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Boeing's Leuer—affordable, creative MILSATCOM solutions
Senior Contributor Willems on VSAT in today's complex ISR ops
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SS/L's Tadros offers his thoughts in The HPA Corner
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Also from Intelsat General, Kay Sears with a Perspective
Plus DISPATCHES from around the globe...

The launch of Boeing's U.S.A.F. WGS-6 satellite via a United Launch Alliance Atlas V on August 7, 2013.

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A United Launch Alliance Delta V launches the U.S.A.F.'s GPS IIF-8 satellite. Photo is courtesy of ULA.

DISPATCHES

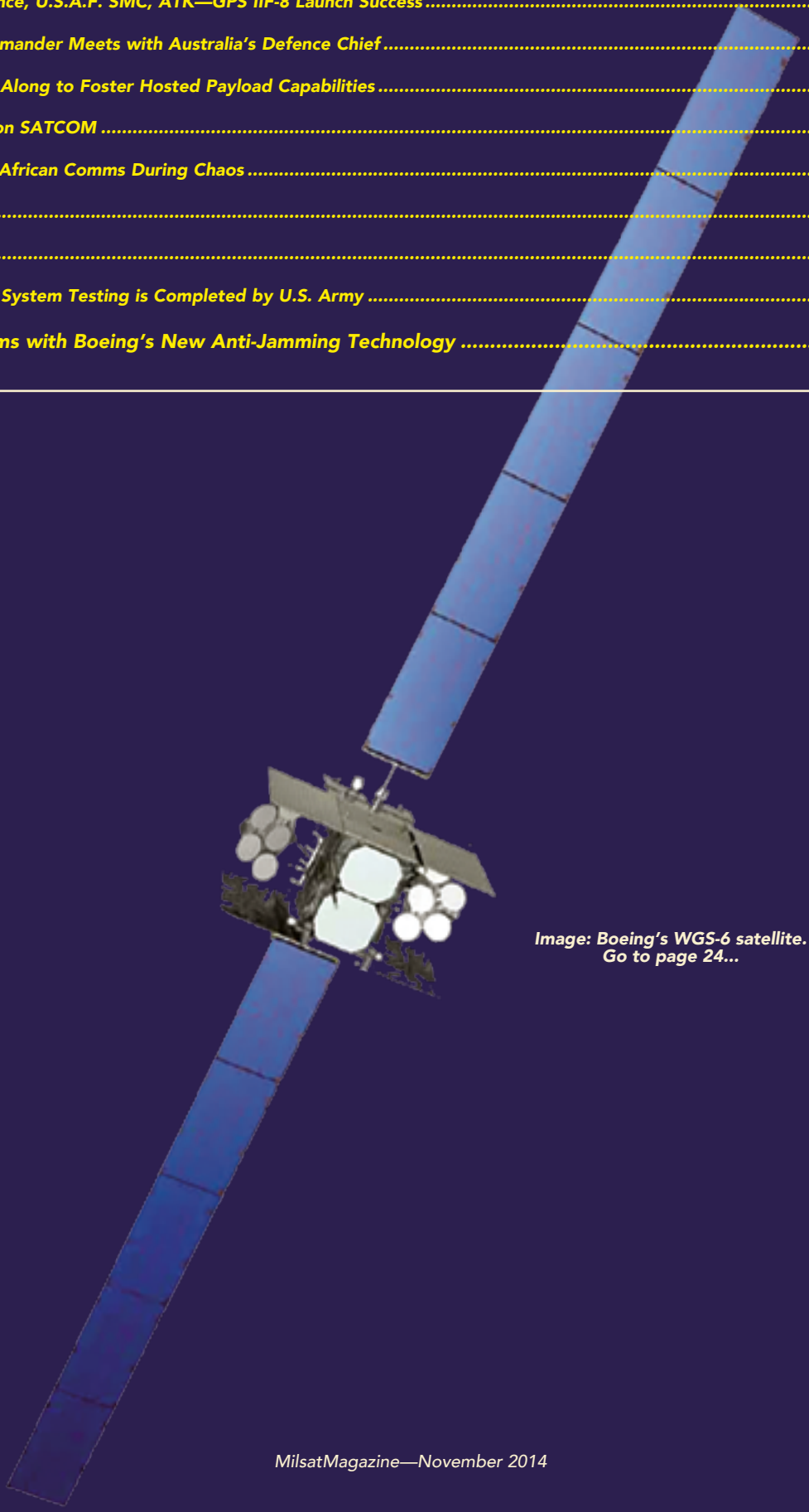

Image: Boeing's WGS-6 satellite.
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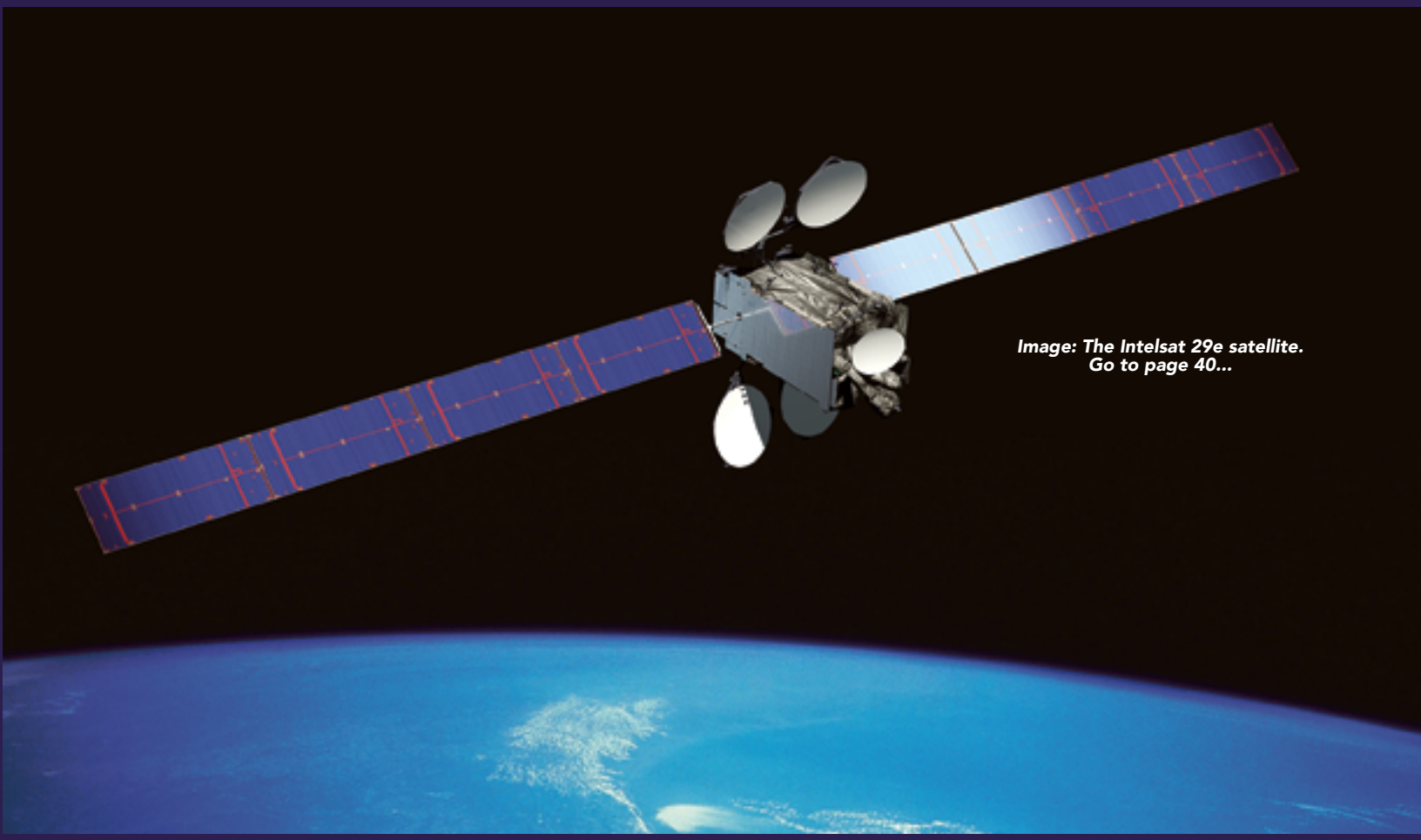

Image: The Intelsat 29e satellite. Go to page 40...

ADVERTISER INDEX

DISPATCHES

UNITED LAUNCH ALLIANCE, U.S.A.F. SMC, ATK—GPS IIF-8 LAUNCH SUCCESS

Launch photo is courtesy of ULA

A United Launch Alliance (ULA) Atlas V rocket successfully launched the eighth Global Positioning System (GPS) IIF-8 satellite for the U.S. Air Force at 1:21 p.m. EDT on October 29th, 2014, from Cape Canaveral Air Force Station's Space Launch Complex-41 in Florida.

This was ULA's 12th launch in 2014, and the 89th successful launch since the company was formed in December 2006.

"We are very proud to have delivered the GPS IIF-8 satellite to orbit on the 50th Atlas V mission," said Jim Sponnick, ULA vice president, Atlas and Delta Programs. "Achieving 50 Atlas missions with 100 percent mission success is a tribute to this team's sustained focus on one mission at a time, and dedication to reliably meeting our customers' launch needs."

This mission was launched aboard an Atlas V Evolved Expendable Launch Vehicle (EELV) with a 401 configuration, which includes a 4 meter diameter payload fairing. The Atlas booster for this mission was powered by the RD AMROSS RD-180 engine and the Centaur upper stage was powered by a single Aerojet Rocketdyne RL10A engine.

ULA's next launch is the Delta IV Heavy Exploration Flight Test (EFT-1) mission of NASA's Orion spacecraft for Lockheed Martin, which is scheduled for December 4th from Space Launch Complex-37 at Cape Canaveral AFS, Florida.

GPS IIF-8 is the eighth in a series of next generation GPS satellites and will join a worldwide timing and navigation system that uses 24 satellites in six different planes, with a minimum of four satellites per plane positioned in orbit approximately 11,000 miles above the Earth's surface.

The Block IIF series will replace the GPS Block IIA satellites that were launched between 1990 and 1997. The IIF space vehicles provide improved accuracy, enhanced internal atomic clocks, better anti-jam resistance, a civil signal for commercial aviation and a longer design life. The GPS IIF-8 satellite provides space-based system global location and time information in all weather conditions.

The EELV program was established by the United States Air Force to provide assured access to space for Department of Defense and other government payloads.

The commercially developed EELV program supports the full range of government mission requirements, while delivering on schedule and providing significant cost savings over the heritage launch systems.

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The Atlas V rocket carrying GPS IIF-8 for the United States Air Force rolls from the Vertical Integration Facility (VIF) to Space Launch Complex 41 (SLC-41).
Photo is courtesy of ULA.

This launch marked the 8th successful Boeing Global Positioning System (GPS) satellite. The craft signaled controllers that all systems were functioning properly with signal acquisition, some 3-1/2 hours post launch. This was the fourth, and final, GPS IIF launch scheduled for the U.S. Air Force this year.

"The schedule this year has put the GPS team through its paces, with launches occurring approximately every three months to continue GPS modernization," said Dan Hart, vice president of Government Space Systems at Boeing Network & Space Systems. "We typically were processing two satellites concurrently at the Cape, requiring strong execution, an unrelenting focus on mission assurance and solid team work with the Air Force and United Launch Alliance."

Now in Medium Earth Orbit (MEO), approximately 11,000 miles above the Earth, the eighth GPS IIF satellite in the constellation will replace older, first-generation GPS satellites and provide improved accuracy, signal strength and quality to America's warfighters, allies and civilian users worldwide.

The next GPS IIF launch is expected during the first quarter of 2015. The Air Force ordered 12 satellites in total—four remaining satellites are stored and maintained at the Boeing Satellite Development Center in El Segundo, California.

ATK played important roles for the mission and their products supported this successful launch of the United Launch Alliance (ULA) Atlas V vehicle and the GPS satellite.

"The Atlas V and GPS programs encompass the scope and scale of ATK's highly engineered products and affordable innovation," said Blake Larson, President of ATK's Aerospace Group. "Both military and civilian GPS users around the world will benefit from increased capability as a result of our team's collective dedication and execution excellence."

For the GPS IIF-8 satellite, ATK provided a host of products and services. ATK's Goleta, California, facility designed and manufactured the satellite solar arrays and a deployment boom. ATK has achieved 100 percent on orbit success on all solar arrays and deployable systems delivered and launched to date.


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The Atlas V with GPS IIF-8 satellite moved into vertical position at the launch pad. Photo is courtesy of ULA.

The ATK components, in the Atlas V launch vehicle and satellite, use the latest, cutting-edge technology across multiple ATK facilities. These include large composite structures, retro motors, state-of-the art solar arrays and other critical components on the GPS IIF satellite.

For the ULA Atlas V rocket, ATK produced the 10-foot diameter composite heat shield, which provides higher performance with lower weight, and essential protection for the first stage of the launch vehicle from engine exhaust temperatures in excess of 4,000 degrees Fahrenheit.

The assembly was fabricated using advanced fiber placement manufacturing techniques at ATK's Luka, Mississippi facility. This is the 50th Atlas V launch using ATK-built composite structures.

This launch also marked the 16th successful flight of ATK-produced retro motors. Eight of these solid motors supported separation of the spent first stage. The Atlas retrorocket was built at ATK's Missile Defense and Controls facility in Elkton, Maryland.

ATK's San Diego, California, facility manufactured the composite solar array substrates. ATK's Commerce, California, facility had responsibility for the ullage tank assembly, including the blankets, heaters, thermistors and pressurant lines. This tank is a spherical vessel constructed of titanium.

ATK's Beltsville, Maryland, facility provided heat pipes for the GPS IIF equipment and radiator panels. The company has delivered more than 50,000 heat pipes to the space industry with perfect on-orbit mission success record. ATK's Rancho Bernardo, California, facility performed final assembly and RF (Radio Frequency) testing of the antenna suite.

Colonel Bill Cooley, the director of Space and Missile Systems Center's Global Positioning Directorate at the Los Angeles Air Force Base, said, "I'm delighted with the outcome of this launch. Thanks to the men and women of SMC, the 45th, 50th and 310th Space Wings; Boeing; ULA; the Aerospace Corporation; and the GPS IIF and Atlas V launch teams ceaseless efforts, commitment, dedication, and focus on mission success, we successfully launched the fourth GPS IIF space vehicle this year. This launch demonstrates our commitment to users around the globe that GPS is the gold standard for position navigation and timing and will continue to deliver capabilities for the foreseeable future," he said.

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Artistic rendition of the GPS IIF-8 satellite. Image courtesy of Boeing.

The GPS constellation itself is healthy, stable and robust, with 31 working satellites orbiting the Earth. Operated by U.S. Air Force Space Command, the GPS constellation provides precise positioning, navigation and timing services worldwide seven days a week, 24-hours a day.

Prior to this important launch, senior command personnel and executives from mission partners participated in a pre-launch teleconference to discuss GPS IIF-8 and the work involved.

During this pre-launch teleconference, Colonel Cooley said that the GPS satellites are broadcasting 14 L2C signals, seven civil signals, and also have 14 M-CODE capable space vehicles on orbit.

"In June of 2013, we achieved the best performance of 46.6cm user range error and, in August of 2014, achieved the best weekly average of 58.7cm user range error. This means performance is improving as these newer satellites replace the older spacecraft.

Since its inception in the 1970s, GPS has evolved into an essential capability that enables technologies that are employed every day across our nation and the world. GPS continues to be the cornerstone of the Global Navigation Satellite System (GNSS) and the gold standard by which global applications are measured."

Colonel Alvin Burse, the Chief of the EELV Generation and Operations Division within the Launch Systems Directorate at SMC, as well as the Mission Director for the launch, discussed some of the planning and execution of the GPS IIF-8 mission.

He said, "While the frequency of these launches may appear routine, their apparent ease is maintained by a significant amount of work leading up to the day of launch. The Air Force, along with its industry partners, applies rigorous engineering discipline throughout the build and processing of the flight hardware and software.

"This approach gives us confidence that both the launch vehicle and the space vehicle are ready to go. While we do continue to look for more efficient ways to conduct mission assurance, we do so under the standard that will not compromise our focus on 100 percent mission success."

The Colonel then added, "In addition to the various engineering disciplines so important to the mission, I also want to acknowledge our teammates in contracting, finance, safety, production planning, quality, and manufacturing, for creating an environment for mission. Without their dedicated support, we would not be able to deliver payloads to orbit."

Munzir Badawi, the Boeing Manager for the GPS IIF Program, offered that 2014 had been a busy year for the GPS IIF team. He said the satellite had been flown from the company's Satellite Development Center in California to the Florida location aboard a C-17, arriving on July 16th.

Activities were then underway at the launch site included functional checkout, compatibility testing, battery installation, fueling, mating to the payload adapter and determining the final flight weight.

On October 14th, combined operations with ULA began as the spacecraft was encapsulated in the payload fairing and later transferred to Space Launch Complex 41 for mating to the Atlas V rocket.

After launch, Boeing support continued with verification testing and checkout of the satellite, prior to GPS IIF-8 being handed over to the Air Force to start service.

"On behalf of the Boeing GPS IIF team that encompasses the factory in California, the launch site at the Cape, and mission operations in Colorado Springs and El Segundo, I am very proud of our efforts this year," he said.

For additional information, please visit the ULA infosite at
http://www.ulalaunch.com

The ATK infosite is located at:
http://www.atk.com/

The Los Angeles Air Force Base infosite may be accessed at:
http://www.losangeles.af.mil/

DISPATCHES

USSTRATCOM COMMANDER MEETS WITH AUSTRALIA'S DEFENCE CHIEF

Adm. Cecil D Haney, U.S. Strategic Command commander, met with Australian Defence Force military and civilian leaders in early November to ensure the USSTRATCOM relationship with a key global and Asia-Pacific ally remains strong.

Hosted by Air Chief Marshal Mark Binskin, AC, Australia's Chief of Defence, the visit included discussions about opportunities for closer cooperation in space, cyberspace, ballistic missile defense and other areas of common interest.

"My visit here and our deep, rich discussions are indicative of the robust partnership we share with the Australian Defence Force and this nation as a whole," said Adm. Haney. "We discussed ways to further strengthen our combined efforts in areas of close cooperation and common interest."

Charged with conducting global operations 24/7, USSTRATCOM is one of nine U.S. Department of Defense unified combatant commands, and is responsible for strategic deterrence, space operations, cyberspace operations, joint electronic warfare, global strike, missile defense, intelligence, surveillance and reconnaissance, combating weapons of mass destruction, and analysis and targeting. This visit was the Admiral's first to Australia since becoming the commander of USSTRATCOM.

Photo: Adm. Cecil D. Haney, right, and Chief of the Australian Defence Force, Air Chief Marshal Mark Binskin AC, left, salute after laying ceremonial wreaths during the Last Post Ceremony at the Australian War Memorial in Canberra, Australia.

DISPATCHES

DARPA IS POD'LING ALONG TO FOSTER HOSTED PAYLOAD CAPABILITIES

Launches of satellites for the Department of Defense (DoD) or other government agencies often cost hundreds of millions of dollars each and require scheduling years in advance for one of the handful of available slots at the nation's limited number of launch locations.

This slow, expensive process is causing a bottleneck in placing essential space assets in orbit, especially in Geosynchronous Earth Orbit (GEO) approximately 22,000 miles (36,000 kilometers) above the Earth.

Launches of commercial communications satellites, on the other hand, are relatively frequent and inexpensive.

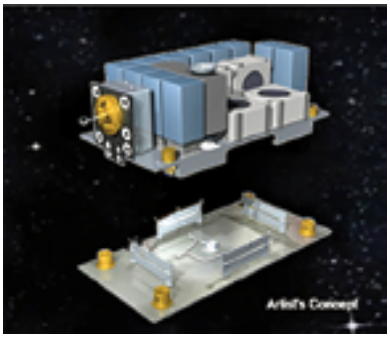
Commercial launch vehicles also often have unused carrying capacity that their operators can offer to other satellite owners through "hosted payload" services.

Unfortunately, no technology currently exists to enable government and military satellites to share rides and separate themselves from commercial communications satellites headed to GEO.

To help foster the creation of such a capability, DARPA's Phoenix program has shared its Hosted POD Assembly Interface Control Document.

The document provides specifications for Phoenix's Payload Orbital Delivery (POD) system, a standardized mechanism currently in development that is intended to safely carry a wide variety of payloads to GEO aboard commercial communications satellites.

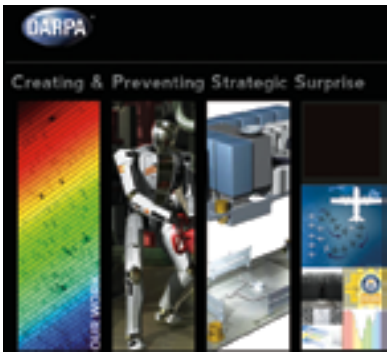
PODs are designed to help take advantage of the frequency of commercial satellite launches and associated hosted payload service opportunities to enable faster and lower-cost delivery of payloads to GEO.



Transfer to Orbit Payload Orbital Delivery (POD) System, a standardized mechanism designed to safely carry a wide variety of payloads, including satlets, to GEO aboard commercial communication satellites. Image courtesy of DARPA.

DARPA is also pursuing a possible risk-reduction flight to validate the POD technology, which could eventually provide "FedEx® to GEO" capabilities to make space deliveries to high-altitude orbits much easier and faster.

Each POD would have dimensions of roughly 1.3 feet (0.4 meter) by 1.6 feet (0.5 meter) by 3.3 feet (1 meter) and could carry a payload ranging from approximately 150 pounds (68kg) to 220 pounds (100kg), depending on the configuration selected.
A standardized interface would attach the POD to the host satellite and then release the POD at the desired orbit.



The POD system is one of three main technology research areas for Phoenix, which seeks to enable robotics servicing and asset life extension in GEO while developing new satellite assembly architectures to reduce the cost of space-based systems.

In October, DARPA released a Request for Information (RFI) seeking insights regarding a potential flight demonstration to introduce DARPA-developed space robotics capabilities in GEO within the next five years.

The RFI also seeks input into potentially establishing a public-private partnership that would make cooperative robotic servicing available to both military and commercial GEO satellite owners on a fee-for-service basis.

DARPA's infosite is located at
http://www.darpa.mil/

DISPATCHES

NSR: UAS IMPACTS ON SATCOM

NSR's *Unmanned Aircraft Systems (UAS) via Satellite* is a new report providing comprehensive market analysis of the Unmanned Aircraft Systems (UAS), and assesses their impact on and use of satellite communications.

Building on years of data and analysis from NSR's coverage of UAVs for government and military markets, this new study presents readers with an in-depth look at regional conditions, capacity demand, and drivers for High Altitude Long Endurance (HALE) and Medium Altitude Long Endurance (MALE) UAS globally over the next 10 years.

This report analyzes the civilian and military UAS markets for both HALE and MALE platforms, in terms of the growth in their number of airframes, in-service SATCOM terminals, revenues, and capacity demand by frequency bands.

Segmented regionally and including case studies of future markets, the report offers not only an overview of the UAS and Satcom ecosystem, but also a thorough look forward at the future development of long endurance UAS as a potential complement or competitor of the Satcom industry. The report's findings are aimed at enabling SATCOM service providers to plan accordingly so as to capitalize on the market opportunities that these UAS bring, and also protect and enhance their current market position by gaining a competitive edge by allocating their satellite resources efficiently across the globe.

The report features more detailed analysis of the UAS SATCOM markets than ever before, using a bottom-up approach for exploring the impact of policy and regulatory framework changes on civilian and military UAS flights that will affect SATCOM procurement by the governments, providing actionable information and perspective to players. The report contains information about key UAS government programs over the next 10 years, potential of SATCOM links for small and tactical UAS, geographical analysis of potential civilian and military UAS SATCOM demand, and the technological and market trends that will drive the UAS and SATCOM industry.

The NSR infosite: ***http://www.nsr.com/***

DISPATCHES

308 SYSTEMS HELPS AFRICAN COMMS DURING CHAOS

Communication always plays a vital role in the completion of missions throughout the African continent.

Imagine the necessity of swift and accurate data transmission during military actions or disaster response within countries such as Angola, Chad, Nigeria, and South Africa.

Previously, African military and humanitarian personnel have found themselves trying to communicate in the midst of total terrestrial chaos and destruction using legacy radio systems and outdated command infrastructure.

Given a recent flare-up of hostilities in many regions, military operations in Ethiopia, Ghana and Sudan recognized the need for more command resources in the remote, communications sterile locations—and deployed TAC-PAK/VSAT(Very Short Aperture Terminals) SATCOM mobile command systems.

These custom-configured "mobile command in a box" TAC-PAK/VSAT systems, manufactured by 308 Systems Inc in Fort Collins, Colorado, and supported in Africa by local partners, are follow-ons to previously deployed systems.

The new systems were custom-configured to meet specific mission field communication requirements, including linking field radios to cell phones and computers throughout the continent. From the base operations in Addis Ababa, Ethiopia, one General said, "These systems are like gold out in the field."

Military and peacekeeping mission completion is easier said than done, due to the fluid and remote nature of each operation, and the presence of ravaged infrastructure.

Swift, reliable and precise communication is critical, yet tough to attain in remote or devastated terrain. However, the recent deployment of TAC-PAK/VSAT technology from 308 Systems enabled the military forces in Ethiopia, Ghana and Sudan to communicate quickly and precisely.

With multiple form factors and VSAT data rates up to 6Mbps, the TAC-PAK/VSAT flyaway kit combination provided deployment flexibility, operated anywhere with great efficiency, and is packaged in a rugged, small, and highly portable form factor easily loaded into a pickup truck or similar deploying vehicle. This effectively turned any local vehicle into a "Mobile Command Center."

This extensive Mobile Command/VSAT lineup represents the latest state-of-the-art high bandwidth mobile command /communication solutions from 308 Systems.

Additional products such as the SATPAK wireless relay systems can be combined to ensure teams or organizations have reliable SATCOM and radio signal access from anywhere, including previously signal blocked areas such as mountain valleys, tunnels and urban canyon buildings.

More information is available at
http://www.308systems.com

HARRIS BUILDS ON...

Harris' newest company addition solidifies the firms commitment to develop advanced software for tactical radios used by the U.S. military as well as militaries and public safety officials around the world.

Harris Corporation has opened their new facility in Sunrise, Florida. The 19,000 square-foot facility will support engineering activities and will serve as the Caribbean and Latin America sales hub for Harris RF Communications products and services. Grand opening ceremonies were held on Monday, November 10th.

"Opening our new development center in Sunrise enabled us to quickly add a significant number of highly qualified engineers with expertise in advanced software defined radio waveforms," said Dana Mehnert, group president, Harris RF Communications.

The following are the positive results of this new building:

- ***6,500 employees in Florida with this project***
- ***Center of the company's nearly $900 million R&D activities***
- ***Nineteen locations in seven cities: Melbourne, Palm Bay, Malabar, Miami, Orlando, Tampa, and Sunrise***
- ***A total of almost 3.5 million square feet of office and manufacturing space***

For more information:
http://harris.com/pdf/fact_sheets/Harris-Florida.pdf

DISPATCHES

MOVING MUOS-3

The U.S. Navy and Lockheed Martin have delivered the third Mobile User Objective System (MUOS) spacecraft to Cape Canaveral Air Force Station, Florida, where it will be prepared for a January 2015 liftoff aboard a United Launch Alliance Atlas V rocket.

For the first time, MUOS Wideband Code Division Multiple Access technology users will have beyond-line-of-sight capability to transmit and receive voice and data using an Internet Protocol-based system.

Prior to launch, Lockheed Martin engineers and technicians at the Cape will complete post shipment testing. Lockheed Martin will fuel the satellite's propulsion system and the spacecraft will be encapsulated inside the launch vehicle's payload fairing. The encapsulated spacecraft will then be integrated on top of an Atlas V launch vehicle for final integrated testing and closeout preparations for launch.

MUOS-2 was launched and handed over to the Navy for operations in 2013. MUOS-1 was launched and became operational in 2012. These two on-orbit MUOS satellites already are demonstrating new capabilities, especially in the Arctic, an area previously beyond the coverage of UHF satellites and growing in interest for transportation and natural resources exploration above 65 degrees north latitude. In the past year MUOS successfully connected users near the Arctic poles during independent testing by Lockheed Martin—and their industry partners General Dynamics, Rockwell Collins and Harris—as well as during the U.S. Navy's 2014 Ice Exercise (ICEX) and the U.S. Coast Guard's Arctic Shield 2014.

DISPATCHES

FORCE 2025 COMMS SYSTEM TESTING IS COMPLETED BY U.S. ARMY

The Brigade Modernization Command has completed their latest field test of the second increment of the Warfighter Information Network-tactical communication system, a Force 2025 initiative that will push real-time intelligence down to a maneuver brigade's company level for the first time.

Network Integration Evaluation 15.1 is the eighth iteration of the semi-annual field test, in which 3,900 Soldiers and 1,200 government employees put multiple pieces of equipment through its paces in the rough Fort Bliss terrain, from October 3rd to November 4th. This exercise refines tactics, techniques and procedures for the equipment as well as pushes the capabilities of the communication network to the limit.

"It's amazing what the Soldiers are able to do with these systems," said Maj. Gen. Peter Utley, commanding general of the U.S. Army Test and Evaluation Command. "They are able to find other capabilities and really maximize the capabilities of these systems far beyond what we thought they could do."

The new network will provide actionable information in a manner that is easy to process, allowing commanders on the ground to have greater awareness of the battlefield around them and the assets at their disposal, which will in turn make the unit more agile and flexible as part of the Army's transformation.

While each piece of equipment went through developmental testing before originally coming to NIE, the exercise has reached a point now where Soldiers, most of whom come from 2nd Brigade, 1st Armored Division, are familiar enough with the equipment from past NIEs to see improvements in the system and build upon past experience to expand what they can do well past the limitations of a lab, according to Col. Jim Crider, BMC's deputy commander.

"When you put things out in the field, and you get a rain storm, or the wind blows 20 or 30 knots, or it gets in the heat, it performs differently," Crider said. "This area is more than just desert. There's undulating terrain, high mountains, narrow and wide passes ... all of which makes this an ideal location to conduct evaluations."

The main tests for the WIN-T2 system are its simplicity and interoperability. The network of computers and radios is designed to easily work with current systems and adapt to the technology of America's allies and even future pieces of equipment. Brig. Gen. Timothy Coffin, commanding general of White Sands Missile Range, New Mexico, where a large part of the NIE testing occurs, noted it was critical for the systems to communicate with as little human interface as possible, so that Soldiers could focus their attention on completing the mission.

"The promise of NIE is the ability to bring all those systems together in a seamless way, where the operator can really focus on the fight, and not fight the systems," Brig. Gen. Coffin said. "We don't want to add burden onto the Soldier or the commander. We want to allow them to focus their intelligence and their efforts into fighting the adversary."

Past iterations of NIE have already proven their worth, most notably validating Capability Set 13, for the 10th Mountain Division (Light Infantry), prior to their 2014 deployment to Afghanistan. With this iteration NIE, has evaluated more than 200 systems and used those lessons learned to provide recommendations for the future of doctrine, organization, training, material, leadership, personnel and facilities to the Department of the Army.

According to Lt. Col. Timothy Gearhart of Project Manager Mission Command, the evaluation accomplishes this by putting the developers of the equipment side-by-side with the Soldiers testing the systems.

In addition to Fort Bliss Soldiers shaping one of the initiatives designed to boost Army equipment availabilities, they are also receiving a new form of training that will prepare and improve them for future operations.

According to Maj. Gen. Utley, the knowledge Soldiers take from NIE is also increasing their creativity and flexibility in utilizing the equipment tactically: a vital trait for them to pass on as leaders.

"I feel very strongly that NIE allows us to see what is in the art of the possible as it relates to these systems," Utley said. "We could have a system that was developed to address a specific capability but now we're starting to see the capability for it to, perhaps, do other things beyond what we originally designed it to do."

Story by Sgt. James Avery + SSG Christopher Blakeslee, 16th MPAD

DISPATCHES

NO STICKY PROBLEMS WITH BOEING'S NEW ANTI-JAMMING TECHNOLOGY

Boeing has proven its new anti-jamming communications technology is capable of operating as either a ground-based user terminal or satellite-based networking hub, enabling the military to send and receive secure communications at a significantly lower cost by using existing terminals and satellites.

The anti-jam technology uses a protected tactical waveform, which shields signals from interference by adversaries or cyber-terrorists.

This demonstration complements previous on-orbit demonstrations over satellites like ViaSat-1 and the sixth Wideband Global SATCOM (WGS-6), showing the ability to operate anti-jam waveforms over existing commercial and military spacecraft.

"We've confirmed this technology can be applied quickly and affordably to existing assets, especially operational WGS satellites and ground terminals," said Dan Hart, vice president of Boeing Government Satellite Systems.

This testing, done under contract for the U.S. Air Force Space and Missile Systems Center and supervised by the U.S. government, confirms that the modem meets technical interface specifications, while successfully transmitting information to and from the ground user terminal.

DISPATCHES

KVH TACNAV BEEFS UP ARMORED VEHICLES

KVH Industries, Inc. has received a $4.3 million order for its TACNAV tactical navigation systems from a new customer who is a major defense contractor that provides armored vehicles for an international military client.

With a short delivery requirement, shipments for this order are expected to be substantially completed in Q4 of 2014.

KVH's Guidance and Stabilization Group Executive VP Dan Conway said, "Providing precise navigation as well as coordination of vehicles in critical situations is an important tool that helps keep soldiers oriented wherever they operate."

KVH's TACNAV military vehicle navigation systems provide unjammable precision navigation, heading, and pointing data for vehicle drivers, crews, and commanders. TACNAV can also serve as a heading and position source for situational awareness.

TACNAV systems are currently in use by the U.S. Army and Marine Corps, as well as many allied customers including Canada, Sweden, Great Britain, France, Germany, Spain, Egypt, Botswana, Australia, New Zealand, Saudi Arabia, Taiwan, Romania, Poland, Turkey, Malaysia, Switzerland, South Korea, Singapore, Brazil, and Italy.

Additional information is available at ***http://www.kvh.com***

CPI TO CONTINUE WITH GROUND DATA TERMINALS FOR U.S. MILITARY

CPI Malibu Division

The Malibu Division of Communications & Power Industries LLC (CPI) has been awarded a follow-on order of more than $5 million for the continued production of tactical common data link (TCDL) antenna ground terminals operating in Ku-band.

With this most recent order, in the past two years, CPI Malibu Division has received multi-year orders totaling more than $30 million for advanced ground data terminals.

These ground data terminals are used by the U.S. military in intelligence, surveillance and reconnaissance (ISR) applications to communicate information, including video and radar information, between ground control stations and unmanned aerial vehicle (UAV) platforms.

CPI Malibu Division's Ku-band advanced ground data terminals feature unique auto-tracking capability, which facilitates continuous contact between ground personnel and the UAV.

"ISR systems provide critical communications links to our military personnel and must be capable of operating in a network-centric battle-space where there is no room for error or delay.

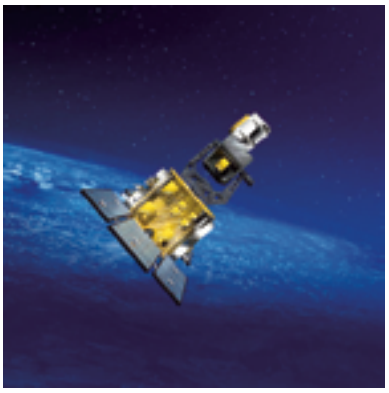
"It is crucial to us that our troops be able to depend wholeheartedly on CPI's tactical and portable data links," said Steve Lonngren, president of CPI Malibu Division.

Work on these orders is being completed at CPI Malibu Division in Camarillo, California.

Additional information regarding CPI's Malibu division may be found at ***http://www.cpii.com/division.cfm/10***

DISPATCHES

FOUR YEARS OF SPACE SURVEILLANCE FOR U.S.A.F.'S SBSS



Artistic rendition of the Space Based Space Surveillance satellite.

Members of the 1st Space Operations Squadron gathered to celebrate the Space-Based Space Surveillance Satellite's (SBSS) fourth anniversary on orbit recently.

The event provided an opportunity for squadron members and leaders to celebrate mission success as well as helped to fortify a new identity for the 1st SOPS, which has transitioned into a space-based, space situational awareness squadron in the past 12 months.

While the squadron has commanded and controlled SBSS since it reached orbit in September 2010, it also gained a new space situational awareness system, the Geosynchronous Space Situational Awareness Program (GSSAP), this past summer.

Last June, Air Force Space Command leaders directed the 1st SOPS to add command and control of GSSAP to its portfolio of situational awareness systems, which includes the SBSS and Advanced Technology Risk Reduction (ATRR) satellite.

"With leadership's decision to make (the) 1st SOPS a space-based SSA squadron, we begin the work of truly operationalizing SSA to where the Joint Functional Component Command space commander will receive truly actionable information," said Lt. Col. Toby Doran, the commander of the 1st SOPS. "Moreover, by gaining synergy among SBSS, ATRR and GSSAP, we can say that space superiority starts in (the) 1st SOPS."

SBSS plays a large and significant role in the space situational awareness realm. Built by Ball Aerospace Technologies Corporation and the Boeing company, SBSS uses a two-axis, gimbaled optical telescope to provide coverage of satellites and other objects in the geostationary belt.

SBSS is one of the few satellites on orbit that look out toward the heavens instead of toward Earth. The SBSS is a Low Earth Orbit (LEO) sensor that provides all-weather, 24-hour space situational awareness data to assist commanders throughout the military in detecting, identifying and tracking potential hazards in space. In essence, the SBSS helps provide a better understanding of the space environment.

"The vehicle performs more GEO observations than any other sensor," said Capt. Jared Grady, the 1st SOPS lead SSA space vehicle engineer. "It also performs a significant number of deep space observations beyond the GEO belt." Grady also said that 1st SOPS analysts and engineers have continued to innovate during SBSS's lifespan, which has extended the satellite's capability beyond its original design life.

This year proved to be an important one for the satellite and the squadron, as 1st SOPS members rewrote the vehicle's tactics manual. This helps operators understand the updated vehicle as well as informs the SSA community about how SBSS contributes to space situational awareness.

"When we consider a one-of-a-kind system like SBSS, we have no choice but to be innovative," Doran said. "There is no opportunity for material solutions, so we turn to our tacticians to get the most out of the system. They have done it and our new tactics manual documents that innovation."

As the squadron opens year five of SBSS operations, the lessons learned and the experience gleaned from the system's performance will be invaluable as it embarks on year one of operating the GSSAP.

"As we transition our mission sets, we're commemorating our success of another year on orbit (for SBSS)," said Capt. Brett Kasischke, the 1st SOPS chief of operations training. "At the same time, what's new and different is we're doing this with a vision of ourselves as an SSA squadron."

Story by Scott Prater,
Shriever Air Force Base Public Affairs

AFFORDABLE, CREATIVE SOLUTIONS FOR MILSATCOM

By John P. Leuer, Executive Director, Boeing MilSat Communications

While government budgets continue to flatten, there continues to be an increasing need for military bandwidth and protected tactical communication—these elements are essential for support of military and humanitarian missions.

For example, recent estimates state that the U.S. government's demand for military satellite bandwidth is expected to rise 74 percent over the next decade from the current level of 24 gigabits per second to more than 41 gigabits per second, according to a Northern Sky Research study that was published in 2013.

To fulfill these needs, governments should look at non-traditional methods to augment their existing assets. An affordable MILSATCOM architecture should include core assets, or dedicated government satellites and augmentation assets, such as hosted payloads and single mission free flyers. In addition to traditional

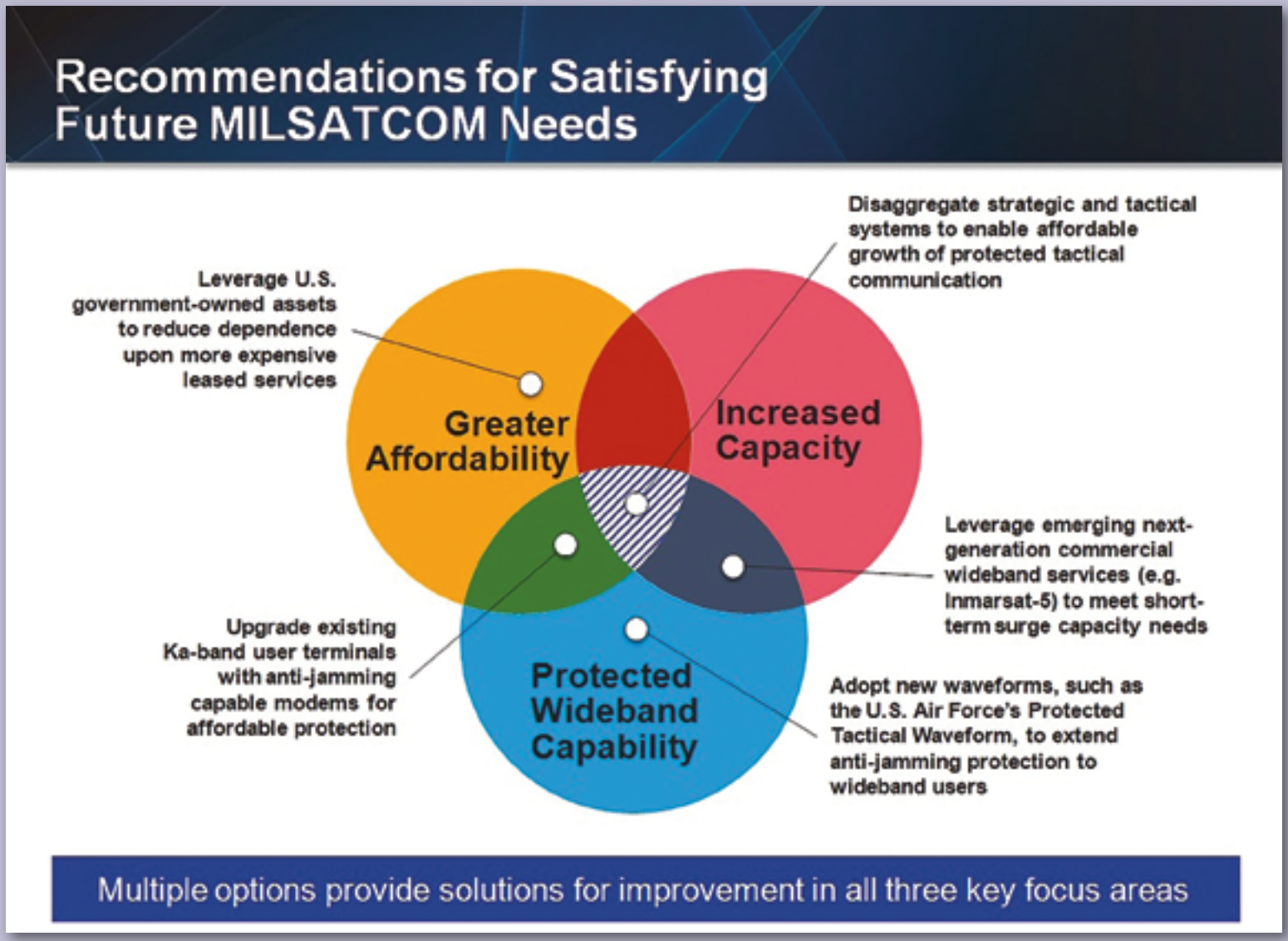
communication, there is the need to provide protected communication due to emerging threats in a highly contested environment where signal jamming prevention is imperative. This layered architecture is an effective and practical approach to satisfy emerging MILSATCOM mission needs.

Satellite systems, such as the U.S. Air Force's Wideband Global SATCOM (WGS) system, are vital in providing necessary broadband communications connectivity for U.S. and allied warfighters around the world. To aid in continuing to fund crucial satellite systems like these, governments have found partnering with other nations useful for obtaining quick, reliable MILSATCOM access.

A successful example of such an occurrence is the U.S. Department of Defense's program to bring partner nations into the WGS system as a highly affordable way to gain modern wideband MILSATCOM access globally for a much lower cost than developing a dedicated satellite system. Australia became the first international participant in the WGS system under a cooperative agreement with the U.S. Air Force in 2007. In 2012, five additional partner nations—Canada, Netherlands, Luxembourg, Denmark and New Zealand—executed a similar agreement to gain global access to the WGS system.

The U.S. government is currently inviting discussions for international partnerships for the eleventh and twelfth WGS satellites. This arrangement provides the benefits of immediate access through an existing worldwide infrastructure. In addition, international partners are able to leverage existing user terminals and telecom equipment.

Another solution designed to help alleviate military satellite services shortage is the use of hosted payloads. A recent example is the commercially hosted payload on Intelsat 22, which provides the Australian Defence Force (ADF) with much-needed service at



A layered architecture is an effective and practical approach to satisfy emerging MILSATCOM mission needs.

Artistic rendition of the WGS-6 satellite.

Image Courtesy of Boeing

satellite users. BCSS works with the owners of satellite systems to market available bandwidth on active systems as well as to include hosted payloads on their future spacecraft.

These are superb examples of commercial and government industries working together to provide substantial capability economically and in a timely manner. Also illustrated though these examples is how the lines that have been drawn between government and commercial services are now blurring. This attempts to address the continuing shortfall of communication availability seamlessly with U.S. and other government assets and existing ground infrastructure.

less cost. This was implemented in a fraction of the time typically required to deliver a traditional military satellite, saving both money and time. According to the ADF, $150 million was saved by contracting with Intelsat for the hosted payload for 15 years, instead of purchasing and operating a fully dedicated satellite.

The U.S. Air Force has already shown interest in using commercially-hosted payloads for government applications, with the recent award of the Hosted Payload Solutions (HoPS) indefinite-delivery-indefinite-quantity contract (IDIQ), which allocates nearly $500 million to provide a faster path to fulfill the U.S. government's bandwidth need.

The satellite industry has witnessed increased interest in recent years in hosted payloads—from the formation of a Hosted Payload office at the U.S. Air Force—to the formation of an industry-led Hosted Payload Alliance—to increased media outlets looking to promote hosted payloads as an affordable, and doable, solution.

Many entities are already benefiting from hosted payloads, with more than two dozen hosted payloads having already entered service over the previous 35 years, serving customers ranging from the Coast Guard to the Japanese government to most branches of the U.S. military, as well as many others.

To make it easier to connect governments to commercial satellite systems, organizations such as Boeing Commercial Satellite Services (BCSS) exist to market commercial satellite telecommunications services to the U.S. government and other

In addition to funding traditional satellite systems and investing in hosted payloads, militaries could also benefit by using free flyers—like the recently developed 502 Phoenix small satellite—that perform a unique mission and are not associated with a

constellation. These satellites could separately support both strategic and tactical missions.

Beyond the basic needs of providing communication in the field, there is a growing need to increase the ability to transmit protected communication in order to prevent threats and inadvertent signal jamming. There has been a great deal of debate about regarding what the best course of action is for protected tactical missions; however, a well-rounded solution should provide affordable, global protected tactical communication using existing assets.

The U.S. Air Force is investigating innovative ways to address the jamming threat, while still dealing with the current restrictive budget environment. Boeing is one of a few companies that was contracted to develop and test protected tactical waveform technology.

This technology boosts the ability of warfighters to send protected information without enemy data interference by using currently available satellites that do not have anti-jamming technology of their own, showing the ability for the technology to be quickly deployed at a much lower cost than building a new satellite.

The company recently applied new anti-jamming technology to both an on-orbit military satellite (WGS-6) and a commercial satellite (ViaSat-1) for the first time, expanding the military's potential to access secure communication more affordably.

These solutions are just some of the options available to governments needing to boost their military bandwidth. Though budgets are decreasing, it is imperative that the military receives the communication capabilities necessary for mission success.

Note: Dedicated satellite communications systems, such as the U.S. Department of Defense's Wideband Global SATCOM satellites, pictured on the first page of this feature, provide vital bandwidth to the U.S. and allied warfighters. All photos in this feature are courtesy of Boeing.

About the author

John Leuer is the Executive Director for Government Space Systems' MilSatCom programs, including Wideband Global SATCOM (WGS), Protected Tactical Systems (PTS), Strategic MilSatCom, and the EHF/UHF payload programs. Additionally, Leuer is responsible for Next-Generation Communications, which includes a family of programs and product development efforts centered on Laser Communications.

THERE'S NO ROOM FOR TRADITIONAL VSAT SYSTEMS IN TODAY'S COMPLEX ISR OPS

By Koen Willems, Senior Contributor

You only need to flick through the newspapers these days to read that there are a large number of active conflicts around the world.

At the time of this writing (Wednesday, September 10th, 2014) the newspaper headlines talk about how Obama will unveil his strategy to widen his ISIS campaign in Iraq, the fragile Ukraine and Gaza ceasefire declarations, the unresolved conflicts in Syria and Libya and the numerous civil wars in Africa.

ISR in a Complex, Globalized World

After the expensive and long interventions in Iraq and Afghanistan, world leaders are reluctant to send in "boots on the ground" to resolve the numerous conflicts. As such, the types of intervention by coalition forces and international peacekeeping organizations have drastically changed over the last couple of years.

Crisis management operations now focus on peacekeeping, the global fight against terrorist organizations and humanitarian relief-efforts. In a globalized world, problems need to be dealt with when and where they emerge before they threaten the economic, social, political or cultural stability of entire nations. Geographic distance is no longer an assurance of protection.

Crisis management operations are typically limited in time, rely heavily on airborne assets and turn to ISR (Intelligence, Surveillance and Reconnaissance) input to ensure missions are as efficient as possible. The role of ISR has grown as crisis management takes center stage on the world's political stage. In fact, ISR has become an integral part of every operation.

During a crisis management operation, a set of ISR tools work in full orchestration with tactical, operational and strategic assets. These tools include:

- *HUMINT (Human Intelligence) tools*
- *SIGINT (Signal Intelligence) tools*
- *COMINT (Communications Intelligence) tools*
- *MASINT (Measurement and Signature Intelligence) tools*
- *ELINT (Electronic Intelligence) tools*
- *IMINT (Imagery Intelligence) tools*

The collected products from these ISR sources provide policy makers and operational units in the theater with detailed information to enable correct and quick decision-making.

Depending on the operation, a large quantity of ISR information is exchanged from the theater or disaster area to the collection management tools in the operations center for analysis and processing. This information can then be redistributed afterwards to other (inter)national agencies or operational units.

SATCOM for Reliable, Secure + Quick Intelligence Sharing

In order to gather all of this ISR data from various sources and platforms located in remote and hostile areas, satellite communications provide a reliable, secure and quick solution for information sharing. Satellite networks are particularly relied upon when:

- *A man-made or natural disaster strikes and the terrestrial communication infrastructure is the first to go down*

Image courtesy of U.S. Air Force

- *Operating in beyond line of sight (BLoS) modus*
- *Collecting data from ISR platforms on-the-move (airframes, vessels, land vehicles)*
- *The incumbent terrestrial telecom infrastructure in the disaster area is not reliable or is insecure*

The different crisis management operations today already deploy a good number of VSAT systems to support their ISR activities. However, there is room for improvement in order to support the complex operating environments and to increase operational efficiency. Looking at today's and future requirements for ISR operations, we can easily address seven main concerns:

- *The need for more data/video throughput to support bandwidth hungry sensors (HD video, Multispectral data and so on)*
- *The ability to deploy and connect any time, anywhere*
- *The importance of service availability in order not to interrupt mission critical communications during a mission*
- *The ease-of-use and the ability to set up a link quickly*
- *The growing budget constraints*
- *Secure communications that cannot be compromised*
- *The possibility to exchange information quickly in a joint operation between different units, nations and platforms (fixed, mobile)*

HTS Constellations + SATCOM Technology Providers to the Rescue

To address the above concerns a combined effort between technology providers for the ground segment and the satellite operators is required. Different high throughput satellite (HTS) programs were recently announced, or placed into service, by both the commercial (Intelsat EPIC, Global Xpress, etc.) and military operators (WGS, Athena Fidus, etc.). These HTS programs allow ISR missions to increase their overall data throughput, provide connectivity on a worldwide scale and support both fixed and on-the-move applications. Ground infrastructure equipment is still required to make sure that satellite communications over these constellations run in an efficient and smooth manner.

No Room for Traditional VSAT Solution in a Complex ISR Environment

Referring back to the complex environments and growing concerns in ISR operations nowadays, there is no room any longer for traditional VSAT systems. In fact, the VSAT platform deployed for ISR missions needs to be multi-purpose, multi-service and multi-functional.

At the operations center, ISR data is collected from different sources, different platforms and different remote locations at the same time. The size and type of the return link will differ, depending upon the activity level, on the type of service (voice, video, data), the application (exchanging monitoring, sensors or biometric data etc.) and the platform (UAVs, manned aircrafts, fixed sensors, etc.). In other words, these return links connected to the hub would need to support traffic from a few kilobits to a tenfold of megabits in an efficient way. That is a reverse philosophy compared to traditional VSAT systems where you typically have a fat forward link from hub to the remotes and only small return links to enable Internet access for consumer or enterprise customers.

A VSAT platform purposed for ISR applications should take three basic principles into consideration: flexibility, scalability and efficiency.

Flexibility

In a complex environment where it is difficult to predict where the next man-made or natural disaster will strike, or when ISR capabilities need to be deployed, the VSAT platform needs to be flexible enough to cope with constantly changing conditions. From the hub side, multiple satellites should be addressable in case the conflict spreads over multiple footprints and should be able to support different ISR operations in different regions simultaneously. Independence from satellite frequency or constellation is also important in order to groom the satellite network elements quickly toward a new conflict area.

ISR collection management tools do not gather their information from a single source. Depending on the situation at hand, the pattern of data flow coming from any theater can be quite varied. We are talking about different services and traffic types produced by a range of platforms that need to be handled by a single multi-service hub.

In operation mode, when a parameter intrusion is detected and bandwidth hungry sensors are activated, the satellite network needs to be able to switch smoothly from low data to high data rate throughput to support HD video and other sensor modes without packet loss. The VSAT platform should be in constant listening mode, ready to change depending on the data traffic, which is being derived from all the terminals in the network.

As soon as traffic throughput changes for a certain terminal, the VSAT system must be able to adapt bandwidth, power, MODCODs, frequency plan and symbol rate on the fly. The VSAT systems should always take channel conditions, such as fading, terminal population, QoS rules and priorities, into full account.

Flexibility also applies to the VSAT terminals population in the theater. These terminals are mounted on the diverse ISR platforms (UAV, manned aircraft, fixed sensors, SIGINT network, and so on) and need to take certain size, weight and power, as well as environmental conditions and the connected service into account. As such, the VSAT technology supplier must be able to offer a range of modems or terminals that fit the specific ISR application. Moreover, all of the different terminal types need to be connected to a single VSAT hub.

Scalability

Each ISR mission is different. The number of deployed ISR tools and the allocated budget will vary, depending upon the mission objective(s) and the severity of the crisis. Obviously, ISR operators do not want to purchase a new VSAT platform for every single operation. They need a multi-purpose VSAT system that scales to the operation at hand.

The VSAT system can start as a small ISR network, connecting only a few sensors in a single satellite footprint, then grow as the operation becomes more important into a multi-satellite, multi-gateway and multi-service ISR platform that connects the theater with different national and international agencies. The DoDs of the different nations will appreciate the fact that they can start with a VSAT system that fits their program and can add functionalities, services, licenses and terminals for future missions. This means that they do no need to spend their full budget from day one. When an assignment has ended, both the hub and terminals can be repurposed for other programs.

Efficiency

Efficiency can be defined both on the technology and on the operational level. Obviously both are closely linked. At the start of a conflict, it is possible that the satellite coverage over the region could be rather scarce. National agencies, international organizations and NGOs will try to get maximum satellite bandwidth to start-up their crisis management initiatives.

As a direct result, the demand for satellite capacity overtakes availability. State-of-the art VSAT systems will already solve part of that problem as they house the latest efficiency technology, which squeezes the maximum bit out of every Hertz. In relation to the new HTS constellations, the throughput results will be even better. On the other hand, efficient VSAT platforms give the agencies the chance to increase their network with extra services or additional platforms within the same bandwidth. These extras bits of detailed information improve the decision making process.

During an ISR operation it is key to maintain the mission critical link over satellite, even in the harshest circumstances like fading conditions or on mobile platforms. A split second of connectivity loss might mean that crucial information is overlooked and results in bad decision-making. ISR operators demand maximum service availability and the ability to respect SLAs, even with CIR requirements in links suffering from variable bandwidth conditions.

Finally, the operational efficiency of an ISR mission depends on how quickly a service over satellite can be established during a conflict to enable instant intelligence sharing. The terminal must be quickly deployed and the satellite easily acquired, even for operational personnel with limited experience or formal education in SATCOM technology, and the sensors or data sources must be quickly connected. ISR units in theater do not have the luxury of wasting time. Before the link is established and the data starts to be transmitted, the ISR operator needs to be certain that the link is secured and the captured information cannot be compromised.

The Key to Successful ISR Operations over Satellite

The bad news is that the number of conflicts and disasters around the world has certainly not reduced in number. On the contrary, these challenges result in an increased complexity fore ISR operations in a globalized world.

The good news is that VSAT technology has evolved—state-of-the-art multi-service VSAT platforms, in conjunction with HTS constellations, support complex ISR assignments in a flexible, scalable and efficient manner.

For more details and more information on multi-service VSAT platforms, I kindly refer you to the documentation set on the Newtec Dialog Multiservice Satellite Platform at ***http://www.newtec.eu***

About the author

Koen Willems started his career in 1998 with Lernout & Hauspie as a project manager in the Consulting and Services division. More recently, he joined Toshiba as a Product Marketing Manager for the Benelux and, later, for the European market. In a total of six years, Koen contributed to all of the major Toshiba Retail IT product releases. Mr. Willems is, currently the Market Director for Government and Defense for Newtec, a Belgium-based specialist in satellite communications.

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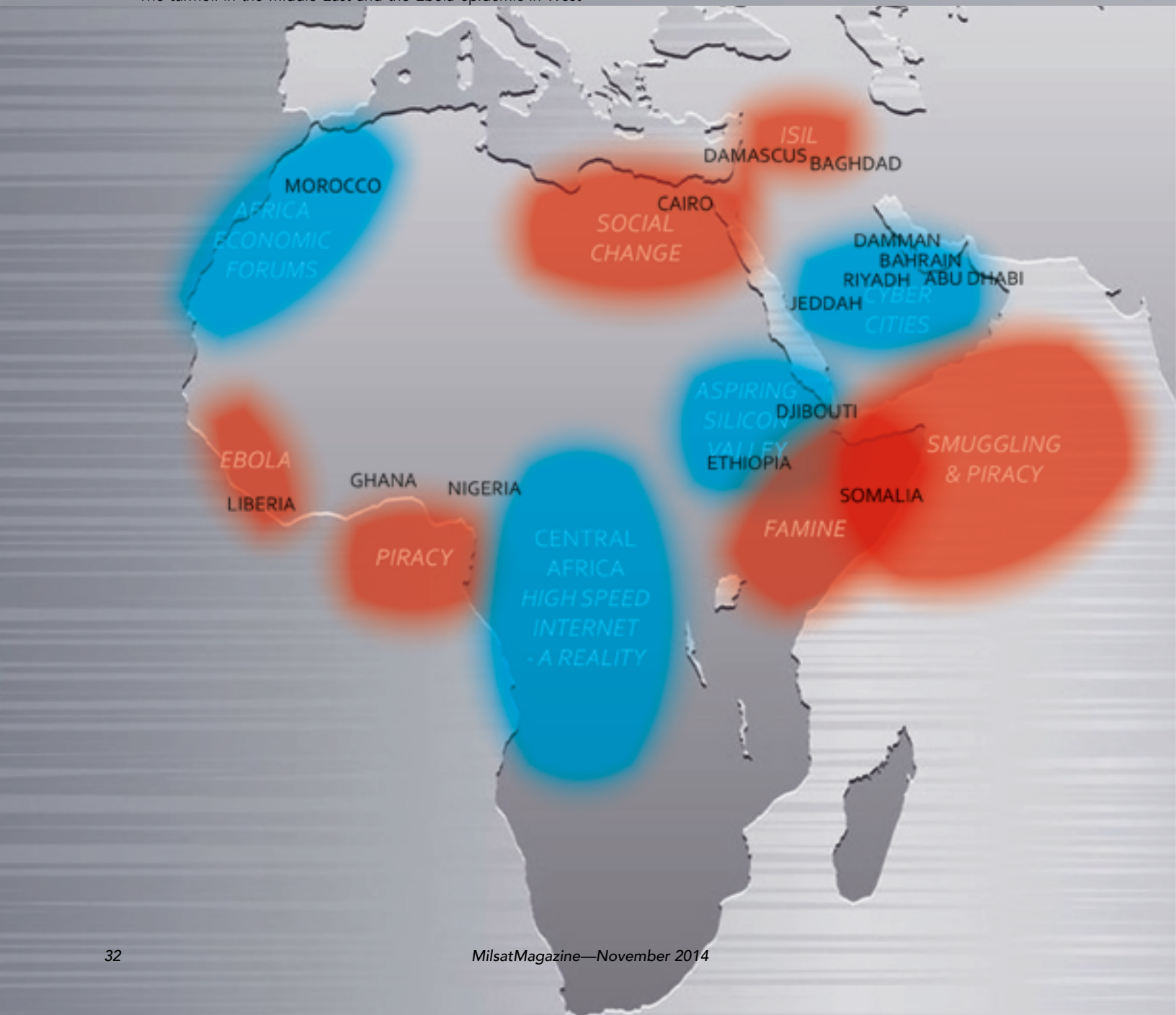
THE EMERGENCE OF SECURE COMMS IN THE MIDDLE EAST + AFRICA

By Scott Davis, Senior Director of Engineering, MTN Government

The news coming out of the vast region encompassed by the Middle East and Africa is grim and often conveyed in the shorthand of a single word: Ebola, ISIS, Hamas.

The medical, social and political challenges faced by governments in the region seem overwhelming. Yet, nothing is more critical for officials dealing with these myriad challenges than having secure and reliable communications with the world outside their borders. The turmoil in the Middle East and the Ebola epidemic in West Africa present their own individual communications challenges and requirements. Common to both, however, is the need to safeguard the integrity of mission-critical information from interference, malicious actors and targeted attacks.

MTN Government (MTNGOV) offers the highest security and efficiency as well as seamless transitions between multiple satellites ensuring consistent connectivity. Our goal is to provide these regions with the confidence that their communications are protected.



Africa

The African continent is one of the least-connected regions of the world. With the exception of a few urban coastal areas, the continent lacks the fiber and cable infrastructure that most of us take for granted. There are undersea cables on the coastlines, but terrestrial infrastructure, except in South Africa, does not exist in the interior of the continent.

With the spread of the Ebola epidemic, the demand has soared for high-bandwidth applications such as telemedicine for acute care, particularly tele-ICU. Not only is telecommunication necessary for treating patients, but parochial schools are looking into video conferencing as a way of extending education to sick children to avoid the spread of infections at school.

Today, satellite communications use standard and high-throughput VSAT capability to bring telemedicine, much needed telecommunications and distance learning capabilities into remote regions where there's no terrestrial telecommunications infrastructure. MTNGOV focuses on the continuity of operations through seamless connections and a range of options to meet secure voice, video and data requirements. The company uses global and regional VSAT solutions using C-, Ku-, and X-band services throughout Africa.

MTNGOV's first priority in Africa is to provide a secure global network infrastructure with a private terrestrial backbone to give users the foundation, confidence and control to exchange critical, time-sensitive information.

Middle East

Governments in the Middle East embattled by militant extremists are looking to create centralized, dynamic intelligence collection capabilities so they can systematically gather and share security reports and possibly resources with allied nation states. Business and governments in the regions need to be protected from outside threats by merging cyber and physical security. MTNGOV's role is to facilitate intelligence, security risk management and protected environments.

The Middle East may benefit by implementing Redeployable Secure Operations Centers (RSOCs). RSOCs are scalable, portable and can be outfitted for different applications, such as a communications facility or data center. With such communications tools in place, this allows MTNGOV the ability to engineer a full end-to-end solution including the space segment, ground segment, teleports, management and equipment. The flexibility of RSOCs allows Middle Eastern governments to customize solutions according to their individual needs, allowing secure and modular options for all protected communications.

True Capabilities

Africa and the Middle East regions provide MTNGOV the opportunity to expand and exceed the ever-evolving security needs in disease-stricken and unsecure areas. As a respected leader in satellite communications, cybersecurity and integrated ISR solutions, customers and partners can agilely push the limits of their capabilities.

Our role not only provides a high-level network of communications operations, but provides secure, global SATCOM connectivity. It is made possible in part due to our privately owned teleports located in Santander, Spain, and Holmdel, New Jersey. The combined utilization of both teleports provides complete coverage of the Middle East and Africa as well as North and South America with a seamless mixture of C-, Ku- and X-band satellite assets.

MTNGOV's RSOCs were designed for exchanging classified information in almost any location. RSOCs are ruggedized, scalable and can be shipped and erected as remote data centers, information clearinghouses or command centers.

As various U.S. government missions are requiring more and more personnel to become mobile, our industry is providing better communication assets that are smaller, lighter and more powerful for expected bandwidth deliverables. Having an agile, innovative culture, with secure solutions and a customer focus, allows MTNGOV to forge strong partnerships that result in high-quality, smart-value solutions, anytime and anyplace.

Understanding the convergence of secure global communications, physical and cyber security, MTNGOV has the infrastructure and staff expertise to help the U.S. government and allied nations implement secure end-to-end communications networks.

The MTNGOV infosite:
http://www.mtngov.com/

About the author

A retired United States Air Force Master Sergeant, Scott Davis has more than 27 years of communications and military experience, with specialized SATCOM and systems engineering management expertise. He spent 13 years at the White House Communications Agency as a senior SATCOM engineer, responsible for ensuring the agency had 24x7x365 global spectrum and network availability.

Mr. Davis currently leads MTNGOV's engineering team in all aspects of end-to-end system design for stabilized and mobile VSAT platforms deployed worldwide. He leads the development of technical solutions for RFPs to ensure technical recommendations meet and exceed customer requirements. Davis also oversees the network engineering team, optimizing satellite and terrestrial networks for government customers, using industry best practices.

COMMAND CENTER: PHILIP HARLOW, PRESIDENT + CHIEF OPERATING OFFICER, XTAR

As the President and Chief Operating Officer, Philip Harlow is driving XTAR's business and operational growth to fulfill the company's strategic mission.

Mr. Harlow focuses on creating new business opportunities while maintaining the company's competitive positioning at the forefront of the government, military and civil satellite communications business. As leader of the management team, Mr. Harlow has developed new company and performance objectives and is accountable for all of XTAR's critical engineering, operations, marketing and sales initiatives.

Mr. Harlow honed his management skills at DRS Technical Services as Vice President of Engineering and Technology, leading their satellite, terrestrial and enterprise network development. Previous to this position, Philip led engineering, business development and sales engineering for several satellite operators serving customers worldwide. Prior to XTAR, Mr. Harlow was Chief Technology Officer for CapRock Communications where he drove all aspects of engineering, IT, infrastructure development, new product management and strategic planning.

Mr. Harlow holds an honors degree in electronic systems engineering from the Royal Military College of Science and an MS in systems engineering from George Washington University.

MilsatMagazine

Mr. Harlow, please describe the overall role MILSATCOM plays within mobile communications for the military. What role does X-band play within this environment?

Philip Harlow

Over the past decade, data has become a critical force multiplier in military operations with users demanding ever faster broadband speeds to smaller and more mobile terminals. Between advances in the performance of users terminals, and better utilization of satellite bandwidth, providing broadband speeds to mobile users has become increasingly more cost effective.

Operators of Fixed Satellite Services (FSS) satellites, which have traditionally utilized an infrastructure model—that is, fixed sites set for long-term use—are transitioning to meet this demand for increased mobile services.

In addition, we've see an accelerated across-the-board move from traditional Mobile Satellite Services (MSS) use as the predominant satellite service for mobile users, to a pervasive broadband culture, with ever-increasing data rates.

Commercial FSS satellite operators need to provide the necessary bandwidth support wherever our military forces are operating around the world. Ku-band and Ka-band, although widely adopted to serve mobile applications, have a couple of inherent technical challenges. For example, rain fade issues will continue to plague both frequency bands, and once more Ka-band satellites get to orbit, we'll see the same issues with adjacent satellite interference as we do today at Ku-band.

In comparison, commercially available X-band, such as XTAR delivers, does not suffer from either of these technical handicaps. I predict that the use of commercial X-band to serve the mobile government user will accelerate as decision-makers experience the enormous benefits available from X-band. Certainly, XTAR has been enjoying enormous success supporting mobile users over the past couple of years.

MilsatMagazine

If demands for increased network capabilities translate into growing reliance on satcom, how can the military meet those needs?

Philip Harlow

The broadband satellites that are being manufactured for the military, Wideband Global SATCOM (WGS) as an example, are not well suited to support the communications requirements of growing mobile networks. With few exceptions, the X-band on those systems is currently utilized mostly for static sites—a misuse of the great versatility of X-band, in my opinion—while many military users are pinning their hopes on the military Ka-band spectrum they have on their satellites. The newcomers to the FSS marketplace, who are bringing vast quantities of Ka-band (both military and commercial variants of Ka-band spectrum) are spending a great deal of time trying to sell their product to the Department of Defense (DoD) to fill this need.

I believe that Ku-band will continue to fill a need, but find a more comfortable home serving more established, static network applications, where larger antennas are acceptable, and star and mesh network topologies are more prevalent.

The real unknown factor is the status of the unmanned aerial vehicles (UAV) fleets. Today, their communications packages are based almost exclusively on Ku-band—really the only solution available at the time those platforms were designed—but the future could see a migration to Ka-band. That migration is not a cost-free undertaking—changes of scope on programs-of-record are seldom inexpensive—so use of Ku-band for these platforms could continue for the medium to long-term.

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How do you believe the DoD will deliver communications capabilities into the future? Where do commercial operators come into play?

Philip Harlow

We've heard from several military leaders that commercial satellites are an integral part of the architecture for military satellite communications needs. One would assume that this means that commercial capabilities are being taken into account when military planners look at their fleet replacement strategy over the next five to 10 years. The industry hasn't seen this in any official form, yet, but it is clear that commercial satellites will continue to play a significant role for the military for many years to come.

Let's examine this. To use their own satellites constellation, DoD would need to retrofit the communications packages on the UAV fleets to a military frequency. The likelihood of DoD gaining access to orbital filings at Ku-band is practically zero, as commercial operators are unlikely to give up such valuable real estate rights. Perhaps more significant, the DoD would have to put many additional satellites into orbit, or very large satellites, perhaps High Throughput Satellites (HTS), to accommodate the number of active UAVs in addition to supporting current operational data networks.

Nevertheless, to rely on commercial satellites for such a critical mission would require DoD to acknowledge that commercial satellites are key partners in the architecture, and force a positive statement to that effect. A true partnership and collaborative effort would be required between DoD and the commercial satellite operators, however this potential partnership currently lacks formal DoD support in the form of an official architecture.

MilsatMagazine

What are the most important mobile communications technologies for the military end-user?

Philip Harlow

What drives the need for mobile connectivity in the battlefield are the increasing number of applications that are proving useful, even critical, for those military personnel deployed across the globe. Mobile communications has come of age over the past

decade, particularly evident with the real-time intelligence, including video and sensor data that UAVs have made readily available and necessary for the military to conduct their missions.

The desire for more applications, and the increased use in mobile environments will continue to drive demand, allowing satellites to play a significant role in providing the connectivity for mobile users. This is already having a dramatic impact on terminal manufacturers and on commercial satellite operators. Current terminal innovations are smaller and lighter to support the mobile user. They are using less power, and are achieving higher and higher data rates. Modems are getting better and better at coding and modulation. All of this has resulted in higher adoption of mobile terminals, which is in turn driving the need for more appropriate bandwidth for mobile users.

Satellites capabilities are expanding exponentially with more powerful transponders that utilize greater bandwidth with the ability to provide service into smaller terminals with greater efficiency. Both satellites and terminals have a ways to go before users can carry a mobile terminal on his shoulder and have always-on broadband communications, but innovations in terminal mobility have already witnessed significantly strides from just five years ago.

The applications in use, and those coming into use, need to increase resiliency to integrate satellites as the main communications path. Latency, interference, blockage and weather can cause dropped packets or loss of connectivity, either instantaneous or for longer periods of time. These applications need to be able to cope with the operating environment in which they will be used, without imposing restrictive limits on their effectiveness.

MilsatMagazine

How do you think the DoD can address the lack of Ku-band to meet the growing UAV demands?

Philip Harlow

If you ask the Ku-band operators, I think they will refute there is a shortage of Ku-band capacity to meet these needs, now, or in the future. The major Ku-band operators, as well as many regional players, are replacing their older satellites with much more capable units. In every case, we see an increase in the numbers of transponders and greater coverage areas at higher power and commercial operators have never failed to rise to the challenge, to bring effective capacity to bear when and where needed.

The issue is the uncertainty of DoD requirements, which are often short-term in nature and procured over congested regions at short notice. This means capacity is in short supply at a greater expensive. With a little planning, there should be no shortage of appropriate capacity at Ku-band, particularly as we withdraw forces from Afghanistan and the transponders used to support those troops are reallocated to UAV missions running on Ku-band.

However, if you want to assure that Ku-band will be available at the right place, at the right time and at reasonable costs, then DoD has to work more closely with the satellite operators. Often DoD states that they already do this, but I can attest that the relationship is often that of user and supplier. There is little real collaboration that would enable the commercial satellite operators to plan effectively. The legwork that is needed to coordinate with other customers, to groom transponders and to get capacity available in beams where there are multiple users cannot be done in a vacuum.

The Pathfinder initiatives, spearheaded by the Air Force Space and Missile Systems Center (SMC), are a step in the right direction with the desired outcome to test contracting and operational mechanisms to improve the collaboration between the commercial industry and the DoD user base they serve.

Pathfinder 1 was the procurement of Ku-band transponders until end-of-life of a satellite over North Africa. This has proven a huge success enabling cost-savings with prices 75 percent less than standard procurement practices.

Pathfinder 2 is in the works and focused on procurement of pre-launch transponders. If the request for information (RFI) is anything to go by, we can expect several additional pathfinders in the future.

Comparing X-band to Other Frequencies

Frequency Band	C	X	Ku	Ka	Mil Ka
High Availability (99%)	✓	✓			
High-Throughput from Small Antenna		✓	✓	✓	✓
Extraordinary MHz-Mbps Efficiency with Small Antenna		✓			
Low Probability of Interference		✓			✓
Available to Commercial Applications & Users	✓		✓	✓	

These pathfinders will help, but we will still need a shift within DoD in their relationship with the commercial operators to view them as more than simple vendors, but as trusted partners, with both satellite operator and DoD user equally vested in the success of the mission. We still have a long way to travel on that road.

MilsatMagazine

What special advantage in mobile communications does X-band provide to the end-user?

Philip Harlow

X-band is a particularly interesting frequency band. It is designated by the International Telecommunications Union (ITU), a United Nations Regulatory Authority that is responsible for international frequency band allocations for all satellite systems, for use exclusively by governments worldwide. Each country decides how to utilize this band.

For many western countries, the regulatory authorities (in the case of the United States, the Federal Communications Commission) further restrict the use of X-band for the military. In other countries, such as New Zealand, the frequencies are used for cellular backhaul or, as in Germany, for microwave terrestrial telecommunications links. Users are government only, which means more stable and secure control over the spectrum.

There are a number of technical performance advantages from X-band. Most notably, X-band suffers very little rain attenuation, a function of the specific operating frequencies—it simply performs well in poor weather conditions that would adversely affect all Ku-band and Ka-band links.

Another key difference from X-band's commercial counterparts is that there are few adjacent satellites—those that are nearby are at least 4 degrees away. This means there is little to no adjacent satellite interference and less noise, so links perform better. The remote antenna size can also be smaller, often much smaller than Ka-band could effectively use. A smaller antenna results in a larger beam width meaning that a smaller antenna has the potential to spread its signal to adjacent satellites more easily. However, with no adjacent satellites, or satellites spread further apart than most Ku- and Ka-band systems, X-band terminals can operate free of this limiting factor.

MilsatMagazine

With potential for X-band orbital slots around the globe, what do you think needs to happen to see countries taking more advantage of this resource, either nationally or commercially?

Philip Harlow

As the resource is limited to government use only, I see little exploitation outside of a small, select number of countries and commercial companies. In this, I am totally aligned with many in the military who have no desire to see this frequency band awash with more satellites. A number of technical and coordination challenges would be introduced that the frequency band currently avoids. If X-band were as congested as Ku-band is currently, and as Ka-band is going to become, it would lose a large part of its value proposition as well as many of its technical advantages.

Where I do see an opportunity to exploit X-band further is in the introduction of HTS-like satellites at X-band. This would mean more capacity in the sky while maintaining the separation between satellites and the exclusivity for government users.

MilsatMagazine

What do you foresee as the future for X-band?

Philip Harlow

When I talk with some counterparts of DoD, there is a significant reluctance to see the frequency band exploited further. However, there is no doubt that the message is getting out there. We see increased interest among the technical and cost advantages that can be realized in X-band. If DoD would get behind XTAR, we would be able to save DoD a lot of money and improve performance significantly for all users.

DoD is banking on military Ka-band to support all its future mobility needs. I don't believe that this is the right approach. X-band has shown itself to be so efficient at serving mobile users, I would advocate for an increase in the amount of commercial X-band being made available to the military, particularly to those whose applications are mobile in nature.

Ka-band is much more suited to point-to-point applications where the antenna sizes can be optimized and factors such as rain-fade can be accounted for in performance analyses. If we turn the current thinking on its head, we would find a large number of customers better served by X-band for mobile applications, and static applications would be well served by Ka-band. In the long run, I believe this is a more logical and technically sound approach.

I see a very positive future for X-band, and particularly for the commercially available X-band that XTAR provides. XTAR is planning expansion into the Pacific region in the near- to medium-term future, as political instability and the potential for natural disaster threaten the region, as well as a desire to operate globally by several of our current and prospective customers. We see users extremely concerned about the potential impact on Ka-band services due to the atmospheric conditions prevalent in that region— X-band represents an excellent alternative for them.

For information regarding XTAR, please visit:
http://xtar.com/

THE HPA CORNER: MATURING THE PAYLOAD FOR HOSTED PAYLOAD SUCCESS

By Al Tadros, Vice President, Civil and DoD Business, Space Systems/Loral (SSL)

NASA is leading the way to success with its approach to working with industry to fly payloads on commercial satellites.

In its efforts to reduce costs, access space more frequently, and benefit from commercial advances, NASA has partnered with industry (including members of the Hosted Payload Alliance) on programs that will benefit from sharing resources with a commercial satellite.

What sets NASA's programs apart from other hosted payload efforts is its deliberate timing of development to accommodate the fast pace of commercial manufacturing schedules.

For two current programs, NASA Goddard's Laser Communications Relay Demonstration (LCRD) and NASA Langley's Tropospheric Emissions: Monitoring of Pollution (TEMPO) mission, the agency is maturing its payload technology, including ground systems, well in advance of selecting the commercial satellite host. This forward looking approach includes working with industry early on to develop the interfaces that will enable the instruments to easily ride on a typical geostationary satellite.

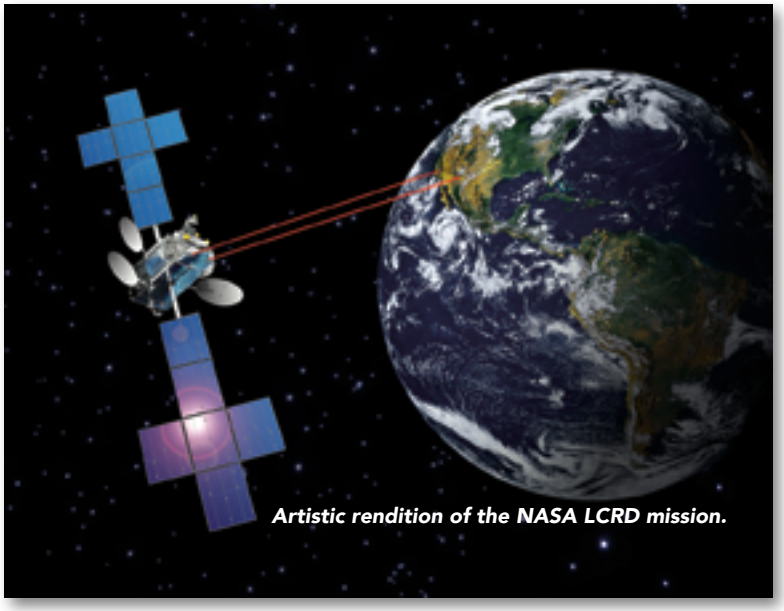
SSL has been working with NASA Goddard's LCRD team since 2012 to develop the technical requirements and engineer the payload interfaces to be integrated with the SSL 1300 satellite platform. As the design for accommodating the payload is finalized, NASA is conducting ground technology validation testing and SSL is working with its commercial satellite operator customers to identify the host satellite for the demonstration, expected to launch in 2018.

The TEMPO instrument, which will measure pollution over North America, is planned for completion in 2017 and will share a ride on a commercial satellite as a hosted payload. NASA Langley has already selected three U.S. satellite manufacturers to study ways to accommodate the observatory on their GEO platforms, well in advance of selecting the actual host mission.

NASA has set a clear path to overcome the schedule mismatch issues that are often a concern for those considering hosting of new payloads under development.

Developing and qualifying the payload in advance to retire the risk of manufacturing the payload on a flight program with a firm launch date is one more step toward alleviating schedule concerns for hosted payloads.

Note: HPA is now an official Association Partner of SATCON. The event was held November 12-13, 2014 in New York City. During the show, they conducted conversations with key government officials to discuss what goes into the Assessment of Alternatives (AOA) when it comes to developing next generation architectures and how industry can best inject its innovative thinking. The session was presented in partnership with HPA. HPA info available at: ***http://www.hostedpayloadalliance.org/***



Artistic rendition of the NASA LCRD mission.

The TEMPO instrument will be aboard a commercial satellite as a hosted payload in 2017.

SatFinder

Satellite Database & Calculation Software

DATABASE

Information on over 500 satellites (orbital location, frequencies, EIRP, G/T, SFD, bandwidth, programming etc.)

Information on 9,000 companies (address, tel, fax, web, products, services and contact names etc.)

Information on 19,000 executives in the commercial satellite industry.

800 hundred EIRP, G/T & SFD maps in color not published anywhere else.

CALCULATION

Has full up-down digital link budget calculators with input provision for uplink power control (UPC), ALC, various interferences and multiple carriers.

Finds HPA size, uplink power requirements, bandwidth and power usage per carrier.

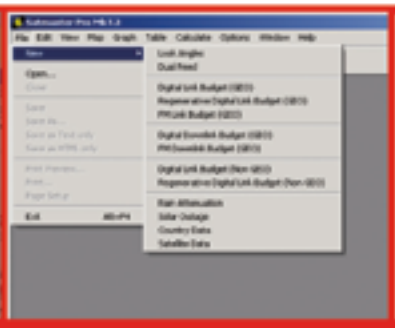
Calculates atmospheric losses and rain fade margins for any desired availability on uplink and downlink.

Handles BPSK, QPSK, M-PSK or M-QAM with any FEC code rate.

Determines power or bandwidth limited modes and calculates the power equivalent bandwidth, if appropriate.

Provision for RS codes or 'Turbo' modems. Option for rain up AND rain down scenarios where uplink and downlink are from/to the same city.

UPDATED QUARTERLY!



http://www.satnews.com/satfinder

COMMAND CENTER: CHRIS HUDSON, SENIOR SOLUTIONS ARCHITECT, INTELSAT GENERAL CORPORATION (IGC)

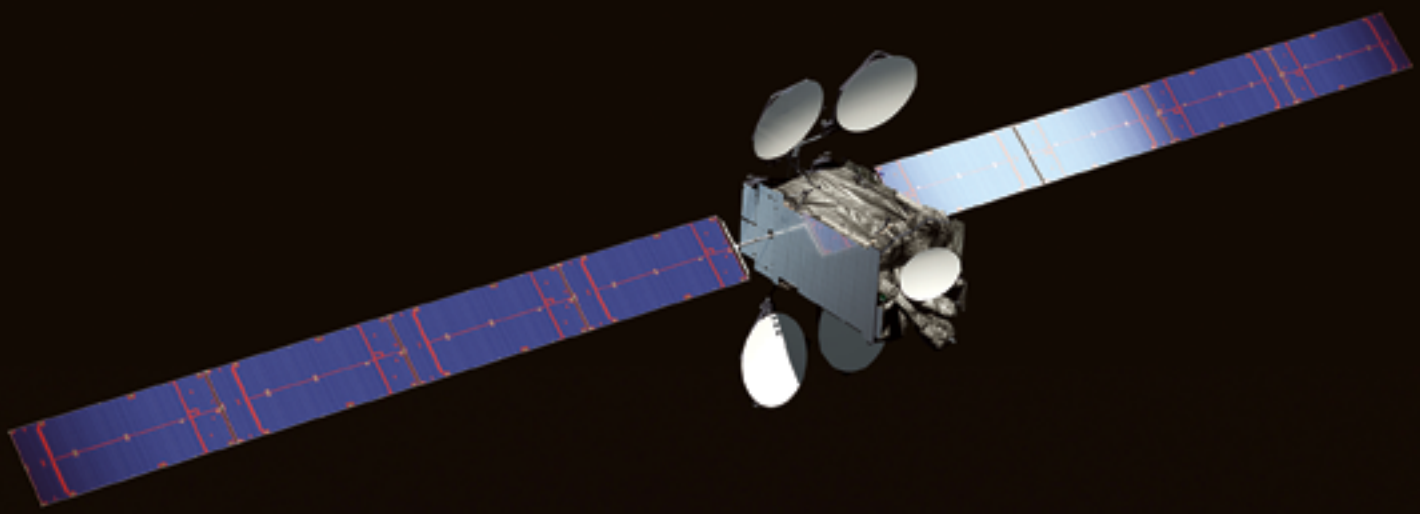
Chris Hudson is the Senior Solutions Architect Engineer at Intelsat General, and MilsatMagazine offers his in-depth expertise regarding the company's various, upcoming Intelsat Epic^{NG} projects, and his successful career.

MilsatMagazine

Mr. Hudson, given the technical expertise you bring to Intelsat General, many of our readers would be interested in learning about your background—how did you decide to enter the engineering field and, then, what drew you to Intelsat General Corporation?

Chris Hudson

Even though I was an Engineering Physics major in college, I co-oped and later worked full time building satellites at Hughes Space and Communications Group (now Boeing Satellite Systems). I moved back east and worked at Spacenet, ComSoft



Systems (now iDirect), and, for the past 17 years, at Intelsat and Intelsat General.

MilsatMagazine

How did you become involved with Intelsat's Epic^{NG} satellite projects?

Chris Hudson

Intelsat Epic^{NG} satellites are being designed, built and launched by IGC's parent corporation, Intelsat. I explain to IGC's customers how Epic^{NG} is radically different from existing satellite designs and why this is important to their applications and needs.

MilsatMagazine

Please tell us about Intelsat Epic^{NG} and the development of this High Throughput Satellite (HTS) system, as well as the role Boeing plays.

Chris Hudson

Intelsat Epic^{NG} represents a major satellite design breakthrough for increased throughput and efficiencies. This satellite system is the next step in the progressive evolution of our company's leading, global satellite and terrestrial infrastructure.

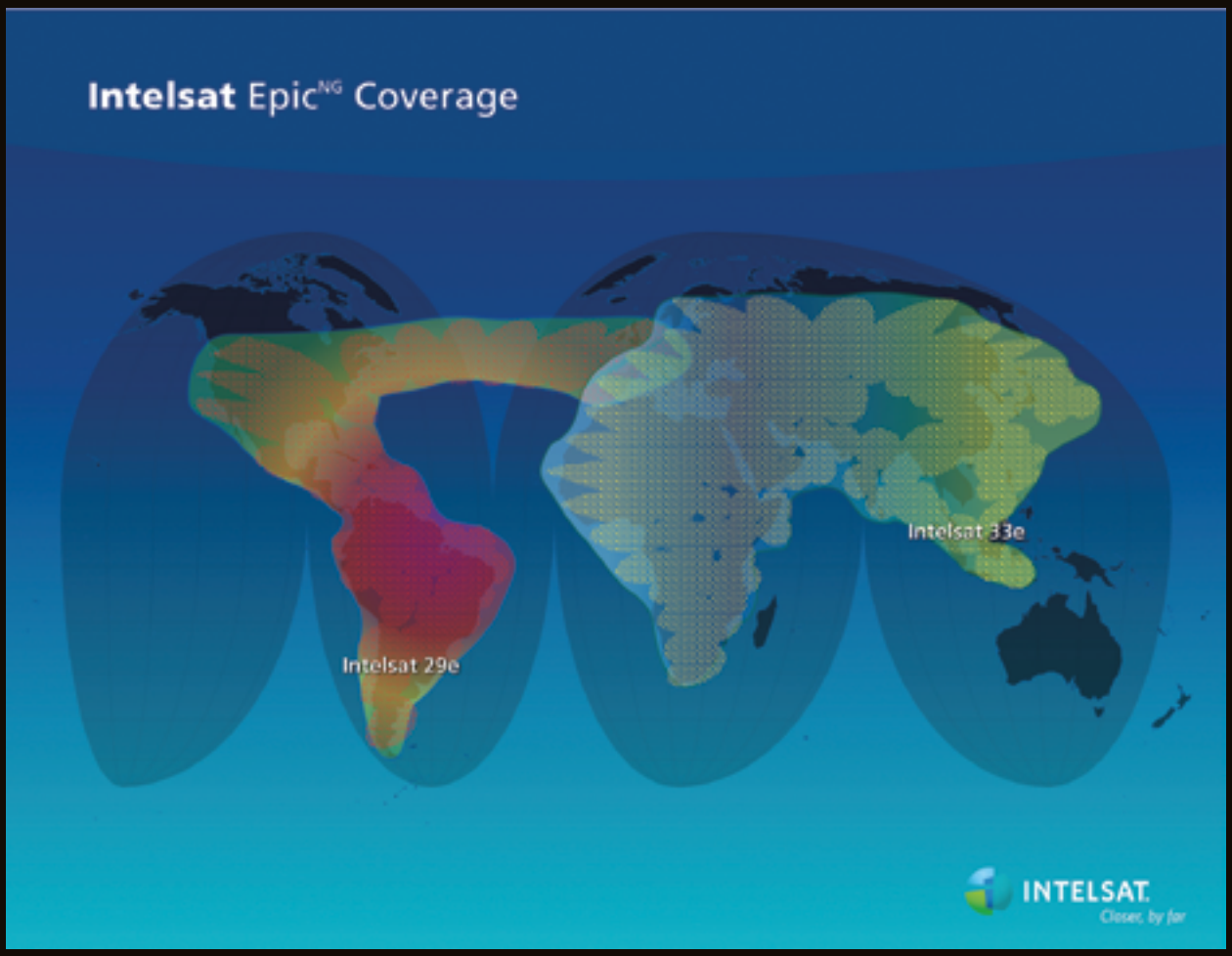
Epic^{NG} incorporates C-, Ku- and Ka-band spot beams with unprecedented flexibility in beam-to-beam connectivity. Epic^{NG} payloads deliver more throughput per unit of spectrum, providing technical and economic benefits for a wide range of satellite communications applications. Connectivity is provided between all beams and can be changed in orbit to meet our customers' evolving needs. For government customers specifically, airborne ISR is a primary application. Boeing will manufacture six of the first seven Epic^{NG} satellites.[1]

MilsatMagazine

How will the new Intelsat Epic^{NG} satellites outperform existing Ku-band satellites for AISR missions?

Chris Hudson

Due to the tightly focused, small beam sizes, Intelsat Epic^{NG} satellites are quite sensitive to receiving signals from small AISR terminals (high satellite G/T). In the opposite direction, those focused beams provide powerful signals to the AISR terminals (high satellite EIRP). This enables AISR terminals to transmit and receive at data rates not possible before this. In addition, these high data rates are provided more efficiently; i.e., using less satellite resources.



Here is an example. With today's widebeam Ku-band coverages, a 45cm terminal can transmit 1Mbps and requires 5MHz of satellite resources to do so. On Intelsat Epic^{NG}, that same terminal—with no modifications—can transmit 3.7Mbps using only 4.8MHz, i.e., more throughput using less resources.

In addition, the Intelsat Epic^{NG} satellites will provide three to five times more capacity per satellite when compared to Intelsat's existing satellites and should provide a range of up to 25-60Gbps for transmissions. This throughput will be approximately 10 times more than traditional satellite fleets.

Lastly, the high-receive sensitivity and transmit power on the satellites will lead to multiple efficiency gains and bandwidth savings specifically for AISR terminals, compared to traditional Ku-band satellites. All of these characteristics will enable performance for existing Ku-band AISR terminals that will rival or exceed Ka-band performance on the government's Wideband Global Satcom (WGS) satellites.[2]

MilsatMagazine

One often stated generalization of HTS Ka-band concerns the challenge of rain-fade and the subsequent degradation of satellite signal. Several "experts" have stated that network optimization is simply not a solution to rain-fade—HTS Ka-band will never be the equal of HTS Ku-band in such weather conditions. How does Intelsat Epic^{NG} handle this issue?

Chris Hudson

Atmospheric rain, snow or ice will absorb radio frequency signals above 11GHz, and a Ka-band signal suffers more degradation than a Ku-band signal because it has a higher radio frequency. This becomes a win for Ku- if there is sufficient rain in the region. Both rain and adjacent satellite interference degradations vary greatly, depending on a customer's specific situation (e.g., satellite and terminal locations), so you can't really make generalizations.

MilsatMagazine

What does the improved technology mean for the U.S. military/ federal government? What makes it a valuable alternative that will meet their current and future demand?

Chris Hudson

The higher and more efficient data rates previously explained are two obvious benefits for the U.S. military / Federal government. The fact that these improvements can be realized using existing Ku-band assets is, possibly, an even larger benefit. Intelsat Epic^{NG} provides a path forward to more capabilities for the warfighter utilizing the government's existing knowledge base as well as the large investments in the existing hardware, training, and infrastructure.[3]

MilsatMagazine

As the DoD withdraws from Afghanistan and continues to lessen its demands for capabilities, do you see this lull in demand changing how much satellite bandwidth the DoD will need going into the future?

Chris Hudson

The DoD's theater of operations is changing and will likely continue to do so into the future. As a result, the demand is naturally shifting to areas such as Africa and southeast Asia. However, the increase in cyber threats in more contested space environments will probably drive an overall increase in requirements from the DoD. In addition, we also expect the demand for high-definition video transmissions from mobile platforms to drive higher bandwidth requirements.

MilsatMagazine

You have mentioned the advantages of using existing Ku-band hardware with the Intelsat Epic^{NG} satellites. Can you offer an example of the efficiency for a specific antenna in order that our readers may more fully understand the comparisons you make?

Chris Hudson

For 'increased performance', existing Ku-band terminals can transmit more Mbps. A good example, as referenced above, would be a 45cm aero antenna.[1] This terminal today can transmit 1Mbps maximum on widebeam Ku-band satellites (nominal, edge of coverage area). This speed will increase by more than 3X this rate to enable 3.7Mbps transmission from the same terminal on Intelsat Epic^{NG} (again, nominal, edge of coverage area).

Lower costs will also be possible because existing Ku-band assets will perform more efficiently on Epic^{NG}. With the same 45cm aero antenna example, 1MHz of satellite resources enables 0.2Mbps from the terminal today (5MHz is required for the 1Mbps transmission).

The improved performance for 1MHz of satellite resources will be 0.8Mbps from the terminal on Intelsat Epic^{NG} (4.8MHz will be required for the 3.7Mbps transmission). Costs and investments needed to use Intelsat Epic^{NG} will be lower than retrofitting Ka-band hardware onto the majority of airborne platforms using Ku-band.

Through its flexibility and open system architecture, Intelsat Epic^{NG} will enable the DoD to leverage deployed, Ku-band assets. In other words, the DoD can re-use its existing infrastructure that accesses Ku-band satellite resources. No purchases are necessary to access the new technology and performance of Epic^{NG} (e.g., no forklift upgrade to Ka-band).

In addition, no new training is required; a further savings by using the existing knowledge base among users. All of these factors will lower total cost of ownership for the government at a time when budget dollars are scarce and ISR applications need higher performance as quickly as possible.

MilsatMagazine

Would you explain the market demand for enhanced Ku-band in Intelsat Epic^{NG}, as the industry seems to be so focused these days on the advantages and uses of Ka-band?

Chris Hudson

Intelsat Epic^{NG} High Throughput Ku-band satellites provide a means to meet ever-increasing data demands in an affordable way by leveraging the extensive Ku-band SATCOM infrastructure. Existing infrastructure includes both hardware assets as well as a widespread Ku-band SATCOM knowledge base.

My paper and presentation at MILCOM 2014, co-authored with Eric Hall of L-3 Communications Systems-West, detailed how Intelsat Epic^{NG} can provide performance and efficiencies equivalent to WGS Ka-band. A 45cm Ka-band terminal requires 7.7MHz of WGS resources to transmit a 10Mbps carrier. A 45cm Ku-band terminal, transmitting the same 10Mbps, requires 7.6MHz on Epic^{NG}.

MilsatMagazine

Security demands continue to increase each and every day—capable adversaries are certainly not going to lessen their aggressive tactics. Please explain how Intelsat General will address this issue with the new Intelsat Epic^{NG} system, especially as such relates to system interference and data transmission?

Chris Hudson

As the U.S. military moves into these other regions, the challenge of cyber security will increase significantly as more adversaries try to counter U.S. operations. The cyber and jamming challenges will force the military to focus on denying the adversary control of the area of operations, including the communications in that region. This concept, referred to as Anti-Access Area Denial (A2AD), has been a military priority for a long time and is even more important today with the explosive growth of cyber attacks on the critical communications architecture that the military must use to successfully achieve their missions.

The Epic^{NG} design inherently provides technology to meet these A2AD issues as well as a level of mitigation against interference, be it intentional or not. This is being discussed with communities of interest with the intent of developing a common understanding about what is provided today and what can be provided going forward.[4]

MilsatMagazine

What are the updated launch schedules for the Intelsat Epic^{NG} satellites?

Chris Hudson

Intelsat Epic^{NG}'s first satellite, IS 29e, is scheduled for launch and operation during the second half 2015. The second and third Epic^{NG}-class satellites, Intelsat 32e and 33e, will launch during the first half of 2016.

MilsatMagazine

With your work in the industry, as you reflect upon your past projects, what truly brings a sense of satisfaction to you?

Chris Hudson

I am an engineer. I like to make things work. My 'thing' turned out to be communications. Working in this area has brought me a great sense of satisfaction because communications has, and will continue to provide, so many benefits, to so many people, in so many ways.

Editor's note: The documents and their attendant URLs listed below fully explain in more detail Mr. Hudson's answers in this interview.

[1] **http://www.intelsatgeneral.com/resources/whitepaper/aisr-missions-intelsat-EpicNG-ku-band**

[2] **http://www.intelsatgeneral.com/blog/intelsat%E2%80%99s-EpicNG-ku-band-spacecraft-will-outperform-both-existing-ku-band-and-wgs-ka-band-sate**

[3] **http://www.intelsatgeneral.com/resources/whitepaper/why-ku-band-makes-most-sense-dod-over-next-few-years**

[4] **http://www.intelsatgeneral.com/blog/protected-communications-commercial-satellites**

THE FOCUS IS ON SURVIVABILITY AN IGC PERSPECTIVE

By Kay Sears, President, Intelsat General Corporation

As most know, General John Hyten took over the leadership of U.S. Air Force Space Command in August, succeeding General William Shelton, under whom he had been vice commander for two years.

Both men have displayed a keen understanding of how Air Force Space Command can take greater advantage of the commercial satellite resources available to the warfighter. We at Intelsat General are quite pleased to see General Hyten selected to follow in General Shelton's footsteps.

General Hyten is an engineering graduate of Harvard University and has spent his 33 year Air Force career working on technology and space challenges. His wide-ranging experience has given him a broad view of the issues facing Air Force Space Command as it seeks to protect America's ability to safely use space resources for communications and remote sensing.

He is a keen advocate of maintaining United States superiority in space and of the nation being able to provide space-based communications under any circumstances.

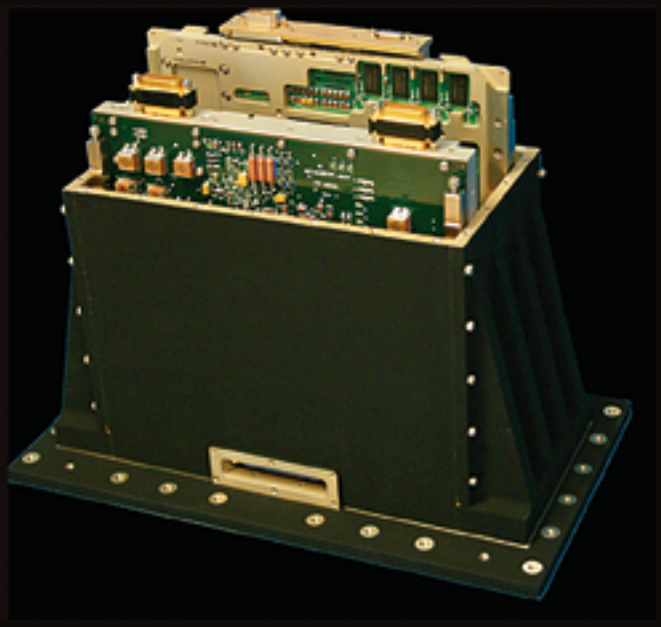
As General Hyten said in his recent speech at the Air Force Association's Air & Space Conference in mid-September, "We have to figure out how to fight through the challenges we face and still deliver the capabilities that our warfighters absolutely are fundamentally dependent on. We have to do that. It is our sacred responsibility."

General Hyten, Commander, Air Force Space Command. Photo courtesy of the U.S.A.F.

In that, and other speeches General Hyten has given in the past couple of years, he has focused on the military's need for a survivable space architecture, one that requires space assets to be "disaggregated" over a number of platforms, rather than concentrated on a handful of satellites.

His thinking on this topic has spread throughout the commercial industry, leading to increased interest in hosted payloads and other means of shifting important military requirements, including communications, to widely dispersed commercial satellites.

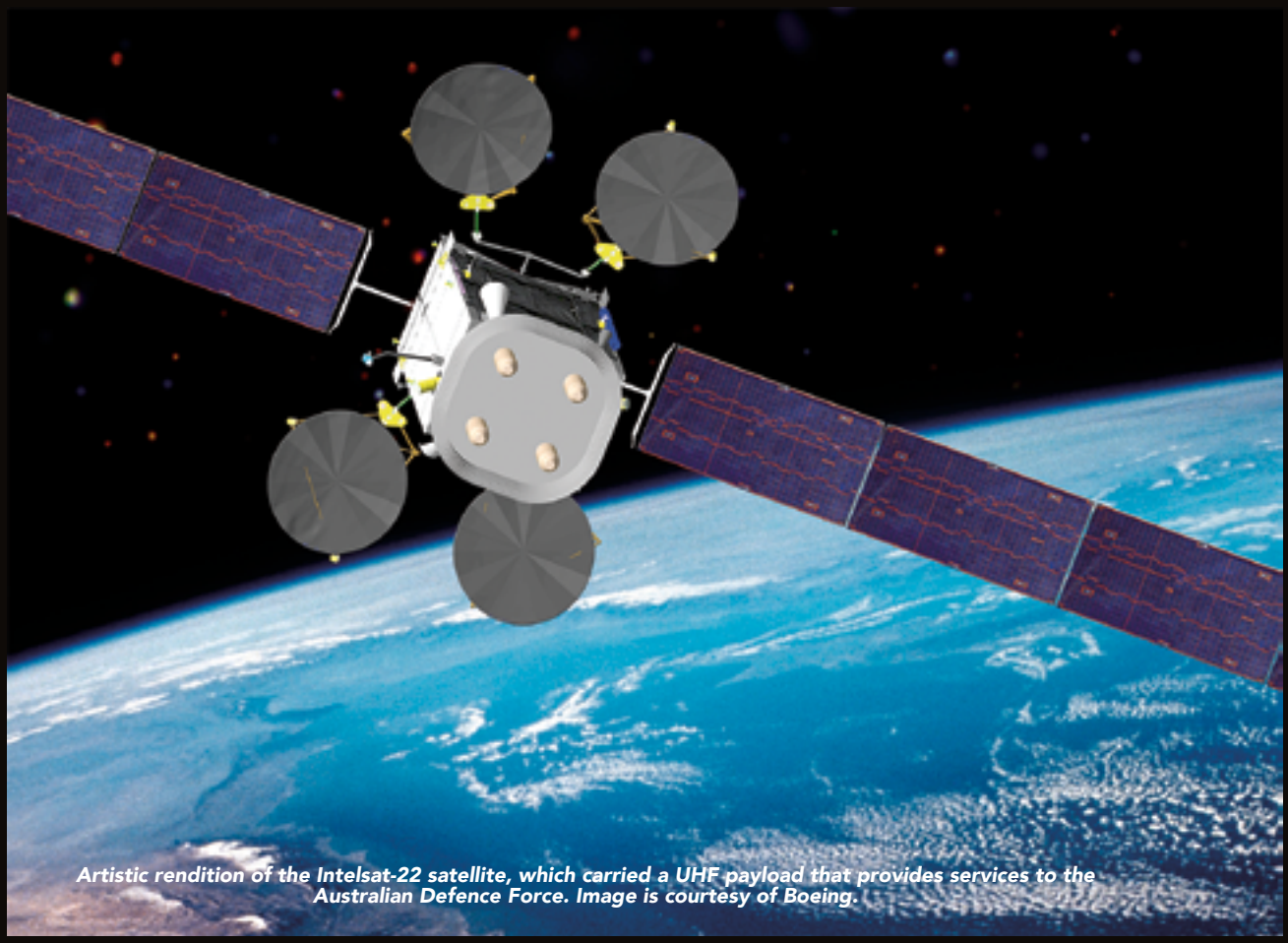
Intelsat General has been working on hosted payload concepts for years, starting with the Internet Routing in Space (IRIS) technology demonstration payload launched in 2009 for the Department of Defense (DoD) aboard the Intelsat 14 satellite.



The Cisco IRIS router, the payload aboard the Intelsat 14 satellite.

Commercial companies initially promoted the hosted payload concept as a means of economically delivering a capability to space. The Australian Defence Force (ADF) estimated that it saved $150 million by hosting a communications payload aboard Intelsat 22 in 2012, rather than building and launching its own ADF satellite.

Hosted payloads remain economical and their role in spreading government space assets over many satellites—disaggregation—has become important to the Department of Defense (DoD).



Artistic rendition of the Intelsat-22 satellite, which carried a UHF payload that provides services to the Australian Defence Force. Image is courtesy of Boeing.

As General Hyten said in his Air Force Association speech, "Resilience is made up of a number of things. Disaggregation could be a big piece of that, because right now we have a very small number of satellites on orbit and our adversaries know exactly where they are. If you know exactly where they are, then it's fairly easy to figure out how to deny the capabilities that comes off those satellites."

This concern led Air Force Space Command to create the Hosted Payload Solutions program, HoPS for short. In July, Intelsat General was one of 14 companies selected to bid on future HoPS contracts to build and launch Air Force payloads on commercial satellites.

The continuing pressure on federal spending has given General Hyten one of the toughest jobs in the military. He said recently in a published interview that he fears another round of across-the-board budget cuts "will break Space Command." While the Air Force can ground training flights to save money, Air Force Space Command can't just shut down a satellite constellation without a long-term impact on the global communications capability of the U.S. military and a very real impact to national security.

General Hyten is looking for ways wherein he can trim spending, and a recent request for studies of how commercial companies could take over some of the Air Force's ground-based satellite control operations provides an innovative example. Intelsat General was selected to participate in one of these studies.

However, as we have often said, the U.S. military still needs its own space capabilities for the most vital functions. Commercial companies, such as Intelsat General, can provide a portion of the satellite capacity, ground networks and other solutions necessary for crucial U.S. government communications.

General Hyten is a leader who knows what that commercial role should be—Intelsat General looks forward to working with him over the coming years in support of his efforts to maintain U.S. space superiority that is affordable and survivable.

The Intelsat General infosite:
http://www.intelsatgeneral.com/