SATCOM For Net-Centric Warfare

September 2013

MilsatMagazine

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FEATURES

ULA'S DELTA IV SENDS USAF'S WGS-6 SKYWARDS

The WGS-6 launch, with the satellite aboard a United Launch Alliance (ULA) Detal IV rocket. Photo is courtesy of Pat Corkery, ULA.

The launch of the Air Force's sixth Wideband Global SATCOM (WGS-6) launch was accomplished without a hitch aboard a ULA Delta IV on Wednesday, August 7th, 2013, at 8:29 p.m. from Space Launch Complex 37 at Cape Canaveral Air Force Station in Florida.

Unique to this launch is the USAF's partnership with the Australian Defence Force (ADF). In November of 2007, Australia signed a bi-lateral Memorandum of Understanding (MOU) with the United States to join the WGS program. Through this agreement, Australia provided the funding for the procurement, sustainment, and launch costs associated with the sixth WGS satellite. In return, the ADF receives assured bandwidth across the WGS 1-6 satellites.

The Air Force Space Command's Space and Missile Center MILSATCOM Systems Directorate procured the sixth WGS satellite through contracts with The Boeing Company. The MILSATCOM System Directorate plans for, acquires, and sustains space-enabled global communications to support the President, Secretary of Defense, and combat forces.

This was ULA's seventh launch in 2013, and the 73rd launch since the company was formed in December 2006, as well as the second WGS mission launch for 2013. Wideband Global SATCOM provides anytime, anywhere communication for the warfighter through broadcast, multicast, and point to point connections. WGS is the only military satellite communications system that can support simultaneous X and Ka band communications.

Jim Sponnick, ULA's Vice President of the Atlas and Delta programs, said after the launch, "Congratulations to the entire team on today's successful launch of the WGS-6 satellite. As with the previous five WGS missions, we have enjoyed a very strong partnership with the Air Force and all of our missions partners throughout this launch campaign. We were honored to launch the first two WGS satellites on our Atlas V vehicle and the next four satellites in the constellation on our Delta IV vehicle, delivering critical communications capability to orbit to support our nation's warfighters throughout the world."

This mission was launched aboard a Delta IV Medium-plus configuration vehicle using a single ULA common booster core powered by an Aerojet Rocketdyne RS-68 main engine, along with four ATK GEM 60 solid rocket motors. The five-meter diameter upper stage was powered by an Aerojet Rocketdyne RL10B-2 engine with the satellite encapsulated in a five-meter diameter composite payload fairing.

The WGS-6 launch marked the fourth flight of the Delta IV medium+ (5,4) configuration and the 23rd flight of the Delta IV family of launch vehicles. "WGS was the first of the constellation of satellites to launch on both the Delta IV and Atlas V vehicles," said Sponnick. "This team's ability to integrate and launch satellites successfully and efficiently on two launch systems provides operational flexibility to our customers."

ULA's next launch is the Delta IV Heavy NROL-65 mission for the National Reconnaissance Office, scheduled (at the time of this writing) for August 28th, from Space Launch Complex-6 at Vandenberg Air Force Base, California.

The Evolved Expendable Launch Vehicle (EELV) program was established by the United States Air Force to provide assured access to space for Department of Defense and other government payloads. The commercially developed EELV Program supports the full range of government mission requirements, while delivering on schedule and providing significant cost savings over the heritage launch systems.

ULA program management, engineering, test, and mission support functions are headquartered in Denver, Colorado. Manufacturing, assembly and integration operations are located at Decatur, Alabama, and Harlingen, Texas. Launch operations are located at Cape Canaveral AFS, Florida, and Vandenberg AFB, California.

The Space and Missile Systems Center is the U.S. Air Force's center of acquisition excellence for acquiring and developing military space systems including Global Positioning System, military satellite communications, defense meteorological satellites, space launch and range systems, satellite control network, space based infrared systems, and space situational awareness capabilities.

Over the next few months, Boeing will initiate on-orbit testing of the satellite to verify nominal performance and prepare the satellite for operational use. Ultimately, the satellite will be controlled by the U.S. Air Force's 3rd Space Operations Squadron at Schriever Air Force Base, Colorado. WGS-6 should enter operations in early 2014.

"WGS is a vital piece of the MILSATCOM enterprise consisting of WGS, DSCS, AEHF, Milstar and terminals," said Ms. Charlotte Gerhart, Chief, Wideband SATCOM Division, MILSATCOM Directorate. "WGS is providing unparalleled global communications capabilities to soldiers, sailors, marines and airmen for the United States, Australia, Canada, Denmark, Luxembourg, The Netherlands, and New Zealand. The continued success of WGS is due to the hard work and dedication from the combined Government and Boeing team."

WGS supports communications links in the 500MHz range of the X-band and 1GHz range of the Ka-band spectra. WGS can filter and route up to 4.875GHz of instantaneous bandwidth.

WGS-6, the third Block II satellite, includes a high-bandwidth radio frequency (RF) bypass capability in addition to the previous capabilities provided by the Block I satellites. Depending on the mix of ground terminals, data rates, and modulation schemes employed, a WGS satellite can support data transmission rates between 2.4 and 3.6Gbps.

WGS has 19 independent coverage areas that can be positioned throughout its field of view. This includes eight steerable/shapeable X-band beams formed by separate transmit/receive phased arrays; 10 Ka-band beams served by independently steerable diplexed antennas (three with selectable RF polarization); and transmit/receive X-band Earth-coverage beams.

WGS can tailor coverage areas and connect X-band and Ka-band users anywhere within its field of view. Four Army Wideband Satellite Operations Centers (WSOC) provide command and control of WGS. Each Global SATCOM Configuration and Control Element (GSCCE) has the capability to control up to three satellites at a time, using X-band or Ka-band telemetry and command links.

Support technologies for WGS include the xenon-ion propulsion system (XIPS), which is 10 times more efficient than conventional bipropellant systems, highly efficient triple-junction gallium arsenide solar cells, and deployable radiators with flexible heat pipes. Four 25-cm XIPS thrusters remove orbit eccentricity during transfer orbit operations. The thrusters are also used to perform orbit maintenance and any required station-change maneuvers during the mission's life. The triple-junction gallium arsenide solar cells provide on-orbit electrical power for the spacecraft. The deployable radiators' flexible heat pipes provide increased radiator area, resulting in a cooler, more stable thermal environment for the satellite.

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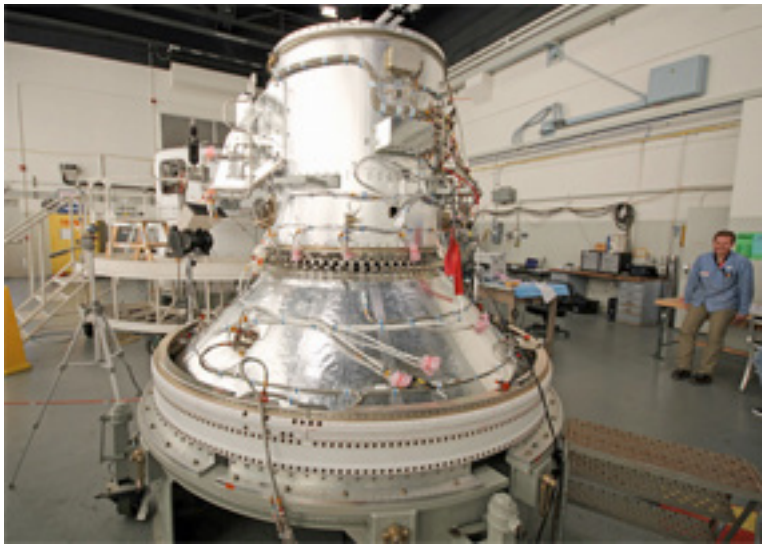
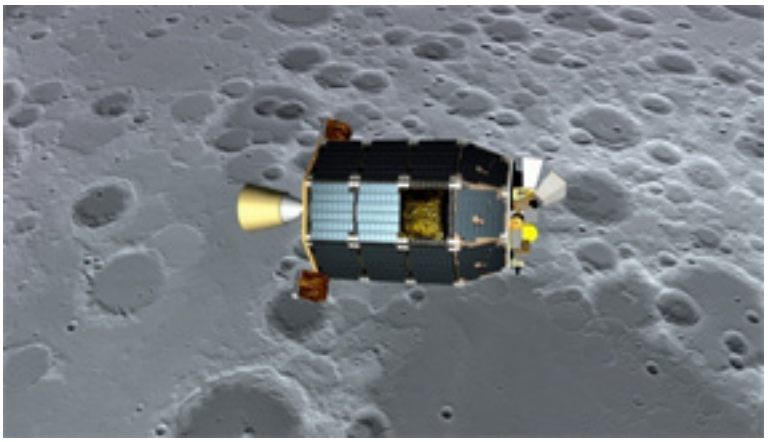
NASA—GOOD LADEE TO GATHER MOON DUST

The NASA LADEE launch via an Orbital Sciences' Minotaur V rocket.



This view is of Orbital Science's STAR 37's 5th stage solid fuel motor that helped to power the LADEE spacecraft into lunar transfer orbit. Photo credit: Ken Kremer / kenkremer.com



Artistic rendition of NASA's LADEE spacecraft in moon orbit, courtesy of NASA Ames / Dana Berry.

This LADEE launch, which finds the spacecraft headed to the moon, occurred at 11:27 p.m., EDT, on September 6th from Pad 0B at the Mid-Atlantic Regional Spaceport from NASA's Wallops Flight Facility, Wallops Island, Virginia.

NASA's Lunar Atmosphere and Dust Environment Explorer (LADEE) is a robotic mission that will orbit the moon to gather detailed information about the lunar atmosphere, conditions near the surface and environmental influences on lunar dust. A thorough understanding of these characteristics will address long-standing unknowns and help scientists understand other planetary bodies, as well.

The LADEE spacecraft's modular common spacecraft bus, or body, is an innovative way of transitioning away from custom designs and toward multi-use designs and assembly-line production, which could drastically reduce the cost of spacecraft development, just as the Ford Model T did for automobiles. NASA's Ames Research Center designed, developed, built and tested the spacecraft.

The Launch Phase began with liftoff and ends about 20 minutes later. Then at 11:50 p.m., the successful separation of LADEE from the launch vehicle occurred, when the spacecraft powered up and transitioned to safe mode.

The launch vehicle selected for the LADEE mission is the U.S. Air Force's Minotaur V launch vehicle. LADEE will be the first mission to launch on the Minotaur V. This is a five-stage (solid propellant) launch vehicle with a 7.67-foot-diameter (2.34-meter) payload fairing. The launch vehicle is slightly more than 80.59 feet tall (24.56 meters) tall.

The Minotaur family of launch vehicles are provided via the Orbital/Suborbital Program and managed by the U.S. Air Force Space and Missile Systems Center, Space Development and Test Directorate Launch Systems Division located at Kirtland Air Force Base, New Mexico.

NASA confirmed that LADEE separated from its ride into space, powered up, and is communicating with ground controllers. According to the LADEE mission operations team at NASA's Ames Research Center at Moffett Field, California, during technical checkouts the LADEE spacecraft commanded itself to shut down the reaction wheels used to position and stabilize the spacecraft.

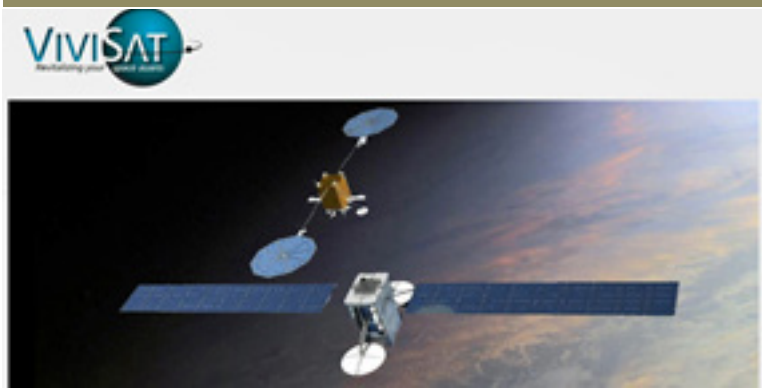
"The LADEE spacecraft is working as it was designed to under these conditions—there's no indication of anything wrong with the reaction wheels or spacecraft," said S. Pete Worden, Ames center director. "The LADEE spacecraft is communicating and is very robust. The mission team has ample time to resolve this issue before the spacecraft reaches lunar orbit. We don't have to do anything in a rush."

LADEE team members are currently analyzing the situation. Normal checkout takes a couple of days, and this anomaly may add a couple more days to the process. "This is not an unusual event in spacecraft," Worden said. "We plan in the next few days to complete spacecraft checkout."

NASA's Lunar Atmosphere and Dust Environment Explorer (LADEE) is managed by NASA's Ames Research Center in Moffett Field, California.

DISPATCHES

VIVISAT—REDUCING THE RISKS OF IN-SPACE OPS



ViviSat, a provider of in-orbit servicing, has announced the selection of Marsh as its insurance broker and risk management advisor.

Marsh, a global insurance broking and risk management company, teams with clients to provide innovative industry-specific solutions that help them thrive and protect their futures.

The selection of an insurance broker marks another key milestone in ViviSat's mission to offer low-risk satellite life extension and protection services to commercial and government satellite operators. Marsh has approximately 26,000 colleagues who collaborate to provide advice and transactional capabilities to clients in over 100 countries.

Marsh is a wholly owned subsidiary of Marsh & McLennan Companies (NYSE: MMC), a global team of professional services companies offering clients advice and solutions in the areas of risk, strategy and human capital. As ViviSat's placing broker, Marsh will implement a risk mitigation strategy to effectively represent ViviSat to the insurance community. Marsh will also advise ViviSat during the financing phase of its development.

The centerpiece of ViviSat's satellite life extension service is the ATK-designed Mission Extension Vehicle (MEV). The primary mission of the MEV is to dock with an orbiting satellite and serve as the propulsion and attitude control systems. This enables mission extension for satellites that have run out of maneuvering fuel yet still have healthy payload and power systems. The ViviSat solution prolongs satellite life, saves capital and protects fleet assets for operators.

"We are very pleased to add Marsh to the ViviSat team," said retired Maj. Gen. Craig Weston, CEO of ViviSat. "Our selection of this well-respected, top-tier insurance broker is an important step in the life of the enterprise, as we plan for the production phase of our satellite life extension service. Marsh's group of trusted advisors will provide valuable expertise in helping us engage the satellite, launch and underwriting communities to inform them of the low-risk and beneficial nature of our service."

"Marsh's Space Projects group is thrilled to be part of the ViviSat team," said Phillip Crawford, a Managing Director of Marsh USA Inc. "We look forward to helping ViviSat thrive as a business by fulfilling its insurance brokerage and risk advisory needs as it strives to alter the landscape for satellite owners, operators and users through its MEV satellite life extension service."

ViviSat is a joint venture between ATK and U.S. Space LLC. U.S. Space LLC is a U.S.-owned provider of dedicated, commercial space solutions, established in January 2009 as a provider of satellite solutions with a unique model combining the best commercial and government practices. ATK is an aerospace, defense, and commercial products company with operations in 21 states, Puerto Rico, and internationally.

DISA—THE WAY AHEAD

DISA Director Air Force Lt. Gen. Ronnie D. Hawkins Jr. welcomes attendees to DISA's Forecast to Industry event. Photo courtesy of DISA.

During the event's networking sessions, attendees interacted with agency leadership and subject matter experts to learn about DISA's services and solutions, provide feedback, and stimulate a continuing dialogue for the Forecast to Industry and afterward. Photo courtesy of DISA.

The Defense Information Systems Agency (DISA) conducted its Forecast to Industry event on Friday, August 9,th at DISA Headquarters. This is an annual event, hosted by the agency for industry representatives.

The purpose of the event was to outline the way ahead for DISA and to provide insight into opportunities for industry to partner with DISA to help the agency achieve its objectives. In addition to presentations by several DISA senior leaders, the event provided small business and large business representatives the chance to network with one another and with DISA leaders, program managers, and subject matter experts during scheduled networking sessions.

Approximately 400 participants attended in-person at DISA Headquarters and hundreds more watched via live streaming video. The agency also tweeted the event in real time using #DISAForecast.

Lt. Gen. Ronnie D. Hawkins Jr., DISA director, opened the event by welcoming the participants and presented a video that showed some of the 15,000 DISA military, civilians, and contractors throughout the world performing a range of DISA functions and services. The director emphasized the closing frame of the video, reiterating that at DISA "our people are our strength."

Hawkins discussed some challenges in developing the Joint Information Environment (JIE) and DISA's areas of emphasis for the next year.

"We have a tough challenge ahead of us as we move to JIE," said Hawkins. "We must develop JIE to secure our cyber infrastructure and to cut costs." It is as much a cultural challenge as technological as we shift from organization-based management to an enterprise environment, he said. "We have work to do."

The director talked about DISA's responsibility for almost all of the Department of Defense (DoD) Information Network (DoDIN) and said the DoDIN is more than the unclassified (NIPR) and classified (SIPR) networks. DoDIN also includes other network services, enterprise services, global applications, transport, and single-purpose networks.

Hawkins said the participants could expect from DISA in the next year "a greater emphasis on efficiency and savings from enterprise solutions." DISA will "pivot on delivery of capabilities and technologies in sprints" measured in months, not years. The agency will "accentuate acquisition agility and focus on Better Buying Power (a DoD initiative)." DISA will "mature the JIE" with a focus on our coalition partners.

Director of Procurement and Chief of the Defense Information Technology Contracting Organization Kathleen Miller highlighted the importance of having a continued dialog between DISA and industry to build the best solutions to support the mission.

Kathleen Miller, director of the Procurement Directorate (PLD) and the chief of the Defense Information Technology Contracting Organization (DITCO), followed Hawkins and pointed out that her organization "does more than provide procurement support to DISA, we also support other organizations in DoD." She said almost 50 percent of the PLD/DITCO workload was for other DoD components.

Sharon Jones, director of the Office of Small Business Programs, briefed on small business contracting vehicles and creating partnerships with large businesses. She mentioned that DISA has achieved its overall small business goals for two consecutive years.

Dr. Jennifer Carter, DISA's component acquisition executive, discussed information technology acquisition trends and the way ahead with industry, the DoD mobility concept and end-to-end vision, unified capabilities (UC) and challenges, DISA's role as the enterprise cloud service broker, and contracting opportunities.

Network Services provides the infrastructure and frameworks for the enterprise network, said Cindy Moran, director of Network Services.

"We work in four areas, and all of them are foundational to the enterprise network," Moran said. The four areas are transport, gateway services, JIE, and UC. She also talked about the DoD Teleport Program and about connecting via task orders to existing Network Services contracts.

Dave Bennett, chief information officer and director of Enterprise Services, discussed the convergence of multiple missions from the Office of the Chief Information Officer and Enterprise Services Directorate, the enterprise cloud services portfolio, data center consolidation for JIE and the changing face of the Defense Enterprise Computing Centers (DECCs) as they transition to "core data centers," and contracting opportunities.

Mark Orndorff, DISA's chief information assurance executive and the program executive for mission assurance and network operations, shared DISA's strategy for DoD cybersecurity, big data analytics, JIE single security architecture, next steps for mission assurance, and contracting opportunities.

During the event's networking sessions, attendees interacted with agency leadership and subject matter experts to learn about DISA's services and solutions, provide feedback, and stimulate a continuing dialogue for the Forecast to Industry and afterward.

Miller closed the forum with a discussion of DITCO procurement actions supporting non-DISA organizations.

The event was applauded by many industry representatives.

"I've been working with DISA for 19 years, and this was the best Forecast to Industry day I've seen," said Gerry Robbins, director of DoD business development for NJVC LLC.

"This event shows that DISA treats industry as a valued partner," said Heather Summers, account executive at NetCentrics Corp. "The networking time with senior leadership and subject matter experts was generous. The streaming video enabled more people to attend and (demonstrated that the event) was truly open to industry."

The briefing slides from the event can be found at ***DISA.mil***.

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Advantech Wireless' new line of ruggedized products, the KR Series, are specially designed to provide LAN and WAN access in theater.

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AMT 73L Modem
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DISPATCHES

NORSAT INTERNATIONAL—FROM GATEWAY TO FLY-AWAYS

A new series of SATCOM Baseband Kits, which were designed to provide convenient, all-in-one communication solutions for satellite system field deployments, have debuted from Norsat International.

The kits are available to support a variety of applications, and include everything needed to maintain satellite connectivity. They provide market leading portability, connectivity support, and the ability to access core office functions while operating in emergency situations in challenging environments. SATCOM Baseband kits are available in:

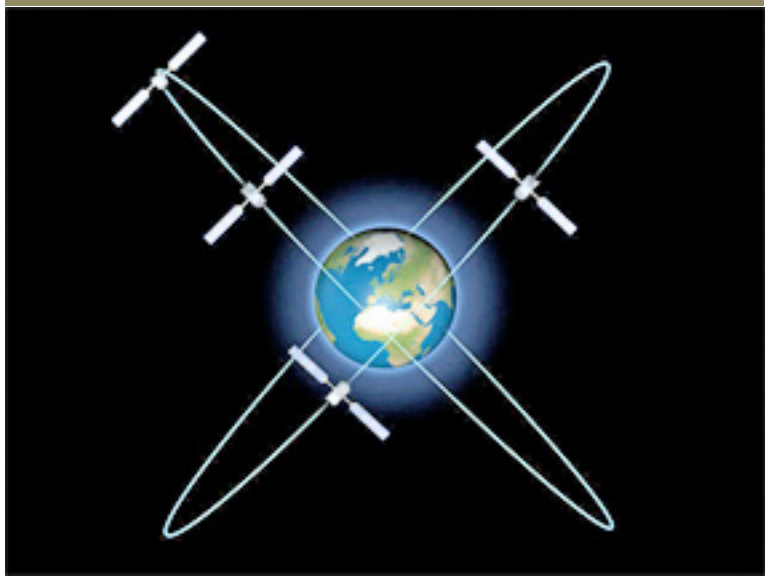
- Compact Fly-away Kits—These integrated fly-away kits are packaged in airline carry-on cases. They are able to provide both secure and non-secure voice and data communications. Included is an integrated uninterruptable power supply for battery backup and diverse powering options for austere environments. Kits include a BGAN satellite terminal, rugged laptop, IP phone, Cisco ASA5505/871 routers (red & black) and various Type 1 encryption device options along with a printer and handheld satphone options

- Emergency Communications Kits—These kits are essentially an office-in-a box which provide first responders with core office functions (computing, printing and scanning) and GPS capability during field emergency operations. The kits provide voice, data and video via multiple means of redundant communications including cellular broadband, GlobalStar/ Inmarsat/Iridium/Thuraya handheld satphone and Inmarsat BGAN satellite communications terminal and Land Mobile Radio (LMR)/Radio over IP (RoIP). Our RoIP solution provides radio interoperability which allows various band radios to seamlessly communicate with each other as well as extend the LMR network beyond line of sight over your network. Our kits are integrated and prewired for easier setup and tear-down and include diverse power capabilities for operation via AC power or from a military or commercial vehicle

- Red/Black Gateway Kits—Red/Black Gateway Kits provide IP gateway solutions for challenging environments in a compact, highly portable package. Simultaneous Red and Black connectivity, routing and WAN acceleration/optimization is provided from a single rugged unit. All kits incorporate one or more Cisco routers with advanced IP Services, a protocol enhancement proxy for improved performance over satellite links, and various encryption options

Customized Baseband kits are also available to meet specialized needs.

ESA—MEMBER INVOLVEMENT WITH GALILEO



The four Galileo In-Orbit Validation satellites in their orbits. Image courtesy of ESA—P. Carril.

EU Member States have begun their independent testing of the most accurate and secure signal broadcast by the four Galileo navigation satellites in orbit.

Transmitted on two frequency bands with enhanced protection, the Public Regulated Service (PRS) offers a highly accurate positioning and timing service, with access strictly restricted to authorized users.

"Galileo is in its In-Orbit Validation phase, planned to include experimental demonstrations of PRS capabilities in terms of positioning and access control," said Miguel Manteiga Bautista, heading ESA's Galileo Security Office.

PRS access was initially considered for Galileo's Full Operational Capability phase, but it has been enabled in 2013 in response to the strong interest of Member States in this service. To allow early access to PRS during the current phase, the European Commission and ESA began the joint project 'PRS Participants To IOV' (PPTI) in July 2012.

ESA ensured the availability of several tools developed under ESA contracts, including test receivers and other qualification equipment. ESA also provided the critical know-how and expertise required to conduct these experimental campaigns. ESA's PRS Laboratory, based at the Agency's ESTEC technical centre in Noordwijk, the Netherlands, was used to provide training, demonstrations and sample data.

"As a result, Belgium, France, Italy and the UK have now performed independent PRS acquisition and positioning tests. In parallel, ESA, through collaboration with Dutch and Italian authorities, is also conducting PRS fixed and mobile validation in several locations in the Netherlands and Italy," said Miguel Manteiga.

ESA's new Telecommunications and Navigation Testbed Vehicle, a mobile test platform to support test campaigns for navigation and telecommunications services, most notably Europe's Galileo constellation.

The PRS tests have demonstrated a current autonomous positioning accuracy below 10 m when in the correct geometrical configuration. This is an impressive result considering the small number of Galileo satellites in orbit and the limited ground infrastructure so far deployed. Testbed vehicle used for Dutch PRS testing. In the case of Italy, which has developed its own PRS receiver, the tests have already confirmed the feasibility of independent PRS receiver development and verification based on specifications provided by ESA.

The project is the first step to ensure the use of the PRS service as soon as it is operational. It will be complemented by the PRS Pilot Projects, focused on PRS applications, which are currently under definition in a common effort between the EU Member States, the European Commission, ESA and the European Global Navigation Satellite System Agency.

In addition to the qualification of the PRS service, these initiatives will allow the timely availability of competitive PRS receivers in Europe and the setting up of organizations in the Member States required to handle PRS.

DISPATCHES

RAYTHEON—SCHOLARSHIPS FOR VET STUDENTS

Raytheon has awarded $10,000 scholarships to three military veterans pursuing degrees in science, technology, engineering or math (STEM).

The three recipients have also demonstrated leadership in their local communities. The scholarships are part of Raytheon's support of Student Veterans of America (SVA), which provides veterans with resources, support and advocacy to succeed in higher education and the workforce.

"The STEM fields are an increasingly important sector of our economy," said Michael Dakduk, SVA's executive director. "Raytheon's generous support will empower three well-deserving student veterans to achieve their academic goals and continue to make valuable contributions to the nation."

Raytheon and SVA joined forces in November 2012 on the shared mission to empower veterans with the resources, support and advocacy needed to achieve their higher education goals. Such empowerment helps the nation's warfighters achieve success as civilians, developing a generation of professionals who already understand the importance of leadership, discipline and perseverance. The multi-year partnership is expected to include additional scholarship grants. Recipients of the 2013 Raytheon-SVA Scholarship are...

- Adailin Lebron Bengochea—Pursuing a bachelor's degree in marine biology at the University of Texas at Austin, Adailin served in the U.S. Coast Guard
- Gwen Linde—Pursuing a degree in geology at the University of Nevada, Reno, Gwen served in the U.S. Air Force
- Ryan Wilson—Pursuing a bachelor's degree in mechanical engineering at the University of California, Irvine, Ryan served in the U.S. Navy Seabees and in the Navy Reserves

To be eligible for a Raytheon-SVA scholarship, applicants must be military veterans pursuing a bachelor's or graduate degree in science, technology, engineering, and/or math at an accredited four-year university, while also displaying leadership and engagement within the community.

Learn more about Raytheon's commitment to empowering military veterans through education on the company's Armed Services website.

SVA is a 501(c)(3) non-profit coalition of more than 850 student veteran organizations on college campuses globally.

Additional information is available at:

http://www.raytheon.com/media/armed_services/

DISPATCHES

USAF—EAGLE VISION IV'S JAPANESE OPS

The South Carolina Air National Guard's 169th Communications Flight Eagle Vision IV (EV4) Mobile Ground Satellite Station from McEntire Joint National Guard Base recently supported a joint operation imagery collections mission for 5th Air Force, Pacific Air Forces (PACAF). The mission involved active-duty Air Force, Marines and Air National Guard members.

Chief Master Sgt. Pete Wiedel and Staff Sgt. Dennis McDougal, members of the 169th Communications Flight Eagle Vision IV (EV4) Mobile Ground Satellite Station, located at McEntire Joint National Guard Base, South Carolina, recently returned from a three-month deployment at Kadena Air Base, Okinawa, Japan.

They supported a Joint Operation Imagery Collections Mission for 5th Air Force, Pacific Air Forces (PACAF), which involved active-duty Air Force, Marines and Air National Guard members.

The Eagle Vision program consists of five DoD deployable, commercial satellite ground stations that are located in South Carolina, Alabama, California, Hawaii and Germany. They each provide customers with near real-time commercial satellite imagery of locations within their 1,300 mile, visibility circle.

Eagle Vision stations are used to collect and disseminate imagery to various government agencies such as FEMA and USGS during natural disasters. They also support mission planning, time-critical targeting and non-war related operations.

The mission objectives while deployed to Kadena Air Base was to collect 1,498 targets located throughout the South Pacific and to train Japan Air Self Defense Force (JASDEF) personnel on how to use imagery analysis and satellite tracking programs.

Wiedel oversaw Data Integration Segment (DIS) operations and trained JASDEF members on the DIS. McDougal worked as a Data Acquisition Segment (DAS) operator and assisted in training new team members on DAS operations.

Even though many of the targets were heavily covered by clouds, the EV team was able to capture 70 percent of their targets. The team collected more than 5,000 satellite images, accounting for 18 million square kilometers of land imaged. This is more than twice the size of the continental United States.

When it was all said and done, using RadarSat-2, TerrSAR-X, World View and SPOT 5 and 6 satellites, the EV team collected processed and distributed more than 3,000 products for imagery analysts to use. All of these products were provided to the 5th Air Force.

As Eagle Vision has the capability to quickly acquire near real-time unclassified, satellite imagery, they are highly sought after and utilized during most natural disasters within their visibility circle. The EV4 teams most often provide images for events such as fires, floods, tornadoes, hurricanes, etc. They have supported first responder efforts during Hurricane Sandy and Katrina, the earthquakes in Japan and Haiti, as well as tornado and fires in the mid-west. Other than hurricanes, these events usually occur quickly and with no warning; therefore, the team is required to be prepared to react and work during unplanned hours of operation.

Story is courtesy of the USAF's 169th Fighter Wing

WHAT DOES A PRESIDENT SAY WHEN HANDED A SATELLITE?

President Nicolas Maduro of Venezuela.

"Someday, Chinese ambassador, I am telling you that we will continue working so that one day satellites will be launched into space from Venezuela 'sooner rather than later'," President Nicolas Maduro said at a ceremony marking the handover from China to Venezuela of control over the South American country's Miranda satellite.

"Yes, we can. We have done the studies and we are going to do it," the Venezuelan president reiterated.

China handed over control of Miranda, a geographic information satellite built and launched from Chinese territory in September of2012, to Venezuela on Monday, September 2nd. The satellite provides information used in urban planning, agriculture, military operations and other areas.

"This is the latest step forward in the sovereign technology we are building in Venezuela and for our people," Maduro said.

Technology transferred by China will allow Venezuela to build its own satellites in the future, the president said. Venezuela has another satellite under manufacture, the Simon Bolivar, which handles telecommunications and was also built in China.

The Miranda satellite was launched by the China Great Wall Industry Corporation, or CGWIC, an aerospace company that is a unit of China Aerospace Science and Technology Corporation.

Venezuela's first satellite, Simon Bolivar, VENESAT-1, was also launched from China, on October 28, 2008, at a cost of 180 million dollars.

Artistic impression of Venezuela's Miranda satellite.

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DISPATCHES

VIETNAM—SIGN OFF FOR REDSAT-1

The Satellite Control and Operation Station in Ha Noi's Que Duong Village. The nation has now mastered small satellite technology. Photo courtesy of VNA/VNS – Minh Tu

The successful launch of Vietnam's first remote sensing satellite, REDSat-1, marks a milestone in the development of the country's space technology program, according to Deputy Prime Minister Nguyen Thien Nhan.

With VNREDSat-1, Vietnam can now independently process images of all regions belonging to the country's territory, he said. Deputy PM Nhan was speaking at a ceremony at which the control of the satellite was handed over to the Vietnam Academy of Science and Technology (VAST). Astrium SAS, an affiliate of the European Aeronautic Defence and Space Company, was at the ceremony to sign off on the new space hardware.

VNREDSat-1 was sent into orbit on May 7 from a launch pad in Kourou, French Guiana. Four months since its launch, the satellite is now under stable operation, said Dr. Bui Trong Tuyen, deputy director of the Institute of Space Technology and head of the Small Satellite Project Management Unit.

Nhan congratulated the VAST staff and scientists and their French partners on the successful launch of the satellite last May, saying that it has marked Vietnnam's entry in space.

As at September 1st, the new satellite snapped and recorded just over 9,000 images, of which nearly1,000 were of Vietnamese territory, he said. In order to become expert operators in the management of the satellite, 15 engineers from VAST left for France in 2011 to complete a specialized training course.

The launch of Vietnam's VNREDSat-1 satellite.

Designed by Astrium SAS, the satellite is capable of capturing images from all around the world. The resource will assist emergency services during flooding, forest fires, oil overflow or other serious incidents.

The majority of the funding was provided by the French government's Official Development Assistance with EUR55.8 million (US$73.5 million), while Vietnam contributed nearly VND65 billion (around US$3.2 million) to the high-tech project.

Following fast on the success of two telecommunications satellites—Vinasat 1 in 2008 and Vinasat 2 in 2012 and now VNREDSat-1—a fourth "made-in-Vietnam" micro satellite, Pico Dragon, was shipped to the International Space Station on August 4 in preparation for a mission in space.

RAYTHEON—IATT REC'D FOR GPS OCX LCS

Artistic rendition of a GPS III satellite, courtesy of GPS.gov.

Raytheon Company has received Interim Authorization to Test (IATT) security certification for the Global Positioning System Next Generation Operational Control System (GPS OCX) Launch and Checkout System (LCS) four months ahead of schedule.

Raytheon received a one-year certification with no liens, meaning the government does not require any changes. The LCS IATT certification enables Raytheon to move to the next stage of testing the Launch and Checkout System in preparation for launch of the first GPS III satellite.

Matthew Gilligan, Raytheon's GPS OCX program manager and a vice president in Raytheon's Intelligence, Information and Services business, said, "Typically IATT certification is given for six-month increments; the LCS one-year accreditation speaks to the quality of the information assurance design and threat protection."

The Interim Authorization to Test not only includes the LCS, but also Lockheed Martin's GPS III satellite support systems, including the Exercise and Rehearsal Training Tool and Upload Generation Tool. OCX is being developed in two "blocks" using a commercial best practice iterative software development process. There are seven iterations in Block 1 and one in Block 2. LCS is the fifth Iteration of Block 1, and it successfully completed Critical Design Review in June 2013. The first GPS III satellite is in production at Lockheed Martin and expected to be delivered to the U.S. Air Force "flight-ready" in mid-2014.

GPS III satellites are expected to deliver three times better accuracy, provde up to eight times more powerful anti-jamming capabilities, and include enhancements that extend spacecraft life 25 percent further than the prior GPS block. The GPS III also will carry a new civil signal designed to be interoperable with other international global navigation satellite systems, enhancing civilian user connectivity.

DISPATCHES

ECUADOR—PEGASO PROBLEMS CAUSE CESSATION

Ecuador's EXA space agency has given up trying to recover signals from the Andean nation's first satellite, which went silent after a brush with space debris.

Participants in an August 28th meeting among officials of the space agency, security ministry and State Intelligence Directorate agreed to terminate efforts to re-establish contact with the Pegaso NEE-001, EXA said in a statement.

Pegaso, a cube weighing just 2.1 kilos (4.6 pounds), was placed in orbit April 26 and began transmitting video on May 16, providing overhead views of Brazil, Colombia, Ecuador, Peru and Venezuela.

The nano-satellite was launched from China's Jiuquan space center, with much fanfare by Ecuador.

The device stopped emitting signals on May 23, when it was side-swiped by floating debris from a Russian rocket launched in 1985.

After pinpointing Pegaso and determining that the satellite's protective casing was intact, EXA began working to recover the signal.

"To date, that operation has not produced the expected results, so EXA has presented the appropriate claim to the insurance company, which has accepted it and gone forward with the corresponding payment," the space agency said.

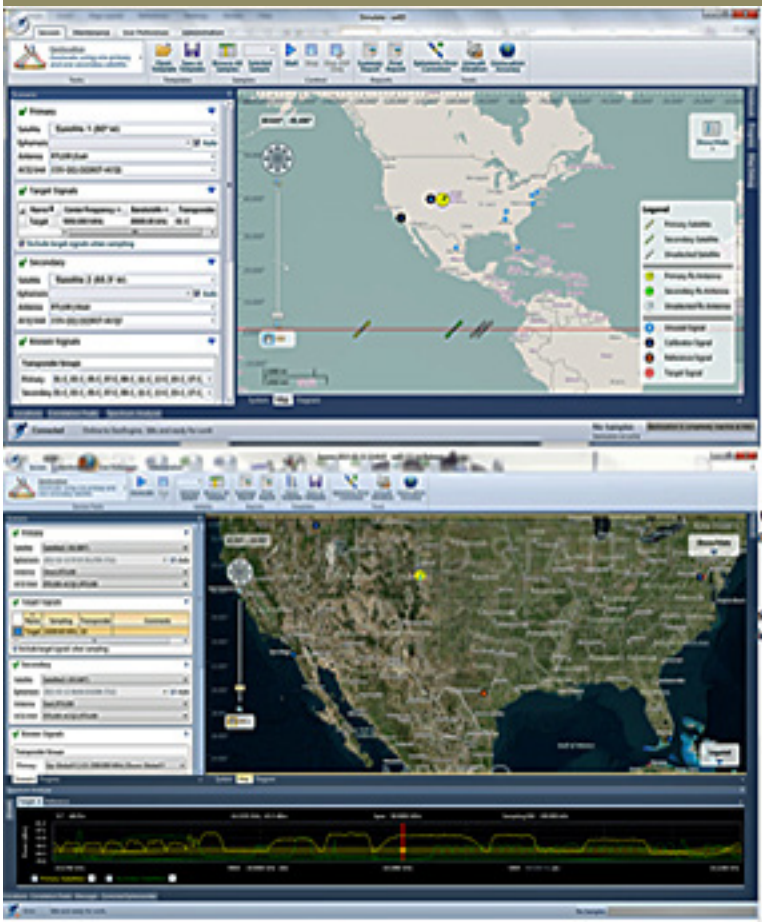
The insurance payment enabled Ecuador to recoup the nearly $800,000 invested in building and launching the Pegaso, EXA said.

EXA and other elements of Ecuador's government also gained valuable knowledge from the experience of dealing with the collision and trying to restore the signal, according to the statement. Ecuadorian President Rafael Correa will announce soon a date for the launch of Pegaso's twin, the Krysaor, from Russia, EXA said.

The original collision with the debris remains of a Soviet rocket that was launched in 1985 occurred on May 24th. The Ecuadorian cubesat impacted with the particle cloud that surrounded the Russian space junk, causing the antenna to lose orientation and a wild spinning of the satellite over two axes.

DISPATCHES

KRATOS, SAT CORP. + EUTELSAT—ID'ING INTERFERENCE



Kratos Defense & Security Solutions, Inc. has announced that its SAT Corporation (SAT) subsidiary has received an order from Eutelsat to upgrade multiple satID® geolocation systems.

satID is SAT's industry-leading RF interference geolocation product that provides an accurate, fast, all-in-one solution for locating and identifying sources of interference due to equipment failure, operator error, intentional jamming, or unauthorized users. In addition to the system upgrades, Eutelsat has extended the company's commitment to SAT's interference mitigation products by including the purchase of software maintenance and technical support for satID over the next five years.

satID 3.0, the newest release of satID, is a milestone advancement in the field of RF interference mitigation, bringing together improvements in accuracy and response times. Based on broad feedback from commercial and military geolocation operators, considerable enhancements were made to satID to create a more intuitive and streamlined user experience. The result is a highly flexible architecture that can scale to fit any type of customer installation that includes support for distributed environments and enables multi-user access.

The most visible advancement in satID is a map-driven user interface providing an efficient way of generating geolocation results. An operator starts with a detailed map from which they can then identify and overlay satellite and signal information, spectrum analyzer displays and other necessary elements to perform geolocation within the map. In addition, satID features streamlined data input and extensive data entry checking for erroneous or incomplete data in order to reduce operator mistakes.

Additionally, satID has built in monitoring capability derived from SAT's Monics®) product, the industry's leading carrier monitoring solution. Monics is an advanced spectrum measurement and interference analysis product used by most satellite and telecommunication providers around the world. Capabilities critical to Monics, such as detailed signal-under-signal characterizations, are pulled into satID's graphical interface to provide a complete scenario analysis and greater geolocation confidence.

"As RF interference continues to grow at all frequency bands, mitigation tools must evolve to battle this growth," said Dan Ojennes, satID Product Manager. "Building on the long-term relationship between Eutelsat and satID, these upgrades enable Eutelsat to geolocate sources of costly RF interference more efficiently and effectively and also extend their capability to operate at Ka band."

Mark Rawlings, Head of Payload Engineering and Operations at Eutelsat, added, "Eutelsat won't cut corners when it comes to investing in technologies that help us provide the best possible service to customers and satellite service users. In addition, Eutelsat continues to enhance the reputation of the satellite sector for delivering on signal quality and services continuity. We are proud to continue our relationship with Kratos and look forward to integrating new enhancements into our geolocation systems, which will enable us to further improve accuracy and response times."

CAMBRIDGE CONSULTANTS—SAVING SPECIES

Product development firm Cambridge Consultants is helping conservationists at the Zoological Society of London (ZSL)—in partnership with the Kenya Wildlife Service (KWS)—protect some of the world's most rare and endangered species. As part of the Instant Wild project, new satellite-connected and motion-triggered cameras are beaming near-real-time images of animals from the remotest areas of Africa.

A mobile app allows users anywhere in the world to view the photos and immediately identify the animals by cross-checking with the field guide provided in the app. At the same time, the system provides early warning of illegal poaching activity, as well as evidence for prosecutions.

Patrick Omondi, deputy director of wildlife conservation at KWS, said: "This technology will enable us to make a significant breakthrough in our day-to-day work with endangered species. We manage around eight percent of the total land mass of Kenya – and these cameras will be critical in helping us monitor the wellbeing of rare animals and ensure their habitats remain protected from poachers. Through our work with ZSL and Cambridge Consultants, we want to help raise awareness of vulnerable species and the risks they face every day."

The system harnesses the capabilities of a range of technologies, including the versatile Raspberry Pi micro-computer. The cameras can run on a single battery, and they use LED flash lighting to work at night as well as during the day. The captured images are sent back over the Iridium satellite communication network – 66 low earth orbit satellites that represent the only commercial satellite system with full coverage of the globe.

"One of our aims is to stop the killing of animals on a daily basis by poachers," said Professor Jonathan Baillie, director of conservation programs at ZSL. "In the last 18 months alone, more than 1,000 rhinos in Africa have been killed as a result of soaring demand for rhino horn products. We need to stop the poachers now before it's too late. We are installing cameras in Kenya's Tsavo National Park to create a safety net of eyes and ears to protect threatened wildlife—and contribute to the efforts of cutting poaching there significantly in the next two years."

Once the system has been installed in Kenya, there are plans to extend it to cover locations such as Indonesia, Sri Lanka, the Himalayas and the South Pole.

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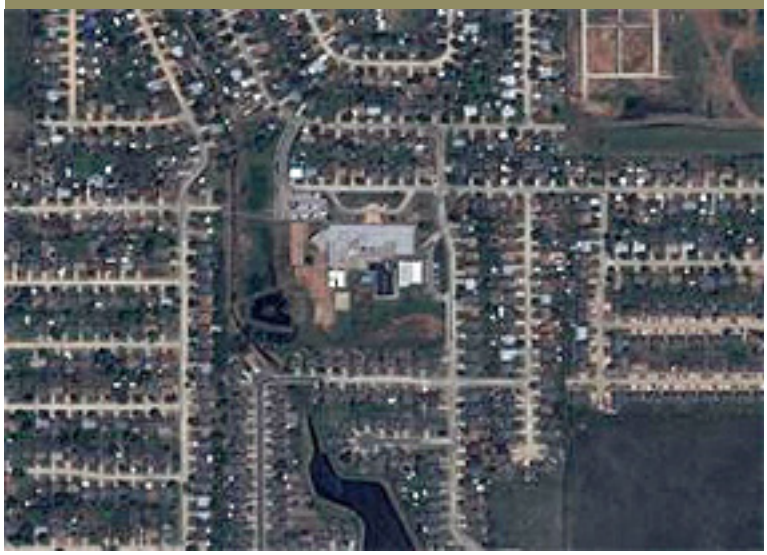


Satellite imagery captured by Hanscom Air Force Base's Eagle Vision program shows the town of Moore, Okla., with the Plaza Towers Elementary School in the center, before the tornado that devastated the region on May 22, 2013. The program office is conducting a cost-savings review to find savings within the program while ensuring the imagery would still be available when needed. (Courtesy image)

An Air Force program at Hanscom Air Force Base that continually provides critical imagery to warfighters and first responders, is also reducing costs.

Eagle Vision consists of five deployable satellite downlink stations that collect, process and distribute commercial satellite imagery in nearly real time. The data not only can be used to highlight areas of interest for U.S. or coalition warfighters in the field, but also for disaster response efforts.

"As soon as the tornadoes struck in Moore, Okla., the team went to work," said Capt. Chris Berardi, the program manager. "Despite being in the middle of a tech refresh, where system equipment was being upgraded, the team turned their attention to ensuring (the Federal Emergency Management Agency), the National Guard and (U.S. Northern Command) got the required imagery they needed."

Although cloud cover hampered some efforts, data was provided within 72 hours of the initial event. Berardi emphasized that the commercial imagery that is provided can be freely shared between organizations. When a tornado touched down once again in Oklahoma on May 31, the program office immediately put their assets to work again. Usable imagery denoting the path of the tornado, as well as the extent of flooding in the area, was provided to first responders within 48 hours of the event.

In addition to ongoing military applications for the imagery, the team is also currently providing support to those battling wildfires in New Mexico. The U.S. Forest Service requested EV imagery after fires broke out near Tres Lagunas, N.M., also on May 31. Currently the fires have burned approximately 10,000 acres and are only minimally contained. Before and after imagery was provided within days.

According to program officials, the organizations often use the imagery for damage assessment.

"The different types of imagery, such as high-resolution, electro-optical imagery and synthetic aperture radar, we can provide are helpful as well," Berardi said.

The technological refresh that Berardi refers to is part of the largest upgrade in the Eagle Vision system's history. New satellite constellations are being added, antenna upgrades are being implemented and new shelters are being provided to house the equipment.

Although the majority of this work is being funded by the National Guard, Berardi said the team is always looking for cost savings. The program office has also performed an analysis on all Eagle Vision satellite providers.

"We needed to determine if what we were getting was worth what we were paying out," Berardi said.

The results led to the elimination of one constellation of satellites, for yearly savings of $610,000.

They also looked at redundant capabilities. The team was able to identify some redundancies within the software architecture and processing capabilities.

"Sequestration is causing everyone to look at what they're spending very carefully," Berardi said. "We need to ensure we're still able to provide the necessary imagery but do so in a more efficient and effective manner."

Eagle Vision is reviewing all current and planned acquisitions to determine if other cost savings are available.

"We are looking at all options, including cost avoidance analyses, to identify further cost reduction opportunities," Berardi said. "Ultimately, these are savings for the taxpayer."

He stressed that the cost savings initiatives would not negatively impact the program office's ability to respond when needed.

"We know how important the capability to provide this imagery is," Berardi said.

Story by Patty Welsh, 66th Air Base Group Public Affairs

EGLOBALTECH + USCG—AN AWARDING DAY

U.S.C.G. Headquarters.

A five year contract from the United States Coast Guard (USCG) for program management and technical support services at Coast Guard Headquarters has been awarded to eGlobalTech.

Support services provided by eGlobalTech will include Acquisition Program Management support and Aviation C4ISR Systems Support for the CG-9335 Command, Control, Communication, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) project offices.

In addition to the C4ISR contract, eGT currently holds two additional Task Orders with the Coast Guard's Aviation Logistics Center in North Carolina in support of aviation systems, engineering, and program management.

Additional information at: ***http://www.eglobaltech.com***.

DISPATCHES

50TH SPACE WING—MASTERS OF SPACE

Col. James Ross (right), 50th Space Wing commander, hoists the Omaha Trophy for Global Operations as Gen. C. Robert Kehler, commander of U.S. Strategic Command, applauds during the trophy presentation May 17 at Schriever Air Force Base. For the second time in three years, the wing has captured the trophy, which is awarded annually to units that demonstrate the highest performance standards in USSTRATCOM's global strategic mission. Ross received the trophy on behalf of the wing.
(U.S. Air Force photo/Dennis Rogers)

"You are, in fact, the masters of space."— These are the words Gen. C. Robert Kehler, commander of U.S. Strategic Command, stated when he visited Schriever Air Force Base back on May 17th to present the 2012 Omaha Trophy for Global Operations to the 50th Space Wing.

For the second time in three years, the wing has captured the trophy, which is awarded annually to units that demonstrate the highest performance standards in USSTRATCOM's global strategic mission. Selections are based on formal evaluations, meritorious achievement, safety and other factors such as community involvement and humanitarian actions. Col. James Ross, 50 SW commander, received the trophy on behalf of the wing.

"I want to congratulate you on a job spectacularly well done," Kehler said. "The Omaha trophy is a big deal; it's a big deal in Strategic Command and it's a big deal for the people of Omaha. They maintain a connection with this award. They know who gets it. We sit down with our consultation committee members, which is the sponsor of the Omaha trophy. And every year, we review with them who gets the award and why."

The general said many of the units assigned to USSTRATCOM are operating in the shadows with the 50 SW as the epitome of "ultimate operations in the shadows. It's difficult for the people who benefit the most from what you do, which are the Soldiers, Sailors, Marines, Airmen and in particular, those who are forward deployed, and in some cases, engaged with the enemy, and in other cases, deployed elsewhere around the world, [to appreciate what you do]," he said. "They are the ones who benefit the most from what you do and yet the odds are, they don't know who is doing it. This is our chance to say thanks to you, on their behalf."

"Not only will we recognize you here today for what you have done and the outstanding way you've done it, but I think when we leave this trophy with you today, we are recognizing your potential," he said. "We are going to rely on you to do things differently as time passes. We are going to rely on your expertise to keep providing for those forward users who can't fight the American way of warfare without GPS, can't fight the American way of warfare without satellite communications, can't fight the American way of warfare without surveillance, without weather, without all of the other things that are provided by you and people like you."

Additionally, Kehler stressed the award is about the whole team, which includes civil engineers, security forces, medical services and more. Kehler added, "Congratulations to you, you deserve it. You don't get enough praise for the things that you do. You labor in silence and in the shadows."

Ross said the award, the Trophy for Global Operations, is what the wing does with its mission "Command satellites to deliver decisive global effects "What General Kehler said was exactly right," he said. "It was a team effort; the entire team is responsible for this. This is your award. Each and every one of you should be proud of how you contributed to the outstanding manner in which we did our mission. Thank you for what you do for the wing, for the Air Force and for this great nation."

Story by Staff Sgt. Julius Delos Reyes, 50th Space Wing Public Affairs

GENERAL DYNAMICS C4 SYSTEMS—A WIN-T WIN

The Tactical Communication Node for the Warfighter Information Network - Tactical, or WIN-T, allows for on-the-move functionality.
Photo credit Courtesy PM WIN-T

Tactical (WIN-T) Increment 2, built by General Dynamics C4 Systems, recently completed a Follow-on Operational Test and Evaluation (FOT&E) during the U.S. Army's recent Network Integration Exercise (NIE) 13.2.

WIN-T Increment 2 is the mobile, secure communications backbone of the soldier's network and the cornerstone of the Army's network modernization plan. When combined with the AN/PRC-154 Rifleman and AN/PRC-155 two-channel Manpack networking radios, WIN-T Increment 2 delivers vital situational awareness, intelligence and mission command that keeps pace with soldiers and their commanders during every stage of a mission.

U.S. Army Lt. Col. Robert M. Collins, product manager for WIN-T Increment 2, said during the exercise, that several insights indicate the "positive impact this mobile network is going to have on the way we fight across the full spectrum of military operations. WIN-T Increment 2 will increase the pace at which the Army can conduct combat operations, extend operational distances for reach and reach back, while also decreasing the military decision-making time cycle."

During the evaluation, more than 3,800 soldiers from the 2nd Brigade Combat Team, 1st Armored Division conducted a wide range of on-the-move military and peacekeeping operations, both day and night, using the WIN-T Increment 2 system. The tests took place at White Sands Missile Range, N.M., from May 6 to May 23.

"The Army's support for the Soldiers' Network has been unwavering and the full and continuous funding of the WIN-T program ensures that soldiers have a decisive advantage in combat," said Chris Marzilli, president of General Dynamics C4 Systems. "Communications gear can be just as important as body armor and rifles in combat."

WIN-T Increment 2 systems are currently fielded with the 101st Airborne and two Brigade Combat Teams with the 10th Mountain Division. WIN-T Increment 1, the predecessor to WIN-T Increment 2, is fielded to the entire Army with 210 systems in the hands of active-duty Army, Army reserve and National Guard units.

The centerpiece of Army's network modernization plan, the Soldiers' Network, includes the WIN-T Increment 2, the AN/PRC-154 Rifleman, and AN/PRC-155, two-channel Manpack networking radios and other capabilities including Nett Warrior, Command Post of the Future (CPOF) and Tactical Ground Reporting (TIGR).

Led by General Dynamics, WIN-T Increment 2, the Rifleman and Manpack networking radios and related Army programs rely on the support of hundreds of suppliers. These companies deliver vital technologies and products that support the Soldiers' Network. Located in more than 30 states, these suppliers include small, veteran-owned, woman-owned and other businesses and represent about 7000 skilled workers.

OFFICE OF NAVAL RESEARCH—STORM PREDICTIONS

Graphic illustration by Jessica L. Tozer.

With the arrival of the Atlantic hurricane and Pacific typhoon season-and the often dangerous storms that can accompany it-new technology sponsored by the Office of Naval Research (ONR) will be used to help Navy and civilian officials alike plan for stormy weather. Called the Coupled Ocean/Atmosphere Mesoscale Prediction System-Tropical Cyclone (COAMPS-TC), the groundbreaking new weather prediction model offers forecasters a detailed look at tropical storms and gives accurate predictions of a storm's intensity from one to five days out. The new model went fully operational June 6 at the Navy's Fleet Numerical and Meteorology and Oceanography Center-the naval command that provides meteorological data to U.S. forces.

"COAMPS-TC will be invaluable to Navy leadership," said Dr. Ronald Ferek, the ONR program officer who helped sponsor the project. "It will give them detailed intensity and wind fields for site-specific damaging wind forecasts: 'This upcoming storm will exceed hurricane-force winds at X time, for Y hours.' For naval installations, that kind of forecast is really useful."

The program was developed by researchers at the Naval Research Laboratory (NRL), primarily to support the mission of the Department of Defense's Joint Typhoon Weather Center. Accuracy has improved dramatically in recent years when it comes to predicting the path, or track, of tropical storms. However, until now, the ability to forecast a storm's strength, or intensity, has been much less reliable. The new model will help close that capability gap.

Navy officials rely on accurate weather models for a wide array of fleet operations, including planning and executing military operations; avoiding damage; protecting or evacuating vulnerable installations; and humanitarian assistance and disaster relief-all part of Chief of Naval Operations Adm. Jonathan Greenert's Sailing Directions that emphasize using "new technologies and operating concepts" to create the ability to "operate forward at strategic maritime crossroads."

Part of the uniqueness of research to further improve COAMPS-TC involves utilizing unmanned aerial vehicles, like NASA's Global Hawk, to make observations above and inside the cyclones themselves, and at higher altitudes than ever before. That kind of innovation and partnership is precisely what Chief of Naval Research Rear Adm. Matthew Klunder has emphasized in order to help increase knowledge to benefit the nation and its warfighters and to share the load on costs.

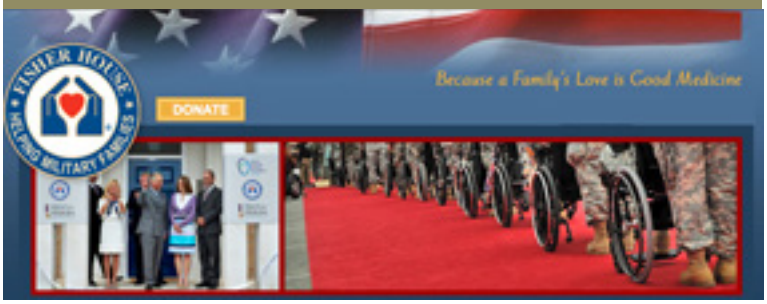
Investigators from NRL, National Oceanic and Atmospheric Administration and several universities are also collaborating on research to rapidly improve a new generation of regional (mesoscale) models designed to predict details of atmospheric and oceanographic processes that control tropical cyclone intensity. These models represent an entirely new capability for forecasting tropical cyclones.

"This effort is the poster child for interagency cooperation," said Ferek. "The nation is benefitting from our shared science and technology work."

A new video with more details on COAMPS-TC has been released and may be viewed at:***http://www.youtube.com/watch?feature=player_embedded&v=rGznRSfuThE***.

Story by David Smalley, Office of Naval Research

FISCHER HOUSE + DSL— HEROES' LEGACY SCHOLARSHIP



Fisher House Foundation is proud to announce a sponsorship from DHL to support the Heroes' Legacy Scholarship, a program that honors not only those who have fallen in battle, but those who have become severely disabled through their active U.S. military service since September 11, 2001.

DHL announced its support of Fisher House with a donation of $300,000 to help fund the scholarship program for the 2013-2014 academic year. The Heroes' Legacy Scholarship program was founded in 2010 when President Obama donated the proceeds from his children's book, "Of Thee I Sing: A Letter to My Daughters," to help establish a scholarship for children of fallen and disabled service members. The contribution from DHL is the largest corporate grant to the scholarship program since its inception.

Donations from DHL and other corporate and private sponsors have made it possible for Fisher House Foundation to help 130 military children with college tuition in the program's first three years.

This scholarship program helps students like Josh Hamilton, a high school senior from Virginia who is a three-time recipient of the Heroes' Legacy Scholarship. Receiving the scholarship in 2011, 2012 and 2013, Josh is currently enrolled at Princeton University and in addition to a full courseload, he is a member of the school's ROTC. He plans on becoming a chemistry or biology major, setting him up to become a pre-med student and eventually a doctor in the Army.

"The Heroes' Legacy Scholarship is definitely a great opportunity," Josh said. "It's a good way to remember people and the scholarship really helped me a lot."

DHL announced the contribution yesterday during the 2013 DHL Public Policy Forum in Washington, DC, a two- day conference on the economy, global supply chains, trade policies, and the changing political-regulatory environment.

"We are so thankful to DHL for their support to this wonderful program," said Ken Fisher, Chairman and CEO of Fisher House Foundation. "They are investing in education for children of those who have made such sacrifices to protect our nation."

"The Fisher House Foundation has provided invaluable support for U.S. veterans and their families, an we salute their outstanding work," remarked Wolfgang Pordzik, Executive Vice President for Corporate Public Policy at DHL. "We are honored to support the Fisher House Foundation's mission to provide these scholarships to the children of lost or disabled U.S. service members."

For more information about the Heroes' Legacy Scholarship and Fisher House Foundation's other programs, please visit ***www.fisherhouse.org***.

DISPATCHES

TCS—DISA DISHES OUT CS2 CONTRACT

TeleCommunication Systems, Inc. (TCS) has entered into a contract with the Defense Information Systems Agency (DISA) to provide Managed Satellite Services, Ku- satellite bandwidth, terrestrial support and 24-hour support services for the U.S. Marine Corps' Tactical Satellite Communications Network.

The initial funding on this award is $12.8 million for the base 12-month period starting August 1, 2013. The contract includes four, one-year option terms, which, if exercised, have a total contract value of $58.3 million.

This contract was issued under the joint DISA/GSA Future Commercial Satcom Acquisition program. TCS is one of eight prime contract awardees under the $2.6 billion Custom SATCOM Solutions (CS2) vehicle, which was awarded in August 2012. The CS2 contract has a base term of three years, ending August 2015 with two subsequent one-year option terms.

The U.S. General Services Administration and DISA are managing this procurement through the $2.6 billion Custom SATCOM Solutions (CS2) contract vehicle.

This is the first CS2 task order awarded directly to TCS, who will be providing the Marine Corps with commercial satellite services to various terminals to extend the Marine Corps Enterprise Network to deployed users.

As real-world missions arise, TCS has created a cost-efficient managed services solution through a network of commercial satellite bandwidth pools that has the flexibility to increase bandwidth in one region and decrease bandwidth in another region to support the Marine Corps[1] diverse operations.

Additionally, The company has received $2.8 million in incremental funding from the U.S. Army for Secret Internet Protocol Router and Non-secure Internet Protocol Router Access Point (SNAP) Tactical Transportable TROPO (3T) deployable communications systems.

The U.S. Army Project Manager for the Warfighter Information Network - Tactical (PM WIN-T) Commercial Satellite Terminal Program is funding these procurements through the Army's $5 billion World-Wide Satellite Systems (WWSS) contract vehicle. The JF-12 certified 3T is a combination of the TCS battle-tested SNAP VSAT system and Comtech Systems' modem. Troposcatter technology overcomes significant terrain challenges that are extremely relevant in today's complex battlefield.SNAP's 3T option provides high bandwidth, low latency, non-satellite Beyond Line of Sight (BLOS) network transport for existing and future bandwidth intensive C5ISR platforms. The 3T system establishes connectivity at data rates greater than typical satellite links without the recurring satellite airtime costs.

The increased throughput capacity offers greater speed for bandwidth-intensive applications such as Intelligence, Surveillance, and Reconnaissance (ISR) video distribution. Bandwidth offloaded onto 3T links will allow better use of the limited satellite resources and provide long-term cost savings to the warfighter.

TCS has established a proven track record for more than 25 years as a trusted provider of communication technology solutions to solve the government's toughest technical challenges, under conditions that demand the highest level of reliability, availability and security. To ensure mission continuity, TCS TotalCom® offers deployable, highly secure communication solutions and complete end-to-end managed services for converged (IP-based) voice, video and data solutions to organizations requiring seamless and secure connectivity between fixed sites and remote operations.

NORTHROP GRUMMAN AUSTRALIA—A DEFENSIVE BUY

Northrop Grumman Australia Pty Limited, a subsidiary of Northrop Grumman Corporation, has signed a definitive agreement with Qantas Airways Limited to acquire Australia-based Qantas Defence Services Pty Limited (QDS).

QDS provides integrated logistics, sustainment and modernization support to Australian government and military customers. The acquisition is subject to various conditions and is expected to close in 2014. Terms of the transactions were not disclosed.

With more than 300 employees in facilities throughout Australia, QDS provides through life support for the Royal Australian Air Force (RAAF) Multi Role Tanker Transport fleet, turn-key operational logistics services for the Australian Government's VIP aircraft, and engine overhaul services for the Orion P-3 and Hawk Lead-in Fighter.

In addition, Indonesia recently awarded QDS a contract to refurbish C-130H aircraft. QDS also provides engineering consultancy services to the Royal Australian Navy and other maritime customers.

DISPATCHES

1ST + 7TH SPACE OPS—INNOVATION ADDS LIFE TO ORS-1

Capt. Eric Palmer and Airman 1st Class Quillan Fay, 1st Space Operations Squadron, review Operationally Responsive Space-1 procedures and mission objectives in preparation for a satellite contact here June 29. The squadron celebrated the two-year anniversary of ORS-1's launch with a low-key ceremony hours later. (U.S. Air Force photo/Dennis Rogers)

The Operationally Responsive Space-1 satellite launched June 29, 2011, and has been a star Air Force performer since its first day on orbit. As members of the 1st and 7th Space Operations Squadrons celebrated the spacecraft's second birthday this week, they couldn't help but imagine years three and four.

"This is a great time to recognize all of ORS-1's accomplishments, but we're not looking to rest right now," said Lt. Col. Toby Doran, 1 SOPS commander. "We're focused on continuing to push innovation and the utility of this system."

The vehicle has earned numerous awards from the scientific community thus far. It was named one of the top 25 most important concepts by C4ISR Journal, an intelligence, surveillance and reconnaissance industry magazine, and the 2012 Mission Sustainment Integrated Product Team award from the Association of Old Crows, an association that advocates for electronic warfare, information operations and cyber technology.

Designed as a quick-response and low-cost alternative to traditional satellite systems, ORS-1 differs in several ways, but its primary distinction stems from its birth. It took approximately three years to develop from concept to launch and on-orbit operations, compared to seven years or longer for traditional systems. Its payload technology was gleaned from a camera first developed for use aboard U2 spy planes decades ago. Contractors attached a larger telescope to the Senior Year Electro-Optical Reconnaissance System-2 camera to give it adequate resolution from orbit.

"It was initially designed to operate for only a year, but 1 and 7 SOPS engineers and operators discovered they could expand the life of the vehicle by pushing it to a higher orbit," said. Lt. Col. Tony Calabrese, 1 SOPS director of operations. "They also found that the higher orbit would not substantially affect the required quality of its images. That action alone extended the life of ORS-1 by three years."

Doran explained that 1 and 7 SOPS, also known as Team 8-Ball, will continue to take innovative steps to prolong the vehicle's life even further, upwards of five times its original lifespan.For instance, the team informed U.S. Central Command that they could deliver effects on short-notice, urgent, high-priority tasks earlier this year. USCENTCOM responded a short time later when a CH-53 helicopter crashed in a remote location. In the meantime, the squadrons also expanded ORS-1 capabilities beyond a single combatant commander.

"We're focusing on the future," Calabrese said. "The vehicle was designed to support CENTCOM, but we recognized it could do so much more. We sent word out to U.S. Pacific and U.S Africa Commands, and reached out through the Joint Functional Component Command directly to combatant commander staffs to let them know we could support their taskings too. All they needed to do was ask."

As a result, ORS-1 now provides effects for PACOM on a regular basis and does so occasionally with AFRICOM and Special Forces commands.

Story by Scott Prater, 50th Space Wing Public Affairs, Schriever AFP

DISPATCHES

VISLINK—SUPPORT FOR SURVEILLANCE + MORE

Immediately available is a motorized version of Vislink's Mantis MSAT satellite data terminal.

A rugged product that's resistant to extreme environmental conditions, the MSAT is designed to operate in any environment, anywhere in the world. Following the successful launch of the military-spec Mantis MSAT last year, the new Motorised MSAT adds the option of a 120cm reflector. It also provides improved data throughput rates of up to 10Mbps, making the MSAT the ideal system for surveillance missions in challenging or hostile environments.

With simultaneous three-axis motorisation and one-button auto acquire, the MSAT terminal offers full support for two-way video, voice and data communications and is designed for rapid deployment and one-man operation in a variety of scenarios. Despite these additional features, the Motorised MSAT still weighs less than 25kgs.

The Motorised MSAT is a full tri-band optioned system that can support X, Ka and Ku configurations. It is capable of delivering high-definition video and data from anywhere in the world and the feeds can be swapped in the field, building on the flexibility and portability that customers have come to expect from the MSAT range.

The MSAT also meets MIL 810F and DEF-STAN military specifications for shock, vibration, sand and rain, and is provided as a 'one-box' solution incorporating the antenna, modem and all electronics.

22 SOPS—GETTING THE "GREEN LIGHT" FOR ANTENNA

Members of the 50th Network Operations Group examine a new transportable antenna July 18. The antenna, operated by the 22nd Space Operations Squadron in support of the Air Force Satellite Control Network, was cleared for operational use September 2nd.

During December 2012, the POGO-A antenna located at Thule, Greenland was considered unusable and investigations showed that a repair may not be the answer.

After an Air Force Space Command commander directive and discussion at the AFSCN Senior Steering Group, a unique solution was devised.

"It was determined by Honeywell Technical service the repair costs would require over a million dollars, and require several months, perhaps years, because of the limited outdoor work season available at Thule," said Donald Blasius, program lead for TVCF. "It was determined that the best course of action to support the loss of POGO-A would be to move the Transportable Vehicle Checkout Facility core van from the Eastern Vehicle Checkout Facility in Florida, move the transportable antenna from Vandenberg AFB and connect the two components, as originally designed, though they had not been connected in 20 plus years."

With the recent removal of one of the PIKE antennas, 22 SOPS already had infrastructure in place for AFSCN making Schriever AFB a perfect candidate to accommodate the new antenna.

"TVCF, in conjunction with infrastructure already at PIKE, is now able to carry some of the load that has been dispersed to other remote tracking stations allowing increased capacity throughout the network," said Maj. Aaron Gibson, 22 SOPS commander.

Even with the equipment being over 20 years old, there has been no loss of operational capability, said Gibson. As of September 2nd, operational testing is complete and operational use is slated to begin September 4th.

"The signing of the Operational Acceptance Letter by the 50th Network Operations Group commander, officially marked the success of the operational testing," said Blasius.

The transportable antenna will continue to function operationally as simultaneous efforts are made in both New Hampshire and Thule building new antennas to replace POGO-A.

"The TVCF was part of our overall mitigation strategy approved by HQ AFSPC to offset the loss of one of our ground antennas at Thule, Greenland. Using the transportable antenna as a temporary gap filler provides us with additional capability while we construct new ground antennas at New Boston, New Hampshire and Thule, Greenland."

After completion of the new antennas, TVCF will continue to be used for redundancy purposes.

"The TVCF provides our Air Force Satellite Control Network users 40 hours per week of additional support scheduling time, with up to 60 satellite contacts per week load sharing from the other nine antenna sites," said Gibson. "The TVCF provides both uplink capability for tracking, telemetry and command data as well as downlink capability to support our user's mission data needs.

Story by Staff Sgt. Robert Cloys, 50th Space Wing Public Affairs, Schriever AFB

DISPATCHES

IDIRECT GOVERNMENT TECHNOLOGIES—ALLOCATIONS ANALYSIS

BTC graph displays: Timeslot data, Over-The-Air (OTA) and IP Bandwidth.

iDirect Government Technologies (iGT) has has announced the availability of its Bandwidth Timeslot Correlator (BTC), an add-on module to its SatManage 5.2 Enterprise edition that allows network operators to view and analyze bandwidth and timeslot allocations.

The BTC expands Network Operations Center (NOC) capabilities in a Time Division Multiple Access (TDMA) network to enable network operators to manage timeslot allocations and to optimize networks to avoid network traffic gridlocks. This is important because several users share the same frequency in TDMA networks, and critical communications must get through the network for operation success.The add-on software module provides an automated graphical representation of historical timeslot usage and bandwidth for a given network, in-route group or remote. By using historical data, users can re-define and enhance upstream links for better throughput performance and achieve savings in satellite bandwidth and costs. These report designations are configurable through a user interface.

Karl Fuchs, iGT Vice President of Technology, said, "The BTC can arm military, government and emergency response agencies with insight into network traffic so they can plan effectively for communications. Organizations which require traffic engineering and better network optimization can rely on the BTC to meet their needs."

NORTHROP GRUMMAN—HOURS + HOURS OF PROVEN WORTH

The Northrop Grumman Corporation-built MQ-8B Fire Scout unmanned helicopter surpassed 5,000 flight hours while providing critical surveillance capabilities to field commanders in Afghanistan.

Since deploying to Afghanistan in 2011, the MQ-8 Fire Scout system has provided real-time airborne surveillance and targeting supporting counter improvised explosive devices (IEDs), provided targeting support and delivered real-time video to military forces on the ground. Northrop Grumman is the prime contractor on the Navy's Fire Scout program. Combined with testing and Fire Scout's six at-sea deployments aboard Navy frigates, the system has eclipsed 10,000 flight hours supporting naval and ground commanders with critical intelligence-gathering capabilities to respond to threats.

U.S.A.F.—NO OF-FENCE, AFTER 50 YEARS, SPACE FENCE CLOSED

Will the last one out please turn off the fence? For 50 years the U.S. Air Force relied on the "Space Fence" to detect objects in orbit, be it good, bad or ugly. Now what is attributed to the automatic budget cuts known as sequestration, the shutdown came a month earlier than anticipated.

Early in August, it was reported that Gen. William Shelton, commander of Air Force Space Command, had directed the AFSSS, located in Texas, "be closed and all sites vacated" effective October 1, the start of the new U.S. government fiscal year. By discontinuing operations, the AFSSS would not be maintained in operational status; however, equipment will not be removed until a final disposition determination is made. Learn more at Raytheon's site here.

The AFSSS sites are operated under contract and the 21st SW has notified the vendor, Five Rivers Services in Colorado Springs, Colorado, that it most likely will not exercise the next contract option beginning October 1. By de-activating the AFSSS by October 1, AFSPC would see a cost savings of approximately $14 million per year, beginning in fiscal 2014.

AFSPC officials have devised modified operating modes for the Perimeter Acquisition Radar Characterization System at Cavalier Air Force Station, North Dakota, and for the space surveillance radar at Eglin Air Force Base, Florida, which allows the discontinuation of AFSSS operations while still maintaining solid space situational awareness.

The AFSSS is a series of three transmitters and six receivers along the 33rd parallel stretching across the southern United States.The three transmitter sites are located at Jordan Lake, Alabama; Lake Kickapoo, Texas; and Gila River, Arizona. The six receivers are located at Tattnall, Georgia; Hawkinsville, Georgia; Silver Lake, Mississippi; Red River, Arkansas; Elephant Butte, New Mexico; and San Diego, California. The two receiver sites at Tattnall and Silver Lake were deactivated in April of this year.

The AFSSS, which has been operational since 1961, is just one part of AFSPC's global Space Surveillance Network. The system is designed to transmit a "fence" of radar energy vertically into space to detect all objects intersecting that fence. The operational advantage of the AFSSS is its ability to detect objects in an un-cued fashion, rather than tracking objects based on previous information. The disadvantage is the inherent inaccuracy of the data, based on its dated design. The new operating modes at Cavalier AFS and Eglin AFB will provide more accuracy than the AFSSS and still collect un-cued observations The AFSSS is typically referred to as the "space fence," which has caused confusion with the new space fence being developed for the future.

"The AFSSS is much less capable than the space fence radar planned for Kwajalein Island in the Republic of the Marshall Islands," said General Shelton. "In fact, it's apples and oranges in trying to compare the two systems."

Unlike the AFSSS, the new space fence will provide very precise positional data on orbiting objects and will be the most accurate radar in the Space Surveillance Network. It will provide enhanced space surveillance capabilities to detect and track orbiting objects such as commercial and military satellites, depleted space boosters and space debris.

The new space fence will have much greater sensitivity, allowing it to detect, track and measure an object the size of a softball orbiting more than 1,200 miles in space. Because it is also an un-cued tracking system, it will provide evidence of satellite break-ups, collisions, or unexpected maneuvers of satellites.

(Story courtesy of Air Force Space Command Public Affairs)

MOBILE SATCOM IN THE FIELD

By Peter Dingley, Vice President Offer Development, Inmarsat Global Government

A new, low-cost Tactical Satellite (TACSAT) capability is now making available more channels as well as providing secure, reliable and scalable Beyond Line of Sight (BLOS) communication, including Communications On The Move (COTM), through the use of existing, tactical, military radios.

The drawdown of multi-national operations in Afghanistan and the global economic down-turn have led to greater than ever pressure on defense budgets for governments and militaries around the globe. There is a constant demand for obtaining the best value for the money spent to meet crucial military capability requirements through the application of the most cost-effective solutions.

Industry has an important role to play in identifying innovative ways to meet these challenges by finding solutions that meet essential military specifications through the application of Commercial-Off-The-Shelf (COTS) product, or through their use with minor modifications.

Inmarsat's new L-TAC service, launched at the start of July, is an outstanding example of technical innovation and re-use of existing products to provide a step-change in capability at minimal additional cost.

TACSAT + L-TAC

The 'workhorse' tactical radios for command, control and coordination normally operate in the VHF band. However, when operational distances extend beyond line of sight, they run out of range—unless rebroadcast stations are deployed. Such deployment consumes manpower and introduces additional logistic and force protection tasks.

UHF TACSAT overcomes the limitations of VHF by providing simple to operate and reliable Push-to-Talk, all-informed networks over wide areas. This critical communications capability allows troops to speak over long ranges for the command and control of widely dispersed force elements, such as vehicle patrols maneuvering in difficult terrain or logistic convoys resupplying remote bases.

Inmarsat's L-TAC solution now provides this networked tactical SATCOM capability on its 4th generation constellation of satellites by simply adding a low-cost frequency converter to the input/output of existing military tactical radios and changing the units to an L-band antenna. This compact external attachment has been developed by Inmarsat's partner, Spectra Group, for use with existing tactical UHF radios.

Called 'Slingshot', the equipment consists of a power supply, frequency converter and antenna. Minimal additional training is required and BLOS communications are provided without the need for supplementary infrastructure or additional

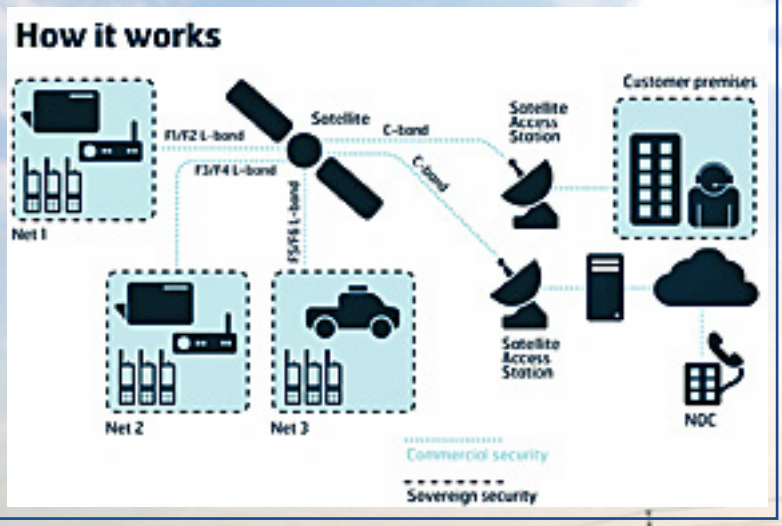
cumbersome equipment to exploit the intrinsic flexibility and global footprint of the Inmarsat-4 satellite constellation. The unit supports most military UHF TACSAT radio types and is certified to military standards, including shock prevention, ingress protection and EMC. With an estimated 200,000 UHF radios in service, the low-cost addition of the Slingshot appliqué and access to the global footprint of the I4 satellite network makes a compelling communications solution that provides maximum value from investments already committed in existing tactical radios.

L-TAC addresses the mobility and agility requirements for critical government information sharing, including the U.S. government's requirement for additional channels at short notice when UHF capacity is not available. The service provides the same 'single-hop' low latency communication capability as existing TACSAT. Terrestrial network, or ground stations, are not required and the technology provides for high-quality voice and low-speed data transmissions.

The low-profile antenna can be concealed for covert operations and its performance is unaffected by severe weather or signal attenuation caused by sand, snow or ice. The unit has been successfully tested communicating on the move from vehicles at speeds of up to 70 mph [112 kph]. Convoys and vehicle patrols will no longer have to pause to use their TACSAT, improving operational tempo and leaving them less vulnerable to hostile action. From concept to delivery, L-TAC was developed in a little over nine months, highlighting Inmarsat's ability to respond swiftly to new military requirements. Users will be able to lease the service for periods as short as one month.

As military budgets worldwide continue to come under pressure and governments demand maximum value for tax-payers' money, the introduction of a new service that involves minimal training, meets military standards, does not involve a large-scale capital expenditure, and addresses a pressing operational need, is a genuinely compelling offer from a trusted provider of mobile satellite services to governments for more than 33 years.

The unit accepts an RF input between 281 MHz and 311 MHz from a host radio, which it converts to L-band for transmission to the satellite and carries out the reverse conversion for the return signal, providing a half-duplex channel equivalent to TACSAT.



Article images are courtesy of Inmarsat Global Government

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COMMAND CENTER

SIMON KERSHAW, EXECUTIVE DIRECTOR GOVERNMENT COMMUNICATIONS, ASTRIUM SERVICES

Simon Kershaw joined Astrium in August 2011 as the Executive Director of Government Communications, Astrium Services, following a career in the UK Ministry of Defence.

Educated at King's Canterbury and Oxford, Simon started his professional career with the Royal Air Force Signals Engineering Establishment where he was responsible for the systems design of secure communications systems. In 1982, he deployed to Ascension Island and the Falklands as part of the initial wave of the reconstruction team.

Moving into the acquisition sector, he led a range of CIS programs, including the PFI pathfinder Defence Fixed Telecommunications System (DFTS). He was responsible for the HR aspects of the move of the Procurement Executive to Bristol and of the formation of the Defence Procurement Agency. He led the formulative work on the Future Strategic Tanker Aircraft project, and also led the team which delivered the groundbreaking and successful Skynet 5 project.

He was a member of the 2007 course of the Royal College of Defence Studies where he gained an MA in International Affairs. He then undertook an operational posting as Head of the multinational MOD Advisory Team in Baghdad, where he was also a personal advisor to the Iraqi Minister of Defence.

More recently, Simon was Head of MOD's Defence Security and Assurance Services, which includes MOD's information systems security accreditation function. He led the MOD contribution to the development of the UK National Cyber Security Strategy. He is a Fellow of the IET.

MilsatMagazine (MSM)

The Skynet 5 contract was signed 10 years ago. How have things progressed during the last decade?

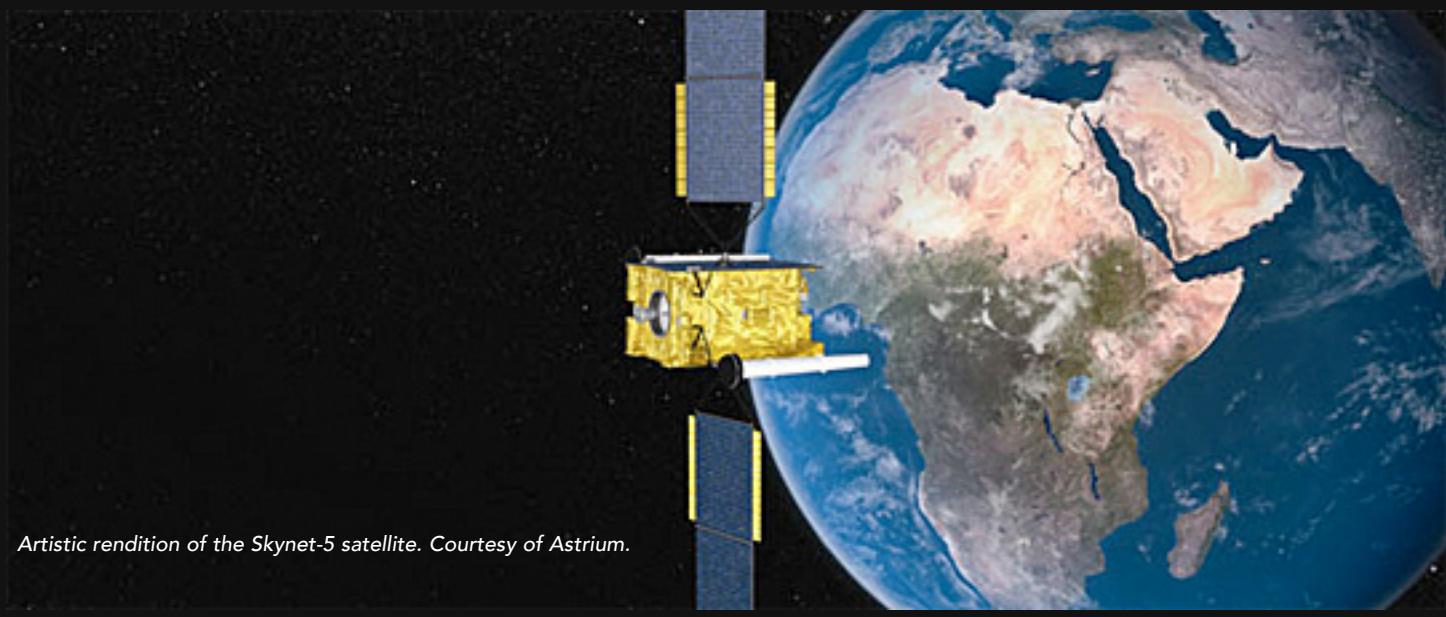
Simon Kershaw

When we signed Skynet 5 in October of 2003 to provide all Beyond Line of Sight (BLOS) MILSATCOMs to the UK Ministry of Defence, it was a huge honor—as well as an enormous challenge.

At that point, it was the UK MOD's highest value and most complex PFI (Private Finance Initiative) project. We had a vast array of milestones and budget targets and we knew that the world was watching us—after all, we were pioneering something completely new—the complete provision of MILSATCOMs from a commercial company.

We had to plan the entire system, design and build the satellites, the ground infrastructure, in-orbit delivery and then, of course, deliver what we had promised—a seamless, one stop shop for all of the UK MoD's needs. Ten years ago no one could have predicted what has since happened since 2003, with the UK forces being deployed in large numbers across the world, giving us even further challenges as we had to prove we could adapt and react to provide the services we had promised to deliver.

Ten years into this crucial project and all of the key milestones have been achieved on time and within budget. That is thanks to teamwork—we adopted a partnering approach to Skynet 5, making certain we worked side by side with the UK MoD all the way—even co-locating our teams with them. Importantly, we also kept all our suppliers and other partners close in what we called the "Skynet Enterprise." This was key for the delivery of all parts of the program and avoided costly and unproductive disputes.



Artistic rendition of the Skynet-5 satellite. Courtesy of Astrium.

Since Skynet 5 has been in service, we have also been successful in securing third party contracts over the past 10 years. Customers using the Skynet services today include NATO, Belgium; France; Germany; the Netherlands; Portugal as well as the U.S. Department of Defense. Astrium Services is proud to provide a beneficial, common means of secure communications for the UK and its allies.

MSM

What are the particularities of the Skynet fleet?

Simon Kershaw

The features and benefits of a SATCOM network designed specifically for military operations using secure satellite links in X-band are vastly different when compared to other commercial frequency solutions. The Skynet 5 fleet of four satellites are the most powerful, commercially controlled, military X-band satellites launched to date.

The satellites were specifically designed to mission critical, sensitive command and control communications systems, where loss of communications is not an option. The high power 160W transponders give 50.5dBW peak EIRP in each transmit spot beam and 41dBW peak EIRP in each global beam. This makes the satellites ideal for supporting smaller, low powered tactical terminals that are deployed across multiple theaters of operation.

Each Skynet 5 features a high performance On Board Active Receive Antenna (OBARA) which can shape multiple uplink beams, fully steerable downlink spot beams, and allow for flexible switching between any uplink beam and at least two different downlink beams. The OBARA also provides space based geo-location capability and protection that nulls out hostile interference against direct attacks with built-in nuclear hardening, anti-jamming capability and laser protection.

However, it is not just about the satellite—the full Skynet system is compliant to NSA, NATO STANAG (interoperability standardization agreement) and MAC1 standards.

MSM

Which countries can obtain your Skynet X-band services?

Simon Kershaw

All NATO friendly nations are able to buy Skynet's X-band and UHF capacity as well as additional available satellite services that include anchoring, backhauling and in-theater support.

MSM

You have extended your capacity with Skynet 5D being operational since March—now Anik G1 has been declared operational by Telesat; what will this change for your customers/end users?

Simon Kershaw

We are the only operator in the world providing near-global coverage reserved exclusively for government and military use. Currently, from 180 degrees West to 135 degrees East with 75 X-band transponders, our constellation has a total of 2.2 GHz capacity. We now offer more available capacity for our customers and a continuous coverage at X-band, than any other operator—this is crucial for our customers as it allows the end-user to have seamless maritime operations, integrated transit and deployment conops (contingency of operations), all supported by our expert MILSATCOM operations.

More importantly, the new satellites give Astrium Services the opportunity to provide unique and bespoke customer solutions for the ultimate in secure SATCOM. This includes tailored beam and transponder leasing solutions, which deliver significant benefits to Astrium Services customers.

MSM

Why is it important to extend your coverage over the Pacific ocean?

Simon Kershaw

In addition to the added flexibility of being able to provide more seamless operations for X-band users, over the past few years we, and the commercial MILSATCOM market, have seen a higher interest and engagement from South American countries. With the addition of Anik G1's X-band coverage to the constellation, Astrium Services is pleased to say that it can now provide services to areas and markets such as South America. As some of the largest MILSATCOM users in the world, the additional coverage will also allow us to address the U.S. and Canadian governments' growing requirements, particularly in regard to the naval, maritime and border security markets.

MSM

Could you say more about the agreement recently signed with Yahsat Military Ka-band service to the U.S. government?

Simon Kershaw

Astrium Services Government, Inc., a subsidiary of Astrium Americas, now offers UAE-owned Yahsat Mil-Ka-band services to the U.S. government. Yahsat's Mil-Ka-, which is compatible with the Wideband Global Satellite (WGS) constellation, provides any U.S. government or Department of Defense end-user with greater global coverage and reliability in the frequency band, which suitably augments both Astrium Services' and the U.S. DoD's milsatcom portfolio.

Astrium Services will provide end-to-end services using Yahsat Military Ka-Band capacity in order to meet DoD requirements on contract vehicles such as the Defense Information System Agency's Future Commercial Satellite Communications (COMSATCOM) Services Acquisition (FCSA) program. This deal will effectively strengthen Astrium Services' commitment to be the leading provider of COMSATCOM and MILSATCOM services to the U.S. government.

Astrium was the prime contractor for the construction of the Yahsat satellite fleet and Astrium Services were prime for the design and deployment of the Yahsat military ground segment, so we are fully aware of the capability of the system and how it can be best utilized for the customer.

MOBILE MILITARIES: COTS PHONES CAN SUPPORT CONOPS

By Giles Peeters, Senior Contributor

The latest advances in mobile technology and the impact these technologies have on affecting military operations are the focus of Mr. Peeters' expertise this month.

The U.S. Department of Defense (DoD) recently approved Enterprise Service 10 on BlackBerry's Z10 and Q10 smartphones, PlayBook tablets and Samsung's Galaxy S4 Knox. The Pentagon has 470,000 BlackBerry users, 41,000 Apple users, and 8,700 people with Android devices—this announcement places the military use of mobile phones under the spotlight.

The reality is that military command personnel have used commercial off-the-shelf (COTS) comms solutions ever since they became available to consumers. In my experience, commanders will tell you that without these devices, they'd be stuck. If they're assigned to a reconnaissance mission and find themselves outside of radio range without an operator in their patrol, how do they send their information back to base? Satellite phones are a luxury and not easy to procure, so they get out their Blackberry/iPhone/Android device and make a phone call.

Unencrypted data flows unimpeded through the mobile networks, into the carrier's' servers and then back out to the receiver. Risks include phones being lost or stolen by the enemy, and system denial (a mobile carrier's signal is either there or not—if an insurgent blows up cellular ground masts, then the carrier is indefinitely out of action).

What happens when a phone is lost? The data that resides on it could compromise the owner, or even an entire mission. Blackberry and Samsung recognized this and their latest technologies partition the devices they're installed on—one half of the device is for personal use, the other for business or military use. In this way, militaries can allow personnel to use their mobile devices for personal use, secure in the knowledge that what is on the device is encrypted, backed up, and can be remotely wiped, if compromised.

Other dangers include the ability to triangulate cellular phones using ground masts and the inability to include them in a concept of operations (conops) due to their potential for disruption. Satellite devices will always work wherever they're being used; they can be relied upon and used for mission planning. Mobile phones cannot and, therefore, can never act as anything more than a first responder accessory. However, the increased capability they afford is significant and worth examining in closer detail.

Readymade Architecture

Cellular networks (GSM/EDGE technology) cover 85 percent of the world's population. Ericsson predicted last year that the same percentage will have access to high speed WCDMA/HSPA networks by 2017. They are ready made comms backbones and are wide ranging. They're maintained by multi-billion dollar private companies with extensive resources.

However, most importantly from a military perspective, they're already in place. When a force enters a new territory, it has to build a radio network using power units and relays. While this is an essential long term comms investment and a key part of any military deployment, it is not suitable for first responders. This leads neatly to the second point.

Risk Vs. Capability

A comms capability is obviously required when entering a region. While a commercial cellular network may not be as secure as combat network radio, it offers good voice and data capability. Commercial devices are also essential for covert operations. Pulling out a combat-net radio will surely blow a soldier's cover, while a Blackberry or similar smartphone goes unnoticed. This is symptomatic of the war among the people our allied forces are now fighting. While the cellular networks remain vulnerable, they can be used to maintain personnel safety and afford crucial first responder comms capability.

Another advantage of cellular networks is communications interoperability. I've personally experienced situations in which an allied helicopter couldn't communicate with a military vehicle 30 feet below it because they weren't carrying the right encryption keys, or were using the wrong type of UHF/VHF radio (for example, police tetra radios aren't compatible with their military frequency equivalents). Whereas, personnel from multiple forces using a commercial cellular network know they'll be able to communicate with one another and will be able to acquire the correct devices to do this subtly, and at short notice. This is an advantage that should not be underestimated.

Security

While commercial cellular networks are vulnerable, the data that travels over them does not need to be exposed to interception. Secure apps designed to send AES256 encrypted positional data, text messages, emails and telemetry over commercial networks already exist and can be downloaded from the App Store or Google's equivalent, the Play Store.

If the nature of a mission changes and a first responder needs to provide their commanders with command and control capability for example, then they can realistically download an app from the relevant store and instantly start using it. Apple's App Store model was recently praised as the 'biggest security innovation of the last 10 years,' according to Mikko Hypponen, chief security researcher with F-Secure.

There has never been a reported instance of malware, and the apps all go through testing and approval processes. This means militaries have two options: Form partnerships with the commercial app store manufacturers to supply troops with secure access to apps on the move, or, build their own app stores. Inevitably the second option will win out as it offers a higher level of control, however, it also requires greater commitment to expensive R&D and will require time to build.

In order to meet urgent operational requirements, we envisage a future in which forces can select from a range of applications dependent on the mission at hand, all designed to securely transmit encrypted military data over cellular networks. In the early days of the Iraq war, plain clothes soldiers were parachuted into Fallujah. Imagine if these first responders were able to download software applications onto their smartphones as the mission developed—applications that would allow commanders to build a common operational picture and coordinate the undercover force securely. This could be done safely with the knowledge that, even if a device was compromised, it would be unbreakable and could be remotely wiped at the touch of a button. The extra capability surely outweighs the risk.

Server Solution Sovereignty

RIM realized that enterprises wanted greater messaging control and introduced the Blackberry Enterprise Server (BES) solution to give companies control over their messaging and data flow. But the BES wasn't a server at all; it was software that sat on a company's existing enterprise servers. The software takes messages, breaks them into small chunks, encrypts and then sends them to the designated receiver. The solution proved extremely popular in the enterprise sector as it gave companies unprecedented levels of control over their messaging.

The same principle is at work in the military and, if commercial manufacturers are going to supply COTS solutions, then they need to be able to provide the back end server, as well. No military wants its command and control messages compromised, or any data, encrypted or not, handled by a private third party.

A Combined Comms Future

Combat radio network will always be used for high level, primary comms. It offers encrypted, real-time, reliable voice communication that a military force has total control over and can use to broadcast to all its assets simultaneously—crucial for situational command and control. If it goes down, then engineers can quickly get it working again and system denial is not an issue. For long term engagements, combat radio is invaluable and will continue to be necessary, regardless of cellular or satellite advances.

When nation states previously faced each other on the battlefield, radio was the only comms medium required (and available)—however, today the warscape has radically changed. A ready made cellular infrastructure, combined with powerful new smartphones that can run military grade software, makes the mobile commercial proposition hard to ignore.

Alongside commercial Beyond-Line-Of-Sight (BLOS) satellite, cellular networks are another weapon in the comms armory and should not be ignored when mission planning. Militaries need to consider the risks involved, work with commercial providers to mitigate them as much as possible, and then exploit the increases in capabilities.

About the author

Giles Peeters commenced his military communications career at RAF Digby in 1997 before moving on in 1998 to the Engineering Office at 751 Signals Unit on the Falkland Islands. In 1999 Peeters joined the Defence Communications Security Agency (DCSA) Corsham, as the Duty Operations Officer of the Global Operations Security Command Centre (GOSCC), before becoming the Military Liaison Officer for Signal Intelligence at GCHQ Cheltenham in 2001.

Peeters then worked with the DCSA Corsham Satellite Integrated Project Team (SAT IPT) as their MOD Commercial Satellite Service Delivery Officer. From 2004 to 2007 Peeters' significant expertise in commercial satellite communications proved invaluable in Iraq and Afghanistan as he provided front line tactical communication and deployment capability for the Joint Helicopter Command (JHC) J6 SO2 from HQ Land Command, Wilton. Peeters' final rank was RAF Squadron Leader. In 2007 Peeters moved to the private sector to consult for organizations such as NATO, on blue force tracking requirements.

Now Defence Sector Director at Track24 Defence, Peeters is the driving force behind the launch of the company's new, commercial-off-the-shelf (COTS) blue force tracking solution, situational Command & Control (SCC).

Medical Communications for Combat Casualty Care (MC4). Photo courtesy of L-3 Communications.

DARPA: SECURE, PRIVATE INTERNET + CLOUD AT THE TACTICAL EDGE

Information, or 'content', on the World Wide Web is replicated and distributed across the world to ensure high availability to the end-user. User expectations for rapid access to content have led to the creation of content distribution systems that enhance the user experience. Consequently, users may quickly access content used for everyday living, from restaurant menus and maps, to local and world news.

Likewise, within the military domain, content is essential to operations. Modern warfare, as epitomized by our current ground operations, is conducted by small units at the tactical edge, and up-to-date information is critical to mission success. Battlefield content is generated and resident in many locations. For example, information can be generated at the edge, such as images of local leaders or

prominent landmarks, social network information, or biometrics of suspects. Other information, such as maps or overhead imagery, is generated at higher echelons.

Currently, warfighters at the edge must reach back to facilities at higher echelon levels to obtain battlefield content and lack the capability to directly share information with other warfighters or neighboring units. This access requirement is not optimized for efficiency or speed.

Different constraints and different network architectures between commercial and military content distribution require different solutions. The commercial sector exploits an expensive, slowly changing computing and communications infrastructure. In contrast, the military uses a dynamic computing and communications infrastructure largely due to its mobility requirements. Content is often transported via wireless networks (i.e. Mobile Ad Hoc Networks – MANETs) that exhibit rapidly changing link capacity and network topologies, which complicates the process of content distribution.

The flexibility the military architecture introduces, along with a high degree of content correlation for warfighters within a geographic area, enables a unique opportunity for a new approach to content distribution that largely eliminates the need for designated, specialized servers.

The Content-Based Mobile Edge Networking (CBMEN) program seeks to develop the network services and transport architectures to enable efficient, transparent distribution of content in mobile ad hoc network environments. It is envisioned that battlefield applications will use these CBMEN network services to efficiently distribute content.

The goal of the CBMEN program is to reduce latency and increase the effective throughput of content for warfighters at the tactical edge. The Content-Based Mobile Edge Networking (CBMEN) program has completed initial field testing of software for rapidly sharing up-to-date imagery, maps and other vital information directly among front-line units

Squads of Soldiers or Marines on patrol in remote forward locations often don't have the luxury of quickly sharing current intelligence information and imagery on their mobile devices, because they can't access a central server. Troops frequently have to wait until they're back at camp to download the latest updates. In the meantime, mission opportunities may erode because the information needed at the tactical edge isn't immediately available.

DARPA's Content-Based Mobile Edge Networking (CBMEN) program aims to provide an alternative approach to the top down focus of most military networks, which provide content over a common operating environment from the strategic to tactical level. Unfortunately, the tactical level is still a severely constrained communications environment, and often when deployed, networks may not have connectivity to higher headquarters and servers needed to provide the latest updates from other units in the area.

CBMEN turns this world upside down and starts the content sharing at the individual Soldier or Marine level. If a set of radios or cell phones are disconnected from higher headquarters units, the individuals can still generate and share critical content on their own, significantly improving their common situational awareness and the ability to carry out their mission. This concept moves past the Internet's "hub-and-spoke" paradigm of requiring point-to-point communications to first go through a central server.

DARPA successfully field-tested CBMEN software loaded on Android-based smartphones and Army Rifleman Radios recently at Fort A.P. Hill, Virginia, marking the completion of Phase 1 of the program.

"CBMEN may not sound revolutionary, because people take server access for granted when cell towers, fiber-optic connections and 4G/LTE networks are so widely available worldwide," said Keith Gremban, DARPA program manager. "But when that infrastructure is not available, CBMEN technology enables real-time information sharing where it hasn't been possible before. CBMEN puts secure, private collaboration and cloud storage in your pocket."

The program aims to make each squad member's mobile device function as a server, so content is generated, distributed and maintained at the tactical edge where it's needed. As long as troops are within communication range—whether by radio, cellular, Wi-Fi or other radio frequency devices—CBMEN software automatically replicates and shares updates, causing the tactical cloud to grow and diminish as users move in and out of range of each other. Any connected collection of warfighters can store and share information in many places right at the tactical edge, making the system tolerant of communications disruptions. In essence, CBMEN creates secure frontline cloud storage services that provide content with decreased latency and increased availability.

The field tests proved the concept works and highlighted the potential benefits of real-time information sharing. At one point in the testing, two squads on foot patrol came within communication range of each other. One squad had information about a simulated person of interest that the other squad was seeking. The CBMEN software, working in the background on the troops' mobile devices, automatically transferred the information from the first squad to the other, without the second squad having to ask for it. As the second squad entered a building where the person of interest was, the squad used that information to immediately identify and apprehend its target.

The testing also identified areas that need further development such as enhancing security and improving efficiency of information exchange, which will be the focus of the next phase of the program. The goal is to reduce the number of transmissions required, which would save power, and to also reduce the bandwidth needed.

A key factor that enables CBMEN is the tremendous computing power available in current mobile devices. "There's more computing power and memory in my smartphone than the supercomputer I used in college," Gremban said. "With 64 gigabytes of storage in a single smartphone, a squad of nine troops could have more than half a terabyte (500 GB) of cloud storage. CBMEN taps into that huge capacity."

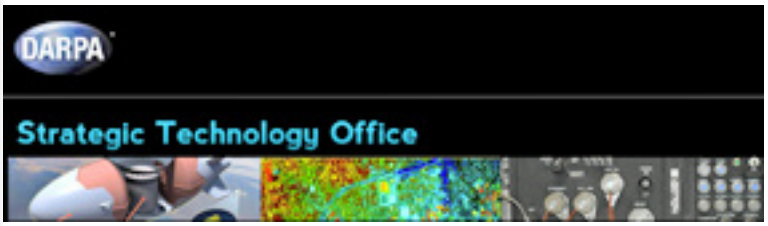
Beyond supporting troops on the frontlines, CBMEN technology may also be useful for civilian applications, especially disaster response, where the established communication infrastructure is unavailable or destroyed. Like forward-deployed troops with no established communications infrastructure, firefighters, police, medical personnel, National Guard members and others responding to a major disaster could quickly share imagery and vital information amongst each other.

Phase 2 of CBMEN program kicked off this month to mature the technology. The objective is to demonstrate improved warfighting mission support in a complex joint-content sharing environment between United States Marine Corps and Army networks using both military radios and commercial smartphone Wi-Fi capabilities.

"Content sharing, starting at the tactical edge, is changing the world in the way information can be shared for warfighters who need it most," Gremban said.

Article and images are courtesy of DARPA Strategic Technology Office.

Program Manager: Dr. Keith Gremban, ***keith.gremban@darpa.mil***



THE EVOLVING 9-1-1 INFRASTRUCTURE

By Tim J. Lorello, Vice President + Chief Marketing Officer, TeleCommunication Systems, Inc. (TCS)

Accessibility is a central concern for emergency communications. The 80 mph winds that rushed through the commonwealth of Virginia in June of 2012 demonstrated what can happen without a resilient communications infrastructure: The functioning 9-1-1 call center was unable to receive calls from the local population.

Advances in Internet protocol technologies and satellite communications can improve the accessibility of our beleaguered public safety infrastructure. An understanding of how 9-1-1 is evolving will shed light on the challenges and opportunities that surround this critical public safety solution and, ultimately, may show the path forward for incorporating satellite technology to add reliability and robustness.

A Brief History

In February of 1967, President Lyndon Johnson's Commission on Law Enforcement and Administration of Justice recommended the establishment of a single, standardized, nationwide number to be used to reach police departments. In December of that year, AT&T (then responsible for the nationwide numbering plan) selected "9-1-1" to be that nationwide number.

In February of 1968, the first 9-1-1 system was inaugurated in Haleyville, Alabama, to serve as a way to rapidly connect citizens with emergency services. Four years later, the FCC joined the nationwide push for the use of "9-1-1." Starting with New York City in 1973, this single emergency number started to be used by callers to access fire and emergency medical services, as well.

In 1978, the first Enhanced 9-1-1 (E9-1-1) system went live in Alameda County, California. With E9-1-1, the phone number of the caller was delivered with the call and was used to determine the home address of the landline caller. This made it possible to route the call to the 9-1-1 call center, known as a public safety answering point (PSAP), closest to the caller's location. In 1980, the first E9-1-1 system to include the delivery of the location, the home address, of the caller to the PSAP was deployed in St. Louis, Missouri.

Roughly two decades later, wireless emerged as a new communications tool used by the population. However, as a wireless phone number could not be tied to a fixed location, wireless phones could not be used to reach emergency services via 9-1-1.

In March of 1998, TeleCommunication Systems (TCS), then called Xypoint, worked with wireless carrier Centennial Communications to deliver the first wireless call to a PSAP serviced by GTE Network Services in Allen County, Indiana. Soon after,

A vicious squall line moves across the northeastern U.S. on Friday, June 29th. (Photo by NASA/Goddard)

A derecho is a large, violent, fast-moving, complex of thunderstorms that follow one another along a path of at least 240 miles, with wind gusts of at least 58 mph. Although derechos are very difficult to predict, they often form along the boundary of a large, hot air mass near a jet stream air current.

Derechos can produce winds as violent as a hurricane or tornado and cause similar damage, but they are not confined to the coastal areas of the United States. While derechos can happen at any time of the year during the day or the night, typically, derechos happen in warm weather, during June and July, and in the Northern Hemisphere. — National Storm Damage Center

the Wireless Communications and Public Safety Act of 1999 standardized and mandated non-landline phones would also use 9-1-1.

In 2004, Voice over Internet Protocol (VoIP) began to proliferate as service providers started to interconnect VoIP with public telephone networks, marketing VoIP service as an economical substitute for traditional phone service. As many VoIP phones could work wherever a person might plug into the Internet, the landline method of determining the physical location of a caller by looking up the phone number in a database became useless.

Following a series of lawsuits in 2005, along with pressure from the public and the telecommunications industry, the FCC implemented a mandate to require interconnected VoIP providers to offer 9-1-1 services and notify consumers of the restrictions of VoIP 9-1-1.

The Next 9-1-1 Challenge: Text to 9-1-1

More than half of all 9-1-1 calls are currently placed via wireless devices. Today, we use our wireless devices for much more than phone calls. In fact, as of the fourth quarter of 2007, the wireless-savvy U.S. population has been sending more text messages than placing wireless voice calls.

Due to this trend, the public often mistakenly assumes that text messages sent to 9-1-1 will reach emergency first responders. For example, during the Virginia Tech massacre in 2007, several text messages were sent to 9-1-1; none were delivered. Following Hurricane Sandy in 2012, hundreds of citizens struggled to reach 9-1-1 via text. These messages do not even receive a response, so texters have no way to know if their messages are being received by emergency personnel.

With efforts to educate the public about current and future Text to 9-1-1 capabilities that are underway, the FCC issued a mandate in May of 2013 and is expected to issue further mandates in the near future:

By September 30, 2013, carriers must provide a bounceback response for text messages sent to 9-1-1 if services are not offered.

It is expected that a future mandate will require that, before the end of 2014, carriers must route 9-1-1 text messages to the nearest PSAP.

These proposed rules do not ultimately mean that Text to 9-1-1 service will be available to all citizens by 2014; accessibility will depend on the deployment and implementation of hardware, software, and training at the more than 6,000 PSAPs across the country. However, the proposed rules are expected to provide a foundation for the day—sometime soon—when all users will be able to send these "silent calls for help" to emergency services via text messaging.

The TCS SNAP 1.2m Lite Terminal

Text to 9-1-1 capabilities are critical in a variety of situations, such as:

- Callers in noise-sensitive situations (such as hiding from an intruder)
- Deaf, speech disabled or hard-of-hearing callers
- Crises or situations in which networks are overloaded with voice traffic, and only smaller, text packets can successfully be transmitted

From a technology evolution perspective, it is interesting to note that over the 45-year history of 9-1-1 just presented, Text to 9-1-1 is the first instance of user-generated data being sent to our emergency responders. Does this become the catalyst for a nationwide transition to IP-based communications technology—the next generation of public safety infrastructure, otherwise known as Next Generation 9-1-1 (NG9-1-1)?

A New Approach With NG9-1-1

As should be evident, our public safety infrastructure has been bombarded with technology advancements that have had to be patched into an architecture that was created in the late 1970s. This may be one explanation why the June 2012 "derecho" storm in Virginia uncovered so many resiliency problems in the 9-1-1 centers: Our public safety infrastructure has been asked to adapt old technology to new challenges. Perhaps we need to look to the latest NG9-1-1 technologies that involve IP-based communications to address such challenges?

As far back as 2000, the National Emergency Number Association (NENA) began planning for NG9-1-1. This initiative has culminated in a national standard, called "i3," which defines an architecture and execution plan for advanced 9-1-1 systems and services that can replace the narrowband, circuit-switched, 9-1-1. These legacy networks are steadily being replaced with resilient IP networks and progressive systems capable of routing multimedia communications based on the caller's position.

The objective of NG9-1-1 is to augment emergency communication services by adapting to this century's always-connected, multimedia-enabled, mobile society. Beyond linking callers to 9-1-1, this technology allows the public to transmit text, images, video and data directly to PSAPs.

By introducing IP-based communications, we open the door to using satellite functionality paired with an NG9-1-1 solution. Military and commercial users have seen the benefit of transporting IP-based voice, video and data communications via a satellite infrastructure. We all know that it is a proven, reliable communications architecture. By connecting future NG9-1-1 solutions to a satellite-based backbone, the public safety infrastructure of the future can be made more resilient, more portable and more accessible.

Satellite Backup Boosts Reliability, Portability + Responsiveness

In the event of an emergency, reliable communication is critical for the public to reach the PSAP. Even NG9-1-1 PSAPs will rely upon terrestrial, IP-based communications architectures. If these wired connections are impaired or severed, as happened in Virginia in 2012, communicating via satellite is still there, with more robust quality and survivability. By adding a satellite terminal to the PSAP, and including satellite communications backup as part of a continuity of operations plan, the PSAP can continue to receive calls, thereby improving reliability.

However, disasters can impact emergency first responders, as well as those calling for assistance. For instance, when terrestrial infrastructures are damaged or destroyed by man-made or natural disasters, first responders may lose the communication methods upon which they normally rely.

Using deployable satellite systems, commonly used in military exercises today in the harshest environments around the world, emergency first responders could continue to communicate, providing life-saving services by receiving voice, video or data while deployed at the emergency site. Thus, satellite communications can provide a portable communications environment, even in the most severe disaster situations. Ultimately, satellite communications can enhance the responsiveness of our emergency response and save lives.

What's Next?

York County, Virginia, is one of the first jurisdictions to pilot NG9-1-1, including the first full deployment of Text to 9-1-1. Public safety officials in York County realized the criticality of next generation technology following an incident when a teenage girl contacted 9-1-1 to report that her neighbor's house was being burglarized. The dispatcher asked the girl for a description of the suspects. Too frightened to peek out the window, she raised her smartphone and snapped a picture of the criminals and their vehicle. When she asked the dispatcher where to send the image, the dispatcher was flummoxed—the capability simply wasn't available.

The quick-thinking dispatcher had the girl send the image directly to her personal mobile phone. Ultimately, due to the image, just a short time later, the criminals were arrested. York County officials immediately understood the value of NG9-1-1 capabilities. This same county was severely impacted by the derecho that hit Virginia in June of 2012. Thus, opportunities are being explored to add satellite communications to the NG9-1-1 solution that York County is implementing.

Unlike systems of the past, emergency responders of the future will be equipped with life-saving, contextual information upon arrival at the location of an emergency. In fact, the use of the word "caller" becomes obsolete, as NG9-1-1 systems enable the use of text or other non-voice communications media to be processed and delivered with equal ease to the PSAP.

In a rapidly changing world, Next Generation 9-1-1, paired with robust satellite backup and deployable satellite communications systems, will improve Public Safety's ability to succeed in its life-changing mission. The challenge today is to deploy this technology nationwide to improve public safety tomorrow.

About the author
Timothy J. Lorello is Senior Vice President and Chief Marketing Officer of TeleCommunication Systems, Inc. (TCS).

TCS' Ready9-1-1

TeleCommunication Systems, Inc. (TCS) offers Ready9-1-1™, a portable, deployable solution to restore 9-1-1 services and make sure they remain operational throughout any emergency. Ready9-1-1 is available to call centers immediately when disaster strikes, and its reliable satellite communications allow your trained call-takers to remain focused on serving the community and ensuring public safety.

Ready9-1-1 is the result of TCS' extensive experience as the pioneer in Enhanced 9-1-1 (E9-1-1) and Next Generation 9-1-1 (NG9-1-1) products and services; our knowledge regarding continuity of operations, information assurance, cybersecurity and integrated logistics support; and our expertise in providing highly secure deployable satellite solutions for mission-critical communications. We have the proven performance and unparalleled experience that make us the company you trust when it matters most.

TCS' Ready9-1-1 solution consists of three primary components:

- *xT911™ call-handling and dispatch software*
- *HyperLite Microsat satellite communications termina*
- *Impact™ Tactical ruggedized communications kit*

Additional information is available at this TCS website:

http://www.telecomsys.com/products/public-safety/ready9-1-1

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Overcoming GPS Spoofing Using Inertial Systems

By Jill Connors, Marketing Writer, KVH Industries, Inc.

When a GPS expert from The University of Texas at Austin was able to spoof the GPS signal of a super-yacht in the Mediterranean this summer and cause the yacht to change its course, the news raised concerns about the risk of terrorism for other types of vessels using GPS.

The research team, led by assistant professor Todd Humphreys of UT's Department of Aerospace Engineering and Engineering Mechanics at the Cockrell School of Engineering, broadcast a series of GPS signals that eventually overpowered the 213-foot yacht's authentic signals and made the vessel think it had gone off course; when the navigation system automatically responded by altering course, the yacht was in actuality straying from its proper course. The researchers had been invited onboard the super-yacht, which was off the coast of Italy at the time of the experiment, but the yacht's crew was unaware the vessel's course had been altered when the experiment was in progress.

Civilian GPS units may be at risk of spoofing, which could alter a ship's course without the crew's knowledge.

Good news for the research team, perhaps, but the experiment's results suggest that civilian GPS units used in commercial shipping can be spoofed or jammed by virtually anyone operating in close proximity to a targeted ship. (A similar experiment was conducted by the General Lighthouse Authorities of the United Kingdom and Ireland in 2010.) Since there is no other global position fixing system available—apart from a sextant—this is potentially bad news for the maritime industry.

Ships set and update their course, either manually or by autopilot, based on their current position fix. That means a subtly introduced and gradually growing error in the ship's position will cause a corresponding error in the course steered. (Military GPS signals are encrypted and hence not as susceptible to this type of spoofing.)

Solutions to make civilian GPS signals less vulnerable to attack are already being developed, and include a Cornell University team's modified GPS receiver whose wiggling antenna can detect a spoofing signal. But it will likely be years before changes can be designed and implemented.

Until then, a solution that can be implemented immediately is to equip commercial vessels with an inertial navigation system (INS), which incorporates inertial measurement technology with the GPS navigation system. Examples of inertial technology include KVH's 1750 IMU (inertial measurement unit) or the CNS-5000 INS.

These fiber optic gyro-based inertial systems are not susceptible to spoofing or jamming as they measure the Earth's rotation to determine position. Therefore, they can be used as backups to, and augmentation of, a vessel's GPS-based navigation to ensure it can not be spoofed or jammed.

If an attempt were made to spoof a ship's GPS signal, the integrated GPS/IMU system would immediately detect the error and take over the ship's navigation to keep it on the correct course. An alarm might also be implemented as part of the backup system, prompting the officers to thoroughly check their position using other techniques, such as RADAR, comparisons of depth soundings, and bearings and ranges off navigation buoys and landmarks.

Inertial technology products such as KVH's 1750 IMU and CNS-5000 INS can address the risk of GPS spoofing on commercial vessels.

As for the UT team, it's not known how soon they might be invited back onto the super-yacht in the Mediterranean, but for now Dr. Humphreys is getting the word out about the risks to the maritime industry. "With 90 percent of the world's freight moving across the seas and a great deal of the world's human transportation going across the skies, we have to gain a better understanding of the broader implications of GPS spoofing," Dr. Humphreys said. "I didn't know, until we performed this experiment, just how possible it is to spoof a marine vessel and how difficult it is to detect this attack."

KVH's CNS-5000 inertial navigation system combines a fiber optic gyro-based IMU with precision receiver technology to optimize raw GPS and IMU data.

An informative video regarding GPS spoofing is available at the following URL:

http://www.youtube.com/watch?feature=player_embedded&v=ctw9ECgJ8L0

About the author

Jill Connors is a primary contributor to ***KVH MobileWorld*** *(http://www.kvhmobileworld.kvh.com/), a blog produced by KVH Industries, Inc., a Middletown, Rhode Island-based provider of precision sensor products and mobile satellite broadband solutions. She was a reporter and magazine editor for 15 years prior to joining KVH last year.*

THE STANDARD MISSILE TURNS 60

By Wes Kremer, Vice President of Air and Missile Defense Systems, Raytheon

On May 15, the U.S. Navy successfully destroyed a complex, short-range ballistic missile target over the Pacific Ocean. Tracking data was accessed from a remote Raytheon sensor payload on the Space Tracking and Surveillance System-Demonstrator (STSS-D) satellites. Using spaced-based assets is a highly effective method to expand the protected area by moving against threats as soon as they have launched.

This accomplishment offered the latest validation for a program that started 60 years ago. The missile launched from the USS Lake Erie in mid-May represented the culmination of decades of innovation and scientific research. However, to fully appreciate the history and breadth of this evolution, one must start at the beginning.

Born in the years following World War II, the U.S. Navy asked industry to create missiles that could defend warships against new weapons, such as fast-moving

fighter jets and their airborne missiles. The Navy recognized that to effectively counteract and defend themselves against the advancements being made in offensive weaponry, they needed a supersonic, guided missile, complete with new kinds of propulsion and control. However, even for the most avid believers, success was viewed as a long shot. The military called it Operation Bumblebee. This was a secret program to develop a weapon that, like the insect, could take off vertically, change directions instantly, and deliver a painful sting.

In spite of numerous detractors ,and a hefty dose of pessimism within the military community, Operation Bumblebee engineers eventually produced three missiles: The Talos, Terrier and Tartar.

Talos was the "big brother" of the three, weighing nearly 4 tons and was designed to take out big threats, such as Soviet bombers. However, the missile was large and expensive—many of the smaller ships couldn't carry Talos.

Tartar was the lightest-weight system and was designed to engage targets at close range. With a cutting-edge (for its time) radar homing guidance system, the smaller Terrier saw wide use by the Navy post-WWII. The first successful launch of a Terrier missile from the USS Mississippi in 1953 is broadly considered the event when the Standard Missile family's story truly began.

Over the past several decades, the Standard Missile family has continued to evolve and now includes:

Standard Missile-1—Nicknamed "Home All The Way," the SM-1 protected the U.S. fleet against air-breathing threats such as airplanes. Combining high-performance and short reaction time, the missile "homes"' in on a target throughout its flight. Several U.S. allies continue to use this missile today.

Standard Missile-2— SM-2 was the first variant that could acquire a target after launch, and that ability doubled its range and altitude. Today, it is the world's premier fleet-area air defense weapon and is used by the U.S. and allied nations.

Standard Missile-3—The SM-3 is the only missile in existence today that can be launched from a ship, blast into space, and take out short- to intermediate-range ballistic missiles. The SM-3 uses a non-explosive warhead, a concept often described as "hitting a bullet with a bullet." Both the U.S. and Japanese navies have deployed this missile on ships.

Standard Missile-6— The SM-6 is a new, over-the-horizon air defense weapon. In 2015, it will take on a new role defending against ballistic missile threats.

Raytheon recently hosted a gathering to celebrate the rich history of the Standard Missile family of interceptors and to recognize the extraordinary feats of engineering that have been accomplished over the past 60 years. This celebration was about honoring our legacy and thanking those who have helped turn Standard Missile into the world's premier family of air and missile defense weapons.

As Vice Admiral James Syring, director of the Missile Defense Agency, pointed out during his remarks, the work the government-industry team is doing to actively protect our homeland, our forces and our international partners against ballistic missiles is essential to our national security. I also agree with Vice Admiral Syring when he says that Standard Missiles will be central and integral to the U.S.'s defense strategy for decades to come.

The proof of that is evident in many recent milestones. Raytheon recently received the green light from the Defense Acquisition Board to start full-rate production of the SM-6, which will provide a game-changing fleet defense capability for U.S. Navy ships. The SM-3 is and will remain the cornerstone of the Pentagon's phased approach to missile defense in Europe, and the missile will also play a mission-critical role in the defense of our very own homeland against the growing threat of ballistic missiles out of North Korea and Iran. Meanwhile, SM-1s and SM-2s will continue to provide fleet defense to our allies around the world for decades to come.

Developing these capabilities has been no easy task; in the early days, engineers were in uncharted territory. But as we've perfected this technology for 60 years, and we've seen it expand from defending ships to defending continents. What was impossible yesterday is possible today. Tomorrow's solutions are limited only by our imagination.