

SATCOM For Net-Centric Warfare

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Saving Lives With SATCOM



cover image courtesy of Inmarsat

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Floods, earthquakes and hurricanes are among some of the natural disasters that can rapidly destroy terrestrial-based communication infrastructures. By Florian Lefèvre, Inmarsat

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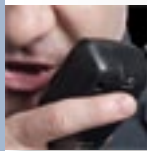
Deployed military in battleground regions are in constant need of connectivity. Troops need networks to remain updated regarding enemy locations... By Karl Fuchs, iGT

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Natural disasters such as Superstorm Sandy strike hard and fast and leave behind destruction that usually takes months, even years, for communities to fully recover. By Paul Duran, Blue Sky Network

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This transcript of General Shelton's remarks are courtesy of the Armed Forces Communications Electronics Association (AFCEA) and were presented at the 2013 AFCEA Symposium.

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How do you get more than three million personnel across 30,000 fire departments, 18,000 police departments and thousands of other law enforcement and municipal departments to... By Tom Cox, Coolfire Solutions

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Drones. They're not just for assassinating international terrorists anymore. Domestic usage of unmanned aerial vehicles (UAV) is on the rise and is poised to grow dramatically in the coming years. By John Paul Titlow, Dell Tech Page One

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The time and cost saving benefits of commercially hosted government payloads are no longer mere talking points exchanged between niche players in the industry and space-savvy users within the Department of Defense.

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Satellites have the ability to provide communications to regions which lack stable ground infrastructure.

Set To Start A Comprehensive Study

Harris Corporation has been awarded a contract to study and make recommendations to help modernize the U.S. Defense Meteorological Satellite Program.

The contract was awarded by the U.S. Air Force Space and Missile Systems Center's Defense Weather Systems Directorate. As part of the study, Harris will analyze the existing Defense Meteorological Satellite Program (DMSP) space and ground assets and create plans to show how each can evolve into the Weather Satellite Follow-on (WSF) to meet mission needs and lower life cycle costs. Key items to be considered include information assurance, net-centric

data strategies, scalability and affordability.

The comprehensive study will address potential compatibility and transition issues, cutover of operations, sustainment impacts, minimizing of disruptions to operations, and security accreditation implications.

The recommendations likely will include an evolutionary approach that leverages Harris' innovative and proven data processing capabilities to meet critical weather information needs for the warfighter. #



Broadband Joins The Rotary World

ViaSat Inc. has demonstrated a high-performance Ka-band satellite communication system that delivers beyond line-of-sight (BLOS) broadband for rotary wing aircraft.

This advanced system provided sustained data rates of 4Mbps from the helicopter to a ground station and 8Mbps to the helicopter despite very high shock and vibration and the inherent repetitive signal blockage from rotating blades.

While previous "through the blade" demonstrations have proved the underlying patented and patent-pending technology, this flight test at Patuxent River, Maryland used a Sikorsky H-3 helicopter.

Flight conditions encompassed rigorous maneuvers, including severe banking and operation through several rotor orientations while running data-intensive applications. During multiple

tests, operators were able to simultaneously run five VoIP calls, three VTCs from air to ground, and streaming videos from the Internet to the aircraft. All applications ran without packet loss or video dropout. This new system builds on proven ViaSat mobile Ku- and Ka- technologies using a modified waveform optimized for efficient through-the-blade broadband communications. The system can be used on manned and unmanned rotary wing platforms and provides communications regardless of the number of blades, blade size, number of rotors, or their orientation on the airframe. #



The Long Lead Parts Procurement Starts

The U.S. Air Force has awarded Lockheed Martin two fixed-price contracts totaling \$120 million to procure long lead parts for the fifth, sixth, seventh and eighth next generation Global Positioning System satellites, known as GPS III.

The GPS III program will affordably replace aging GPS satellites while improving capability to meet the evolving demands of military, commercial and civilian users. GPS III satellites will deliver better accuracy and improved anti-jamming power while enhancing the spacecraft's design life and adding a new civil signal designed to be interoperable with international global navigation satellite systems.

Incorporating lessons learned from previous GPS programs, the Air Force initiated a "back-to-basics" acquisition approach for GPS III. The strategy emphasizes early investments in rigorous systems engineering, industry-leading parts standards, and the development of a full-size GPS III satellite prototype to significantly reduce risk, improve production predictability, increase mission assurance and lower overall program costs. These investments early in the GPS III program are designed to prevent the types of engineering issues discovered on other programs late in the manufacturing process or even on orbit.

Lockheed Martin is currently under contract for production of the first four GPS III satellites, and will now begin advanced procurement of long-lead components for the fifth, sixth, seventh and eighth satellites. The Air Force plans to purchase as many as 32 GPS III satellites. The GPS III team is led by the Global Positioning Systems Directorate at the U.S. Air Force Space and Missile Systems Center.

#



Glowlink Is The Link

The company will be unveiling at Satellite 2013 several breakthrough products and technology designed to prevent, detect, locate, and remove satellite interferences.

These new Glowlink products and technology will improve overall SATCOM communications. Visit

Glowlink at the Satellite 2013 Conference and Exhibition, March 19 – 21, 2013, in Washington D.C. (Booth #4047). Key personnel from Glowlink will be on hand to explain and conduct product demonstration. Contact Glowlink at sales@glowlink.com to schedule a meeting. #

Defending CENTCOM Critical MILSATCOM Links

More than 22,000 miles away, spinning silently through the vacuum of space, is one of the most critical components to air, space and cyberspace superiority today; a satellite.

The mission to defend and protect the operability of that satellite rests a little closer to home, at the U.S. Air Forces Central Command Combined Air and Space Operations Center within the Combat Operations Division's Space Cell.

"We have five priority missions we support," said Capt. Brandon Davenport, the Space Cell chief. "Theater missile warning, personnel recovery support, satellite communications, GPS constellation health and modeling, as well as battle space characterization."

One of the biggest threats to satellite communications and GPS missions is its vulnerability to electromagnetic interference, or EMI, which causes the signal to be "jammed."

Jamming, at its most basic level, is denying a satellite the ability to communicate by overwhelming it with energy where it would expect to see the friendly signal. This is basically like someone using a bullhorn to drown out someone else's conversation.

This type of occurrence can be intentional, in which case it is considered hostile, or accidental. The most common causes of accidental EMI are easily found and remedied. Hostile jamming, however, can require a more creative solution.

"To assure minimal operational impact, our communicators systematically work through actions to quickly restore the services affected," said Lt. Col. Jason Knight, the Director of Space Force's assigned space weapons officer. "If the EMI is determined to be intentional, we engage up the chain and through other governmental agencies to apply non-lethal, or lethal, national instruments of power in order to quickly restore services and resolve the problem."

EMI resolution would not be possible without cross-Combatant Command and cross-agency collaboration between space and cyber professionals, or one of the most technical aspects of the space cell's mission, geolocation of a hostile jamming signal.

"Our focus is to track down a jamming signal with high-confidence and say 'it's this guy,'" Knight said. "By combining our cyber and space expertise at the operational and tactical levels we are better able to attribute and identify sources of interference, and eliminate intentional denial of SATCOM by our adversaries."

Because the satellite transmission spreads out as it travels toward Earth at the speed of light, each satellite covers an area approximately one-third of the planet's surface from its perch far into outer space.

This allows for overlap between several satellites and grants U.S. forces the flexibility to shift to another satellite if necessary to complete the mission.

The linchpin in this whole process is Operation Silent Sentry, run by the 379th Expeditionary Operations Squadron. The Silent Sentry team's mission is to monitor hundreds of satellite transmissions every week using the Rapid Attack Identification Detection Reporting System and help detect and locate signals that do not belong on U.S. satellites, such as a jammer.

"The Silent Sentry antennas and our satellites represent two known locations and the jammer a third, unknown location," Davenport said. "Because we start knowing two out of three points, and have both frequency and time values available to us, we can use algebra to figure out a line running north south as well as a line running east and west of possible locations. Where those lines cross, we'll find the offending transmitter."

Though the technology does not yet exist to prevent jamming, the available actions that the U.S. military and its allies may take can be swift and decisive.

"Most emitters that put our systems at risk can be identified by our teams," Davenport said. "During combat, an adversary could technically jam our satellite signals, but we can recover fairly quickly, attribute the source of interference and respond accordingly." #



Capt. Brandon Davenport, U.S. Air Forces Central Command Combined Air and Space Operations Center Combat Operations Division Space Cell chief, diagrams how to geolocate a jamming signal at a deployed location in southwest Asia, February 28. Jamming is the denial, whether intentional or accidental, of a satellite's ability to communicate by overwhelming it with another signal. Geolocating allows coalition forces to reliably attribute the source of the jamming signal and help prevent it from happening again. (U.S. Air Force photo/Tech. Sgt. Mike Andriacco)

*Story by
Tech. Sgt. Michael Andriacco,
U.S. Air Forces
Central Public Affairs*

Worth Repeating

An advanced satellite payload for Cospas-Sarsat, the global search-and-rescue system, is to be developed by Canada's COM DEV International Ltd.

The contract for the first phase of the Medium Earth Orbit Search and Rescue project was issued by Canada's Department of Public Works and Government Services and is worth about \$4.6 million.

The Cospas-Sarsat system was established in the 1970s by Canada, the United States, France and Russia and became operational in 1982.

Under the contract, COM DEV will develop a fully integrated prototype MEOSAR repeater, which will provide enhanced and more rapid detection of emergency distress signals anywhere in the world from an orbit altitude of more than 16 miles.

The repeaters will be used on the next generation constellation of Global Positioning Satellites. COM DEV began the development of its MEOSAR technology in 2008 under through a Canadian Space Agency project. #



Artistic rendition of Cospas-Sarsat

The COMCEPT Concept

The DGA—Defense French Procurement Agency—late last year awarded ACTIA SODIELEC and its partner ASTRION SERVICES a contract for the realization of the COMCEPT Network and Ground Segment.

With this SATCOM system, French military forces will access high throughput transmissions in Ka-band, using the new



Athena-Fidus satellite that will be launched in early 2014.

Within this new contract, ACTIA SODIELEC will develop, manufacture, and test COMCEPT cornerstone User Satcom Terminals: High Data Rate

Terminal (HDR), Theater & Metropolitan Terminal (TMT) and Small Deployable Terminal (SDT). Design of these terminals will be compatible both with commercial and Governmental Ka-band. #

SATCOM Terminal Training Suite Upgraded

The Army recently began schoolhouse computer-based and simulated training upgrades for its advanced Secure Mobile Anti-Jam Reliable Tactical -- Terminal to evolve the previous legacy training system to accommodate various new system enhancements.

When commanders need protected, secure throughput for worldwide communications, they rely on the Secure Mobile Anti-Jam Reliable Tactical -- Terminal, or SMART-T.

This system makes it possible for Soldiers to extend the range of their network in such a manner that communications cannot be jammed, detected or intercepted. The Advanced Extremely High Frequency, or AEHF, SMART-Ts provide advanced capability to the force over legacy systems, including a four-fold increase in throughput and enhanced security features.

"Since all of the legacy SMART-T systems are currently being upgraded to the AEHF capability, these training upgrades are a vital step in ensuring that Soldiers and their units are getting the most out of these improved protected communication capabilities, and in the most efficient and cost-effective manner available," said Lt. Col. Greg Coile, product manager for Satellite Communications, or PdM SATCOM, which manages SMART-T. PdM SATCOM is assigned to the Army's Project Manager Warfighter Information Network-Tactical.

The United States Army Signal School and Fort Gordon, Georgia, training upgrades began in December 2012 after months of planning and scheduling critical events.

Major enhancements include the AEHF upgrades to the Satellite Simulator, or SATSIM, and Computer Based Training, or CBT, system, along with the addition of 12 new AEHF

SMART-T systems, with the last of these systems being delivered in February.

The updated training began in mid-January with four Army classes and one Marine class, totaling 73 students. Over the next year, the three-week AEHF SMART-T course will be taught to 62 classes, with more than 1,000 Army students and 100 Air Force, Marines and civilians.

"These training enhancements increase efficiencies for both the Army and Marine Corps," said Larry Raville, SMART-T project lead. "If these Soldiers have an AEHF SMART-T fielded to their unit, they will have already had the Advanced EHF training, eliminating the need for delta training had they only been trained on the legacy system."

With SMART-T, Soldiers at the brigade echelon and above can send text, data, voice and video communications beyond their area of operations without worrying that the information will fall into the hands of enemy forces.

SMART-T is part of the WIN-T architecture and is compatible with both WIN-T Increment 1 and Increment 2, which make up the Army's tactical communications network backbone.

Similar to a home Internet connection, WIN-T Increment 1 provides high-speed, high-capacity voice, data and video communications to units on the battlefield, at-the-halt or at-the-quick-halt.

WIN-T Increment 2 provides this network to maneuver formations down to the company level while on the move. In May WIN-T Increment 2 will undergo its Follow-on Operational Test and Evaluation at Fort Bliss, Texas, and White Sands Missile Range, New Mexico. As part of the training improvements at Fort Gordon, the facility's SATSIM was upgraded to accommodate the new AEHF SMART-T training.

The SATSIM provides



constant simulated satellite access to allow training to be conducted year-round, without interruption or overloading the satellite in real-time.

Satellite time is a limited and costly resource. However, the simulator provides the same training benefits and replicates everything that Soldiers would normally see if they were logged onto a real satellite, thus decreasing satellite cost and dependency.

"Simulation is a big focus now because our forces can train in real-time without having to utilize valuable satellite resources," said Mel Pointer, SMART-T logistics management specialist. "Now instead of Soldiers logging on to the actual satellite for training, they can use the SATSIM, and that satellite resource can be more appropriately dedicated to an operational unit where it is most needed."

The SMART-T CBT system was also upgraded to accommodate the AEHF capabilities. The CBT replicates a satellite and AEHF SMART-T working in tandem so Soldiers receive real-time, simulated training as if they were actually using the system.

In the past this server-based system was used to provide classroom training on the legacy SMART-T, but in January both the server and CBT classrooms were upgraded to accommodate the upgraded AEHF version

of the system. The number of classrooms and student capacity was also increased to four classrooms with 24 students per class, running two or three shifts.

Although it is not practical or cost efficient to have enough actual live AEHF SMART-Ts to put every Soldier on a terminal for hands-on experience for the entirety of the course, the SATSIM and CBT upgrades maximize the amount of training that can be conducted by minimizing the amount of hands-on training time needed.

Following the classroom training with the SATSIM and CBT, the SMART-T AEHF terminals themselves provide hands-on training through live practical exercises.

Since the Soldiers already had the simulated training, by the time they get to the hands-on training, they know how to operate the system.

"By having this updated SMART-T AEHF training available, Fort Gordon, the Training and Doctrine Command, and the Army are postured to absorb any type of Military Operational Specialty surge that might arise in the future and they will be well prepared to meet any increased training requirements," Pointer said. #

Story by Amy Walker, staff writer for PEO C3T

Four Days Of Flight Without Need Of Fuel

Boeing's liquid hydrogen-powered Phantom Eye unmanned airborne system completed its second flight Feb. 25, demonstrating capabilities that will allow it to perform intelligence, surveillance and reconnaissance (ISR) missions for up to four days without refueling.

During the flight, at NASA's Dryden Flight Research Center at Edwards Air Force Base, California, Phantom Eye climbed above an altitude of 8,000 feet and remained aloft for 66 minutes at a cruising speed of 62 knots before landing. The aircraft exceeded what it achieved last year during its first flight when it flew at an altitude of 4,080 feet and remained aloft for 28 minutes.



Phantom Eye UAS photos are courtesy of Boeing.

Boeing is self-funding development of the environmentally responsible Phantom Eye, which generates only water as a byproduct of its propulsion system.

Following the first flight, Boeing upgraded the aircraft's software and hardware, including the landing gear. The upgrades paid off in the form of a picture-perfect landing.

The Phantom Eye demonstrator is capable of carrying a 450-pound payload while operating for up to four days at altitudes of up to 65,000 feet. #

Archangels Continue Satellite Control Legacy

Alpha Company at Fort Detrick began its existence as the first Satellite Operation Center in 1982.

Since then, the Archangels (Alpha) have led the 53rd Signal Battalion (Satellite Control) in several technological advancements to better serve the United States Military in the ever-increasing need for satellite communications.

With the launch of the Wideband Global Satellite 5, Alpha Company is now preparing to make the next move in advancing satellite communications to soldiers, sailors, airmen and Marines around the world.

WGS is the latest military communication satellite, with the first launching in 2007.

The WGS constellation continues to mature and Alpha Company will be taking on the newest mission.

Although this is not the first WGS in orbit, it will be a first for the 59 soldiers, one Department of Army civilian and 11 contractors who make up the Archangels.

"We continually endeavor to provide seamless communications to our users, and Alpha has created a yearlong training plan to ensure mission accomplishment with WGS," said Capt. Mark Anderson, company commander.

"The Archangels have worked with a legacy satellite constellation known as the Defense Satellite Communication System for more than 30 years, and the move to WGS requires training on new equipment and most importantly—experience. Alpha Company has drawn from multiple resources to ensure our satellite controllers are prepared for this mission.

"We have the benefit of five geographically dispersed sister companies and other agencies to support our train-up. Our Sister Companies around the

world are able to share a wealth of knowledge about this new system, but we are fortunate to have one of our sister companies, Bravo Company, located an hour down the road at Fort Meade, Maryland."

According to Anderson their location allows Alpha Company to conduct new mission training by bringing WGS experienced soldiers here, as well as sending soldiers to the Bravo location. In addition to this new mission training, he said, the ability to learn from subject matter experts on new equipment and positions has proved invaluable. "All of our satellite control equipment training is conducted on site, and takes up to six months for Soldiers to achieve their initial certification. This type of mission has no room for error, so training is a constant at Alpha Company."

In addition to new mission training, Alpha Company has been able to work with multiple organizations to change their site configuration to utilize a WGS. "This has created the ability for our satellite controllers to experience a 'crawl, walk, run' training plan. This is the first time this site re-configuration has ever been attempted, and has proven to be a success. The ability to look at a different WGS before taking on our new mission has created a real world WGS operating environment at the Alpha Company site."

This opportunity allows the company to test and validate new standard operating procedures, as well as give the satellite controllers real world experience, while having another operations center sit in the "back-up" seat to coach Alpha Company along.

The 53rd Signal Battalion's goal of providing the best customer support possible does not stop, no matter what systems they use. "Alpha Company's new WGS mission is no exception making our long range planning and execution so important," Anderson said.

"This train-up utilizing organizations and agencies around the world will ultimately ensure the Warfighter has all the satellite resources needed to fulfill their mission for years to come." #

*Story by
Captain Mark T. Anderson,
Commander, Company A,
53rd Signal Battalion,
U.S. Army*



Two terminal dishes assist Army space soldiers of Alpha Company, 53rd Signal Battalion (SATCON) at the Wideband Satellite Communications Operations Center, Fort Detrick, Md. The green antenna is called a replacement terminal and is temporarily supporting A Company's Auxiliary Site Control Terminal mission, while the Modernized Enterprise Terminal (white antenna) is going through testing in preparation to fill a Wideband Global Satellite and ASCT role. The MET is the latest antenna to be fielded with several upgraded capabilities. This facility provides Alpha Company controllers increased capabilities to control the communications payloads and communications transmissions of the Defense Satellite Communication System and WGS constellations.

L-TAC For Defense + Moving On Up.

Inmarsat is expanding the availability of mobile tactical Beyond-Line-of-Sight (BLOS) communications to a broad range of new government users through the innovative exploitation of the capabilities of its L-band satellites.

The company has announced its plan to launch L-TAC, a new L-band service, which will deliver a 'UHF-like' tactical satellite capability for use with existing UHF tactical radios for approved government customers at low cost.

UHF tactical satellite capability is in high demand by government customers due to its suitability to create Beyond-Line-of-Sight Push-to-Talk networks using tactical radios, either man-portable or installed in vehicles, helicopters, ships, or other mobile platforms.

Inmarsat's L-TAC service complements this existing UHF tactical capacity, providing additional capability when UHF capacity is unavailable.

The company's Inmarsat-4 constellation of satellites provides this capability across the world, with the additional benefit of supporting small antennas for BLOS communications on the move.

To access the service, users require only a small antenna adaptor for their existing tactical radio, which replaces their existing UHF antenna.

Inmarsat has partnered with Spectra Group to develop the Slingshot™ adaptor, which is expected to be commercially available in late Q2 2013. Designed with the soldier in mind, Slingshot™ will work with existing tactical military radios and with minimal additional training, will provide Beyond-Line-of-Sight communications without the need for additional infrastructure.

Slingshot™ combined with Inmarsat's L-TAC leased service is fully flexible and designed to meet security and reliability requirements cost-effectively.

Users will be able to lease the service for a fixed period with leases as short as one month.

Inmarsat has also appointed Bashir Patel as its Regional Director of Global Government for the Central Asia, Middle East and North Africa (CAMENA) region. A highly experienced executive in Information and Communication Technology (ICT), satellite systems and defence aerospace, Mr. Patel will develop the company's Global Government business in the region, and enhancing Inmarsat's network of government hubs in the United Kingdom, the United States, Australia, Canada, South Africa and Singapore.

Mr Patel has worked in hi-tech industries, primarily the satellite and telecoms sectors, for some 30 years, serving in management consulting and business development capacities. He has particular expertise in the Middle Eastern, African and Western Asian markets. He will also retain his role as the CTO's Ambassador to the Middle East. #

Warhorse Arrives To Train

High intensity combat training began for soldiers of 2nd Brigade Combat Team, 4th Infantry Division, after they moved to Pinon Canyon Maneuver Site last February in preparation for a month long field training exercise.

As soldiers arrived, their vehicles were staged in a marshaling area, they were assigned sleeping tents, additional vehicles were off-loaded from railcars and they received mandatory classes before moving to their assigned training site.

"As the brigade arrives at Pinon Canyon, we are replicating the procedures that we would follow as we enter a combatant theater using reception, staging, onward movement and integration training," said Master Sgt. Phillip Cornell, brigade master gunner, Headquarters and Headquarters Troop, 2nd Special Troops Battalion, 2nd BCT.

Units will have time, resources and personnel to conduct a variety of training ranging from offensive and defensive maneuvers to stability operations during the month long training.

"The units are in a crawling walk stage," said Capt. Luke Bowers, deputy current operations officer, HHT. "When they leave, they should be at a brisk walk or a nearly running phase. Companies should be effective in connecting their operations and mission essential task list."

Bowers said he knows the units will have several obstacles to overcome.

"Units will have to be self-sustaining and have a general understanding of the mission, the intent and be able to accomplish that within the boundaries provided," said Bowers.

Communicating orders quickly and concisely to convey the intent and not be reliant on always having the means or robust communications systems is essential, said Bowers.

For many of the junior leaders, this is the first time operating away from counter insurgency operations, which have been used to fight the war on terror for the past ten years.

"A lot of junior leaders have not done many of these tactical tasks," said Cornell. "The only



U.S. Army Sgt. Danielle Dye, left, and Spc. Reynold Studler, place grounding stakes for a satellite terminal at Pinon Canyon Maneuver Site during training in Trinidad, Colo., Feb. 19, 2013. The satellite terminal allows units to have connectivity and to send and receive data in a field environment. Dye, a multichannel transmission systems operator maintainer and Studler, a cable system installer are both assigned to Bravo Company, 2nd Special Troops Battalion, 2nd Brigade Combat Team, 4th Infantry Division. (U.S. Army photo by Staff Sgt. Andrew Porch/Released)

time they have done them was during initial training, basic officer and noncommissioned officer courses or a professional school. This is an opportunity for leaders to actually get down on the ground, execute these tactical tasks, take away lessons learned and go back to Fort Carson with knowledge that will drive our onward training into the National

Training Center, Fort Irwin, California, and preparation to enter the central command area of operations." #

*Story by
Staff Sgt. Andrew Porch,
2nd Brigade Combat Team,
4th Infantry Division,
U.S. Army*

Making The Grade

The VR-12 Ka-band satellite antenna system from ViaSat Inc. has passed industry standard DO-160G testing that meets FAA and international regulations covering electrical and electronic equipment installed on commercial aircraft.

This standard applies to virtually every aircraft, ranging from general aviation and business jets, helicopters, and commercial jets, to civilian aircraft modified for government use.

Test criteria include temperature, altitude, vibration, sand/dust, power input, RF susceptibility, and lightning and electrostatic discharge requirements. These new

qualified production units are expected to be shipping within a few weeks.

The VR-12 Ka- antenna system and a companion ViaSat mobile satellite modem provides very high data rate, Beyond Line of Sight (BLOS) airborne satellite communications for bandwidth intensive applications such as military intelligence, surveillance, and reconnaissance (ISR) over commercial and military Ka-band frequencies.

Designed for use on aircraft such as Gulfstream, King Air, Pilatus, and C-130, the VR-12 Ka- follows on the heels of its VR-12 Ku- predecessor, which has accumulated more than 500,000 mission hours and is used on more than 300 government aircraft.

The VR-12 Ka systems also operate on ViaSat's growing worldwide mobile SATCOM network in Ka-band overlay regions. #

Previously announced VR-12 Ka- flight test results included simultaneous transmission of HD video, video teleconferencing, VoIP applications, and Internet at aircraft-to-satellite transmission rates upwards of 10Mbps.

Navigating Presidential TFR's

During the recent presidential campaign, local law enforcement agencies and other departments needed to be aware of the temporary flight restrictions (TFRs) in place to accommodate the presidential candidates' movements across the country.

Los Angeles County Sheriff's Department (LASD) made extensive use of SkyWeb, SkyTrac's asset management program to ensure aircraft avoided TFRs, and to identify and respond to questions about aircraft flying during the restrictions.

When new TFRs were announced, LASD were able to set up geofences so they could be notified if any of their aircraft flew into or near a restricted area. LASD was also easily able to identify if an aircraft belonged to them when questioned by other groups monitoring the TFRs.

"Having an ISAT installed on our aircraft made navigating the TFRs a much simpler process. At a glance we were able to redirect our aircraft if needed," said a sergeant at LASD.

LASD has also found the service valuable for when their aircraft are operating out of state, and have no radio communications with the base.

The system provides an extra layer of safety for the unique flying environment found in California, which includes deserts, mountains, oceans and other bodies of water.

"LASD has employed many advanced features in SkyWeb, and the efficiency and effectiveness of their operation is obvious," commented President and CEO Malachi Nordine.

"It is amazing to be able to watch how differently each client uses our system, and how we can

help tailor a solution to fit each individual's needs."

SkyTrac is a SATCOM solutions supplier for data, text and voice communications. SkyTrac has acquired a long list of Supplemental Type Certificates (STCs) and the company's hardware has been installed on

a large number of rotary and fixed wing aircraft types from AgustaWestland, Eurocopter, Cessna, Bell, Sikorsky, MBB, Beechcraft, de Havilland, LearJet and Raytheon. #



MILSATCOM Ops Strengthened

Infrastructure for the 3rd and 4th Space Operations Squadrons' integrated operations environment at Schriever Air Force Base is complete and combined operation started in January of this year.

"The start of satellite command and control operations in the integrated ops environment this week is the culmination of countless hours of work by hundreds of government and industry people," said Col. James Ross, 50th Space Wing commander. "This new facility will allow 3 SOPS and 4 SOPS professionals to more effectively and efficiently deliver decisive communication effects on a global scale."

The IOE is a 50th Space Wing initiative to integrate the operations of Department of Defense military satellite communications systems and architectures into a single operations floor.

"This is designed to strengthen the effectiveness of military satellite communication operations and enhance operational efficiencies and situational awareness while creating a truly integrated MILSATCOM operations center," said Capt. Gail Smicklas, 3 SOPS IOE project officer.

The demand for efficiency is increasing as the difficulties within the operational environment continue to grow. This is why a highly effective work environment is critical.

"Without question, the geosynchronous space environment has become increasingly congested," said Lt. Col. Chadwick Igl, 3 SOPS commander. "The warfighters demand for reliable, space borne communications becomes even more critical as the nation prepares for a potentially contested environment."

"IOE realizes this vision of a combined MILSATCOM operations center where the two premier SATCOM squadrons at the 50th Space Wing will have unprecedented situational awareness to recognize, react and respond to potential hostile actions and satellite anomalies."

"We hope to expand the synergies realized to our mission partners when they join us in the IOE and provide an even greater opportunity to enhance the combat effects provided by the 50th Space Wing to our U.S. and allied partners."

The IOE concept has been in development for a decade, but the current configuration was solidified in 2005.

The original concept was to have one massive operations center that was two stories tall and could facilitate all satellite operations squadrons. Eventually leadership decided that 3 and 4 SOPS were best suited for the combined environment.

"During 2012, 3 and 4 SOPS tested the IOE concept by performing co-located operations," said Capt. Micah Dodds, 4 SOPS operations flight commander. "Building on the success of that experience, we are looking forward to moving into the new operations center."

The IOE aims at preparing the U.S. to successfully operate far into the future, in a spectrum of environments, including peacetime, degraded operations and full hostilities in space.

"We are very excited to enter the next phase of making MILSATCOM operations more effective and efficient," said Lt. Col. Scott Trinrud, 4 SOPS commander.

The layout of the ops floor is designed to encourage inter-squadron communication and situational awareness to respond to satellite anomalies, potential attacks or interference.

"What started with a vision many years ago by my forward thinking predecessors Lt. Gen. John Hyten, Brig. Gen. Teresa Djuric, Brig. Gen. Cary Chun and Col. Wayne Monteith is now becoming a reality. We should be proud to continue the 50 SW tradition of innovation and operations excellence," said Ross. #

*Story by
Staff Sgt. Robert Cloys,
50th Space Wing, U.S.A.F.*



The 3rd and 4th Space Operations Squadrons begin combined operations in their new integrated operations environment Jan. 15. (Courtesy Photo)

Satellite IRG Sets New Standards

"We are now aiming to ensure this new standard is integrated across satellite equipment... in time for a number of high profile sporting events in 2014."

The Satellite Interference Reduction Group (IRG) has announced that the DVB Carrier ID (DVB-CID) specification, supported by IRG and its members, has been approved by the DVB Steering Board on 28th February 2013.

The specification will now be submitted to the European Telecommunications Standards Institute (ETSI) for formal standardization. The DVB-CID specification is available for downloading on the DVB website.

The new technology is based on a proposal by Comtech EF Data and became a DVB specification supported by a wide group of manufacturers including Advantech Wireless, Ericsson,

Gilat, Newtec, and iDirect, following a meeting instigated by IRG at the 2011 IBC.

Manufacturers, such as Newtec and Comtech, are implementing the new technology into their modem products, starting with the Comtech EF Data DM240XR and the Newtec M6100 modulator.

Products implementing the new DVB-CID will be announced at CABSAT.

The new spread spectrum Carrier ID standard adds a low power spread spectrum carrier underneath the host carrier it will identify. This means that the correct transmission doesn't need to be interrupted to identify the interfering carrier, enabling the operator to drastically minimize the effect on the correct user.

"We are delighted that this new DVB specification has been approved," commented Martin

Coleman, Executive Director, the Satellite Interference Reduction Group. "We are now aiming to ensure this new standard is integrated across satellite equipment for all SCPC (Video & Data) transmission types, in time for a number of high profile sporting events in 2014."

The CID carrier has no real impact on the host carrier and typically adds less than 0.1dB of noise energy to the host carrier. In dual illumination situations, multiple over-lapping CIDs can be decoded at the same time, allowing efficient resolution.

"This new specification will help the industry to drastically reduce the time to resolve day-to-day satellite interference," commented Roger Franklin, CEO, Crystal Solutions and Chairman of the CID Working Group, IRG. "We are pleased to have worked with the industry to formalise this

important specification."

IRG is working with manufacturers to roll-out the new Carrier ID equipment in time for 2014 Football World Cup, Winter Olympics, and Commonwealth Games. Carrier ID will be a topic at the Satellite Interference Prevention Summit being held at Satellite 2013. For more information or to register please visit <http://www.satirg.org/>. #



Wallop @ Wallops

Hurricane Sandy came ashore in northern New Jersey on Oct. 29, 2012, and as the powerful storm made its way along the East Coast, it brought damage to NASA's Wallops Flight Facility in Wallops Island, Virginia.

The Wallops Shoreline Protection Project has been managing the restoration efforts and released before and after photos of the shoreline.

At 8:00 a.m. EDT, on October 29, 2012, the National Hurricane Center reported tropical-storm-force winds were occurring along the coasts of southern New Jersey, Delaware and eastern Virginia.

Tropical-storm-force winds extended as far inland as the central and southern Chesapeake Bay as Hurricane Sandy closed in for landfall.

Hurricane Sandy removed about 700 feet of protective berm and about 20 percent of the beach protecting Wallops Island,

home to NASA's Wallops' launch pads and launch support facilities.

The beach, which had been recently improved under the Wallops Island Shoreline Protection Project is vital to protecting the more than \$1 billion in NASA and governmental assets on Wallops Island from hazards such as hurricanes and nor'easters.

In addition to beach erosion, Hurricane Sandy caused minor roof, door and siding damage and downed trees throughout the facility.

NASA Goddard Space Flight Center's Wallops Flight Facility (WFF) was established in 1945 by the National Advisory Committee for Aeronautics as a center for aeronautics research, and is now NASA's principal facility for managing and implementing suborbital research programs.

WFF is located in the northeastern portion of Accomack County, Virginia,



Aerial photographs of the NASA Wallops facility and coastline. On the left is from August 2012 after completion of a Shoreline Protection Project. On the right is from November 2012 after Hurricane Sandy swept by. Photo credits: NASA

on the Delmarva Peninsula, and is comprised of three land masses: the Main Base, Wallops Mainland and Wallops Island. Wallops Island consists of approximately 1,680 hectares

(4,600 acres), is bounded by Chincoteague Inlet to the north, Assawoman Island to the south, the Atlantic Ocean to the east and estuaries to the west. #

In The Frontline Of Disaster Zones—Saving Time + Saving Lives...

By Florian Lefèvre, Head Of Business Development For Aid Agencies + NGOs, Inmarsat

Floods, earthquakes and hurricanes are among some of the natural disasters that can rapidly destroy terrestrial-based communication infrastructures. In other situations, including conflict zones or terrorist activity, mobile telecommunications networks may either be switched off or become overwhelmed.

In all cases, alternative communications have to be quickly restored to enable aid agencies and authorities to access vital information, immediately and reliably, and provide effective coordination of relief efforts. Inevitably, crises can happen anywhere in the world—and for many rescue workers mobile, global-based satellite communications have become an essential component in their response strategy.

The ability to rapidly set up a broadband mobile command post in a temporary field office has now become a top priority for aid teams first on the scene. Delivering both voice and high-speed data access provides essential connectivity, almost immediately, enabling the effective coordination of welfare resources, while also improving response times, which could ultimately save lives.

Inmarsat has very strong relationships with aid agencies and first responders who operate at the frontline of disaster zones. As a trusted partner, it continues to develop a product and service portfolio based on their specific requirements. Many of the emergency teams deployed at short-notice characteristically equip themselves with highly portable, lightweight satellite terminals—typically **BGAN** terminals (*Broadband Global Area Network*). Possessing voice and data connectivity, and satellite phones, aid teams can respond immediately and effectively in the critical hours following a disaster.

Response Times

The capability to deploy mobile communications rapidly, where local communications are either poor or non-existent, means the first people on the scene can begin managing and coordinating search and rescue efforts, set up medical centres and oversee delivery of aid to survivors—helping to speed up response times, and ensuring the right assistance gets to the right place at the right time.



Fitting into a backpack and weighing just a couple of kilos, the 'plug 'n' play' BGAN terminal can be up and running in minutes—field workers don't need any technical expertise to use the system, and connectivity is assured anywhere in the world. The rugged design of the terminals can withstand the challenges of extreme environments, and if responders need to move between locations they can use a vehicular terminal designed to create a mobile command post, allowing them to send status reports and make calls while on the move. The vehicular unit takes up minimal space in the car, with a discreet racking antenna mounted on the roof.

While agency-to-agency coordination is paramount, no less essential is allowing civilians to contact their friends and family. After listening to its customers, Inmarsat built support for social media into its satellite phone, allowing messages to be quickly sent anywhere in the world. Familiar to many,

Twitter can be accessed on the IsatPhonePro with messages sent for the price of a SMS text, helping to reassure loved ones that they are safe, while also contributing to the wellbeing and welfare of local communities. For NGOs, this feature can create immediate awareness of their actions across the world.

All-Weather, All The Time

Inmarsat's BGAN and **IsatPhonePro** operate in the L-band and, therefore, are true all-weather systems, unlike high-frequency satellite systems which can be disrupted by heavy rain or seismic activity. As a broadband mobile communications system, BGAN supports email, Internet, VPN and voice, providing connectivity between individual first responders, other mobile command posts and off-site teams.

Satellite Fleet—Today + Tomorrow

Inmarsat can draw on its long experience of traffic requirements based on previous disaster responses. The 24/7 monitoring of its operations centre means it continually adapts and optimises the network, providing critical satellite communications capacity and network solutions to the government or first-response agencies.

Emergency response situations typically create significant demand for Inmarsat's services in a particular region, so the company manages its satellite and network resources to ensure that the increasing number of terminals being used is supported.

To accomplish this, the **Inmarsat-4 (I-4)** satellites—among the most advanced commercial mobile communications spacecraft of their kind—generate hundreds of high-power spot beams. Each I-4 can generate 19 wide beams and more than 200 narrow spot-beams. Across the I-4 constellation, the spot-beams can be reconfigured and focused anywhere on Earth to provide extra capacity where needed.

The I-4 series are 60 times more powerful than their predecessors. And, almost the size of a double-decker bus, the I-4 satellites set a new benchmark for mobile SATCOMs when first introduced, establishing the world's first global 3G network that delivers a wide portfolio of broadband services.

Inmarsat's ongoing commitment to L-band services is demonstrated by its agreement with the **European Space Agency (ESA)** to become the commercial operator of the new **Alphasat** satellite. Built by **Astrium**, Alphasat is scheduled for launch in 2013 when it will supplement the I-4 series by providing additional L-band capacity for coverage of Europe, the Middle East and Africa.

Alphasat will be one of the world's largest telecommunications satellites, providing increased capacity to handle more than 750 channels in the L-band, with improved quality particularly for satellite phone users.

Currently, the next-generation **Inmarsat-5 (I-5)** satellites are being built by U.S. manufacturer **Boeing**, based on its powerful **702HP** platform and scheduled for launch in 2013 and 2014. The Inmarsat-5s will form the backbone of the new **Inmarsat Global Xpress®** network, offering significantly increased broadband downlink and uplink speeds from compact terminals.



For the first time, and providing a complementary service to the L-band services, the I-5 series of Inmarsat satellites will use Ka-band to provide communication links for end-users.

Remote Possibilities

In helping prepare against future disasters, and allowing first responders to communicate humanitarian needs as quickly as possible, satellite-based environmental monitoring systems can be deployed to support relief programmes. Providing real-time data, and based on L-band resiliency for maintaining connections in extreme environmental conditions, the systems can alert authorities of an impending event ahead of time in order to implement emergency procedures and help reduce loss of life.

Satellite-based *machine-to-machine (M2M)* broadband services offer organisations the ability to plug the gaps in terrestrial coverage and extending their reach to devices in more remote and hostile locations. The all-weather terminals deliver reliable, high availability data communications for fixed monitoring applications, all backed by Inmarsat's proven end-to-end IP data capability.

Télécoms Sans Frontières (TSF)

Inmarsat's support for the humanitarian work of the charity, **TSF**, for example, includes equipment for their emergency teams tasked with restoring communications in the wake of man-made or natural disasters. TSF has been appointed by the **United Nations (UN)** to act as its principal communications provider in disaster situations, and it also supports the **European Commission** and non-governmental relief agencies.

In an emergency, TSF's priority is to set up telecom centres to help coordinate first responders' relief efforts and also enable survivors to call and reassure their loved-ones. The charity states that through Inmarsat's support it is serving more than 200 organisations per year and tens of thousands of people in distress, providing them with the necessary contacts inside and outside their countries.

Supporting Reconstruction

Inmarsat has recently focused on delivering a new humanitarian aid package for NGOs and aid agencies tasked with the reconstruction following disasters. Unlike their first responder counterparts, these groups require a full suite of communications over extended periods. However, as with their counterparts in emergency response, they frequently have to operate in areas either without existing terrestrial communications or with seriously damaged infrastructure. In these situations, the need



for broadband voice and data communications remains critical but budgets are often very restricted.

Covering both IsatPhone Pro and IsatPhone Link, these connectivity services have been packaged around the needs of the reconstruction team.

Humanitarian Award

In October, 2012, at **ITU Telecom World**, Inmarsat was presented with the **International Telecommunications Union (ITU) Humanitarian Award for Lifesaving**, in recognition for its commitment and consistent leadership in supporting the use of telecommunications to save lives during emergencies.

In receiving the award, **Andrew Sukawaty**, Chairman, said, "In a crisis situation, time is of the essence and an early, coordinated response is key to minimising the impact of any disaster. Mobile SATCOMs are therefore among a range of essential services for relief agencies in the initial days after a natural disaster, ensuring emergency services are deployed both quickly and reliably."

As a long-standing ITU partner, Inmarsat has a proud history of supporting the relief effort across the world, and the award occupies a position of prominence at the company's London headquarters.

About the author

Florian Lefèvre is head of business development for humanitarian aid agencies and NGOs.

Lightweight, portable and the size of a backpack, BGAN is portable broadband to go.

With BGAN, aid workers can create a temporary communications hub immediately, supporting site operations including all the applications needed for an 'office' in the field, covering voice, email, fax, web browsing, remote access to company networks and even video-conferencing.

Once set up, the system provides reliable back-up and mobile off-field communications for a variety of workers. For instance, first aiders can carry BGAN as they travel in the field, using it to communicate and work almost as effectively as they would from their offices, with secure access to networks through industry-standard VPN (virtual private networks) systems.

With a footprint roughly that of a laptop, a BGAN terminal is truly mobile. And as a powerful voice and data tool in its own right, emergency teams can use it for a wide range of tasks to support large-scale operations in the field, including sending status reports and photographs, coordinating operations and contacting other agencies by phone, email or via video link.

- **Simultaneous voice and broadband data**
- **Rugged, laptop-sized terminals**
- **Works almost anywhere**
- **Highly reliable, whatever the weather**
- **Quick to set up and simple to use**
- **Supports all common office applications**
- **Cost-effective (pay per MB)**
- **Video-conferencing**
- **Data at up to 492kbps over standard IP**
- **Supports ISDN and IP-based networks.**



SATCOM Solves Defense Communications Challenges

By Karl Fuchs, Vice President of Technology, iDirect Government Technologies (iGT)

Deployed military in battleground regions are in constant need of connectivity. Troops need networks to remain updated regarding enemy locations, to receive orders from their superiors, and to download maps and important intelligence, surveillance and reconnaissance (ISR) data.

However, terrestrial networks experience outages from time to time. These outages can be caused by weather conditions, hostile actions and even network intrusions. While this can be aggravating to a casual computer user, for mission-critical military personnel—as well as first responders, law enforcement, state and local governments and disaster recovery organizations—network outages can be life threatening.

Therefore, it is important that government agencies, emergency response and military organizations maintain continuity of operations (COOP) during and after an event.

An important technology that enables organizations to do just that is satellite communications. By providing end-to-end Internet Protocol (IP) services over satellite, SATCOM can operate completely independent of a terrestrial infrastructure, or seamlessly integrate with an existing terrestrial infrastructure, providing anytime and anywhere connectivity worldwide.

Satellite communications are extremely reliable and secure, and they are also resilient. Satellite allows users to bypass the existing terrestrial infrastructure while providing the same user experience as traditional networks. The technology proves particularly advantageous for the military and emergency responders who need to quickly communicate on the move, or set up networks on the fly that can be scaled without the restrictions of an existing communications infrastructure. SATCOM is easily deployable and supports

all voice, video and data communications requirements with high network availability.

Effective SATCOM networks deliver fast, non-stop connectivity, operating from a flexible platform that supports multiple satellites and bands, including X-, C-, Ku-, and Ka- over commercial or WGS satellite frequency. One SATCOM developer that knows this as well as any organization is iDirect Government Technology (iGT).

iGT delivers an encrypted satellite communications system that can be easily configured to suit any mixture of voice, video and data communications requirements and IP applications with stellar network availability. iGT's system can be integrated into terrestrial infrastructures to support COOP.

To make a COOP system financially viable during normal non-outage periods, bandwidth can be accessed by various users. When an outage occurs, the iGT Group QoS (Quality of Service) system allows for preemption of existing services to support high-priority COOP traffic. iGT's Group QoS allows for intelligent and extremely efficient bandwidth sharing and priority management while mapping to terrestrial circuits and established service level agreements. Group QoS delivers greater traffic management flexibility, which means during a disaster, when operational continuity matters most, an organization can prioritize traffic in a shared network environment.

Investing In SATCOM

Some first responders in major U.S. cities are investing in the power of satellite communications technology, deploying satellite-based emergency response networks. These networks are equipped with voice, video and data access to handle 9-1-1 calls, receive and transmit live video feeds, and keep organizations' field units connected to improve situational awareness.

In the city of Chicago, for example, iGT and Morgan Franklin developed the Unified Command Vehicle (UCV) to assist during emergencies. During a disaster, the UCV system can remotely coordinate rescue efforts and dispatch police, fire and EMS units. The system can also provide satellite-based backup for the city's entire 9-1-1 call volume from any location, acting as a mobile communications gateway for a temporary base of operations. The vision for the unified command system includes projecting the technical and logistics footprint of any organization to any point in the continental United States using virtually any band satellite. Leveraging commercially available technologies and standards where possible, satellite provides incident command and communications coordination (including radio interoperability/cross-banding) for major events and critical incidents.

A properly equipped UCV is able to provide instant situational awareness while on the move, eliminating the setup and alignment procedures for reach-back satellite communications. The system is easy to use, also eliminating the requirement for expert technicians on site for setup and operation.

The same ingenuity went into setting up a communications system for a relief agency in the aftermath



of *Hurricane Katrina*. The agency needed to coordinate relief and serve thousands of displaced people and needed a system that could be deployed quickly while bypassing the heavily damaged terrestrial infrastructure, which had been heavily damaged in places and completely destroyed in others.

The network needed to be easily scaled, extended to reach any geographical location, easy to transport, and with user-friendly configuration, management and maintenance. The solution included a single hub chassis installed at a Virginia teleport hub and 40 satellite routers deployed at needed locations in the Louisiana region.

From the teleport hub in Virginia, the agency was able to configure, monitor and control all remote access sites, and even customize services to meet individual site requirements.

At the remote locations in Louisiana, and later in Mississippi, Alabama and Florida, satellite routers provided the hardware and software needed to support mission-critical broadband applications. Each compact terminal provided a satellite modem, IP router, Transmission Control Protocol optimization over satellite, *Advanced Encryption Standard (AES)* and QoS prioritization.

The agency continues to deploy the satellite communications system to assist during emergency disaster response, and the satellite communications technology is getting even better.

This past summer, iGT rolled out **SatManage 5.2**, an upgrade to its suite of web-based software tools that integrate, monitor and automate hybrid networks and *Network Operations Center (NOC)*-based applications. SatManage enables first responders, public safety, military and national security agencies to transform how they manage complex deployments, resulting in stronger network performance, faster response times, and more secure communications.

Public safety and security agencies rely on the solution to meet the communications demands of any emergency situation and to support coordinated efforts in response to emergencies. SatManage

helps the military and emergency responders to better protect people and property when facing threats that range from extreme weather, terror/criminal acts and other unforeseen events.

In this day and time, effective back-up network capabilities are not merely a luxury. COOP has become an absolute critical component to ensure mission-critical operations are not compromised.

About the author

Karl Fuchs serves as Vice President of Technology for iDirect Government Technologies (iGT); kfuchs@idirectgt.com.

After The Storm...

By Paul Duran, Vice President of Marketing + Sales, Blue Sky Network

Natural disasters such as Superstorm Sandy strike hard and fast and leave behind destruction that usually takes months, even years, for communities to fully recover. Beyond the physical damage to homes and buildings, when civilians find themselves in need of rescue, they rely on the efforts of first responders and non-governmental organizations (NGOs) in order to survive.

The hours immediately after a disaster are often the most critical, and reliable communication solutions for first responders and NGOs are essential. However, there are a number of challenges they face that can affect efficiency and operations during recovery periods. These include power loss and downed phone lines that can

lead to a number of problems for fleets. Inefficiencies in internal communication can also be significantly hindered as response crews receive poor information from their command centers that delay their arrival to an emergency scene.

At times, it can even take first responders hours to arrive as impassable roads impede travel time. A major concern, and top priority for fleet managers, is the safety of their fleet. While trying to assist victims of a disaster, first responders can also become injured thus requiring assistance themselves.



During the onslaught of Hurricane Sandy, this photo reveals the high tides created by the superstorm.

According to the U.S. Department of Energy, more than 8.6 million people were without power and cell coverage following Superstorm Sandy. During the storm, New York City's 911 systems received over 10,000 calls per half-hour at the height of the storm—10 times the normal volume for emergency calls. The overload of calls received led to delays and inefficiencies while dispatching first responders.

The most beneficial thing these organizations can do is to be well prepared and equipped with reliable communication solutions before disaster strikes. In today's market there are advanced satellite tracking and voice technologies that can limit the risks of these problems and improve safety conditions for all through monitoring and communication capabilities. With these technologies, emergency responders that require around-the-clock communication with widely distributed mobile assets can now stay connected and ultimately improve operations.

Satellite Tracking Solutions

Satellite-based fleet management solutions that include voice communication and asset tracking are excellent for responding to emergency situations. For example, the **Iridium Satellite Network** delivers essential communication services to and from remote areas where no other forms of communication are available. Iridium provides low latency and pole-to-pole coverage from anywhere in the world.

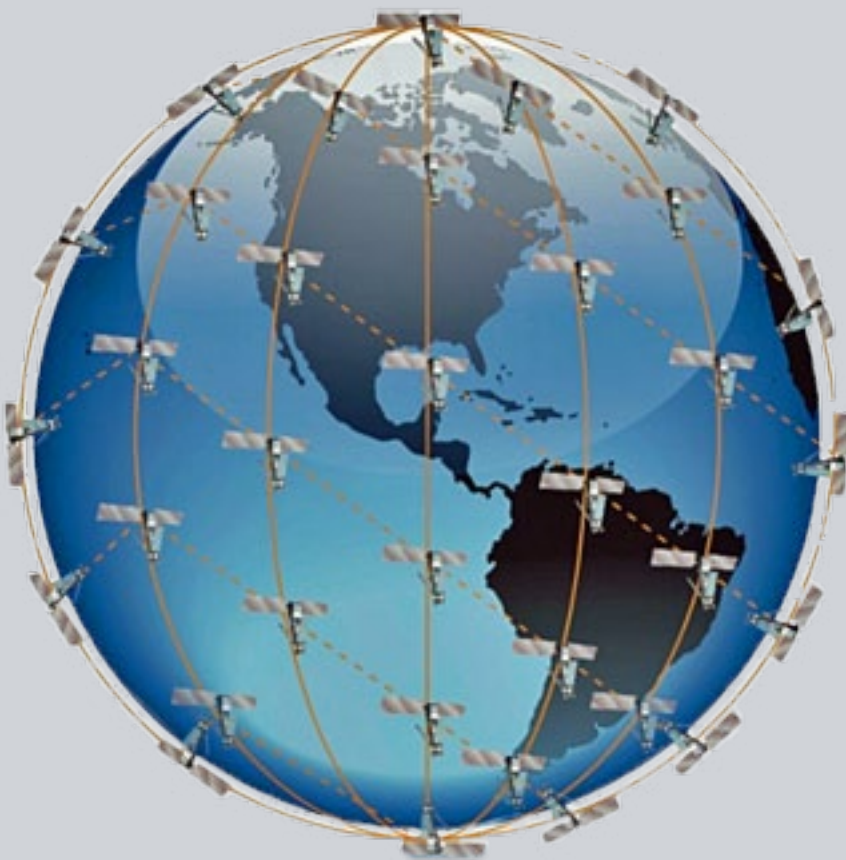


Figure 1. Iridium Satellite Mesh Configuration.

Iridium's constellation of 66 interconnected *Low-Earth-Orbit (LEO)* satellites in a mesh configuration provides inherent advantages in terms of performance and reliability. As such, fleet management solutions which use the Iridium network provide numerous benefits in terms of connectivity. *Figure 1* below illustrates the Iridium satellite mesh configuration.

How To Improve SATCOM Emergency Communication

By using cloud-based satellite tracking web portals, emergency operators are able to centralize their fleet command center and reduce operational and capital expenditures by obviating the need for specialized servers or software. Cloud-based tracking solutions enable intelligent sharing of position reports, special events, two-way messages and telemetric data.

First responders can utilize a Graphic User Interface, multiple map views (road and aerial), and point and click interface. With the constant connectivity offered by satellite tracking solutions, fleet managers can communicate with assets in nearly real-time. Emergency aid features such as quick positioning alerts can send emergency notifications from the tracking hardware installed on the asset back to control centers so managers can properly assess and monitor emergency situations encountered by the fleet.

Moreover, fleet managers and emergency administrators can create geo-fences for every fleet asset. This means that notifications can be programmed to occur every time an asset exits or enters any specific geo-fence which can be designated as a danger or safe zone. See *Figure 2* on the next page for an example of a web portal displaying assets in geo-fence areas.

Satellite tracking solutions for aviation assets can also aid first responders and NGOs who take to the sky during emergency situations. Aviation Iridium-based hardware installed on the assets can be used in conjunction with cloud-based web portals to provide pole-to-pole tracking connectivity, resulting in improved overall safety and asset deployment. Examples of benefits in emergency situations include GPS location that allows command centers to know where assets are at all times and improves operations with flight planning, sensor reporting, two-way messaging and email. This is often offered by industry-leading aviation tracking hardware products. Moreover, satellite voice communication is also possible with aviation assets when paired with hardware that supports voice.

Lastly, tablets and smartphones are becoming even more valuable when it comes to communication in emergency situations. There are now technologies that enable smartphone and tablet applications to be connected to the Iridium Network (via the tracking hardware installed in the asset) making more information and data available to command and control centers via cloud-based web portals.

After The Storm... (Cont.)

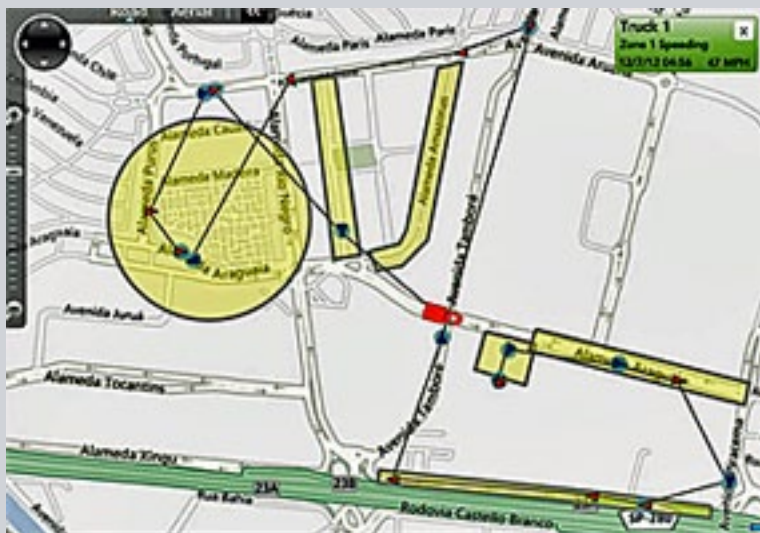


Figure 2. Web portal displaying assets in geo-fence areas.

Solving Problems=Saving Lives

We often take the ease of communication for granted because of mobile phones and radios; the attitude of many is "if it isn't broken, don't fix it." It is not until these methods of communication become unavailable that we realize our true dependency on communication. Unfortunately, it usually takes a natural disaster or workplace emergency to recognize you are ill-equipped to handle, operate or communicate in the face of these events.

During *Hurricane Katrina* thousands of people were left without power or methods of communications due to landline switches or facilities being out of service for two weeks. Only blocks apart from each other, emergency response fleets were unable to communicate with one another.

However, the **Sulphur Fire Department** in Louisiana utilized fleet management hardware and software (provided by **Blue Sky Network**) with the Iridium satellite network which improved their response times on the ground. Not only was the on-scene crew able to stay in contact with the department over 200 miles away—while standing in 12 inches of water—but they also used the service to communicate with family members at home.

During times of emergency, managers can have peace of mind that communication via alerts, two-way messaging, email and voice communication are all possible through satellite services improving the safety and security of first responders and those involved in emergency situations. This lesson is universal no matter the industry—reliable communication solutions are essential.

About the author

Paul Duran leads the Sales and Marketing teams at Blue Sky Network. He also provides the leadership role in Product Development initiatives and strategy around customer driven solutions. Paul brings more than 15 years of hi-tech sales, marketing, and business development experience to Blue Sky Network. Paul's experience spans industries ranging from high speed physical layer devices, enterprise memory products, and switching power supplies to digital satellite set-top receivers.

Reliable voice and data communication solutions for first responders and NGOs can lead to faster response times in disaster recovery missions.

Serving land, air and marine fleets, Blue Sky Network's New SkyRouter, D1000 and ACH1000 provide comprehensive aviation fleet management solutions that utilize the Iridium satellite network to aid in disaster recovery.

The New SkyRouter is a cloud-based tracking Web portal which allows managers to maintain, view and communicate with multiple assets simultaneously on a single map from a centralized command center.

Incorporated with the New SkyRouter is Blue Sky's industry-leading D1000 aviation series hardware, which provides GPS tracking, flight planning, alerts, and more. Additionally, a satellite voice connection can also be achieved when used in combination with Blue Sky's ACH1000.



This complete solution has been known to improve overall fleet safety in day-to-day operations as well as in emergencies.

New SkyRouter also enables over-the-air device parameter configuration, such as the reporting interval, two-way messaging and email, as well as GPS positioning. The solution is certified by Iridium.

HawkEyeLink is a product that connects mobile devices via Bluetooth to the D1000 tracking hardware installed in the asset.

This brings Bluetooth to the cockpit enabling data obtained from tablets and mobile phones to be sent via the Iridium network to the New SkyRouter portal.

Spotlight On General Shelton @ The 2013 AFCEA Symposium

This transcript of General Shelton's remarks are courtesy of the **Armed Forces Communications Electronics Association (AFCEA)** and were presented at the 2013 AFCEA Symposium. General Shelton is the Commander, Air Force Space Command

Thanks for the kind introduction. I've been looking forward to speaking with this group again this year—and if any of you have some influence in Washington, can you please get this budget thing fixed?

I think, as you know, there are a lot of pressures on all of us to try to make some really tough decisions without a whole lot of good information.

I have no idea what this fiscal year is going to look like for the rest of this year, much less what FY14, '15 and beyond are going to look like. How in the world do we execute modernization and sustainment of our national security assets in an environment like this? I know it's just as irritating to all of you as it is to me.

Lewis Carroll wrote in *Alice in Wonderland*, "If you don't know where you are going, any road will take you there." These days, I feel like we're in Wonderland. We're on a lot of different roads right now. Frankly, we're trying to prudently cover all our bets because we don't know what the environment's going to be. But you didn't invite me here to talk about the sorry state of affairs in our budget situation. Rather, I'd rather talk about **Air Force Space Command** and our role in the cyberspace business.

Let's first, cover a few 'givens.' I think most people today understand

that cyber clearly underpins the full spectrum of military operations, including planning, employment, monitoring, and assessment capabilities. I can't think of a single military operation that is not enabled by cyber. Every major military weapon system, command and control system, communications path, intelligence sensor, processing and dissemination functions—they all have critical cyber components.

Now, as immature as we are in our work in cyber, already it's clear that it's a critical enabler for all military operations. It is deeply embedded in the other Air Force domains of air and



space, and it provides an integrating connection between domains and missions. And, as such, the Air Force recognizes we had better get our arms around this domain—and soon.

To that end, the Secretary and the Chief have charged me with being the single commander responsible not only for operation, maintenance, sustainment and defense of the Air Force Networks, but also with developing, fielding, and employing operationally relevant cyber capabilities and effects. Bottom line: The buck starts and stops with me and my Command.

Now, you might remember, last year at this time, I gave myself an “F” as the lead for cyber in the Air Force. Since then, we’ve made what I consider to be some impressive progress—that’s the good news, which I’ll describe soon.

The real challenge is, though, there’s so much more work to be done. Back in 2009 when we began the concentrated cyber effort within the Air Force we didn’t get it right the first time. That’s why we are aggressively re-evaluating our roles, and authorities as we speak. We’re taking a microscopic view on exactly how and why we’re doing ‘all things cyber.’

We’re reviewing every piece and part of cyber to assess its proper home; what piece is operational versus what part is considered infrastructure, and where do those responsibilities properly fit in the current Air Force organizational structure.

We’re reviewing the operational impacts and costs of merging with DoD programs like the Joint Information Environment and DISA’s Defense Enterprise Email. And we’re thinking about whether we should outsource entire capabilities to industry where exceptional, secure capabilities already exist.

Priority And Guiding Principle

Our overarching priority, of course, and therefore our guiding principle, must be on providing the best support to the warfighter—cognizant of operational effect, cyber security, and costs. We’re taking these challenges head-on and as a Command, we’re moving out.

But full disclosure here, not everything is moving as fast as I’d like. For example, we thought we’d be done at the end of this fiscal year with our AFNet migration project, driving toward a single, centrally-managed, homogeneous and defensible enterprise. Hiccups occurred, we needed more money, and the schedule lengthened; certainly not the path we’d projected. We now anticipate completing the migration midway through FY14.

We’ve learned from the mistakes that led to the fits and starts, and we’ve begun to change a cultural mindset from

one of, “it must be invented here,” to one of innovation based on partnerships.

We understand our AF networks like never before; we’re better able to implement new capabilities across the entire spectrum of operational cyber. And it’s our considerable task to take those lessons and implement new cyber capabilities on operationally relevant timelines. Those must be, in fact, “lessons learned” and not just lessons observed—it’s doubtful we’ll have the luxury of making the same mistakes twice in the future.

So, even though the AFNet project is late, there are some things to brag about. But, before I cover those successes, I’d like to provide an overview of some key next steps that I’ve recently discussed with the Air Force senior leadership. We’ll focus on some technologies, organizations, structure and policy, financial, and related keys to formulating the next wave of successes.

Translating A Vision

We’re working hard to translate our vision for Air Force cyber operations into reality. Our first responsibility has been to develop an Air Force vision that is based in realism in the cyber domain—a domain that is incredibly dynamic, evolving at speeds and in ways that we couldn’t imagine just a few short years ago. For a technology-based Service like the Air Force, which is so dependent on cyber, it’s only logical that we commit ourselves to maintaining the edge over potential adversaries. And we should be comfortable with speedy evolution, and technological innovation; after all, that has been our birthright in the Air Force since our beginnings in air



and space and it has to be the way we act in cyberspace as well.

But that’s the easy part—the commitment. The “how” is the hard part.

Machiavelli wrote: “There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of new things.”

From that quote, we can assume he was an observer of the real world, and we have been working diligently to introduce this new order of things within the Air Force very deliberately and very methodically. Now, don’t confuse being deliberate and methodical with being slow. We have several initiatives underway that leverage new technologies and challenge the traditional ways we acquire and operate in this domain.

Now, as I look at this new order, we face some additional

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challenges in a clearly decreasing budget environment:

- The availability and retention of qualified and proficient cyber professionals;
- Organizing staff functions to provide adequate oversight,
- Management of roles and responsibilities; mundane, yes, but critical to an Enterprise, game-changing approach to a game-changing domain,
- Establishing responsive acquisition activities that produce capabilities on much shorter timelines; and finally,
- Overcoming cultural challenges accompanying the faulty assumption by many that all data and information is trustworthy and actionable.

And, these needs and challenges come together in an age where precision engagement and battlefield success in all Air Force core functions requires larger amounts of higher quality information in shorter periods of time. We must assure access to required information and freedom of action to create desired cyber effects at a time and place of our choosing to meet the Combatant Commander's requirements anywhere, anytime, while denying the same abilities to our adversaries.

The Air Force currently operates 21 Air Force networks; we have 840,000 users. There are 1.9 million computing devices and we spend about \$40 million annually to clean up cyber-related attacks on our information infrastructure. This may not make us the most complex enterprise in the world, but it's got to be up there among the most.

Therefore, we've embraced the idea that "Enterprise" means providing a consistent template upon which to maximize effectiveness while inherently providing efficiencies of scale, cost, and use.

We certainly don't have all the answers yet, but we're clearly leading the effort to make these overarching concepts military realities. To ensure progress toward our objectives, we are aggressively managing our oversight roles and responsibilities to provide focus to Air Force cyber efforts.

So, in that vein, let me talk about standardization a bit. It's imperative that we not continue "one-off" implementations. How many times over the years have individual units used what we would call "county options" to purchase technology, then not optimize what is installed, or even worse, not use it at all?

You all know what I'm talking about... and this practice has just got to stop.

We'll work on standard architectures and standard operational processes, but we'll all need to be vigilant against that "I've got a great idea" implementation mentality at Base X or Command Y... and that's the least we can do for our Air Force and our taxpayers to maximize available economies of scale. To that end, all of our efforts are based on that "Enterprise" approach... that's the way we view our AFNet and that's the way we will present our capabilities as a Service to the Joint arena.

Since the Air Force and the DoD started down the path of establishing cyberspace, we've been challenged to clearly articulate what's cyber, what's IT, and what are communications and information. Definitions in DoD, Joint and even Air Force policy can be interpreted in multiple ways leading to confusion, duplication, and unnecessary work. With the pace of change, the ops tempo, the threats associated with cyber, and our constrained resources, we must have clear definitions which will then allow us to define who's doing what in cyber and IT to make sure we are all pulling together and working toward the same end-state.

I have my staff doing a thorough review starting with what does law, like *Clinger Cohen*, say about IT and cyber? From there we are going to come up with definitions that clearly articulate....well, this is cyber because it falls within the realm of warfighting weapon systems...this is IT because it is a business system application...this is communications because it is a telephone or postal service.

Definition Of My Role For The Air force

This also will help us better define what's in my role as the *Cyberspace Superiority Core Function Lead Integrator* for the Air Force vs. what belongs in my role as the *Lead Major Command* within the Air Force for cyberspace.

Closely coupled with this effort is a lanes-in-the-road dialog, both internal to my staff and with external organizations like the Air Force **A3/5** and **A8** staffs, as well as Lieutenant General Mike Basla's **SAF A6/CIO** organization. And, we're not forgetting that a significant part of the role of Core Function Lead Integrator will be to facilitate partnering with industry, academia, other services, allies and friends to ensure a robust, defensible network enterprise.

Very recently, I published an *AFNET Commander's Intent*. While normally commander's intents are focused on purpose, desired end state, and key activities required to achieve that end state, I went further to also define the AFNET. I have to admit there is not unanimous consent to this definition, but for the sake of progress, this is how we're going to refer to the AFNET from this point forward. The definition is also the foundational building block that will drive decisions across all communities, systems, and functional areas. Our next steps will be to provide an additional level of detail to inform our architecture work from the "As-is" to the "To-be" to the "Should-be."

My A5 is leading the AFNET "As-is" Architecture work and we will have that complete by the end of this month. In concert with our programming efforts, we'll be developing the "To-be" Architecture, which will be done by the end of the month also. Together, these architectures will help us understand where the gaps in capabilities and resources lie. We're also developing standard, expected levels of service. We owe it to the Common Computing Environments, missions, and business systems what levels of service they should expect.

In parallel, we're going to identify what we expect of these programs and systems. To connect to the AFNET, users will comply with these standards and waivers will be the exception, not the rule. While there are many more activities outlined in the Commander's Intent, in the interest of time, I'll ask you to read the document for yourselves and partner with us toward that desired end state. Over the next few months, we will be releasing more foundational guidance documents to ensure all of us are on the same page and these will range across the spectrum of capabilities, networks and classifications.

I've set up a *Cyber Working Group* to identify, monitor, and execute these key steps. While I'm normally not a fan of management by committee, the breadth and depth of our work demands a broad approach, and they are updating me weekly with their progress.

Good Reports From Cyber Acquisitions

Let me now shift to some outstanding work going on in cyber acquisitions. We've set up a *Cyber Solutions Cell* with the **Air Force Life Cycle Management Center** and the **688th Information Operations Wing** folks at **Lackland AFB**. These are our 9-1-1 agencies to rapidly acquire cyber capabilities in response to warfighter needs. We have a really good mix of operators and engineers working together to identify and close gaps in the cyber domain—sometimes within hours.

These operations and acquisition teams are dedicated to making sure the operational needs generated by the move-countermove nature of the contested cyber environment are developed, tested, and fielded in a timely fashion.

Across the Air Force we're seeing increased awareness of the need for new cyber-related capabilities and operational concepts which will materially improve the ability to employ forces across the range of military options. And, as Lead MAJCOM for cyber, we're chartered to make those tough decisions as to which great idea or solution is the best for the mission. Developing an enterprise architecture with adaptable, controllable, and defensible attributes requires an achievable and enforced set of standards, clarity in organization, and well-defined authority, roles, responsibilities, and accountability.

Within the Air Force, and within the DoD as a whole, we will require that the capabilities and effects are developed, tested, fielded, and employed by proficient acquirers, developers, and operators. We will make sure they are proficient in those skills. Functional systems and Program Management Offices will conform to the standards as outlined in law and in our guidance documents. Wondering how to get a waiver to avoid conforming shouldn't be a manager's first impulse. Some may consider this a bit "draconian," but it's how we will ensure security and efficiency of AFNET for its operations.

We'll develop a requirements framework in which cyber capabilities and effects can be integrated into other core functions, services, and agencies. To that end, we're developing roadmaps for *Offensive Cyber Operations*, *Defensive Cyber Operations*, and *Defense Information Network Operations* mission areas. These roadmaps will provide a template from which to examine the various cyber capabilities as they are associated with mission area requirements, the related programmatics and corresponding sustainment or modernization of those capabilities.

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We're doing this with an eye toward making investment and divestment recommendations while providing transparency to major stakeholders such as the other Major Commands across the Air Force. Over time, as policies and procedures evolve, we foresee cyber-related capabilities and effects integrated wholly with kinetic capabilities to maximize success during employment.

Giving Our Airmen More Operational Guidance

Until very recently, some of our **24th Air Force** Airmen were a little bit confused about what was expected of them because we had not provided them with the operational guidance needed to accomplish their missions. We've moved aggressively to address that shortfall by publishing four guidance memorandums within the last year - for Combat Comm Employment, one for Operations and Training, and one for Standardization/Evaluation. And now our IG is inspecting our units against those standards.

Another measure we've taken to address standardization is the establishment of cyber weapon system teams. This will operationalize and normalize our capabilities similar to Air Force weapon systems in the other domains. These weapon system teams are addressing equipment baselines, sustainment, training, follow-on development, funding, and fielding. All of these initiatives provide the structure and discipline we must have to enhance our combat capability and integrate cyber effects across all warfighting domains.

As we consider current technology, I think we can do a better job of making our Airmen more productive by furthering the use of *Commercial Mobile Technologies*. The DoD has explored using expanded mobile technology for a number of years. It's time to move out on this, and we have—in a coordinated effort throughout the federal government, with the **Defense Information Systems Agency**, and with the **National Security Agency**. We're taking advantage of the fast-moving commercial market, in concert with the added security and functionality needed for Air Force users.

In fact, we are going operational with AF capabilities to extend mobile solutions, to **Air Mobility Command**, **Global Strike Command**, **Air Education and Training Command**, **Air Combat Command**, **Air Force Special Operations Command**, and of course, **Air Force Space Command**. A great example of this is our direct support to the Mobility Air Forces and their Electronic Flight Bag—true innovation to decrease operating costs while providing much more up-to-date information in the cockpit.

Hand-in-hand with mobility is getting away from our traditional way of presenting IT by being connected to jacks and wall outlets and being bound to desks. Our Group at **Tinker AFB** is piloting a wireless-only capability that we expect to roll out in the future, aimed at extending the network reach of our Airmen to edges of the flight line, or to the inside of a security police patrol car. So as you can see, we'll become more efficient and more connected across the board.

While I won't belabor my previous comments on our economic situation, I would like to address a related topic on financing the costs of DoD IT Enterprise Services. A particular focus of mine over the next few months will be the utilization of commercial constructs and reduction of costs in areas such as long-haul communications. As we move to more enterprise services, we must address the speed, agility, and pricing that the scale of commercial services brings. The DoD is making progress with commercial cloud services, as an example, but it's simply not fast enough.

Innovate To Save Financially

We need to do more and leverage the billions in R&D and security that the banks and credit card companies have made, especially for unclassified services. Also, the commercial IP capabilities across all communications is driving capability up and costs down. Meanwhile, our AF bills continue to rise. We've got to address these trends, but we won't have the ability to spend to save—instead, we'll have to innovate.



No cyber-related speech these days would be complete without some reference to **JIE**, the *Joint Information Environment*. I'll be the first to admit, I have some reservations on JIE. While I understand and agree with the overall objectives, the devil's clearly in the details and we have significant work ahead to truly realize the JIE vision at affordable costs.

We are committed to providing the expertise of the Air Force's AFNet experts, our network defense operators, and our acquisition professionals. We've already invested thousands of engineering man-hours to the effort—the best and brightest in our Air Force. They are deeply involved in the potential changes to how we will protect and defend our networks. We must do this right the first time and we must continue to emphasize mission assurance in our cyber defense posture.

Successes In Reduction Of Adversary Entry Points

I mentioned earlier that I'd end on some successes... successes that make me particularly proud. By reducing the number of Internet gateways over the past two years, we've reduced the attack surface—the number of potential adversary entry points—from 144 entry points to just 16, along with gaining better focus, generating fewer holes, and achieving greater visibility into network operations.

The Command has leveraged expertise at three different squadrons in Major General Suzanne Vautrinot's 24th

Air Force to change and improve network defense tradecraft. Our operators are now using a more focused model of examining known threats instead of a scattergun "defend against everything" type of approach.

There is much improved integration between 24th Air Force defensive units and the Air Force ISR Agency cyber support which we've accomplished by collocating crews to achieve maximum communication and mutual support.

Network operators can now "deny by default," closing ports and potential entry points into the network to IP addresses and locations that traditionally have either shown mischief or have shown no value to Air Force users.

We've added interactive sensors and automated processing, so our analysts are freed up to work problems vice spending time finding problems, and this has led to a much greater increase in high-confidence forensics and heuristics analysis. That said, not every malicious actor is caught at the gateways. In fact, many are caught by defensive capabilities within the network, with rule sets that are created by proficient Airmen who now have greater freedom to do the analysis required.

As always, it's our professional Airmen who rise to the occasion, and I'm proud to say that some 60 percent of all rule sets created for DoD defensive tools are generated by innovative Airmen within the 24th Air Force. Those same Airmen, by the way, are leading efforts to create defensive schemes for the Joint Information Environment; truly, when it comes to defense of cyber networks in the military, when 24th AF Airmen speak, people are listening to them.

These improvements in our cyber defensive posture aren't trivial, even though they

don't have the cachet of offensive cyber capabilities, but they represent some of the best ways that automation, innovation, and partnership have led to a much more effective enterprise approach to protecting our information.

We're Not Done

But we're not done... there are some other things we must continue to get after such as providing cyber overwatch of our Air Force's global air, space, and cyber missions.

Just as an example, in 2012, our 24th Air Force operators provided support for more than 4,000 Remotely Piloted Aircraft sorties worldwide, executed 4,000+ computer network exploitation missions against 10,000+ national priority targets and supported 100 IED neutralization missions in Afghanistan. That's truly direct support to the Joint team.


The challenges presented by the cyber domain are new and in many cases unique. However, much like nuclear deterrence, air superiority, and other airpower "centers of gravity," the Air Force will be successful in developing, fielding, operating, and maintaining operational capabilities representing the cyber "center of gravity."

Success requires clarity in organization, authority and accountability, and while we're still ironing out some of the details, make no mistake that the center of gravity for this effort is Air Force Space Command in its role as lead Major Command for cyber.

We're adopting a building-block approach in which we will make some strategic decisions about which lines of business have priority. We'll decide what our Airmen need to operate and manage, and what functions or capabilities would be better performed by industry in the private sector. So, as I've highlighted today, we've made considerable progress over the last year. And, I also discussed areas where we clearly recognize we must improve this year.

What's my assessment for our grade this year? I'd give us a "C," and I'm much more confident we're moving smartly toward achieving excellence in this domain. But I'm impatient—we need to move faster, and our foundational work will enable a faster pace. I thank you for your attention, and thanks again to AFCEA for providing this forum for us. #





Fixing A \$7B Problem With A \$200 Smartphone

By Tom Cox, President + Co-Founder,
Coolfire Solutions

How do you get more than three million personnel across 30,000 fire departments, 18,000 police departments and thousands of other law enforcement and municipal departments to use the same communications medium?

If you ask the federal government, or the defense industry at large, they will most likely give you an answer that involves using legacy radio technology across several radio frequency (RF) spectrums. Then, they will suggest adding expensive bridging technologies or using radios that have multiple frequency bands inside them. This is how the defense industry has solved problems for decades.

However, First Responders and NGOs across the country have needs and processes that are quite different than the **Department of Defense (DoD)**. And, sometimes, a bigger hammer—or a more expensive radio—isn't the best answer to the question.

After the incidents of September 11th, 2001, Congress created a commission to review ways to improve our homeland security. The most important recommendation to come from that commission was to improve the communications systems

that First Responders and NGOs use to communicate in crises.

Hardly any of the responders to the disasters in New York, Washington DC and Pennsylvania had the ability to communicate across departments.

In 2012, Congress created **First Responder Network Authority (FirstNet)** as an independent authority within the **National Telecommunications and Information Administration (NTIA)**. FirstNet was created to establish a single nationwide, interoperable public safety broadband network.

FirstNet is approaching the problem of creating a nationwide interoperable network through allocation of frequencies and an attempt to realign the way radios have been used for decades. The *New York Times* recently published an article that defined the challenges FirstNet faces. In that article they note that officials estimate that it could take up to \$10B and 10 years to implement a **push-to-talk (PTT)** audio link capability.

TiVo's First Responders' Lesson

In 1997, if you asked people how they would record two television shows at the same time, they would tell you that they would need two televisions, two cable boxes, and two **Video Cassette Recorders (VCRs)**. And probably a smart tech-type to program the VCRs, as no one really knew how to use those things.

Then **TiVo** changed the way we thought about recording television programs. Now it's nearly impossible to find a cable box that doesn't include a **Digital Video Recorder (DVR)** as part of its base capability.

Are the communications companies eyeing FirstNet attempting to solve the problem with 'more VCRs'? If you read through what the suggested offerings from companies, you'll see a lot of expensive hardware involving a do-it-all approach.

Worse, these solutions will undoubtedly be difficult to use, difficult to understand, and involve expensive maintenance contracts.

The correct answer may not lie in legacy solutions. To truly address a problem of this magnitude, a new technology—one that all of us use on a daily basis—may be the answer.

Why A Smartphone Might Be The Correct Answer

We've come a long way in smartphone technology since 2007 when Apple introduced the first iPhone. Until that debut, smartphones were basically email readers with QWERTY keyboards that required half of the screen real-estate.

Take the **Palm Treo 650**. It was arguably one of the most advanced smartphones at the time with a large user base. Yet, it had a limited number of applications, required the use of a stylus, was single-touch only, and a notoriously short battery life.

Now when you think of an **iPhone** or an **Android** phone, or potentially a current generation Windows or Blackberry phone, you think of the consumer experience. Playing *Angry Birds*, sending emails, browsing the web, making phone calls, taking pictures and videos, and writing text messages—all without ever reading the phone's user manual—it just works.

While many software developers have attempted to build secure communications applications that encrypt voice, video and text messages, and send it securely to another (or several other) smartphone(s), these apps aren't appropriate for First Responder and NGOs as these apps are limited to the inherent user interface of the smartphone. They rely on the user being able to look at the screen and see where they are pressing buttons. Additionally, there is little to no haptic feedback (the feeling of pressing a button, for example) that makes a user wonder if they've performed the necessary function.

Consider the dial tone on a phone line. When you lift the receiver of a desk phone, you get a dial tone that lets you know you have access to a working outside line. Well, actually, this isn't so true anymore. A dial tone is a carryover from the years when we had analog powered lines from the telephone company coming into our homes. The dial tone



Coolfire's RECONN product shown on the right.

Fixing A \$7B Problem With A \$200 Smartphone... (Cont.)

is there because we are used to it and it is comforting, not because it is needed.

The same user experience needs to apply to users in stressful environments where they can't look at a communications device when using it. That's why the standard interface to a smartphone isn't appropriate for first responders. They've become comfortable using radio communications (click to talk) over the decades and don't have a great deal of interest in abandoning that interface. This is part of the reason it is so hard to get first responders to adopt a new technology—they like what they are already used to using. However, here's the really important part.

You can marry existing user experience with a new radio interface.

There's no reason you can't use the existing *Push-To-Talk* CB-esque interface and have that connected to the smartphone being carried by the user.

The Forgotten Link

Alan Kay is a former member of the **Palo Alto Research Center (PARC)**, where *Steve Jobs* found his idea for a *Graphical User Interface (GUI)*. Alan invented the GUI, along with the concept of *Object Oriented Programming (OOP)*. Both of these concepts dominate the way we write and interface with software code. Alan once said that "People who are really serious about software should make their own hardware."

The FirstNet solution should involve hardware and software, but not in the ways that the large defense contractor or the U.S. Government thinks about such.

First responders already have defined a highly functional and refined user experience. In many cases, they use shoulder-mounted, two-way microphone/speakers with a large push-to-touch button. When they push the button, a slight chirp or some other form of feedback (audible or haptic) signals that the radio is working and they are now transmitting. When they release the button, another form of feedback informs them (and others) that their transmission is now complete.

Why can't we use that same user experience, but connect it to a different radio?

Smartphones are, generally speaking, small computers with several radios, sensors, and an intuitive user interface. They have data ports in addition to *Bluetooth*, *WiFi*, *LTE*, *3G*, *HSPA+*, and sometimes other radios (*NFC*, for example).

Why not replace the *VHF*, *UHF*, and other incompatible units with a universal radio that leverages existing nationwide networks built by companies such as **Verizon**, **AT&T**, and **Sprint**? This would allow first responders to use the standard networks in low-priority situations.

In certain situations it may make sense for First Responders to provide their own cellular network. Several systems integrators and communications companies provide mobile *LTE* base stations that could provide coverage across a 40-mile-wide range for thousands of users, allowing for the switch to the hardened private networks provided by their regional private mobile *LTE* network system on those

occasions that warranted such an implementation.

Better yet, why not attach a radio to the smartphone that does provide *VHF*, *UHF* and other frequencies, in addition to those that are a part of the smartphone?

How To Combine Hardware With Smartphones

At **Coolfire Solutions**, for the past three years we've been working on combining hardware and software in unique ways.

Coolfire Solutions was founded in 2010 with the intention of building a product that could replace more than 120 lbs. of test equipment that is carried into the battlefield by field engineers for setting up and testing satellite communications systems.

Reconn, a joint collaboration between Coolfire Solutions and Harris Corporation, is a software application that runs on an **iOS** device. The Reconn software allows a user to easily locate a satellite and provides users with step-by-step workflows to conduct high-level engineering tasks.

The goal of Reconn is to allow technicians to conduct the work of engineers (saving hundreds of thousands of dollars per box in Field Services Engineering costs). This is done by embedding tribal knowledge of field engineers into software-based workflows, and simplifying the user interface to highly complex test equipment.

A critical part of the software product isn't software at all. **It's the hardware.**

Reconn embeds an iPhone directly into a box that houses 10 separate sensors, instruments, and test functions in a single 10 lb. box. Individually, these sensors and functions would normally take up 120 lbs. of equipment. Before Reconn, field engineers carried this equipment around the world with them as they went from site to site to setup, troubleshoot and maintain satellite terminals. There's an extremely tight integration between the hardware and software. In fact, the hardware doesn't function without the software, and the software is pretty much useless without the hardware.

Coolfire Solutions has spent three years getting the software interface just right, but without the hardware, the product could not truly meet the needs of the users.

The iPhone makes it simple to use. Coolfire Solutions has turned the smartphone into a useful tool, not just an interface to a software app.

Smartphones In Battle

In addition to Reconn, Coolfire Solutions has also built a rugged case for *Android* phones that houses a microprocessor. That microprocessor makes it possible to interface an *Android* phone to several legacy military systems.

Directly connecting an *Android* phone to, say, a *VHF* radio used by the U.S. Army and the Marine Corps that communicates with an *Unmanned Aerial Vehicle (UAV)* is not really possible for any number of technical reasons. However, by adding the microprocessor inside the case, the *Android* phone has a "go-between" to which both it and the radio can communicate. It's like plugging both devices into a laptop and having software on the laptop do the multi-device communications.

The microprocessor in the in the ruggedized case allows an *Android* smartphone to communicate with a legacy tactical radio. Using this system, users can simply load an app

that is specifically designed to work with any particular radio. All of a sudden, the difficult-to-use interface to the radio has now disappeared and “it just works”.

In addition to controlling communications, this smartphone case with embedded computer can also support plugging in peripherals, such as push-to-talk microphones, cameras, medical sensors, etc. Coolfire Solutions is currently exploring the idea of adding a few large buttons to the front of the case that would allow users to conduct simple tasks without having to look at the screen.

The goal here is to merge this new mobile device computing technology with user interfaces that are functional and comfortable for the user. Dragging fingers around a small screen isn’t always the best way to interface with technology, as many first responders will tell you.

A New Way To Look At Communications Problems

One of the benefits of the upcoming budget changes for the federal government—and local municipalities—is the ability to critically look at every dollar spent and determine if those dollars actually translate into improved reliability, capability, and safety. Most of the money spent on communications technology over the past 10 years was probably wasted. First responders now have an opportunity to migrate to a technology that has nearly a trillion dollars of research and development and infrastructure behind it.

The government doesn’t need to pay a dime for any of the development. They simply need to purchase smartphones, and when appropriate, deploy radio hubs that can replace inoperable cellular networks. Current industry offerings in GSM, LTE, and 3G are already robust, secure, and available to the government today from leading Mobile Network Enablers.

All that’s left is to then find ways to attach those smartphones to user interfaces that first responders already know how to use. Just imagine how much money would be saved—and how many headaches would dissipate.

About the author

Tom Cox is the President and a cofounder of Coolfire Solutions, a software development company that creates mobile, web, and hardware solutions for defense, healthcare, and enterprise clients. Tom started Coolfire Solutions along with four other cofounders in 2010 after a 17 year career in the defense industry. Coolfire Solutions was founded with the goal of creating an organization that can look at long-standing problems from a unique perspective. Tom wanted to build a company that can rapidly field solutions far faster, and far less expensive, than other defense contractors. Primarily self-financed through project work, Coolfire Solutions also develops its own products such as Reconn, ViewPoint and CAMP. Before Coolfire Solutions, Tom worked in Business Development at General Dynamics C4 Systems, where he helped close more than \$1B in Satellite Communications business with the Department of Defense. Tom also worked for the National Security Agency (NSA) as a satellite engineer, and in the U.S. Army as a Satellite Controller and a Combat Medic.

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The Future Of Drones Is Sky High...

By John Paul Titlow, Dell Tech Page One Contributor

Drones. They're not just for assassinating international terrorists anymore. Domestic use of unmanned aerial vehicles (UAV) is on the rise and is poised to grow dramatically in the coming years.

The Federal Aviation Administration (FAA) has seen an uptick in interest in using domestic drones from local governments, universities and private entities. On February 14, U.S. President Barack Obama signed a bill that will make it easier for domestic drones to get off the ground. As many as 30,000 of these aircrafts are expected to be zooming around in U.S. airspace by the end of the decade.

What will all these drones be up to? The U.S. military has used drones overseas for more than a decade, but the UAVs flying over places such as Dayton, Ohio, aren't going to be equipped with Hellfire missiles. They'll be undertaking much more mundane, though at times controversial, missions, rather than taking out terrorist commanders.

Domestic Policing + Surveillance

Perhaps the most controversial use case for domestic drones is their use by law enforcement. On one hand, a high-tech UAV equipped with infrared cameras and all kinds of sensors could do wonders for catching fugitives or finding missing children.

On the other hand, there are serious concerns about the privacy implications that arise when data-gathering machines equipped with high-resolution video cameras are flying around in the sky. Organizations such as the **Electronic Frontier**

Foundation and the **American Civil Liberties Union** have been probing the **FAA** and publicly advocating for greater transparency and privacy protections when it comes to domestic drone usage. In response, the FAA has promised to outline privacy standards for its domestic drone program.

The lawsuits and legislation that will shape exactly how police will use drones are only just getting started. Perhaps what the surveillance drones are allowed to do will be limited, but searching for suspects and monitoring the nation's borders will likely continue. Legal constraints will almost certainly fall into place, but there's little reason to doubt that more and more police departments across the U.S. will be using drones for law enforcement tasks.

Making Maps

For those tasked with making maps, remote-controlled aerial drones are a potential godsend. The versatile and lightweight aircraft are much less expensive to operate than the airplanes traditionally used for map-making. The **Ohio Department of**



Transportation, for example, says it plans to use drones to make topographical maps and save money in the process.

The ability to quickly and inexpensively map a given area using high-resolution photography could be beneficial for a broad range of professional applications. The insight gained could be used to help build new developments or assess the damage wrought by a storm or other disaster.

Journalism

Matthew Waite isn't legally able to launch a drone, but that hasn't stopped the **University of Nebraska-Lincoln** Journalism Professor from planning for the future. Waite is at the forefront of a group of academics who are anxiously awaiting the day when UAVs can be used for certain types of reporting.

Waite's *Drone Journalism Lab* is still in an early, experimental stage, but it's already exploring how drones could survey damage from storms, report on large-scale protests, or potentially assist war reporters attached to units in the battlefield.

As in other UAV use cases, the prospect of drone journalism has raised questions about ethics and privacy (imagine airborne paparazzi chasing celebrities down the street). Once those issues shake out in the courts and legislative halls, the future of professional information-gathering will almost certainly involve flying machines.

Futuristic Espionage Via Robotic Insects

In addition to the type of law enforcement surveillance previously mentioned, drones are also used for international espionage and information-gathering. Such will continue into the future, but are likely to get far more futuristic and, some might say, somewhat scary.

The **CIA** and **Pentagon** have been working on microdrones for years. These are UAVs that look and fly much like birds and insects, but are actually tiny flying computers equipped with sensors, cameras, and the ability to record audio. As the technology improves and gets smaller, this futuristic-sounding reality gets closer.

Some have even speculated that small mosquito-like microdrones could land on people, take DNA samples, or even inject tiny *RFID* tags under their skin. Such capabilities are probably a few years out, but for all we know, these incursions could be happening already.

Building Tall Buildings

While militaries use drones to knock buildings down, some architects are thinking about how they could be used to build new ones. "*Flight Assembled Architecture*" is an experimental proof-of-concept developed by two Swiss architects to show how drones could be used to construct buildings in the future.

Brick by brick, flying robots erected a simple structure as part of an installation in France. While the rudimentary result wasn't something you'd want to live in, it's easy to see how remote-controlled and pre-programmed drones could be used to build skyscrapers and pull off architectural feats not yet imagined.

For reader follow-up, head over to...

— <http://www.techpageone.com/technology/from-minority-report-like-surveillance-to-flight-assembled-architecture-the-future-of-drones-is-sky-high/>

About the author

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The HPA Corner: Words Mean Things...



By Nicole Robinson, Vice Chair, Hosted Payload Alliance, +
Vice President, Marketing + Government Affairs, SES Government Solutions

The time and cost saving benefits of commercially hosted government payloads are no longer mere talking points exchanged between niche players in the industry and space-savvy users within the Department of Defense.

During his confirmation hearing as Defense Secretary Nominee, Charles "Chuck" Hagel was asked if he supported commercial hosting of Defense payloads.

"Hosted payloads are one of the ways to enhance resilience and assure space capabilities in the congested, contested and competitive space environment. If confirmed, I would support innovative approaches to improve the national security benefits we derive from space in a budget-constrained environment, including through the use of hosted payloads," said Hagel.



Charles "Chuck" Hagel, Secretary of Defense

As Hagel's statement indicates, the U.S. Government's current financial situation has driven senior officials to pay increased attention to ways in which the government can save substantially by partnering with industry to gain access to space capabilities. As advocates for, and educators of, innovative commercial solutions to deliver capabilities to orbit, the Hosted Payload Alliance is pleased to see heightened attention to this under-utilized means of accessing space.

Members of the **Hosted Payload Alliance (HPA)** were asked what they believe *Chuck Hagel's* remarks signify for the future of commercially hosted government payloads.

"We're happy to see Senator Hagel is among the supporters of hosted payloads. We fully agree with his view that hosting scaled-down versions of current MILSATCOM capabilities can substantively improve both the capacity and the resilience of these networks. We have worked closely with previous Secretaries of Defense and their staffs to craft affordable solutions to important national security problems. We look forward to a continued close relationship with the future Defense Secretary, whoever it may be."—**Rick Skinner**, Business Development Director, **Northrop Grumman**.



"Senator Hagel's remarks signify a level of understanding of the value of thinking outside the box and approaching space differently than we have traditionally. His forward-looking perspective is refreshing in that it reveals an appreciation for engaging industry in innovative ways to deliver cost effective space capability."—**Tip Osterthaler**, President and CEO, **SES Government Solutions**.



"As defense budgets and schedules continue to tighten, discussions and contractual decisions are being made to plan for a more permanent and sustainable arrangement to deploy military applications. This is right in line with Senator Hagel's remarks about utilizing hosted payloads as a solution. Whether it is a long term or permanent endeavor—hosted payloads offer a cheaper, faster and more efficient way to launch their capabilities into space."—**Dawn Harms**, Vice President of Sales, Marketing and Communications for **International Launch Services (ILS)**.



"It is great to see the progress hosted payloads have made over the last two years. Senator Hagel's comments on the value of hosted payloads as an innovative approach to fulfilling space missions demonstrates that hosted payloads are viewed as a credible option by highest leadership of the Defense Department. The Hosted Payload Alliance looks forward to working with the Office of the Secretary of Defense on hosted payload initiatives."—**Don Thoma**, CEO, **Aireon LLC**.





"Upon the confirmation of the next Secretary of Defense, we anticipate that the trend to provide viable and affordable commercial options to meet the ever increasing needs of the warfighter will continue. The expanded use of hosted payloads can accelerate our military communications and intelligence gathering capability in a responsive

and affordable manner. Ultimately the goal of our industry is for our defense infrastructure to have the necessary tools to effectively and successfully protect our interests in an extremely dynamic geo-political environment."—**Carl D'Alessandro**, Vice President of Advanced Programs and Technology at **Harris Corporation**.



"It is good news indeed to hear the man who will probably be our next Secretary of Defense take such an objective look at the best means for the DoD to meet its communications needs. Mr. Hagel joins several other open-minded thinkers in the U.S. government when he affirms the nation's needs for innovative and cost-effective communications solutions such as hosted payloads on commercial satellites. True adoption

of hosted payloads will take place once this technology is accepted and implemented by all levels of the acquisition hierarchy in the DoD and Congress. We hope Mr. Hagel will be the one to lead this."—**Nancy Nolting**, Marketing Program Manager, **Intelsat General Corporation**.



"COM DEV designs and produces spaceflight payload hardware exclusively, which we deliver to the satellite manufacturers. We have flown hardware on numerous Hosted Payloads to date, comprising military communications, remote sensing and Earth observation. Having developed a family of spaceflight products over many years enables us to rapidly respond with hardware solutions

for the Customer. The key to success in delivering Hosted Payloads on commercial satellites is all timing—often a short 24 month cycle. Senator Hagel's call for innovative approaches is most welcome and we are ready to support and participate!"—**Chris Willson**, P.Eng., Director, Business Development, **COM DEV International Ltd.**



"It is very encouraging to know the Department of the Secretary of Defense nominee is familiar with the advantages of commercially hosted payloads. To move the Department forward in this regard, industry must work with government on innovative solutions to the information assurance (IA) challenges posed by moving data from sensitive payloads through the commercial information sphere to the military information sphere. These

enabling IA technologies will make it possible to securely expand today's national security mission architectures to include affordable, commercially-leveraged elements."—**Dave Anhalt**, Vice President, U.S. Government Solutions, **Space Systems/Loral**

About the HPA

Established in 2011, The Hosted Payload Alliance (HPA) is a satellite industry alliance whose purpose is to increase awareness of the benefits of hosted government payloads on commercial satellites. The HPA seeks to bring together government and industry in an open dialogue to identify and promote the benefits of hosted payloads. The HPA:

- Serves as a bridge between government and private industry to foster open communication between potential users and providers of hosted payload capabilities
- Builds awareness of the benefits to be realized from hosted payloads on commercial satellites
- Provides a forum for discussions, ranging from policy to specific missions, related to acquisition and operation of hosted payloads
- Acts as a source of subject-matter expertise to educate stakeholders in industry and government.

MILSATCOM Calling On Australia

Satellites have the ability to provide communications to regions which lack stable ground infrastructure. They can deliver one-to-remote or multi-point solutions anywhere on the Earth's surface and are an ideal offering for military forces that operate globally in remote locations and less than stable environments.

Be it for mission critical communications, recreation or morale, project research, business-to-business research or briefings, there is no doubt that there is always a need for satellite communications wherever military personnel are present.

Today, the growing demand for more capacity and higher bandwidth being requested from the military sector is far outstripping available supply. The U.S. **Department of Defence (DoD)** and coalition forces deployed in various areas of the world want the reliability, flexibility, reach and mobility offered by satellite communications, as they wish to be in charge of their communications, as opposed to relying on local telecommunications operators.

It is estimated that the commercial satellite arena currently supports 80 percent of the U.S. DoD's satellite consumption, complementing its Wideband Global SATCOM (WGS) system, a network-centric, Ka-band system consisting of up to nine geostationary satellites, four of which are already in orbit.



Artistic rendition of the Jabiru-1 satellite. Courtesy of NewSat.

As the DoD continues the withdrawal of troops from Afghanistan, military satellite communications (MILSATCOM) and commercial satellite communications are playing an increasingly important role at this stage of the mission. With fewer forces on the ground and tighter budgets, the DoD is mindful of using its resources in the most efficient way possible—commercial satellites play a pivotal role in seamlessly integrating communications between *Foreign Operating Bases (FOBs)*, soldiers, military personnel, base commanders and support headquarters.

At the same time, the DoD is increasing its fleet of unmanned aircraft to support deployed ground troops around the world. Drone operators depend on fast, secure and reliable communications to control *Unmanned Aerial Systems (UAS)* and sensors, and to communicate with FOBs and ground troops.

"Demand for superior satellite communications services coming from the military sector has never been higher. The US DoD and coalition forces require more flexibility and higher quality bandwidth from commercial satellite communications providers in order to respond quickly to situations arising in hot spots around the world. Most importantly, these services need to be ultra-secure and reliable", said *Diego Paldao*, **NewSat** Vice President of Sales for the Americas.

As the DoD shifts its focus toward the Asia-Pacific region and moves toward using more unmanned technologies than ever before, it will require more commercial satellite communications for missions in this expansive region. Chances are that many commercial satellite communications solutions required for these missions will come from Australia.

Why Australia? As a politically and geologically stable country, Australia provides the perfect location to house teleport and satellite infrastructure. As a geographically remote country, Australian teleports ensure minimal noise and frequency interference and provide optimal look angles into Asia, India and the Middle East, enabling superior and extensive coverage.

In addition, Australia will soon launch its first Ka-band satellite, NewSat's **Jabiru-1**. The prospects of new capacity, higher bandwidths, innovative regional and steerable beams, greater mobility and smaller end-user antennas (VSATs) offered by Ka-band satellites such as Jabiru-1, are encouraging military organizations to look to Australia for their mission critical satellite communications.

Smaller and lighter terminals make the deployment of communications equipment around the world much faster and easier than ever before, especially when providing connectivity to mobile platforms, ships or aircraft. With the realignment of DoD troops to the Asia-Pacific, there is a lot of interest in Australian commercial satellite communications, and in particular, the Ka-band offering, which can strengthen capabilities during maritime and aeronautical missions.

Ultimately, as the DoD's need for satellite communications continues to grow, it is forecasted that commercial satellites will assist in meeting this demand well into the future. While the launch of the WGS has been a much welcome and needed addition, demand for more capacity and throughput has called for strategically-placed Ka-band

satellite communications providers to deliver secure, reliable and flexible communications solutions to the U.S. DoD.

As global government and military organizations continue to expand their existing networks, we will keep seeing an increase in their 'communications on the move' requirements, and the infinite reach of satellite will allow them to redistribute high volumes of content across markets and regions around the world, from urban to extremely isolated areas. Demand for more satellite communications will continue outstripping supply and, for this reason, more and more partnerships will be formed between government and military organisations, and commercial satellite communications providers that can deliver effective, secure and reliable communications solutions, tailored to mission or operation-specific needs.

It is also predicted that in the not-too-distant future, soldiers will be networked together and rely on data fusion, *Intelligence, Surveillance and Reconnaissance (ISR)*, knowledge management and dynamic targeting, all of which will be communicated via satellite. Undoubtedly, this will be a future where military satellite communications and commercial satellite communications will be interoperable.



