SATCOM For Net-Centric Warfare – July / August 2017

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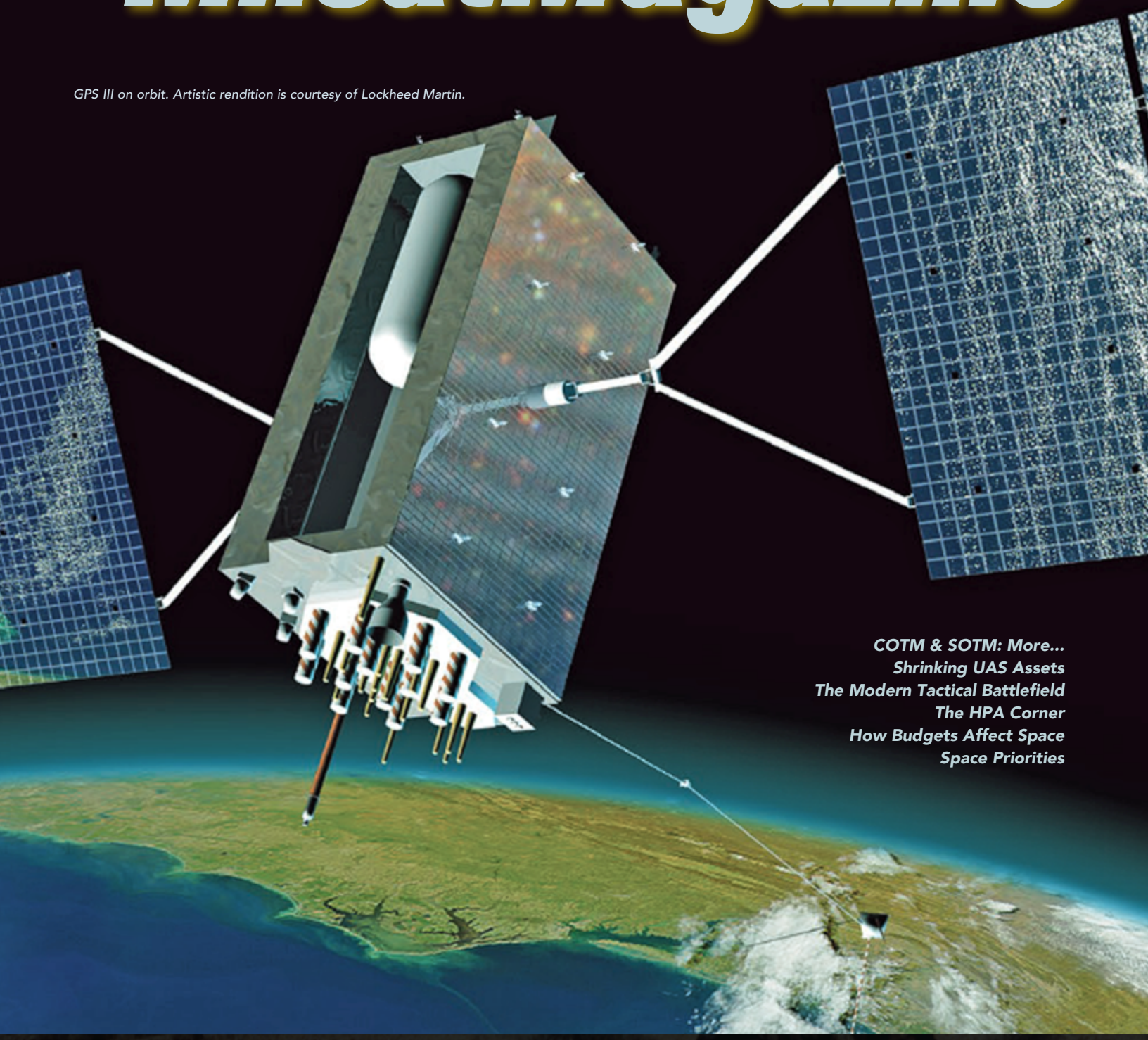

GPS III on orbit. Artistic rendition is courtesy of Lockheed Martin.

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KEYNOTE SPEAKER

Mark Dankberg
Chairman & CEO
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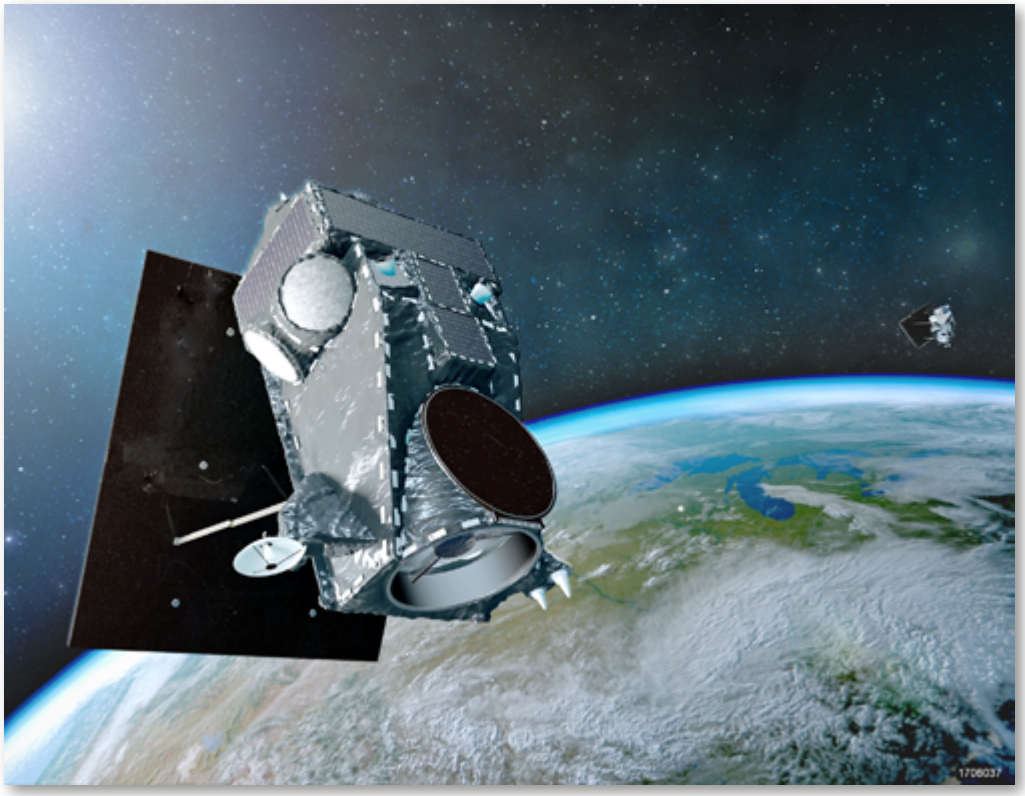
DISPATCHES

DIGITALGLOBE'S WORLDVIEW LEGION CONSTELLATION TO BE BUILT BY SSL



DigitalGlobe, Inc. has selected Space Systems Loral (SSL) to build the spacecraft for their next-generation WorldView Legion constellation.

The constellation will deliver industry-leading resolution and accuracy, enable high-revisit applications and assure service continuity for the company's customers through 2030.

SSL has entered into this firm-fixed price contract with DigitalGlobe to build the WorldView Legion satellites — the first of which is planned to launch in 2020 — to replace the WorldView-1, WorldView-2, and GeoEye-1 satellites. The WorldView Legion constellation will double DigitalGlobe's capacity to collect 30 cm and multi-spectral imagery starting in 2020.

Once combined with DigitalGlobe's existing WorldView satellites and the forthcoming Scout smallsat constellation, DigitalGlobe will image the most rapidly changing areas on Earth as frequently as every 20 to 30 minutes, from sunup to sundown.

These capabilities will provide even greater insights into global events of significance, giving customers the ability to make critical decisions with confidence when time is of the essence.

According to Dr. Walter Scott, DigitalGlobe's Founder, EVP & CTO, WorldView Legion represents DigitalGlobe's commitment to meet the demanding and evolving needs of a diverse customer base for many years to come, building upon the firm's excellent track record of performance, best-in-class satellites and ground infrastructure as well as a deep understanding of government mission needs and commercial applications. DigitalGlobe has great confidence in the quality, value, and reliability of the SSL spacecraft.

Richard White, the President of SSL Government Systems, noted that the award of this contract with DigitalGlobe demonstrates SSL's emerging leadership in building satellite constellations and Earth Observing spacecraft. DigitalGlobe is known as a global leader in advanced geospatial solutions and the company is pleased that they have placed their trust in the company's proven performance and state-of-the-art design for a fleet that will provide exceptional agility and persistence.

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DigitalGlobe's new Westminster, Colorado, headquarters. Photo is courtesy of DigitalGlobe.

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DISPATCHES

ENVIRONMENTAL TESTING IS NEXT FOR GPS III

In a specialized cleanroom designed to streamline satellite manufacturing, Lockheed Martin is in full production building GPS III — the world's most powerful GPS satellites.

The company's second GPS III satellite is now assembled and preparing for environmental testing, while the third satellite is close behind having just received its navigation payload.

In May, the U.S. Air Force's second GPS III satellite was fully assembled and entered into Space Vehicle (SV) single line flow when Lockheed Martin technicians successfully integrated its system module, propulsion core and antenna deck.

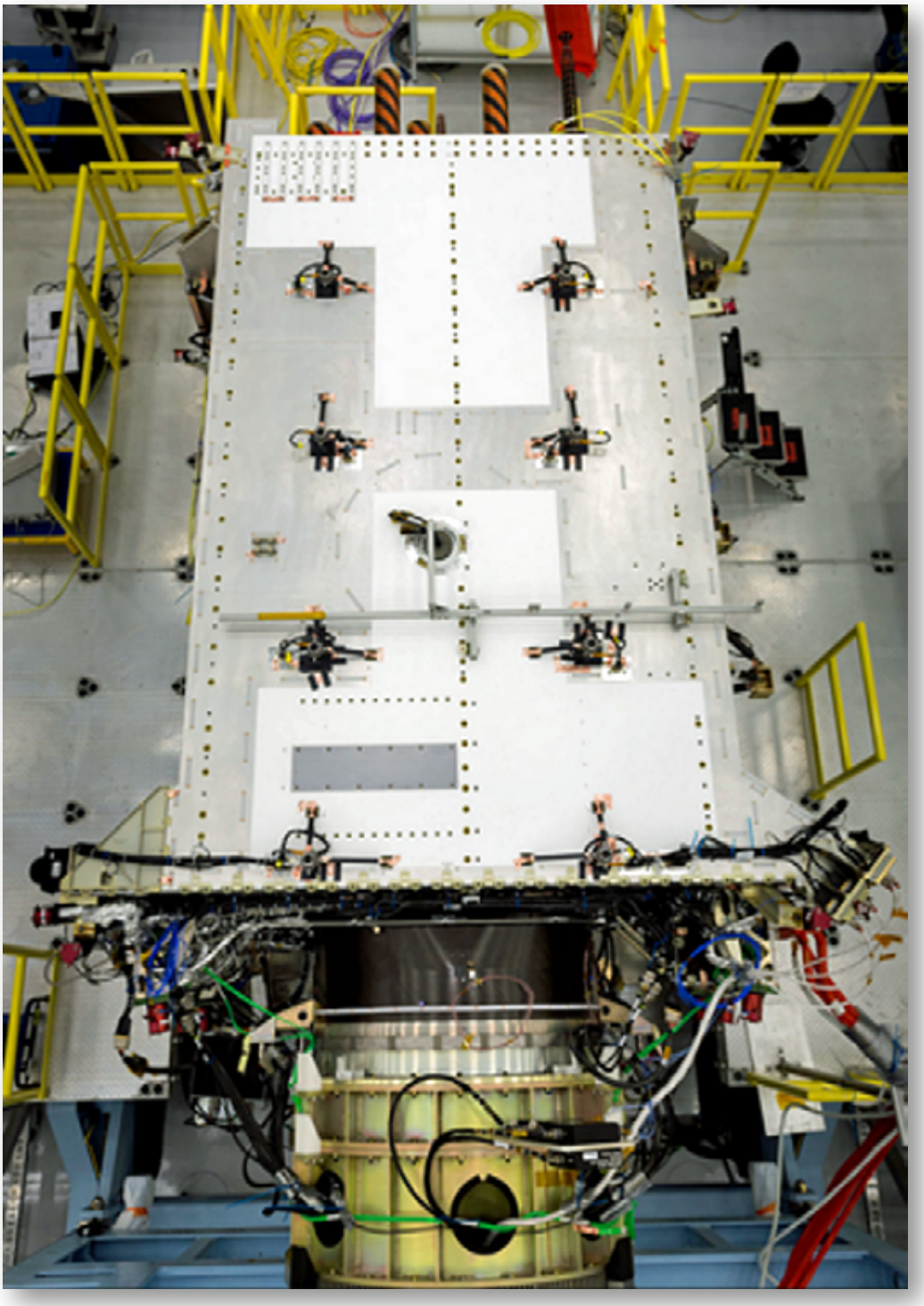
GPS III SV02 smoothly came together through a series of carefully-orchestrated manufacturing maneuvers utilizing a 10-ton crane.

GPS III SV02 is part of the Air Force's next-generation of GPS satellites, that have three times better accuracy and up to eight times improved anti-jamming capabilities.

Spacecraft life will extend to 15 years, 25 percent longer than the newest GPS satellites on-orbit today.

According to Mark Stewart, VP of Navigation Systems for Lockheed Martin, GPS III SV02 will begin environmental testing this summer to ensure the satellite is ready for the rigors of space.

This testing simulates harsh launch and space environments the satellite will endure, and further reduces any risk prior to it being available for launch in 2018.



First photo of the GPS III Space Vehicle #2, fully-integrated. Photo courtesy of Lockheed Martin.

Directly following GPS III SV02, eight more contracted GPS III satellites are moving through production flow at Lockheed Martin's nearly 40,000 sq. ft., state-of-the-art GPS III Processing Facility near Denver, Colorado.

GPS III SV03 recently completed initial power on of its bus, which contains the electronics that operate the satellite.

The company received SV03's navigation payload from its supplier, Harris Corporation, in May. After further system testing, SV03 will be ready for full integration later this fall.

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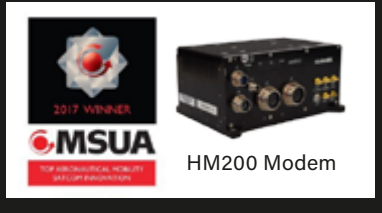


HM200 Modem

Lockheed Martin's GPS III processing facility. Photo courtesy of Lockheed Martin.

GPS III SV04's major electronics are being populated as it prepares for its own initial power on. This satellite's navigation payload is expected to arrive and be integrated into its space vehicle before the end of the year.

Components of the next six satellites, GPS III SV05-10, are arriving at Lockheed Martin daily from more than 250 suppliers in 29 states. To date, more than 70 percent of parts and materials for SV05-08 have been received. The company was placed under a production contract for SV09-10 in late 2016.

Investing in the Future of GPS III — GPS III satellites in the production process.

Photo is courtesy of Lockheed Martin.

All of these satellites are now following the Air Force's first GPS III satellite, GPS III SV01, through a proven assembly, integration and test flow.

SV01 completed its final Factory Functional Qualification Testing and was placed into storage in February 2017 ahead of its expected 2018 launch.

With multiple satellites now in production, Lockheed Martin engineers are building GPS III smarter and faster.

The key to their success is the company's GPS III Processing Facility, a cleanroom manufacturing center designed in a virtual-reality environment to maximize production efficiency.

Lockheed Martin invested $128 million in the new center, which opened in 2011.

The company's unique satellite design includes a flexible, modular architecture that allows for the easy insertion of new technology as it becomes available in the future or if the Air Force's mission needs change.

Already satellites based on this design will also be compatible with the Air Force's next-generation Operational Control System (OCX) and the existing GPS constellation.

The GPS III team is led by the Global Positioning Systems Directorate at the U.S. Air Force Space and Missile Systems, Center.

Air Force Space Command's 2nd Space Operations Squadron (2SOPS), based at Schriever Air Force Base, Colorado, manages and operates the GPS constellation for both civil and military users.

GPS III will ensure the U.S. maintains the gold standard for positioning, navigation and timing.

www.lockheedmartin.com

DISPATCHES

HONEYBEE ROBOTICS IS ACQUIRED

A long-standing company — 181 years, to be exact — has acquired Honeybee Robotics Spacecraft Mechanisms Corporation.

Honeybee Robotics Spacecraft Mechanisms Corporation has been acquired by Ensign-Bickford Industries ("EBI"), of Simsbury, Connecticut Honeybee Robotics will be a stand-alone, wholly-owned subsidiary of EBI and will complement EBI's current aerospace and defense subsidiary, Ensign-Bickford Aerospace & Defense ("EBAD").

Honeybee Robotics has been building advanced robotic solutions since 1983. Over the company's 34-year history, the firm has completed hundreds of projects for government agencies and private enterprise in the fields of planetary exploration spacecraft, spacecraft components and subsystems, medical technologies, flexible manufacturing, mining, and oil and gas. Honeybee will continue to serve these markets while gaining access to new resources and business expertise from EBI to power its growth. The company will continue to serve customers from facilities in Brooklyn, New York, Longmont, Colorado, and Pasadena, California.

Co-founder Stephen Gorevan said that Honeybee has been fortunate to develop robotic technologies for some of the most exciting missions in recent decades, and they have built a reputation for quality, reliability, and innovation in their work. Now they are thrilled to have a new corporate parent in Ensign-Bickford to usher in the next chapter of growth in spacecraft and robotic technologies. When his partner Chris Chapman and he started the company over 30 years ago, they could only dream of having such a partner with long-term vision and the business expertise to take their technologies to the next level.

EBAD serves as a prime contractor and supplier to most primes in the areas of space launch vehicles, satellites and spacecraft, missiles, and soldier systems. Honeybee Robotics will help to expand technology offerings to many of the same customers as EBAD, particularly with mission solutions for mechanisms, control, instrumentation, and robotic systems in space. Though both EBAD and Honeybee will operate as stand-alone businesses within EBI, the businesses will work together closely to develop advanced and innovative ways to meet customer needs and to create new, efficient solutions in the spacecraft and advanced robotics markets.

Brendan Walsh, President of EBAD stated that Honeybee has established impressive capabilities for high growth Satellite and Space Exploration markets. This is a great addition to EBI. Kiel Davis, President of Honeybee Robotics added that the timing is great.

www.ensign-bickfordind.com/

DISPATCHES

ADVANCED TACTICAL COMMS FOR GERMAN ARMED FORCES FROM ROHDE & SCHWARZ

Following many years of joint development, the Federal Office of Bundeswehr Equipment, Information Technology and In-Service Support (BAAINBw) has signed a contract with Rohde & Schwarz for the procurement of the SVFuA, which is an advance measure in the "Mobile Tactical Communications" (MoTaKo program for digitizing tactical communications within the German Armed Forces.

SVFuA operates on the principle of the software defined radio (SDR) and offers secure, trustworthy communications up to the classification level SECRET.

Rohde & Schwarz drew on their own in-house cryptology development as a key national technology. Initially, 50 command vehicles — PUMA infantry fighting vehicles (IFV) and BOXER armored transport vehicles (ATV) — will be equipped.

Rohde & Schwarz will produce and deliver the first installment of the overall SVFuA system by 2020. The contract's framework agreement allows the Federal Armed Forces to order additional SVFuA systems within a seven-year timeframe.

In 2009, Rohde & Schwarz was given the responsibility for the overall design and the overall system, as well as for developing a prototype base unit and proving that such could be series produced.

In 2016, the Federal Office for Information Security (BSI) confirmed that the requirements for certification at the classification level SECRET had been met.

Certification in line with the internationally recognized Software Communications Architecture (SCA) standard for SDR radio systems was a prerequisite for customer acceptance.

As the radio system was developed in line with the SCA standard, it is possible to port current and future national and international waveforms onto the radio system as long as these waveforms also meet the requirements set out in the SCA standard.

The SVFuA gives the German Armed Forces all the tools needed to create and especially protect information superiority and also ensures interfaces with allies during joint missions and for collective defense.

With the acquisition of the SVFuA, the German Armed Forces are taking the first step in modernizing its tactical communications within the framework of the MoTaKo program.

To support these projects over the long-term, Rohde & Schwarz has established a joint venture with Rheinmetall AG for the purpose of submitting a tender as a general contractor.

Hartmut Jäschke, the SVP of Market Segment Secure Communications Sales and Projects at Rohde & Schwarz, explained that with the SVFuA system, the German Armed Forces lays the foundation for state-of-the-art, future-ready, tactical communications. Rohde & Schwarz fulfills all of the customer's requirements for a scalable, reconfigurable, and future-proof overall system.

The company has demonstrated the implementation of current third-party waveforms on the software defined radio while preserving intellectual property rights, satisfying today's requirements for interoperability with partners.

Harald Stein,the President of BAAINBw, added that quipping the first PUMA and BOXER command vehicles with SVFuA is an important first step toward MoTaKo and with Rohde & Schwarz, a technologically-leading partner for this key modernization project has been found.

www.rohde-schwarz.com/

DISPATCHES

LEVERAGING NEW COLLECTION STRATEGIES FOR GEOINT

The second GEOINT and Open Source Analytics Summit, occurring on September 19 and 20, seeks to find solutions to the challenges promoted by the integration of open-source geospatial imagery with classified sources in order to provide the IC with the highest quality GEOINT data available.

Building on the success of last year's GEOINT & Open Source Analytics Summit, Defense Strategies Institute's summit provides a collaborative, open forum, where attendees will convene to discuss technological solutions and best practices that enhance the Intelligence Community's ability to process, exploit, and disseminate open source data.

This year DSI will bring together senior leaders within DoD, the IC, Federal Agencies and Industry and academia for two days of off the record briefings and informal discussions in Alexandria, Virginia. The Summit seeks to find solutions to the challenges promoted by the integration of open-source geospatial imagery with classified sources in order to provide the IC with the highest quality GEOINT data available. The dialogue will focus on this year's theme of "Leveraging New Collection Strategies to Enhance the Nation's GEOINT Capability."

Confirmed speakers include:

- *Dr. Anthony Vinci, Director of Plans and Programs, NGA*
- *Dr. Joseph Fontanella, Director, US Army Geospatial Center*
- *John Burkert, Director, Air Force GEOINT Office, U.S.A.F.*
- *Patricia Guitard, Deputy CIO, Senior Technical Advisor for OSINT & Office of the Deputy Chief of Staff, G-2, U.S. Army*
- *Col. Sean Larkin, USAF, Commander, NASIC*
- *Chris Rasmussen, PM, Unclassified GEOINT Pathfinder PM & Public Open Source Software Development Lead, NGA*

Seating is limited. In order to allow for actionable discussion and dialogue amongst speaker and attendees, seating will be limited.

For more information and to register for the 2017 GEOINT and Open Source Analytics Summit, please visit ***geoint.dsigroup.org/***

Satnews Publishers is the official media partner of the 2nd GEOINT & Open Source Analytics Summit.

DISPATCHES

FINAL RFP RELEASED BY U.S.A.F. FOR GPS III AND AFSPC-8 LAUNCH SERVICES

An Atlas rocket launches the launches the AFSPC-5 mission. Photo is courtesy of U.S. Air Force.

The U.S. Air Force released a final Request for Proposal (RFP) for an Evolved Expendable Launch Vehicle (EELV) Launch Service supporting the Air Force Space Command (AFSPC)-8, AFSPC-12 and GPS III 4-6 missions.

The draft RFP was released on May 3 to obtain industry feedback for the final RFP. After extensive industry engagements and Government reviews, the final RFP was released on June 29, 2017, with proposals due back to the Air Force no later than August 14, 2017 in accordance with the solicitation instructions.

The contracts for these missions are expected to be awarded in Fiscal Year (FY) 2018.

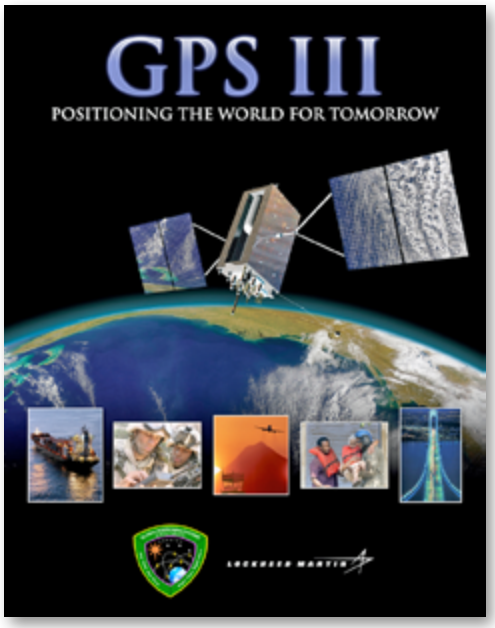
The Air Force will award multiple firm-fixed price contracts that will provide the government with a total launch solution for the AFSPC-8, AFSPC-12 and three GPS III missions.

Each award includes launch vehicle production, mission integration, and launch operations. If an offeror is awarded multiple missions, the Air Force will award one contract with that offeror to cover all awards.

The three GPS III missions will be awarded as a single "winner take all" block and the remaining missions will be awarded individually.

The Air Force's acquisition strategy for this solicitation achieves a balance between mission success/operational needs, and lowering launch costs, through reintroducing competition for National Security Space missions.

"*This solicitation marks another opportunity to foster competition on the EELV program in an effort to reduce launch costs while maintaining assured access to space with two or more launch providers*," said Lt. Gen. John Thompson, Space and Missile Systems Center commander.



The AFSPC-8 mission is comprised of two identical Geosynchronous Space Situational Awareness Program (GSSAP) satellites, known as GSSAP 5 and 6. AFSPC-8 will be launched during the third quarter of Fiscal Year (FY) 2020 into a geosynchronous orbit.

The AFSPC-12 mission is comprised of a forward space vehicle (SV) and an aft SV. The forward SV is known as the Wide Field of View (WFOV) Testbed and the aft SV is a propulsive Evolved Expendable Launch Vehicle (EELV) Secondary Payload Adapter (ESPA).

Both SVs will be launched during the second quarter of Fiscal Year 2020 into a geosynchronous orbit.

The three GPS III missions will deliver sustained, reliable GPS capabilities to America's warfighters, our allies, and civil users.

GPS provides positioning, navigation and timing service to civil and military users worldwide.

This is the fifth competitive launch service solicitation under the current Phase 1A procurement strategy.

The Phase 1A procurement strategy reintroduces competition for National Security Space launch services.

DISPATCHES

UP TO DATE MAPS FOR MILITARY OPS OFFERED BY AIRBUS

Sometimes roads lead to the wrong places, bridges no longer stand, or rivers are wider than anticipated.

Troops moving on the ground never exactly know what they'll encounter when traveling across new terrain. Every move is critical and knowing what is ahead is crucial. Misinformation leads to delays and other problems that can affect the outcome of a mission.

Created in partnership with Thales exclusively for the French Army, Modules Géographiques Projetables (MGP), is a deployable, modular system that produces up-to-date maps for external operations on foreign soil. The maps help personnel move safely and make more informed decisions by reducing the risk of encountering blockades, hidden adversaries, or getting stuck on unsuitable terrain.

MGP is certified for harsh climatic conditions and for transport by land (road, train), sea and air. Whenever technical information is needed about the camber of a road, the width of a river, or whether a bridge is strong enough, the system produces high quality geographic and thematic maps in the quickest possible time.

Hundreds of different types of information can be collected and added in different information layers on thematic maps. The mapping data is complemented with information acquired on the ground to support the decision making process.

So-called acquisition vehicles are in charge of collecting surveys of the ground, such as the altitude of a set point, the depth of a river and the speed of its current.

The system began as a prototype in 2010 and, following operational testing, was later approved by the French Army for use in the field. It has since supported missions in three foreign countries and today is active in a peacekeeping intervention. Though once developed for the French Army, of course, the maps can be adapted to any specific needs.

www.intelligence-airbusds.com/

Image courtesy of DoD

DISPATCHES

U.S.A.F.'S SECOND SPACE OPS PARTS WAYS WITH SVN 32 GPS

The 2nd Space Operations Squadron began the disposal of Satellite Vehicle Number 32, Inter Range Operation Number 6809, on June 5 and the satellite was fully disposed of as of June 12.

The process required several days and each day focused on a different aspect of the disposal, such as placing the vehicle into a spin-stabilized configuration, firing thrusters to raise the orbit, depleting the vehicle of any remaining fuel and disconnecting the battery chargers, and then turning off the receivers.

According to 1st Lt. Cameron Smith, 2 SOPS bus system analyst, SVN 32 launched on November 22, 1992, and began transmitting its GPS signal on December 11 of that year, which means the satellite nearly tripled its design life of 7-½ years.

SVN 32 orbited Earth for 24 years, six months and 23 days, according to Smith, but contributed to the mission for 15 years, 3 months and 9 days. SVN 32 was turned off on March 17, 2008, due to failing clocks, the main payload component used to provide an accurate signal, and has been in the residual constellation since.

Artistic rendition of SVN 32 GPS.

"*Our residual constellation are our on-orbit spares if you will. If a vehicle in the primary control needs to be replaced, we can remove the bad satellite from the primary control and add in the residual*," Smith said. "*Based on bad clocks and a growing supply of new satellites, SVN 32 was moved from the primary ground control system and placed in a residual status. This was done in 2008, hence 15 years serving the mission, but 24 years on orbit.*"

Because SVN 27 was disposed in mid-April, the short time frame between the two satellites did not allow for much expansion on the experimentation done on SVN 32.

"*This was my first (disposal) as the Disposal Lead, so for the disposal itself, training our new personnel on the process while managing all the activities needed to successfully complete the maneuvers was the most interesting,*" *Smith said, then explaining that the vehicle could no longer produce and maintain its position, navigation and timing signal to meet standards.*

"*To better clarify, a block IIA GPS vehicle (like SVN 32) is launched with four clocks, one active and three redundant. SVN 32 had used three of the four clocks within the first four years of its life. We switched to the fourth clock in August of 1996 and limped through its decommission on March 17, 2008*," Smith added.

Senior Airman Brandon Myers, 2 SOPS, satellite system operator, helped with sending commands to the satellite that the contractors and officers requested. "*The officers have to give the SSO's permission to send a command first, but we are the only ones who can physically send them,*" *Myers said, adding that the process was extremely smooth, especially with the support of the Satellite Vehicle Operators and contractors.*

Col. DeAnna Burt, 50th Space Wing Commander, gives Senior Airman Brandon Myers, 2 SOPS satellite system operator, the final command to decommission satellite vehicle number 32 at Schriever Air Force Base, Colorado, Monday, June 12, 2017. First Lt. Col. Peter Norsky, 2 SOPS commander, observes the final command.

U.S. Air Force photo/Airman 1st Class William Tracy.

"*It has been very interesting, to quite literally taking a multi-million dollar piece of equipment in space and moving it into an entirely new orbit and after that, shutting it down. I am glad I was given the opportunity to participate in the disposal.*"

Airman 1st Class Rachael Alvarez, 2 SOPS SSO, explained she did not notice a significant difference between the normal operations of a satellite and the disposal process, but the process has been sad nonetheless.

"*Watching the numbers get lower and seeing different colors flashing is a bitter-sweet death in our satellite family,*" *Alvarez said. "It was mostly bitter considering I've been commanding this one since the beginning of my SSO career in 2015*," dhe said.

The active constellation continues to exceed standards for users around the world.

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DISPATCHES

KRATOS' RT LOGIC'S STUDY FOR DOD REGARDING SATCOM RESILIENCY CONCEPTS

When critical information is needed, something that involves the U.S. Government's Department of Defense (DoD), those who possess the expertise and information are sought. And so ...

Kratos Defense & Security Solutions, Inc.'s subsidiary RT Logic's expertise has been enlisted by the U.S. Government to perform a critical Wideband Communications Architecture Study (WCAS) contract that will define the next-generation resilient ground architecture for the DoD.

Kratos was awarded three of the study's primary tasks:

- ***Defining the overall ground architecture***
- ***Identifying flexible and efficient mechanisms to provide wideband transport including both satellite communications (SATCOM) and ground resources***
- ***Determining the operations management requirements needed to facilitate system control and situational awareness***

Increasingly, DoD terminals must be able to "roam" beyond one satellite network to expand SATCOM capacity and resiliency.

To achieve this capability, U.S. Government systems must be able to flexibly access commercial and government resources and traverse among a diverse pool of satellites, teleports, and managed systems.

Currently, this capability is hindered by the proliferation of managed service networks using proprietary modems and waveform technologies.

Kratos is supported on this effort by a team of satellite operators to execute the study, including Intelsat General, SES, INMARSAT, Hughes and OneWeb.

According to John Monahan, Senior Vice President of Kratos SATCOM products, the program draws upon Kratos' core SATCOM and MILSATCOM capabilities that leverage their extensive portfolio of ground system products and architectural depth.

The 'roaming enterprise' approach will increase SATCOM capacity and create a more resilient architecture to anticipate and respond to future attacks.

www.kratosdefense.com/

DISPATCHES

U.S. ARMY ENLISTS HARRIS FOR THEIR COMMS EXPERTISE

The U.S. Army is upgrading their land mobile radio (LMR) system infrastructure on all the Army bases in the U.S. as well as replacing their current systems with the latest technology.

In order to accomplish this task, the Army has enlisted the expertise of Harris Corporation.

Harris Corporation has now been awarded a five-year, $461 million ceiling, multi-award IDIQ contract to modernize the U.S. Army's mission-critical communications network.

The contract was awarded in the first quarter of Harris' fiscal 2018.

Harris received their first order from the contract for two Voice, Interoperability, Data and Access (VIDA®) cores, support services and integration of the first Army installation into the enterprise network.

Nino DiCosmo, President, Harris Public Safety and Professional Communications, remarked that opening up this critical project and moving toward competition is a major step forward in bringing richer innovation, better technology, heightened responsiveness and more competitive pricing to the customer. He added that the U.S. Army customer clearly recognizes the value of competition, applying open standards and open architecture to its network.

This forward-thinking approach will allow multiple vendors and multiple technologies to be integrated, ensuring interoperability into the future.

www.harris.com

DISPATCHES

U.S.A.F.'S STP-3 MISSION AWARDED TO UNITED LAUNCH ALLIANCE

Confidence in United Launch Alliance's 100 percent success rate has the military enlisting that company's to assist with this test mission.

The United States Air Force has announced that ULA was awarded a contract to launch the Space Test Program-3 (STP-3) mission.

This contract resulted from a competitive award under the Air Force's Phase 1A procurement strategy.

The STP-3 mission is scheduled to launch in the summer of 2019 from Space Launch Complex-41 at the Cape Canaveral Air Force Station in Florida. This mission will launch aboard an Atlas V 551 vehicle.

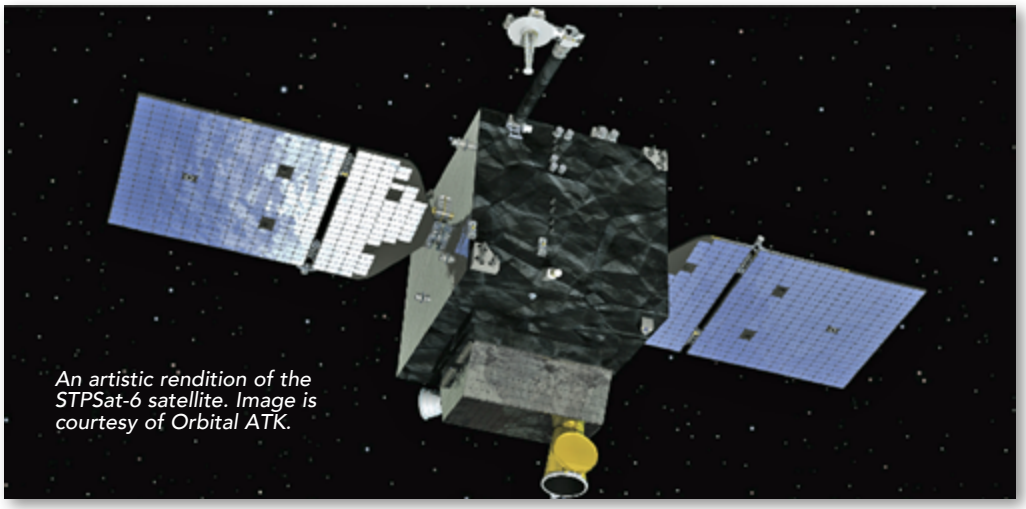
ULA also launched the first Space Test Program mission in March of 2007. That launch marked the first Air Force Evolved Expendable Launch Vehicle mission on an Atlas V and the first Atlas V mission for ULA.

The STP-3 mission consists of a primary space vehicle (STPSat-6) and an integrated propulsive EELV Secondary Payload Adapter (ESPA) holding up to six payloads (IP-ESPA).

The STPSat-6 space vehicle will host the National Nuclear Security Administration (NNSA), Space and Atmospheric Burst Reporting System-3 (SABRS-3) payload, and the NASA Laser Communications Relay Demonstration (LCRD) payload.

Additionally, seven science and technology (S&T) payloads are manifested by the Department of Defense Space Test Program on STPSat-6.

ULA has successfully delivered more than 115 satellites to orbit that provide critical capabilities for troops in the field, aid meteorologists in tracking severe weather, enable personal device-based GPS navigation and unlock the mysteries of the solar system.



An artistic rendition of the STPSat-6 satellite. Image is courtesy of Orbital ATK.

Tory Bruno, ULA's president and CEO, said that the company is honored that the Air Force has entrusted them with the launch of this important test mission.

Bruno continued by adding that ULA offers the most reliable ride to space. With a mission success record of 100 percent and a tremendous heritage of 71 consecutive successful Atlas V launches, the firm provides the best overall launch service for customers. ULA is the choice for customers when a critical payload must be delivered to space on-time and safely.

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DISPATCHES

U.S.A.F. REPORTS REVEAL NEAR-PERFECT CIVIL GPS SERVICE PERFORMANCE

The U.S. Air Force has released two technical reports that demonstrate that the Global Positioning System (GPS) continues to deliver exceptional performance to civilian users around the world — GPS is a U.S. Air Force satellite system that provides highly dependable positioning, navigation and timing (PNT) services to military and civilian users around the world, free of direct user charges.

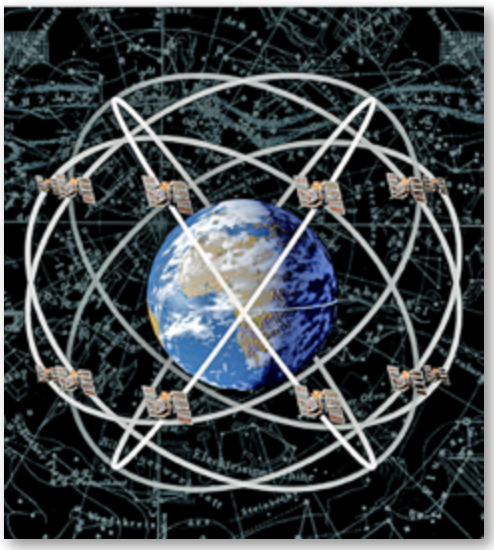
Operated by the 50th Space Wing at Schriever Air Force Base, Colorado, the GPS constellation provides precise PNT services worldwide 24-hours a day, seven days a week.

The 2014 and 2015 performance reports confirm that the GPS Standard Positioning Service (SPS) satisfied nearly all measurable performance commitments documented in the GPS SPS Performance Standard, furthering the status of GPS as the "Gold Standard" for PNT.

The GPS Directorate at the U.S. Air Force's Space and Missile Systems Center commissioned the GPS SPS performance reports to enhance public transparency of the real-world performance of civil GPS. The reports confirm that GPS met all of the evaluated commitments for calendar years 2014 and 2015 with one exception.

That exception was that the reporting notification commitment for scheduled GPS satellite interruptions during calendar year 2014 was only met in 29 of 30 cases (96.7 percent). The vast majority of GPS users were not impacted by this single delayed notification.

In this single case, the U.S. Air Force only provided 17 hours of advanced notice, as opposed to the SPS PS commitment of at least 48 hours advanced notice, before the scheduled satellite interruption.



Artistic rendition of the GPS constellation.

The commitments evaluated in the reports include those of accuracy, integrity, continuity, and availability of the GPS signals-in-space. For example, the signal-in-space ranging accuracy of the GPS civil signals was significantly better than the published standard of "7.8 meters or better at the 95th percentile." This metric represents a key component in the total "user range error" that GPS receivers experience.

Most impressively, the oldest GPS satellites still provided an average signal-in-space accuracy of 2.8 meters during their worst performing month of 2015 — surpassing the target accuracy metric by over 300 percent. On average, the signal-in-space accuracy of the GPS constellation in 2015 was 1.4 meters, which is a 0.4 meter improvement over the accuracy in 2013.

The GPS SPS performance reports are generated by Applied Research Laboratories, the University of Texas at Austin (ARL:UT), which is a Department of Defense University-Affiliated Research Center. Using data from 33 GPS monitoring and reference stations located around the globe, the ARL:UT team assesses GPS performance against the commitments defined in the 2008 GPS SPS Performance Standard (published at ***www.gps.gov/technical/ps/***).

The ARL:UT reports focus on those commitments that can be verified by anyone with knowledge of standard GPS data analysis practices, familiarity with the relevant signal specifications, and access to a Global Navigation Satellite System data archive.

ARL-UT expects to complete the 2016 SPS performance report later this year. The 2013, 2014, and 2015 reports are publicly available for free download at ***www.gps.gov/systems/gps/performance/***.

The National Coordination Office for Space-Based PNT maintains the ***GPS.gov*** website to provide official information about GPS to the public.

Colonel Steven Whitney, the Director of the GPS Directorate, commented that the GPS Directorate remains committed to providing highly accurate and reliable PNT services to our users around the globe. The use of published standards to transparently guide data-driven decision making is how we have become the 'Gold Standard' in PNT. The GPS Directorate is working every day on improved capabilities to ensure users receive the maximum benefit of the PNT services offered by GPS.

Air Force Space Command's Space and Missile Systems Center, located at Los Angeles Air Force Base in El Segundo, California, is the U.S. Air Force's center of excellence for acquiring and developing military space systems. SMC's portfolio includes GPS, military satellite communications, defense meteorological satellites, space launch and range systems, satellite control networks, space-based infrared systems and space situational awareness capabilities.

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MEETING GOVERNMENT REQUIREMENTS

COTM & SOTM: MORE MOBILITY, MORE BANDWIDTH

by Dwight Hunsicker, Executive Vice President and General Manager, Government Solutions, Globecomm

In today's world there is a constant need for information, intelligence and awareness.

This is particularly true for military forces who may be deployed anywhere from large cities to the most remote of locations. Deployments may range in size from small teams to enterprise-level divisions that number in the thousands.

Satellite network technologies can provide the services, capabilities and infrastructures to furnish U.S. Government customers with connectivity services anywhere in the world, and provide those services in a highly secure and resilient manner.

This insatiable, global demand for broadband connectivity grows every day. Communication systems have taken the largest leaps in attempting to satisfy the demands that new use cases are placing on networks.

Government regulatory commission's and standard's groups are working to provision communication spectrum that will support the traffic. The challenge is to support new connectivity requirements and uses of spectrum, while simultaneously not diminishing the capacities or services that are currently in place (*e.g.*, video, voice, and Internet Protocol (IP) data.)

VSAT ADVANTAGES

A typical satellite network will consist of a hub or teleport with connection via satellite to Very Small Aperture Terminals (VSATs).

- *VSAT services can be deployed anywhere*
- *VSAT provides a wireless link completely independent of the local terrestrial / wireline infrastructure — especially important for expediency, command and control, as well as backup or disaster recovery services*
- *VSAT services can be deployed in hours or even minutes, especially true with auto-acquisition antennas*
- *VSAT enables networks to get the same speeds and SLAs at all locations across their entire network regardless of location*
- *VSAT systems use onboard acceleration of protocols such as TCP ("spoofing" of acknowledgement packets) and HTTP (pre-fetching of recognized HTTP objects); this delivers high-quality Internet performance and associated user experience regardless of path latency*
- *VSAT systems use a broadcast download scheme (such as DVB-S2) which enables them to deliver the same content to tens of thousands of locations simultaneously at no additional cost*
- *VSAT networks are private layer-2 networks over the air providing Corporate-grade security*

LOOKING FORWARD: THE SATELLITE SPACE SEGMENT

The mature Fixed Satellite System (FSS) will play an important part as a gateway connecting back-haul data using the available C-, X-, Ku- and the emerging Ka-frequency bands to link data centers supporting network management.

The FSS marketplace is also moving into the implementation of High Throughput Satellites (HTS) to increase data delivery capacities.

HTS platforms will provide increased capacities and augment the ability of FSS gateways to support larger user communities.

Additional infrastructure provided include Mobile Satellite Systems (MSS) with the implementation of Medium Earth Orbit (MEO) and Low Earth Orbit (LEO) platforms using L-band frequencies as well as the promising, newer, HTS Ku- and Ka-band LEO constellations that will be arriving in the market over the coming years.

The MSS interface is the cross over point from the terrestrial cellular system. This interface provides the dual-mode connectivity that supports coverage gaps that are a part of the cellular infrastructure. The following table below summarizes the satellite types that we estimate will be used in the future:

SATELLITE ORBIT TYPES

With the diverse requirements of mobility, currently there are no single solutions available that address the needs of Rolling, Floating and Flying use cases. Viable options will require the integration of fixed radio networks (Wi-Fi, low power/narrow band, etc...), satellite and cellular and satellite

Satellite Orbit Types

OVERVIEW	DETAILS
LEO: Low Earth Orbit Satellites	In order for Low Earth Orbit satellites to remain only a few hundred miles above the surface of the earth, it is necessary for them to move much faster with reference to the earth. Lower orbits appear to move faster than the rotation of the earth, and higher orbits slower. Low Earth Orbit (LEO) satellites, like the Iridium fleet are only a few hundred miles above the surface of the earth, allowing small, handheld terminals (like overgrown cell phones) with omnidirectional antennas to be used. To maintain this low orbit, the satellites are constantly moving, rapidly around the earth. The disadvantage of LEO satellites is that they are not parked in one spot, relative to the earth, and are actually rotating rapidly around the earth. LEO satellites are rising and setting and zipping across the sky, so to provide uninterrupted service, you need to be able to see more than one satellite at any given time, with the capability to hand off the call from one setting satellite to a new one that might be rising. Iridium and Globalstar are two of the major vendors and soon to market OneWeb and LeoSat constellations have pursued this complex technology.
MEO: Medium Earth Orbit	Medium Earth Orbit satellites, like the O3B Network, have satellites in a circular orbit about 5000 miles above the equator. The O3B Network currently uses 12 satellites each with 10 steerable spot beams that light up certain areas on the surface of the earth as the satellite revolves around the earth
GEO - Geostationary Earth Orbit	In order to overcome Earth's gravity and remain stationary in the sky synchronized with the rotation of the earth, geostationary satellites must maintain an orbit of 22,300 miles (37,000Km) above the equator. These are the primary means of satellite communications and are spaced just 2 degrees apart, and often even less. This results in the satellite orbiting the earth at exactly the same rate that the earth revolves, thus appearing to the observer to be stationary in the sky.

in multi-mode, hybrid connectivity scenarios, depending on the data throughputs required.

LOOKING FORWARD: IMPLICATIONS OF HTS

Also needed is consideration of the advent of HTS that enables network service providers to offer a new generation of communications solutions. HTS systems combine the exceptional spectrum efficiency and performance of spot-beam antennas with ultra-wideband transponders to enable unprecedented levels of bandwidth and throughput.

Each spot beam reuses frequencies in multiple carriers so that a single HTS spacecraft can provide five to ten times the capacity of traditional satellites.

For the customer, this provides the potential to dramatically increase data rates, greater than 100 Mbps to a single site and improve application performance compared to traditional satellite based communications.

HTS SPACE SEGMENT LIMITATIONS

The multiple spot beam approach could limit the opportunity to provide a one-to-many distribution covering a wide area such as we have with traditional VSAT networks. Other requirements may involve a private TDMA-type network composed of numerous remote terminals spread across an

BENEFIT	
Bandwidth/ Throughput	With HTS, higher throughputs can be achieved. Therefore, modem and VSAT management system manufacturers are developing and building systems that can deliver those high throughputs.
Flexibility	With the ever-changing market and customer demands it's important to live up to those expectations with modems and VSAT management systems which are easy and quickly adaptable to those demands. This means being able to quickly upgrade and/or downgrade in both hardware at the teleport as well as throughput on the user's end.
Network Management Systems	Looking at the VSAT management systems manufacturers it's clear that for complex networks out there today an easy and accessible tool is a must. Manufacturers have made great progress in developing Network Management systems which allow for easy configuration and monitoring of networks. Furthermore, there is continuous research and development in designing flexible and bandwidth management to improve satellite bandwidth efficiency.

Area of Responsibility (AoR). In order to achieve this, End Users would have to use multiple uplinks from the various hub ground stations managing the specific geographic spot beams. They are typically charged by a consumption model rather than bandwidth which will typically increase costs.

Along this same train of thought, the HTS satellites also require ground infrastructure to manage them removing the typical bent-pipe scenario of legacy satellites; i.e., communication must land at the satellite operators' ground stations and be available to the user. The benefit of HTS comes in delivering a broadband signal to a geographic region within a single spot beam, or delivery of broadband for mobile applications where the network will have switching capability from spot beam to spot beam. This is good for Communications-On-The-Move (COTM), less so for other wide-area networking requirements.

Despite this tremendous potential, there is much misperception and lack of understanding about these new technologies among customers and the industry at large. This is compounded by the marketing exuberance from some satellite fleet operators who offer their own specific and often proprietary flavors of these emerging technologies. Customers and satellite network service providers alike need an unbiased engineering perspective on the features, benefits and trade-offs of emerging HTS technologies.

LOOKING FORWARD: MODEMS & ANTENNAS

For the modem and VSAT management systems, manufacturers are rapidly developing new modems equipped with the latest technologies to support technologies like HTS as well as creating greater bandwidth efficiencies. These technologies will help in providing a stable and secure connection between hub and remote with high throughput availability. These benefits are further highlighted in the table offered on *page 27*

.

For mobility use cases that require a dual-mode satellite connection to sustain their data connectivity, the emerging arena of malleable flat panel antennas offer promising benefits in terms of vehicle integration, installation flexibility, size, weight and power (SWaP), and cover.

These antennas offer sizing to achieve the desired signal quality for the transmission and reception of satellite signals, while at the same time allowing for conformal installation to the body of the vehicle, vessel or aircraft due to the malleable nature of the panel material.

ROUSING RESULTS

For consumers and producers of broadband connectivity, these truly are exciting times. With the continual evolution of technology, providing more for less, the industry is energized and the end user reaps the benefits.

As the evolution occurs from point-to-point voice to integrated data networks, to highly sophisticated command and control as well as surveillance networks, to the current state of the Internet of Things (IoT), the envelope must continue to be pushed to expand throughput, increase connectivity and enhance the overall user experience.

www.globecomm.com

Globecomm develops smart connectivity solutions to address customer issues across a broad spectrum of areas, including system design and integration, managed communication services including mobile and IoT, media services and mission critical networks. Globecomm provides robust connectivity to the most remote locations under the most treacherous conditions. The company is dedicated to improving communications and leverages the firm's world class, global teleport and fiber network and data centers to offer end-to-end, managed service communication's solutions worldwide.

SHRINKING UAS ASSETS CALLS FOR TINY ANTENNAS... AND BIG TROUBLE

by Paul Hopkins, Senior Director for Government Programs, SES Government Solutions

Airborne ISR — the use of manned and unmanned aerial systems (UAS) for intelligence, surveillance and reconnaissance — continues to evolve to address current and future challenges facing America's military.

Those challenges include more advanced and sophisticated adversaries capable of disrupting the near impunity our UAS resources currently have in the skies, and a much more contested environment where UAS survivability isn't guaranteed.

At the same time, the military is actively looking to use new technologies, making troops better informed and aware in the field. ISR and communications solutions in forward operating bases (FOBs) ensure the warfighter has real-time situational awareness. However, when the soldier leaves the FOB, current technology does not allow for the same level of situational awareness to go with them.

These challenges — and the steps the military is taking to overcome them — were expertly detailed in a recent article in *National Defense* magazine (***www.nationaldefensemagazine.org/articles/2017/6/14/special-ops-community-eyeing-new-drone-technology***). Perhaps the most notable step detailed in the article is to achieve Group 4 UAS capability on a Group 3 size platform.

According to Mike Fieldson, airborne ISR division chief at SOCOM's program executive office fixed wing, this means a move away from Group 4 and Group 5 drones, which weigh more than 1,320 pounds, and toward a smaller and lighter UAS in Group 1 through Group 3.

As Mr. Fieldson put it, "*The intent…is to take Group 4 and Group 5-type capabilities and push that down into a Group 1, Group 2, Group 3-type configuration.*"

Shrinking America's fleet of UAS resources can have multiple benefits for the military. Most Group 3 UAS don't require a runway, lowering their signature in a given area. They require less power to operate. They're significantly less expensive. In addition to this, their low cost and small size makes it more feasible to use multiple assets for each mission, greatly increasing resiliency through redundancy.

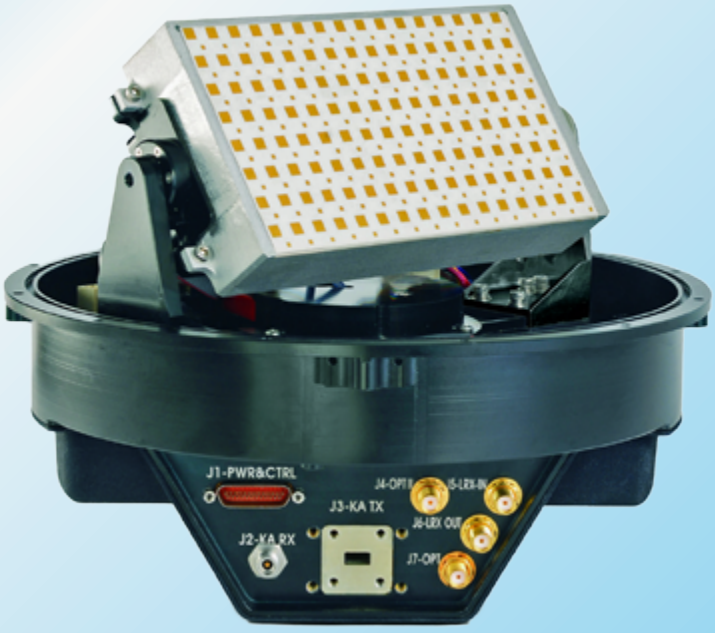
This plan to go smaller and proliferate UAS resources was shared in the article by Lieutenant General Kenneth Tovo, commander of Army Special Operations Command, who said, "*The large [UAVs] that we're relying on now perhaps could be replaced by a multitude of essentially throwaway swarms of UAVs.*"

This concept of creating swarms of smaller UAVs seems plausible enough — however, there are challenges. While moving to a smaller UAS isn't limited by the platform, the biggest challenge to a Group 3 UAS is often overlooked — the antenna required for Beyond Line of Sight (BLoS) operations.

THE INCREDIBLE SHRINKING ANTENNA

For UAS fleet resources to shrink in both size and weight, they'll need all components to shrink as well. This includes the sensors and the antenna used to transmit data back to the personnel aggregating, analyzing and drawing actionable intelligence from the data.

To accomplish this, satellite hardware manufacturers — such as GetSat (***getsat.com/***) — are working feverishly on a new generation of advanced antennas. These antennas can sit flatter on surfaces to reduce drag and are more aerodynamic, and are smaller. The most exciting new antenna technologies are flat panel arrays and the "Holy Grail," electronically steered aperture (ESA) antennas.



GetSat's Nano SAT, the smallest KA Band SOTM Terminal in the market. Photo courtesy of the company.

Hardware manufacturers are also working to develop a new generation of software-defined modems which are smaller and can be paired with new antenna designs to make the entire apparatus responsible for sending and receiving data more compact.

However, smaller antennas aren't always the panacea. Yes, they cut down on size and weight and can help the military usher in an era of smaller UAS resources. But they give SATCOM providers nightmares and leave users wanting higher throughput.

SHRINKING FROM THE SPOTLIGHT

Small antennas mean problems for satellites, regardless of how sophisticated and advanced they become. The smaller an antenna is, the greater the opportunity for adjacent satellite interference to occur.

Although emerging commercial GEO SATCOM solutions are designed to be used with smaller antennas — such as those found on commercial aircraft — the military has been reticent to use them, mostly because commercial practices for these new technologies run counter to their critical requirements.

This means as the commercial SATCOM industry focuses investments on technologies necessary to meet the demands of the always connected commercial world, it does little to address the ISR requirements for smaller antennas required for the next, highly-coveted, Group 3 UAS class.

Luckily, two solutions could already be in space — MEO satellite constellations and GEO High throughput satellites (HTS). Unlike traditional wideband GEO satellites, these satellites use high-powered, concentrated spot beams that are easier for smaller antennas to access.

*The preceding article is republished courtesy of The Government Satellite Report (GSR), produced by SES Government Services (**ses-gs.com/govsat/**)*

Paul Hopkins is the Senior Director for Government Programs at SES Government Solutions. Prior to beginning his career with SES GS, Paul had a long career with the United States military, where he served in multiple positions, including PM of Special Programs at U.S. SOCOM and Special Assistant to the Vice Chief of Staff of the U.S. Army.

HOW THE MODERN TACTICAL BATTLEFIED HAS BECOME A VAST DIGITAL DATA EXCHANGE

by Simon Davies, Senior Contributor and CEO of Spectra Group (UK) Ltd.

The nature of warfare has changed greatly over time yet certain aspects of battle have stayed the same for many centuries — namely, the importance of maintaining effective command and control of deployed forces and the need to communicate securely.

Modern day warfare calls upon military units to operate as smaller and more agile forces, across diverse geographical areas and often in often extremely rugged terrain.

Such dismounted units frequently are unable to maintain line-of-sight communications with operational headquarters (HQ) — or even with other units that may be only a few miles away from their location.

Worryingly, this not only restricts HQ's capability to track dismounted units but also massively limits any commander's situational awareness — that awareness is crucially important to achieving safety and mission success.

The tactical battlefield has now evolved into a vast digital data exchange where large numbers of weapons, sensors, computers and command centers must exchange high speed data to function effectively.

A reliable communications link can act as a lifeline on the battlefield. Whether that link is for someone operating a radio or logging on to a laptop, having a network that works first time — and every time — is vital.

Military missions today are often centered on counter insurgency, the rebuilding of nations as well as humanitarian aid. This means soldiers must operate as small units spread across increased areas of responsibility.

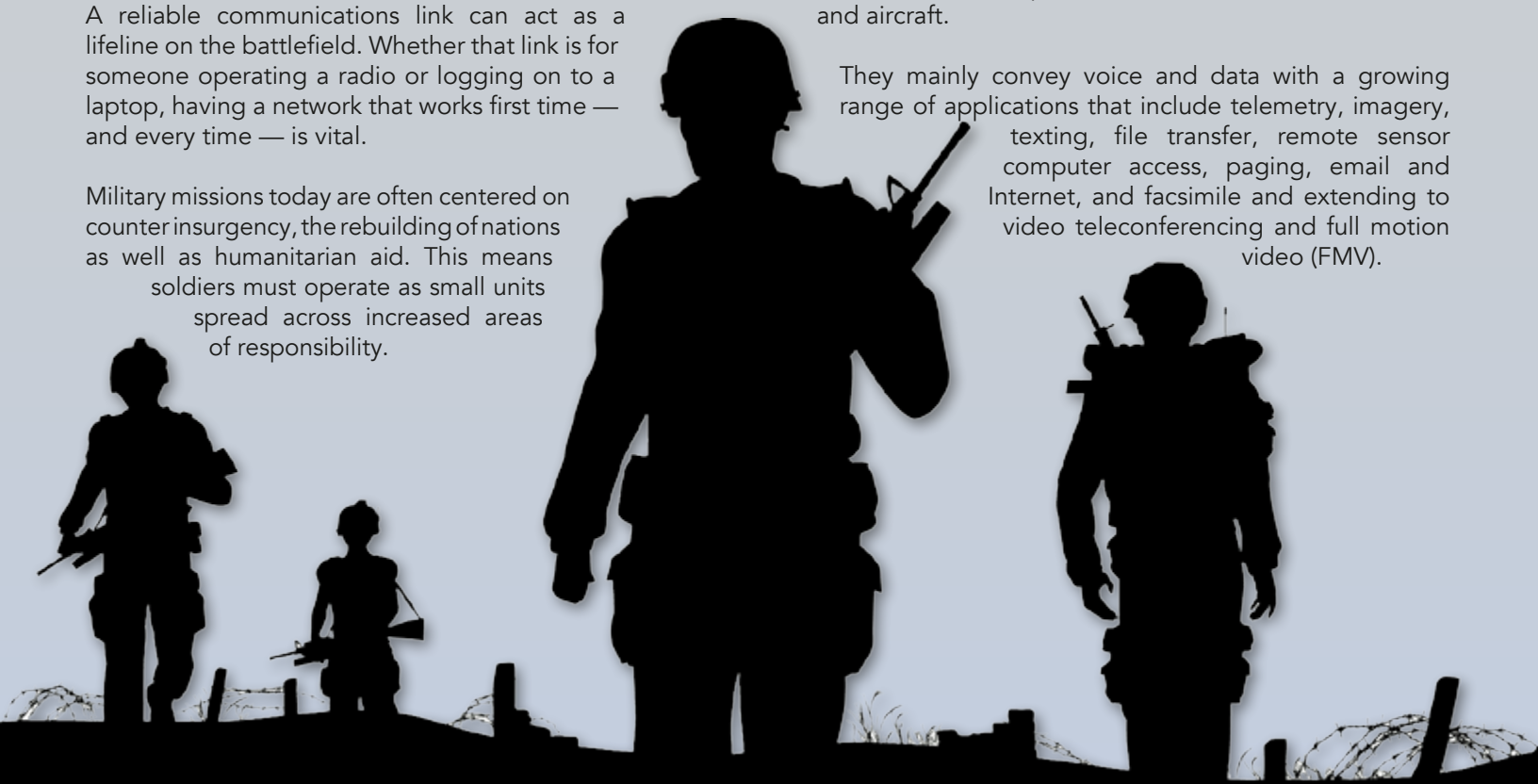
Military communications technologies are extensive and can be quite complex. Every latest generation of communications equipment strives for an improvement in component life that could equate to extended operating time for portable radios powered by new rechargeable batteries or greater processing power from the latest, high-powered microprocessors.

Communications systems for military applications are selected depending on each task, with a range of systems as traditional as high-frequency (HF) two-way radios to more sophisticated MILSATCOM systems or mesh IP radios.

Recent years have seen a huge increase in the area of military satellite communications — MILSATCOM systems can offer many advantages for military applications, such as a wide area of coverage, rapid deployment, flexible networking and long-range service for moving platforms such as ships, aircraft and vehicles.

MILSATCOM has become vital to help soldiers with secure global connectivity, even in the most remote areas where there is no communications infrastructure. Mobile and tactical MILSATCOM systems are characterized by terminals with small antennas on ships, submarines, boats, land vehicles, and aircraft.

They mainly convey voice and data with a growing range of applications that include telemetry, imagery, texting, file transfer, remote sensor computer access, paging, email and Internet, and facsimile and extending to video teleconferencing and full motion video (FMV).



Satellites permit direct communications with units on the battlefield. Light-weight mobile terminals can be established in a short time, enabling advancing troops to remain in constant contact with command authorities.

Spectra has established itself as a leading player in providing SATCOM-On-The-Move (SOTM) for conventional and special operations units operating in small teams on foot or in vehicle with the company's game changing SlingShot product.

The company has teamed up with commercial satellite operator Inmarsat to use that firm's global satellite network to provide tactical satellite channels. Spectra then developed the equipment to allow in-service tactical radios to be converted to use the Inmarsat satellite network to provide many channels for Beyond-Line-Of-Sight (BLOS) comms.

A major advantage of SlingShot is that the product can be connected to existing tactical radios without compromising their in-built encryption systems. There is no need for any configuration to tactical radios as the unit plugs into its antenna socket, converting the VHF or UHF frequencies into the appropriate frequencies and power for the Inmarsat network.

SlingShot has a further market leading feature — the omni-directional antenna — and this is a key differentiator which alters the way people using Tactical Communications Satellites (TacSat) accomplish their missions.

These antennas allow operators to travel in excess of 80 mph and maintain reliable communications. Spectra has also successfully brought to market an aviation capability which offers command and control communications to all units on airborne platforms—fixed-wing aircraft and helicopters — without the need for any land or air-based radio repeaters. Future testing is about to begin on a solution for fast jets to complete the company's support for a broad range of aviation platforms.

Now, more than ever, the provision of reliable and resilient voice and data communications is essential at the tactical level. As the nature of conflict changes, with high-tempo, short duration deployments becoming the norm, there was a need to design systems for ease-of-use and reliability, thereby minimizing the burden for warfighters in the modern battlefield.

Spectra could well be providing voice and data services in areas where none currently exist, or where high intensity conflicts, natural disasters, terrorist attacks or pandemics have destroyed the existing networks.

This year, the capability of SlingShot has been extended with the availability of new power options and the launch of the SlingShot Satellite Emulator (SSE) — an L-band satellite emulator for full offline system testing without the need to have a "live" satellite channel; a Universal Power Supply solution affords flexibility in regard to power needs, as well as an AA battery cassette capable of powering SlingShot in manpack form.

The SSE comprises a programmable test tool, permitting operators to train with the system as if it was in real-time, operational use by simulating satellite connectivity without expenditure. There is no need for reconfiguration or frequency programming as the SSE behaves exactly as a satellite and only reacts to the incoming RF from SlingShot. All that is required by the operator is to ensure that the supplied Transmit/Receive antennae are connected — then, just plug the unit in and all is ready for testing.

www.spectra-group.co.uk

Simon Davies is the CEO of Spectra Group (UK) Ltd. Spectra is a leading provider of Voice and Data services into remote and hostile areas world-wide for defence, governmental and non-governmental sectors.

Upon leaving the Military in 2004, Simon set up Spectra which has achieved steady growth over the past 13 years through these difficult security and economic times and is fast becoming a leading service provider of reliable, robust, deployable communications. Spectra's services are deployed worldwide in some of the harshest environments supporting the UK Military and European Union, Stabilisation Unit to name but a few.

THE HPA CORNER

AFFORDABLE SATCOM CAPABILITIES FOR MISSION SUPPORT

by Rebecca Cowen-Hirsch, Senior Vice President, U.S. Government Business Unit, Inmarsat

Recognizing that one size does not fit all, the Hosted Payload Alliance welcomes the U.S. government's exploration of new business models for commercial satellite communications (SATCOM), including hosted payloads.

In order to effectively utilize innovative approaches inclusive of hosted payloads, the government should adopt an integrated SATCOM architecture and develop a strategy to embrace the range of diverse capabilities necessary to support the enterprise.

There is progress toward this goal, as evidenced by government leadership remarks made at the 33rd annual Space Symposium. At this key strategy event, government leaders emphasized the urgency for a new, cohesive organizational structure to expedite the adoption of an enterprise-level, completely integrated satellite acquisition and deployment process, among other outcomes.

Rep. Mike Rogers (R-Ala.) commented that an overhaul of satellite acquisition remains a key component of his objectives. This includes the implementation of policies to make it easier for the satellite industry to meet the requirements of Department of Defense (DoD) users. This unified, strategic approach will better allow the DoD to manage commercial SATCOM and military SATCOM as a critical warfighting capability essential for mission success.

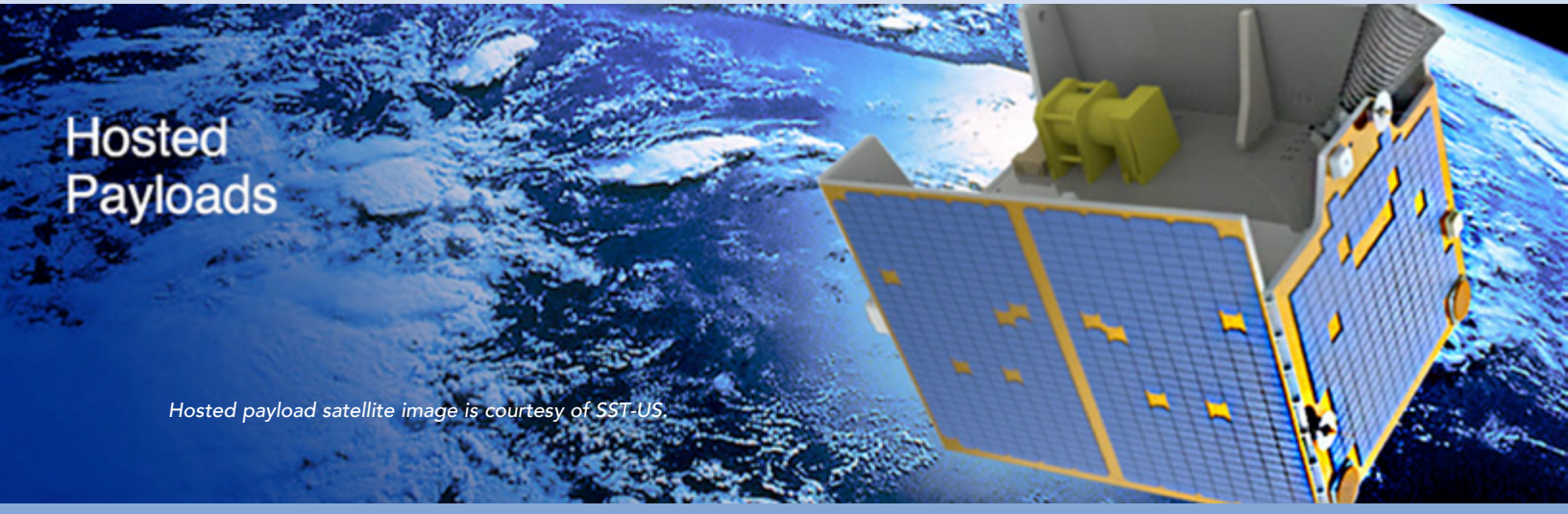
Toward this end, government and industry should move forward as partners to break down long-held siloed practices and cultural inhibitions in order to provide robust and complementary SATCOM capabilities. While the commercial SATCOM community appreciates the complexities of DoD architectures, understands the critical requirements and recognizes the budget challenges, it remains evident that commercial SATCOM will continue to play an essential role in this integrated SATCOM architecture of the future.

In the modern age of global conflicts and ever-changing threats, DoD users need immediate access to resilient, robust and secure SATCOM worldwide, across the full spectrum of engagement. To ensure this, the commercial sector and government leaders must work together to create a more protected space environment.

This column's question for HPA Members is…

Why is industry partnership critical to the government's future in satellite communications?

"For a commercial space company to be successful in a highly competitive market, it must continually improve its processes and technologies. It must be agile and able to deliver higher qualities at lower costs in time to meet demanding customer schedules. The government recognizes the need for more use of commercial practices and solutions, and a public-private partnership is a natural means to achieve this synergy.



Hosted payload satellite image is courtesy of SST-US.

"The hosted payload model is a great example of the benefit that the commercial space industry can offer government customers for a wide array of missions including communications, space situational awareness, intelligence, surveillance and reconnaissance, missile warning, and environmental monitoring.

"Interest in hosted payloads for national security missions has peaked recently as part of developing a more resilient space architecture. SSL and MDA have deep expertise in both commercial and government space missions, and SSL has experience in integrating a variety of hosted payloads for both government and science missions, including x-ray sensors, visible and infrared imagers, MILSATCOM and fully processed communication payloads.

"Finally, hosted payloads can offer government operators lower cost yet innovative solutions. HPA members have been innovators for many years, supporting new and evolving solutions in both commercial and government satellite communications. As commercial satellites are expected to continue launching at a consistent rate with a wide range of accommodation offerings in multiple orbits, government payloads can turn to commercial satellites for a cost-effective ride to space."— ***John Higham***, Chief Architect, Advanced Concepts, **SSL**

"New Ideas: Apply Within. Partnering to meet the DoD's space mission needs, including ubiquitous SATCOM, demands intense focus on threats to our space forces and those who rely so heavily upon them. Likewise, one must acknowledge entities in play are expanding rapidly.

"Hosted payloads, small satellites, and reconfigurable subsystems all add resilience. Responsive technology-refresh, adaptive ground systems and rapidly callable launch confounds the adversary and invigorates the industrial base.

"The highest hurdle moving forward appears more structural than technical, as Gen. John 'Jay' Raymond, USAF Space Command, commented, '…we can't do business the way we have in the past... we don't have that luxury.'

"Affordable, competing and compelling concepts abound, but can new, possibly riskier offerings be esteemed? Partnering amid changing conditions offers alternative viewpoints, and if inclusive, will generate solutions for the DoD's future space needs."— **Ken Bowling**, Business Development Manager, ***Harris Corporation***

Established in 2011, The Hosted Payload Alliance (HPA) is a satellite industry alliance whose purpose is to increase awareness of the benefits of hosted government payloads on commercial satellites.

The HPA seeks to bring together government and industry in an open dialogue to identify and promote the benefits of hosted payloads.

The HPA:

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

www.hostedpayloadalliance.org/

AN INSIDE LOOK: HOW BUDGETS AFFECT SPACE & AIR FORCE SECRETARY ON SPACE PRIORITIES

Even though one influential Senator called President Trump's 2018 budget proposal for the Defense Department "dead on arrival," there are many positive takeaways for the national security space community that could very well survive as the budget moves through both houses of Congress.

Article author: Myland Pride, Director, Intelsat General Corporation's Government and Legislatve Affairs

The Trump administration recently released their request for $1.15 trillion in federal funding for the 2018 fiscal year. While the administration has touted the request as the first step toward balancing the federal budget by 2027 and cutting unnecessary government spending, the proposal has already seen fierce opposition from both sides of the aisle.

The chief criticisms are directed at the budget's cuts to social programs, which have been proposed in part to pay for a boost in defense spending. The proposal requests $639.1 billion for the Department of Defense (DoD), including $574.5 billion in base funding and $64.6 billion in Overseas Contingency Operations funding. Compared to projections for FY18 in the Obama Administration's FY17 budget request, the new budget represents an $18.4 billion increase.

Even with the proposed increases, Sen. John McCain (R-Ariz.), Chairman of the Armed Services Committee, panned the budget as insufficient for defense and went so far as to give the budget a dead-on-arrival label.

Despite the derision from Congress on the proposal, the request reflects a formal Major Force Program for space for the first time, intended to enhance the traceability and visibility of overall investment into the domain.

Funding for space is up $349.1 million in the FY18 request as compared to projected levels from FY17. This increase is driven by substantial investment in space research, development, testing and evaluation (RDT&E), which offsets a decrease in space procurement.

Investments and improvements in future technology underscore the Air Force's intent to develop more resilient space capabilities in the face of an increasingly congested and contested operating environment.

The Air Force also intends to start seven new programs in FY18, including Evolved SBIRS, the Space Surveillance Telescope, and Protected Tactical SATCOM.

Though the overall SATCOM portfolio is down from FY17, SATCOM programs received noticeable attention in the FY18 request, including several new programs of record involving modernization efforts.

The request invests $358M in Protected SATCOM, including AEHF, SMI, Polar and Protected Services. Protected Tactical Services and Polar Communications both saw new programs of record initiated to develop new and improved systems.

There is also increased investment in SATCOM terminals, primarily for the FAB-T program, which provides SATCOM capability over the Milstar and AEHF constellations.

The request also reflects the Air Force's continued consideration of what will replace the aging Wideband Global SATCOM satellites by sustaining investment into the COMSATCOM Pathfinder initiative, Wideband AoA, and COMSATCOM Pilot program.

While presenting the Air Force's space budget, Maj. Gen. Roger Teague noted that the Pentagon is "looking very aggressively across every mission area" to determine where commercial industry's capabilities can be integrated into the overall architecture.

While the emphasis on investment in future technology, commercial integration, and the level of attention given to SATCOM programs are encouraging signs, this proposal will likely only serve as a rough guideline for the forthcoming House and Senate spending bills. However, given the recent attention space has seen in Congress, it seems the Air Force and lawmakers agree that now is the time to invest in earnest to assure U.S. dominance in space.

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SatCom Frontier

The White House recently swore in former Congresswoman Dr. Heather Wilson as the 24th Secretary of the U.S. Air Force, the first Air Force Academy graduate to hold the service's top civilian post.

Wilson assumes her new position at a time when many believe the U.S. Air Force faces a number of serious readiness and modernization challenges.

Dr. Heather Wilson, Secretary of the Air Force.

"*Innovation doesn't always come from something the government sets out,*" she said at Air Force Association event in Washington. "*It comes from your laboratories.*"

In a statement released prior to her confirmation, Wilson said, "*America and our vital national interests continue to be threatened. I will do my best, working with our men and women in the military, to strengthen American air and space power to keep the country safe.*"

Space technology is undergoing a fundamental transition. For example, a more resilient commercial SATCOM is coming on line. The digital payload on the new Intelsat Epic^{NG} satellites provides added security and anti-jam capabilities, and the spot-beam architecture limits the area from which jamming can be effective.

In her first public remarks as secretary, Wilson again pointed out the need to innovate faster. To this end, she expressed the need to increase the Air Force's research budget and turn to industry. She has also stated that Congress needs to put an end to the budget caps that keep the Pentagon from building up its readiness and replace outdated systems.

"*If you don't provide relief from the Budget Control Act, we will hollow out the force and set ourselves back years. We have to get beyond the Budget Control Act.*"

Wilson replaces Acting Secretary Lisa Disbrow, who filled the position temporarily after former Secretary Deborah Lee James left with the Obama administration. The incoming secretary knows well the value of research and development in the private sector.

Most recently, she was the president of the South Dakota School of Mines & Technology, an engineering and science research university in Rapid City, South Dakota. In addition, Wilson has served as a senior advisor to several national laboratories on matters related to nuclear weapons, non-proliferation, arms control verification, intelligence and the defense industrial base.

A native of Keene, New Hampshire, Wilson grew up around aviation. Her grandfather flew for Great Britain's Royal Flying Corps in World War I and, after emigrating to America, operated an airport and helped establish the New Hampshire Civil Air Patrol. Her father started flying at the age of 13 — Wilson herself is an instrument rated pilot.

Wilson graduated from the Air Force Academy in 1982 as part of the Academy's third class to admit women. She was the first woman to command basic training and the first woman Vice Wing Commander. She was also a Rhodes Scholar at Oxford University in England, where she earned master's and doctoral degrees after leaving the Air Force Academy. Wilson served as an Air Force officer in Europe during the 1980s.

She left the Air Force in 1989 to become director for European Defense Policy and Arms Control for the National Security Council (NSC) under President George H.W. Bush during the fall of the Berlin Wall. Her book, International Law and the Use of Force by the National Liberation Movement, was published a year later.

Wilson was a Republican member of Congress and represented New Mexico's 1st District from 1998 to 2009. As a member of the House, she served on the Armed Services Committee, the Permanent Select Committee on Intelligence, and the Energy and Commerce Committee.

Prior to her confirmation, President Trump lauded Wilson for her "*distinguished military service, high level of knowledge, and success in so many different fields.*"

The Air Force has a number of initiatives in motion exploring ways government and the commercial space industry can better collaborate in constructing the next generation of space architecture. With her deep background on both sides of the fence, Secretary Wilson seems perfectly suited to push that collaboration forward, maintaining America's technological advantage in space.

The preceding articles are courtesy of Intelsat General's SatCom Frontier infosite, the named author(s) as well as the company's editorial team.

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