Military Communications: Industry News and Recent Developments

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Tunable Filter Research at Army Research Lab

Research being done at the U.S. Army Research Laboratory (ARL) is leading to significant improvements in how Soldiers send and receive data—including videos, voice transmissions, and other communications—on the battlefield.

Dr. Melanie Cole, an ARL Fellow, led a team of scientists that received award recognition for work done under their Director's Research Initiative in UV-photon irradiation. The team included Ryan Toonen, Eric Ngo, Matthew Ivill, Gary Hirsch and Clifford Hubbard from ARL's Weapons and Materials Research Directorate, and Theodore Anthony from ARL's Sensors and Electron Devices Directorate. The DRI is an annual competition launched in 1998 that calls for high-risk, out-of-the-box research ideas expected to result in emerging or alternative technologies that significantly advance mission needs beyond conventional expectations.

The DRI research concentrated on the development of a novel materials technology solution to achieve high-Q tunable complex oxide thin film materials to enable enhanced performance, low cost, tunable Ka-band filters for the next generation communications platforms.

Cole notes that all communications systems require frequency-selective elements (i.e., tunable filters) to separate different parts of the received spectrum; therefore, such research to improve filter technology is critical. Both semiconductor and magnetic based materials have been extensively researched for electronic and magnetically tunable filters, respectively.

Air Force Works on Integrated Networks

The Air Force soon will have a relatively new term to add to its network operations lexicon: "networthiness." Air Force Network Integration Center officials recently led efforts to develop the Department of Defense's networthiness concept, an operational assessment that goes well beyond information security to provide a holistic review of anything and everything that connects to a DOD network.

With the proposed DOD criteria in coordination, AFNIC officials now are leading implementation of networthiness for the Air Force, which will provide a singular, seamless framework of processes for introducing new systems and applications to the Air Force network, or AFNet. While the implementation will be largely transparent to the average network user, Airmen can expect enhanced rigor, performance and reliability of new capabilities introduced to the network. "What Airmen can expect to see is future systems that get fielded without having major issues," said Gene Zuratynsky, chief of the AFNIC certification and accreditation policy branch. "They should see better performance and better quality."

The Air Force implementation is based on DOD assessment criteria developed by the Joint Networthiness High Performance Team, which was led by Nancy Klein, AFNIC's networthiness lead and deputy director of information assurance, and included representatives from the Defense Information Systems Agency and each of the service components. "The purpose of the DOD-level effort was to come to agreement across the services and DISA so that when something needs approval to connect there are standard criteria that should be looked at," Ms. Klein said.

Using the DOD approach of reviewing common criteria, AFNIC officials, in partnership with staffs at the Secretary of the Air Force Chief Information Officer Networks, Air Force Space Command, 24th Air Force and other functional communities, are reviewing existing Air Force processes and checks already in place. These processes for evaluating interoperability, security, sustainability and supportability will be brought together to achieve networthiness.

Naval Research Lab Uses CubeSats

Launched from Cape Canaveral Air Force Station in December 2010 as secondary payloads on a Space Exploration (SpaceX) Technologies, Inc. Falcon 9 launch vehicle, two nano-satellites designed and built by the NRL Naval Center for Space Technology have been deployed to evaluate nano-satellites as a platform for experimentation and technology development.

Known as the CubeSat Experiment (QbX), the two 3U (30×10×10 cm) CubeSat buses were built by Pumpkin, Inc., San Francisco, Calif., and provided to the NRL by the National Reconnaissance Office's Colony Program Office.

This is the first flight of the Pumpkin-built Colony I spacecraft bus and is being used to evaluate the performance of the vehicle as a platform for experimentation.

Flight software, antennas, and the TTC radio were built and integrated by the NRL, as was the developmental communications payload. Environmental testing of the completed package was also performed at NRL. Ground stations on the east and west coasts provide coverage for command loads and data collection.

The primary payload launched aboard the SpaceX Falcon 9 was the Dragon Module. Developed by SpaceX and sponsored by NASA's Commercial Orbital Transportation Services (COTS) program, the Dragon Module is an initiative to develop private spacecraft to ferry cargo to and from the International Space Station.

ManTech International Acquires MTCSC Inc.

ManTech International Corporation a provider of innovative technologies and solutions for mission-critical national security programs, announced that on Dec. 22, 2010, the company completed the acquisition of MTCSC Inc. for $75 million in cash. The completed acquisition adds additional Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) systems integration and cyber capabilities to ManTech's services portfolio.

Headquartered in Chula Vista, Calif., with a major presence in Stafford, VA, MTCSC provides C4ISR systems integration, cyber security and network engineering solutions to U.S. government customers. The company holds several large contracts with the U.S. Marine Corps, the majority of which are for classified efforts. MTCSC will be integrated with ManTech's Systems Engineering and Advanced Technology (SEAT) group, led by Terry M. Ryan, SEAT group president and chief operating officer.

Booster Amplifier Receives JITC Certification

AR Modular RF has received JITC Certification on its AR-50 booster amplifier. The 50-watt, automatic tuning, multi-band tactical booster amplifier (30 - 512 MHz) has been tested and certified for conformance to applicable Military Standard (MIL-STD). The AR-50 booster amplifier boosts tactical radio signals from handheld and back-pack transceivers operating in the 30 - 512 MHz band. It provides 50 watts output with as little as 2 watts input and offers two antenna ports dedicated to line-of-sight (LOS) or UHF Satellite (SAT-COM). The system also provides a switchable low-noise amplifier (LNA) and a three-position RF output level control. The small, compact, lightweight unit can run from either 12 V or 24 V vehicle power systems.

Manpack Transceiver is JITC Certified

Codan has announced that it has received certification from the Joint Interoperability Test Command

(JITC) for the Codan 2110 high frequency manpack transceiver. According to the notification, the Codan 2110 manpack is certified as conforming to the Automatic Link Establishment (ALE) requirements of Military Standard (MIL-STD)-188-141B, Interoperability and Performance Standards for Medium and HF Radio Equipment.

The JITC certification enables interoperability between Codan and other HF radio brands and establishes a common waveform for ALE operation. This is important in coalition and Partnership for Peace (PFP) operations and the extension of HF networks for emergency preparedness and disaster relief. Within minutes of a radio operator initiating a call, ALE chooses the best frequency and signals the operators on both ends so they can begin communicating with each other immediately. One of the many benefits of ALE is that it eliminates the need for repetitive calling on pre-determined time schedules and monitoring static on HF radios.

Accelerated UAV Deployment Planned

The Army is speeding up delivery of some of its newer Unmanned Aircraft System assets such as the Gray Eagle, and expanding the size and range of its overall fleet to include a Family of Small UAS and a Vertical-Take-Off-and-Landing UAS, service officials said. A Defense Acquisition Board in February of this year is expected to confirm the addition of two more Low Rate Initial Production Gray Eagle systems—each consisting of 12 air vehicles, five ground control stations and five additional attrition vehicles. The Army has already deployed two Gray Eagle "Quick Reaction Capabilities." One QRC is now flying with Army Soldiers in Iraq and another is with U.S. Special Operations Forces in Afghanistan. The surveillance aircraft can beam images from up to 29,000 feet for more than 24 hours at a time.

The Army's Program Office for UAS is also planning a QRC for the A160 Hummingbird Vertical-Take-Off-and-Landing, or VTOL UAS. It's a 35-foot-long helicopter-like unmanned system able to conduct Intelligence, Surveillance and Reconnaissance (ISR) missions and move cargo for more than 20 hours at altitude ceilings of up to 30,000 feet. The first A160 aircraft was provided by the DARPA. U.S Special Operations Command is providing the next two follow-on aircraft.

The Army is also developing a formal requirement for a VTOL UAS designed to work in tandem with the A160 QRC, a process which will result in a formal competition and selection of a new capability.