

Wideband Technology

Interoperability for Near-Earth Services

National Aeronautics and
Space Administration



Commercialization of Satellite Relay Services

As NASA enters a new era of space exploration, the agency is adopting commercial satellite relay services for emerging near-Earth missions. NASA's SCan (Space Communications and Navigation) Program is actively working with industry to develop and demonstrate space-based relay services that satisfy mission needs, with plans to deliver commercial services to NASA missions by 2031.

Wideband Polylingual Terminals

Just as roaming technology allows cell phones to jump from network to network without service interruption, wideband polylingual terminals use software defined radios to enable similar roaming capabilities in space, empowering spacecraft to move between both government and commercial frequencies. A proven, innovative technology, software-defined radios enable software and waveform updates for active missions, instead of completing all updates prior to launch—a key capability that enables wideband terminal technology.

Wideband terminals are under development by NASA and industry partners to support a variety of user needs. The first Ka-band wideband polylingual terminal is set to launch on a flight demonstration, no earlier than the summer of 2025.

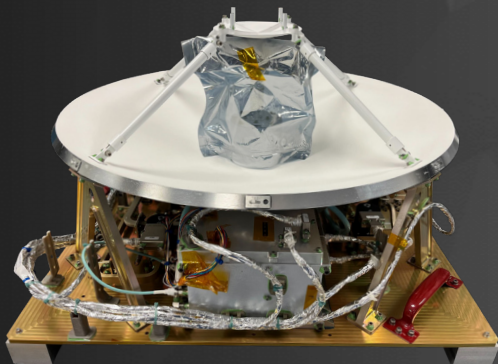
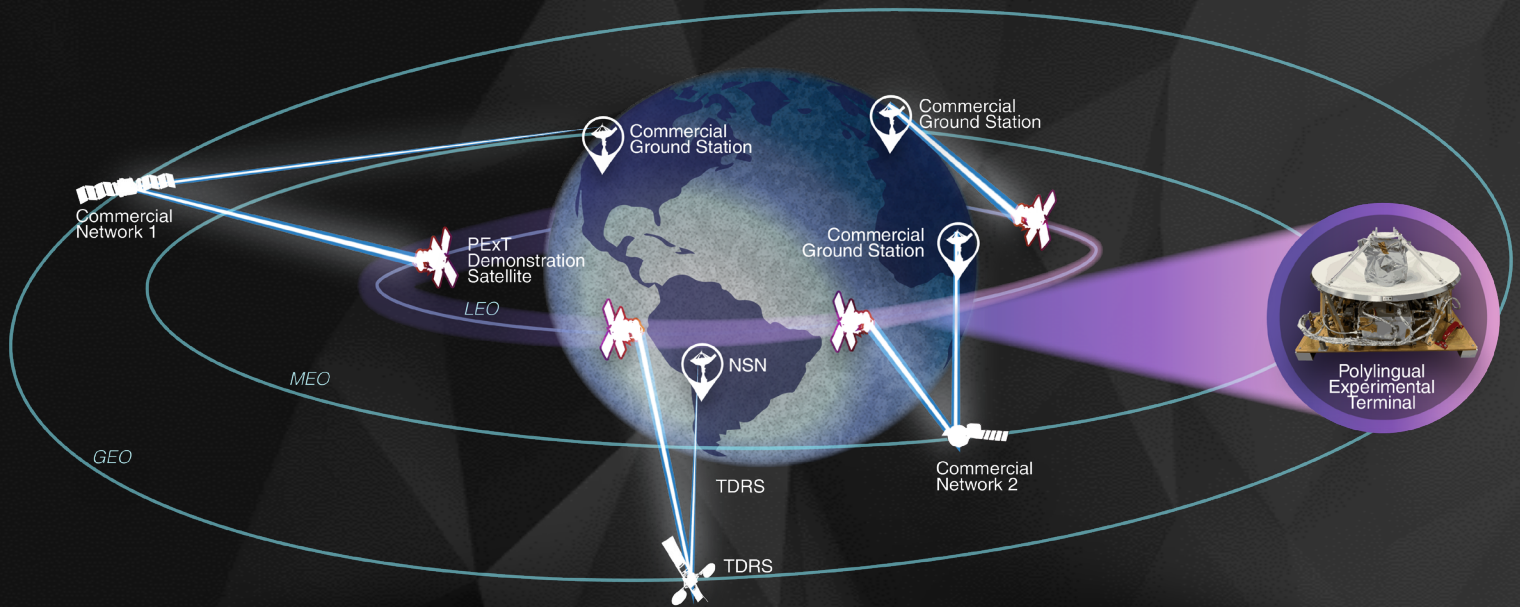
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Wideband Terminal Flight Demonstration

NASA is collaborating with the Johns Hopkins University Applied Physics Laboratory to test a wideband terminal called the Polylingual Experimental Terminal, or PExT, during a flight demonstration. The body-mounted payload includes 0.6-meter high gain antenna, which will launch into low Earth orbit on a York Space System S-CLASS bus. PExT will rideshare alongside NASA's TRACERS mission, launching no earlier than the summer of 2025.

This is the first flight demonstration of a wideband polylingual terminal proving seamless compatibility across both government and commercial networks. PExT will complete various mission scenarios that require satellite communications services, while roaming between NASA's Tracking and Data Relay fleet and two commercial networks. Demonstrated mission scenarios include nominal day-in-the-life operations such as self-pointing and scheduling capabilities, secure tracking and telemetry exchanges, and failure recovery scenarios, as well as direct-to-Earth capabilities



Terminal Details

- SWAP: 24 x 24 x 17 inches, ~23kg weight, peak power 200 watts
- Operational Frequency Coverage: 17.7 GHz-23.55 (Forward) and 27 GHz-31 GHz (Return)
- EIRP: 46.21 dBW (Minimum)
- G/T: ~6dB/K
- Waveforms: DVB-S2, CCSDS TDRSS
- Data Rates: up to 90 Mbps (Forward) and up to 375 Mbps (Return)
- Future Data Rates: up to 490 Mbps (Forward) and 1 Gbps (Return)



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