



DoD To Test Laser Communications Terminals in Low Earth Orbit

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<https://www.sda.mil/dod-to-test-laser-communications-terminals-in-low-earth-orbit/>

The Space Development Agency says optical inter-satellite links are “one of the most critical technologies to be demonstrated.”

WASHINGTON — Optical communications terminals that use lasers to beam data across space will be tested in upcoming experiments by the Space Development Agency and the Defense Advanced Research Projects Agency.

These terminals are important pieces of DoD’s future low Earth orbit constellations which will require satellite-to-satellite optical crosslinks so data collected in space can be immediately sent to military command centers on the ground. Laser communications systems have much faster data transmission rates than radio-based systems but DoD has concerns such as the effects of space radiation on optical terminals and whether the electronics can withstand the stress of space launch.

“Optical inter-satellite links are one of the most critical technologies required to be demonstrated for Tranche 0,” the Space Development Agency said in a request for proposals issued last month for its communications constellation known at the transport layer. Tranche 0 is the initial deployment planned for 2022.

The satellites in the transport layer have to pass data in space and down to the ground to military users with very low latency. That can't happen "without the demonstration and maturation of optical inter-satellite crosslinks — with radio frequency (RF) crosslinks as a backup," the SDA request says. One of the concerns in using lasers for downlinks is penetrating the Earth's atmosphere, especially through clouds.

SDA wants to build one or more constellations of hundreds of satellites for communications and for missile tracking. It plans to buy optical terminals from multiple vendors so it's asking bidders to ensure their hardware is interoperable with those of other vendors.

Several companies make advanced optical terminals for NASA's deep-space communications and follow common standards. But there is no accepted industry standard for optical inter-satellite links in lower orbits below geosynchronous range, according to SDA.

In its request for proposals, SDA included a recommended standard to make links interoperable but it will still need suppliers to collaborate to make sure their systems are compatible.

One of the companies now working with SDA on optical links is General Atomics Electromagnetic Systems. GA-EMS announced on June 5 that it signed an agreement with the agency to conduct a series of experiments for optical inter-satellite links using the company's laser communication terminals.

"These experiments will demonstrate robust communication capabilities through multiple mediums, from Earth, to and between satellites in multiple orbits, and on in to deep space," Scott Forney, president of GA-EMS, said in a statement.

For the experiment scheduled to launch in March 2021, the company will develop two 12U cubesats, each hosting an infrared payload and a laser communications terminal.

Contract information

Space Development Agency

Optical Inter-Satellite Link (OISL) Demonstration

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