Secure, Mobile, Wireless Network Technology Designed, Developed, and Demonstrated

The inability to seamlessly disseminate data securely over a high-integrity, wireless broadband network has been identified as a primary technical barrier to providing an order-of-magnitude increase in aviation capacity and safety. Secure, autonomous communications to and from aircraft will enable advanced, automated, data-intensive air traffic management concepts, increase National Air Space (NAS) capacity, and potentially reduce the overall cost of air travel operations. For the first time ever, secure, mobile, network technology was designed, developed, and demonstrated with state-of-the-art protocols and applications by a diverse, cooperative Government-industry team led by the NASA Glenn Research Center. This revolutionary technology solution will make fundamentally new airplane system capabilities possible by enabling secure, seamless network connections from platforms in motion (e.g., cars, ships, aircraft, and satellites) to existing terrestrial systems without the need for manual reconfiguration.

Called Mobile Router, the new technology autonomously connects and configures networks as they traverse from one operating theater to another. The Mobile Router demonstration aboard the Neah Bay, a U.S. Coast Guard vessel stationed in Cleveland, Ohio, accomplished secure, seamless interoperability of mobile network systems across multiple domains without manual system reconfiguration. The Neah Bay was chosen because of its low cost and communications mission similarity to low-Earth-orbiting satellite platforms. This technology was successfully advanced from technology readiness level (TRL) 2 (concept and/or application formation) to TRL 6 (system model or prototype demonstration in a relevant environment).

The secure, seamless interoperability offered by the Mobile Router and encryption device will enable several new, vehicle-specific and systemwide technologies to perform such things as remote, autonomous aircraft performance monitoring and early detection and mitigation of potential equipment malfunctions. As an additional benefit, team advancements were incorporated into open standards, ensuring technology transfer. Low-cost, commercial products incorporating the new technology are already available. Furthermore, these products are fully interoperable with legacy network technology equipment currently being used throughout the world.

Find out more about this research:
Bibliography at http://roland.grc.nasa.gov/~ivancic/papers_presentations/papers.html
Secure mobile networking demonstration at
http://roland.grc.nasa.gov/~ivancic/secure_mobile_networks/smn.html

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Programs/Projects: Earth science; may benefit nearly all of NASA's future programs and projects. The equipment is mass, power, and volume efficient and can be used on nearly any mobile platform (trucks, cars, planes, helicopters, ships, spacecraft, etc.).
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