

Laser Communications Relay Demonstration (LCRD)

December 9, 2021

In news- Recently, **NASA has launched its new Laser Communications Relay Demonstration (LCRD)** from Cape Canaveral Space Force Station in Florida.

About LCRD-

- It is the **first-ever laser communications system** (to transmit data from space to Earth) of NASA.
- Currently, most NASA spacecraft use radio frequency communications to send data.
- LCRD **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 which will then be transmitted via encoded beams of light.
- These capabilities make LCRD **NASA's first two-way, end-to-end optical relay.**
- Optical communications will help increase the bandwidth 10 to 100 times more than radio frequency systems.
- 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.
- For the first two years, LCRD will test its communications capabilities.
- 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.
- Using infrared lasers, **LCRD will send data to Earth at 1.2 gigabits-per-second (Gbps).**

Note-

- Optical communications systems are smaller in size, weight, and require less power compared with radio instruments.
- The infrared light used for laser communications differs from radio waves because it occurs at a much higher frequency and shorter wavelength, allowing engineers to pack more data into each transmission.
- More data yields more information and discoveries about space at once.