



# NASA's New Communications System: LCRD

## Why in News

Recently, [NASA \(National Aeronautics and Space Administration\)](#) has launched its new **Laser Communications Relay Demonstration (LCRD)**.

## Key Points

### ▪ About:

- It is the **first-ever laser communications system** that will **pave the way for future optical communications missions**.
  - Currently, most NASA spacecraft use radio frequency communications to send data.
- The **LCRD payload is hosted onboard the US Department of Defense's Space Test Program Satellite 6 (STPSat-6)**. It will be in a [geosynchronous orbit](#), over 35,000km above Earth.
- It will be controlled by engineers at the **LCRD mission's ground stations in California and Hawaii**.
- The team will send test data through radio frequency signals and the LCRD will reply using optical signals.

### ▪ Features:

- It has **two optical terminals**. One to receive data from a user spacecraft, and the other to transmit data to ground stations.
- The modems will **translate the digital data into laser signals**. This will then be transmitted via encoded beams of light.
- These capabilities make **LCRD NASA's first two-way, end-to-end optical relay**.

### ▪ Significance:

- Laser uses infrared light and has a shorter wavelength than radio waves. This will **help the transmission of more data in a short time**.
  - Using infrared lasers, LCRD will send data to Earth at 1.2 gigabits-per-second (Gbps). At this speed, it will take less than a minute to download a movie.
  - It takes roughly nine weeks to transmit a completed map of Mars back to Earth with current radio frequency systems. **With lasers, we can accelerate that to about nine days**.
- Optical communications **will help increase the bandwidth 10 to 100 times more** than radio frequency systems.
- Optical communications systems are smaller in size, weight, and require less power compared with radio instruments.
- A smaller size means **more room for science instruments**.
- **Less weight means a less expensive launch**.
- Less power means **less drain on the spacecraft's batteries**.
- With optical communications supplementing radio, missions will have **unparalleled communications capabilities**.

**Source: IE**

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