High-throughput data transfer for commercial satellite constellations.
 - **Sovereign Defence Constellations**- Secure, jam-resistant tactical communications in space.
 - **Orbital Compute**- Supporting edge computing architectures directly in orbit.



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Linking Indian satellites with light. Enabling a more connected space future.

A BIG STEP TOWARDS A SELF-RELIANT SPACE INDIA



Indian Satellite (OISL Terminal)

LIGHT-BASED COMMUNICATION BETWEEN SATELLITES

Indian Satellite (OISL Terminal)



High-Speed Data Transfer
Using laser (optical) beams



Secure & Reliable Communication
Difficult to intercept



Indigenous Technology
Designed and developed in India



Enables Future Space Missions
Supports constellations, deep-space missions and real-time data sharing

EXPLORE
INNOVATE
SELF-RELIANT

CONNECTING INDIA'S SPACE ASSETS FOR A BRIGHTER TOMORROW

ATMANIRBHAR
BHARAT
IN SPACE

Reference

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