COMSATCOM LABORATORY

Commercial Satellite Communications Laboratory

The Commercial Satellite Communications Laboratory (COMSATCOM Lab) allows Aerospace and its customers much-needed insight into the performance of commercial architectures that are being adapted for U.S. government purposes. Operations are strategically aligned with both Aerospace's corporate objectives and the Pentagon's "2024 DoD Commercial Space Integration Strategy." As the DoD shifts toward nongeostationary and proliferated low Earth orbit SATCOM constellations, whether both commercial or hybrid, the COMSATCOM Lab offers critical assessments and analysis. It provides comprehensive testing capabilities, including both hardware and software platforms, to evaluate and optimize these advanced architectures.


OneWeb terminals continued testing in FY25.

Evaluation, Test, and Assessment Capabilities

- Network monitoring and performance analysis
- User ground terminal resiliency to radio frequency interference
- Impact of encryption on link performance and latency
- Load balancing across multiple user terminals to achieve higher effective data rates
- Cybersecurity threat analysis of user terminal and satellite network services
- Satellite and terrestrial network performance characterization across commercial and military satellite networks with various traffic profiles required by our customers

Starlink user terminal undergoing testing.

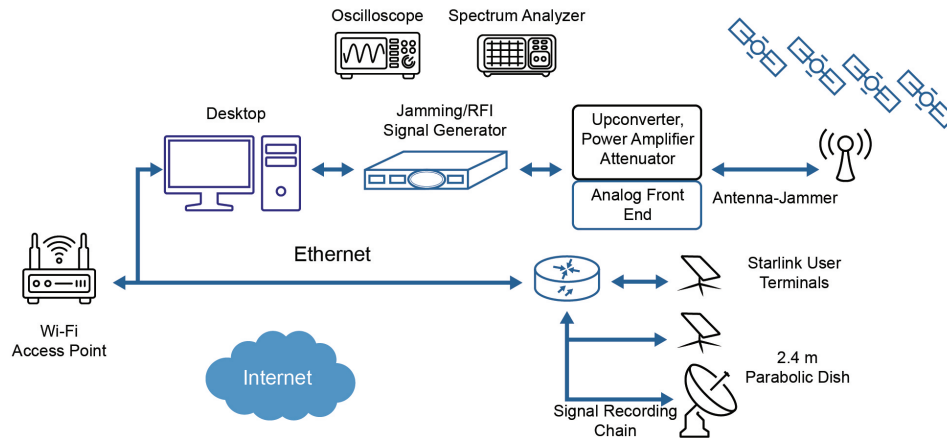

COMSATCOM network testbed.
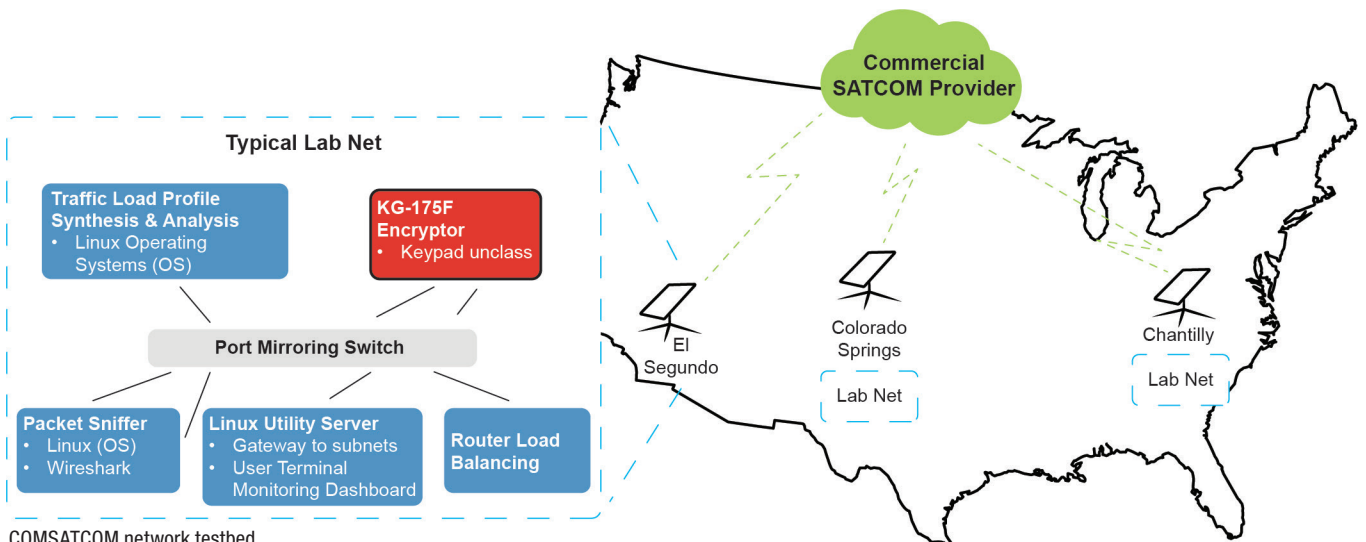
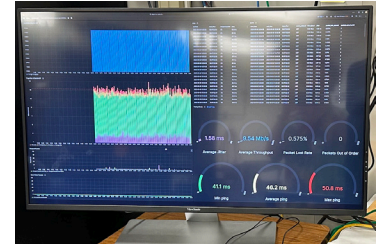## Continental United States (CONUS) Network Testbed

Thorough testing was completed in FY24 to study the effectiveness of employing the Starlink satellite network for transporting encrypted traffic for a government-owned-and-operated military network. Starlink was tested as an alternative to terrestrial backhaul communications and the pathfinder effort involved all three CONUS nodes of the COMSATCOM Lab. Recognizing the numerous commercial and hybrid architectures in development and under consideration, the COMSATCOM Lab is continually growing its capability with the current roadmap including OneWeb terminal testing in FY25.

Dashboard displaying network performance metrics.
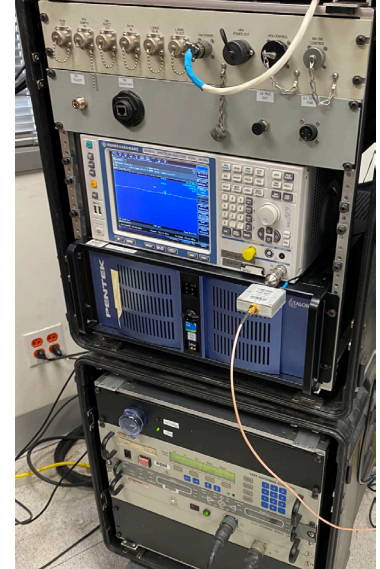
Radio Frequency and Digital Testbed

A wide array of key performance indicators (KPIs) for evaluating SATCOM networks can be characterized and benchmarked under various environmental, manmade (accidental or adversarial), or natural conditions. The COMSATCOM Lab can analyze the impacts to throughput and bandwidth, latency, jitter, packet loss rate, and availability and reliability. It can assess geographic coverage and signal strength in the presence of Radio Frequency Interference and jamming, cybersecurity threats, and weather and natural disaster effects. The lab can determine application-level impacts to navigation, encrypted communications, remote sensing, and disaster recovery and emergency response, with extensions to aeronautical and maritime communications.

COMSATCOM Lab: Radio frequency and digital testbed.

The signal capture system allows selection between narrowband (~60 MHz) and wideband (~1 GHz) signal recording modes to allow waveform analysis.

Cybersecurity Threat Analysis

The COMSATCOM Lab is equipped with necessary state-of-the-art tools to analyze cybersecurity threats in SATCOM networks, to provide comprehensive insight into potential risks to our customers.

Penetration
- Port scanning
- Gaining access

Hardware Fault Injection Attacks
- Hardware fault injection
- Boot-up fault injection
- Side-channel attacks

Network Fuzzing
- Fuzzing data generation
- Execute and monitor fuzzed behavior

Cybersecurity threat analysis.

The Aerospace Corporation

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