



AMAZON LEO

COMMUNICATIONS SERVICES PROJECT PARTNERSHIP

NASA is commercializing satellite relay communications for science missions near-Earth. The Communications Services Project (CSP) is leading agency efforts by investing in the U.S. satellite communications industry to develop and demonstrate powerful services for missions launching as early as 2031. In 2022, CSP awarded \$278.5 million to commercial industry through six Funded Space Act Agreements to demonstrate a variety of capabilities, including near-instant delivery of high-rate science data, critical support for launch operations, and reliable exchanges of telemetry, tracking, and command information.

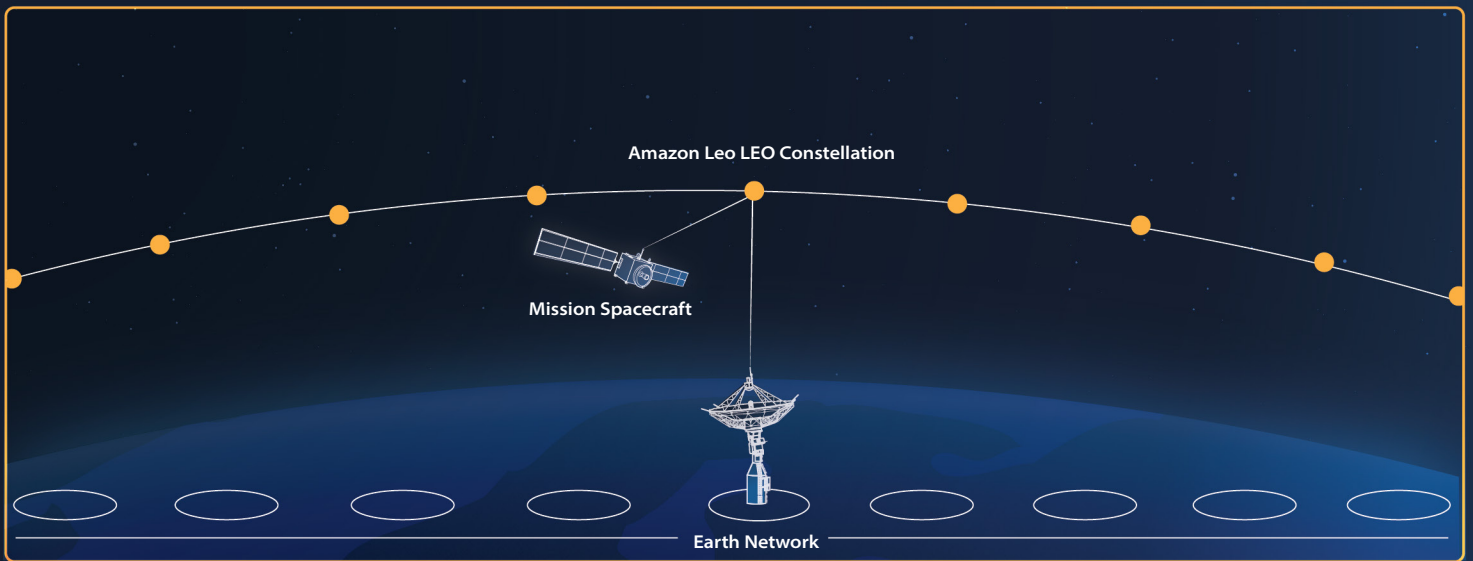
Kuiper Government Solutions LLC, now doing business as Amazon Leo, was awarded \$67 million to demonstrate an optical low-Earth orbiting (LEO) relay network that can provide high and low-rate satellite communications services to LEO spacecraft. The global network will support routine missions, contingency operations, and early operations phase communications.

VISION

Amazon Leo is Amazon's initiative to provide fast, affordable broadband to communities around the world that are currently unserved or underserved by traditional internet and communications options. To achieve this goal, Amazon will deploy more than 3,000 satellites in LEO that link to small customer terminals on one end and a global network of hundreds of ground gateways on the other. Amazon's secure global networking will connect those gateways to the internet, public cloud, or private networks, offering resilient connectivity with end-to-end encryption to users around the world.

The satellites and customer terminals use electronically steerable phased array antennas operating in the Ka-band for space-to-ground communication. In addition, the customer terminals, satellites, and gateways all use software-defined networking and an Amazon-designed baseband chip to dynamically allocate bandwidth throughout the network, with each satellite capable of processing up to 1 terabit per second (Tbps) of data. For space-to-space communication, Amazon is testing optical links between terminals onboard the satellites to create a resilient mesh network in space.

NETWORK ARCHITECTURE



A constellation of more than 3,000 satellites deployed in LEO and equipped with optical terminals and advanced antennas will link to a secure, ground-based communications network to deliver resilient, low-latency communications to users on Earth and in space.

KEY FEATURES

- High-speed, low-latency optical services
- Resilient on-orbit optical mesh networking
- End-to-end encryption for customers
- Secure, global ground network
- Improved performance over traditional C- and Ku-bands

LEARN MORE

The Communications Services Project is managed by NASA's Glenn Research Center, under the direction of the SCan (Space Communications and Navigation) Program within NASA's Space Operations Mission Directorate. SCan operates and manages the communications and navigation systems that are critical to every NASA missions, while facilitating a seamless transition from near-Earth government-owned communications assets to commercial alternatives.

To engage with NASA's Communications Services Project, contact scan@nasa.gov.

