

SATCOM For Net-Centric Warfare – December 2017

MilsatMagazine

High Throughput on the High Seas

recon: Year in Review

Dispatches

A Path Forward to Unified SATCOM

The Rise of Smallsats

Storm School

Interference Mitigation and Beam Switching

Cover image is courtesy of SES GS.



PUBLISHING OPERATIONS

Silvano Payne, Publisher + Senior Writer

Hartley G. Lesser, Editorial Director

Pattie Waldt, Executive Editor

Jill Durfee, Sales Director, Associate Editor

Simon Payne, Development Director

Donald McGee, Production Manager

Dan Makinster, Technical Advisor

SENIOR CONTRIBUTORS

Simon Davies, Spectra

Tony Bardo, Hughes

Richard Dutchik, Dutchik Comm.

Chris Forrester, Broadgate Publications

Karl Fuchs, iDirect Government Services

Dr. Rowan Gilmore, EM Solutions

Rebecca Cowen-Hirsch, Intelsat General

Bob Gough, Carrick Communications

Ryan Schradin, SES GS

Koen Willems, Newtec

AUTHORS

Skott Butler

Mike Carew

Robert Clark

Jason B. Cutshaw

Rebecca
Cowen-Hirsch

Simon Davies

Dr. Rowan Gilmore

Chief Petty Officer

Sara Muir

Miguel Ángel
Panduro

Ryan Schradin

Airman William Tracy

Sgt. Joseph Trickily

Dr. Michael Weixler

Koen Willems

MilsatMagazine is published 11 times a year by...

Satnews Publishers
800 Siesta Way
Sonoma, CA, 95476, USA
Phone: (707) 939-9306
Fax: (707) 939-9235

© 2017 Satnews Publishers

We reserve the right to edit all submitted materials to meet publication content guidelines, as well as for grammar and spelling errors, or to move articles to an alternative issue to accommodate publication space requirements, or remove content due to space restrictions. Submission of content does not constitute acceptance of said material by SatNews Publishers. Edited materials may, or may not, be returned to author and/or company for review prior to publication. The views expressed in SatNews Publishers' various publications do not necessarily reflect the views or opinions of SatNews Publishers. All rights reserved. All included imagery is courtesy of, and copyright to, the respective companies and/or named individuals.

TABLE OF CONTENTS

Dispatches	4 to 23
"A Path Forward" to Unified SATCOM, by Rebecca Cowen-Hirsch	26
The HPA Corner: The Rise of Smallsats, by Robert Clark + Members	30
Storm School for All, by Raytheon	32
SatCom Frontier: Interference Mitigation and Beam Switching	34
Validated on Epic ^{NG} Satellites, by Skott Butler	
Satellite, Not Walls, Secure the Border, by SSPI	36
The GSR Report: High Throughput on the High Seas for	38
the U.S. Navy and On Orbit Servicing, by Ryan Schradin	
<i>recon: Year in Review</i>	
EM Solutions, by Dr. Rowan Gilmore	42
HIDESAT, by Miguel Ángel Panduro	44
Hughes	46
ND SatCom, by Dr. Michael Weixler	48
Newtec, by Koen Willems	50
Spectra Group, by Simon Davies	52
Speedcast, by Mike Carew	54

ADVERTISER INDEX

Advantech Wireless	11
AQYR (A Windmill company)	23
AvL Technologies	9
Comtech EF Data	15
Comtech Xicom Technologies, Inc.	19
CPI Satcom Products	13
Defense Strategies Institute (DSI)	21
iDirect Government	17
Intelsat General Corporation	7
MITEC VSAT / Alga Microwave	2
Newtec	5
Smallsat Symposium	24 to 25
Space Foundation — 34th Space Symposium	56
W.B. Walton Enterprises, Inc.	cover + 3

COST EFFECTIVE SOLUTIONS FOR THE FUTURE S, C, X, Ku & Ka



1 Kw
Indoor & Outdoor
BUC's & SSPA's
GaN & GaAs
Redundant systems, Diplexers, Filters, Waveguides

16715 Hymus Blvd.
Kirkland, QC (Canada) H9H 5M8
Phone: +1.514.694.8666
email: sales@alga.ca

www.alga.ca

ALGA
MICROWAVE

Satellite 2018 (Mar 12-15) Washington, DC

DISPATCHES

EO Data Support Services by ICEYE for DoD's DIUx



ICEYE, a leader in synthetic-aperture radar (SAR) technology, now has an agreement with the Defense Innovation Unit Experimental (DIUx) to purchase airborne Earth Observation (EO) data support services from ICEYE U.S.

"Having just opened our U.S. subsidiary, ICEYE U.S. is on a fast-track in providing services that will help the public sector," said Mike Lyons, CEO of ICEYE U.S. "DIUx is tackling some of the nation's most challenging problems, and we're eager to provide them with data support services that will help in solving those problems."

The U.S. Department of Defense (DoD) launched DIUx in 2015 to build a bridge between commercial technological innovation and national security endeavors.

Headquartered in Silicon Valley with offices in Boston, Austin, and the Pentagon, DIUx facilitates DoD's efforts to identify and work with commercial companies, including ICEYE U.S., to help solve national defense problems.

Earlier this year, ICEYE announced the firm's expansion into the U.S. with an entity focused on delivering EO data in long-form to its current and prospective clients.

ICEYE U.S. is also developing data analytics capabilities to support more varied industry specific services.

The company also expand their operations into Warsaw, Poland, to further develop ICEYE's operations and accelerate company growth.

Tapping into the country's deep and growing talent pool of engineers, ICEYE's expansion into Warsaw is the company's first office outside of its current headquarters in Espoo, Finland.

ICEYE's Poland office, set to open later this year, will house one of ICEYE's Mission Operations Centers to control communications with the satellite constellation.

Coming on the heels of securing nearly \$15M in funding just this year, ICEYE remains on track to be the first organization in the world to launch SAR smallsats.

www.iceye.com

www.diux.mil



DISPATCHES

Rescue and Ocean Safety Training by U.S. Coast Guard on Hawaii's North Shore



The U.S. Coast Guard, Honolulu Fire Department and Ocean Safety and Lifeguard Services crews conducted joint training on Oahu's North Shore Tuesday ahead of the island's famed annual high surf season.

The three agencies are the primary responders to incidents in the nearly seven mile long surf zone off Oahu's North Shore which draws surfers from all over the world every winter.

The swell can reach heights of more than 30 feet and is very dangerous even for experienced surfers.

Two Coast Guard MH-65 Dolphin helicopters from Coast Guard Air Station Barbers Point,

a Honolulu Fire Department helicopter and small boat crews and three Ocean Safety rescue craft operators participated in the event off Haleiwa.

The focus was operating together to rescue a person in trouble in challenging high surf conditions.

The crews worked to improve communication and practice hoisting techniques in and out of the surf while exposing each organization to the other's capabilities.

"We were really excited to have an opportunity to train in the surf on the North Shore with our partners at Honolulu Fire Department and Ocean Safety," said Captain Carl Riedlin, commanding officer Coast

Guard Air Station Barbers Point. *"It was a great opportunity to share techniques and camaraderie in an area we are all passionate about and that is rescuing people in the ocean."*

Residents and visitors alike are encouraged to check conditions prior to engaging in ocean activities. Lifeguards on scene can be spoken with and Ocean Safety maintains a database of current beach surf conditions at www.hawaiibeachsafety.com for all island coastlines including closures and alerts.

All agencies support the current advice: When in doubt, don't go out. However, if you are going out tell someone where you are going and when you'll be back.

Small emergency beacons have also come down in cost and fit in the pocket of your board shorts. Once activated, they use a satellite signal to alert responders to your location quickly and are extremely accurate.

www.uscg.mil

Story by Chief Petty Officer Sara Muir, U.S. Coast Guard District 14, Hawaii.



DISPATCHES

For the U.S. Army's 1st Security Force Assistance Brigade, Comms are the Key

Soldiers with the military occupation specialty Signal Support Systems Specialist, or 25U, are vital to the mission success of the 1st Security Force Assistance Brigade at Fort Benning, Georgia.

SFABs are new brigades specifically trained and built to enable combatant commanders to accomplish theatre security objectives by training, advising, assisting, accompanying and enabling allied and partner indigenous security forces. Signal operations in a unit are primarily conducted solely by 25 series MOS's.

"It is like working with a bunch of professionals as a member of 1st SFAB," said Sgt. 1st Class Douglas King, a native of St. Louis, Missouri, Section Chief, 4th battalion, 1st SFAB. "It is a job that does not get a lot of recognition in most units," said King. "The leadership here as a whole is fully engaged not only in training but the communication piece as well, which is key toward the success of the missions of SFAB."

King said that he has never been in a unit where everybody is willing to get involved to help accomplish the mission.

"There is a common understanding of the roles of everyone, and how important it is to work together," King said, adding, "As a 25U our, role is to help our foreign counterparts as well as our teams to understand the significance of proper communication. During missions everyone will be spread out and ensuring those lines of communication are up and available will be our focus."



Sgt. 1st Class Douglas King, communication section chief, 4th battalion, 1st Security Force Assistance Brigade, checks communication platforms during a brigade system validation exercise at Fort Benning, Georgia. The validation exercise was conducted to test the systems of the new equipment for the newly formed 1st SFAB. U.S. Army photo by Sgt. Joseph Truckley, 50th Public Affairs Detachment.

As advisors to partner nation communications specialists, 25Us will assist with the best use of communication equipment, and developing plans for how to employ communications assets, said Sgt. 1st Class Charvis Phillips, from Roanoke, Alabama, senior communication chief, 2nd battalion, 1st SFAB.

Phillips said as part of assisting in the development of plans they will advise their partners on dealing with factors such as the environment and terrain that could affect the range of voice and data communications.

"There is a whole lot of hands-on training with new communication equipment," said King. "There are systems we use here that throughout my 16 year military career that I have never used before."

He added, *"The real difference is the availability of different communication equipment," said Phillips. "The type of radio platforms we have allows us to talk on multiple wave lengths, such as frequency modulation, ultra-high frequency, high frequency and satellite communication for voice and Soldier radio waveform and tactical reconnaissance wing for passing data."*

The exposure to all the different signal platforms that wouldn't be available in the normal Army, is definitely a benefit to joining SFAB, said Phillips.

During King's prior assignment, he was a capability developer at Fort Huachuca, Arizona, where he was part of the future development of the Army's network.

"I never thought I would get my hands on some of the equipment we use here which is really cool. I was part of the planning team at Fort Huachuca, but never thought that I would get the opportunity to use the equipment," said King. "The tempo of training and execution is very fast and competitive in nature," said King. "That is one of the big differences between SFAB and a conventional unit. But here, no one is too big for the task, a lot of working together and doing what it takes to get the job done and complete the mission. The experience both technically and tactfully is rewarding in itself. Soldiers looking for a challenge and willing to be part of a winning team would be great candidates to join SFAB. Without comms the mission would fail, that is what makes our job so important. Individually, we don't have all of the answers, but we will find them together."

Soldiers looking to volunteer for 1st SFAB should contact their branch manager.

*Story by Sgt. Joseph Truckley,
50th Public Affairs Detachment,
U.S. Army*

DISPATCHES

Vital Comms Link Provided by U.S.A.F.'s 3 SOPS

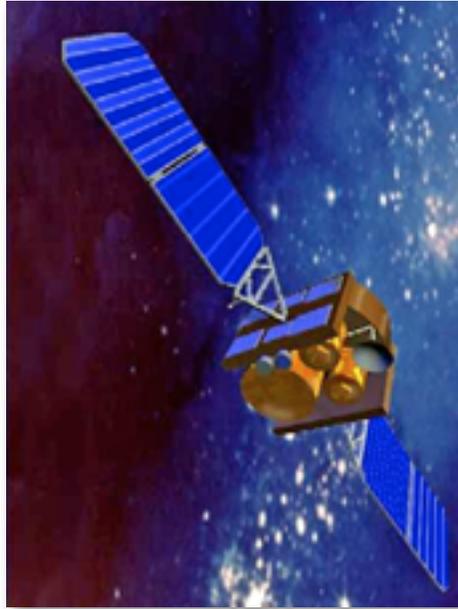


Schriever's 3rd Space Operations Squadron directed a new mission for the Defense Satellite Communications System's B7 satellite, providing improved communication for scientists at the National Science Foundation's Amundsen-Scott Station at the South Pole.

Twenty-one years after its launch, the DSCS III B7 satellite adopted its new mission of supporting communication efforts for the NSF's remote base at the South Pole, increasing connectivity in an area where communication with the rest of the world has long been a challenge.

"DSCS III B7 is the primary means of personal communications for the NSF," said Major Eric Bogue, 3 SOPS director of operations. *"It provides approximately four hours of coverage every day based on its highly-inclined orbit of 9.96 degrees."*

The DSCS III B7 is a vast improvement over the NSF's Geostationary Operational Environmental Satellite, increasing coverage time and bandwidth.



Artistic rendition of the U.S.A.F.'s DSCS B7 satellite.

"The previous satellite they used (GOES) was riddled with issues and not very reliable," said Bogue. *"The B7 is able to provide daily and reliable coverage since being adopted by the NSF earlier this spring. We optimized all six channels for NSF use, which provides much larger bandwidth for their data."*

Providing this extended coverage to a distant area such as the South Pole has drastically helped further the research of the scientists stationed there, said Bogue. The connectivity also links scientists to their loved ones, and has helped save lives.

According to a Lockheed Martin press release, the satellite played a vital role in relaying telemedicine data for the medical evacuation of two NSF employees at the station who needed additional medical care.

The incident is indicative of the reputation the DSCS III B7 has upheld after more than two decades of orbit. The Lockheed Martin-built satellite launched in July of 1995, with a 10-year design life, and continues today as part of the DSCS constellation, one of six DSCS satellites still in operation.

"The DSCS constellation has been a legacy workhorse for the U.S. military's super-high frequency communications," said Chris Ayres, Lockheed Martin Space Systems director of Operations, Sustainment and Logistics, in the company's press release. *"Now operating past twice its design life, it is gratifying to see the DSCS III B7 still delivering value, providing significant return on investment by furthering scientific research and providing potentially life-saving communications with a location otherwise unreachable."*

The proven success of the DSCS III B7 serves as a testament to advances made in satellite technology, providing connectivity for scientists in one of the most isolated regions of the world.

"This communications link to the outside world is a significant morale boost to the NSF," said Bogue. *"The NSF has reached out numerous times expressing their gratitude for this capability."*

*Story by Airman William Tracy,
50th Space Wing,
U.S. Air Force*

DISPATCHES

Next U.S.A.F. SBIRS Satellite Sits Tight @ Cape Canaveral AFS for January Launch

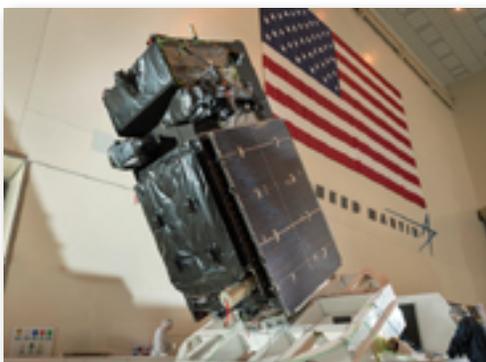


Awaiting launch at Cape Canaveral Air Force Station, Florida, is the next Geosynchronous Earth Orbit (GEO) satellite for the Space Based Infrared System (SBIRS), shipped to the launch facility by the U.S. Air Force and Lockheed Martin.

SBIRS enhances the military's ability to detect missile launches, supports ballistic missile defense, expands technical intelligence gathering, and bolsters situational awareness on the battlefield.

The Air Force's next SBIRS satellite — GEO Flight 4 — is slated to launch in January of 2018 aboard a United Launch Alliance Atlas V rocket.

The Air Force's SBIRS includes a combination of satellites in GEO orbit and hosted payloads in Highly Elliptical Orbit (HEO).



A robust, new ground control system serves as the nerve center for the entire constellation, collecting large amounts of data from the satellites' powerful sensors and converting it into actionable reports for defense, intelligence and civil applications.

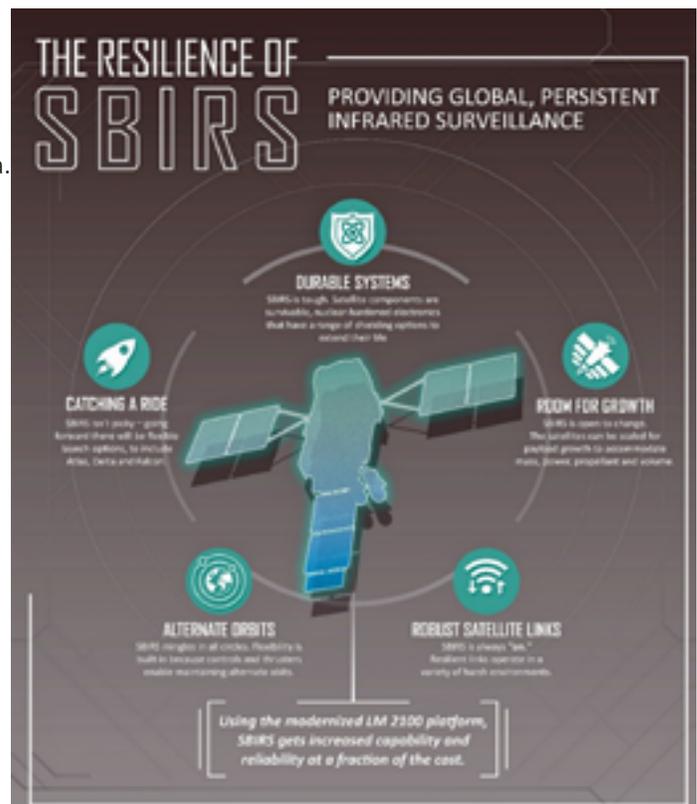
Lockheed Martin manufactured the SBIRS GEO Flight 4 satellite at the firm's Sunnyvale, California, facility. For the trip to Florida, the satellite rode in a Lockheed Martin-built C-5 Galaxy aircraft from nearby Moffett Federal Air Field in Sunnyvale, California.

SBIRS GEO Flight 4 follows the Air Force's GEO Flight 3 satellite, which launched on January 20, 2017, and in March sent its first images back down to Earth. The next SBIRS satellites, GEO-5 and GEO-6, currently in production, incorporate Lockheed Martin's new, modernized LM 2100 spacecraft to reduce costs

and cycle times, while improving resiliency and increasing the potential to incorporate future, modernized sensor suites.

The SBIRS development team is led by the Remote Sensing Systems Directorate at the U.S.A.F. Space and Missile Systems Center, Los Angeles Air Force Base, California. Lockheed Martin Space Systems, Sunnyvale, California, is the SBIRS prime contractor, with Northrop Grumman Aerospace Systems, Azusa, California, as the payload integrator. The 460th Space Wing, Buckley Air Force Base, Colorado, operates the SBIRS system.

www.lockheedmartin.com/sbirs



DISPATCHES

Harris Provides U.S. Army with Comms

Harris Corporation has been selected to outfit U.S. Army Security Force Assistance Brigades (SFABs) with reliable and combat-proven communication systems.

Harris will provide a full battlefield solution including its Falcon III® AN/PRC-152A Wideband Networking Handheld Radios and AN/PRC-117G Multiband Networking Manpack Radios, as well as its AN/PRC-160 High Frequency Manpack Radios.



*Harris' Falcon III® AN/PRC-117G(V)1(C)
Multiband Networking Manpack Radio.*

The radios will be equipped with the Soldier Radio Waveform (SRW) and the Adaptive Networking Wideband Waveform (ANW2), providing robust battlespace communications.

The SFAB trains and organizes coalition forces, while equipping them with proven and reliable equipment needed to complete their missions.

The SFAB builds coalition partner capability, preserving U.S. Army combat forces for other pressing missions if required.

Chris Young, the President at Harris Communication Systems, said that the Security Force Assistance Brigades are an important, near-term Army priority. Harris' world-class manufacturing facility enables the firm to quickly support the Army with immediate delivery of these battle-tested radios and waveforms, providing the critical communications capability for these brigades on the battlefield.

www.harris.com

DISPATCHES

Space and Missile Defense Command Leads the U.S. Army Into space

For Soldiers looking to take their career to the ultimate height — literally — the U.S. Army Space and Missile Defense Command/ Army Forces Strategic Command oversees Functional Area 40, or FA40, the space operations officer and Army space cadre development and management selection for Soldiers looking to transition to a career in space.

"FA40 officers serve in operating and generating force positions supporting the Army and unified action partners that focus on delivering space capabilities to the warfighter today, as well as developing and integrating space capabilities for the future," said Mike Connolly, director, USASMDC/ARSTRAT Army Space Personnel Development Office, or ASPDO.

Soldiers are selected for the FA40 after a competitive selection process through the Voluntary Transfer Incentive Program, or VTIP, which can occur at the four-year mark of a Soldier's career. In addition to their technical abilities, Soldiers applying for the FA40 are also evaluated based on their values and leadership capabilities.

Once designated, FA40 officers attend the Space Operations Officer Qualification Course that includes the National Security Space Institute, the Space 200 course, and seven weeks of Army-focused space training provided by the SMDC Directorate of Training and Doctrine.

"These courses, 11 weeks in total, are the foundation for FA40 education," said Robert C. Hoffman, chief of U.S. Army Space and Missile Defense School Space Training Division. *"This is the course that takes Army officers from their basic branch and*



A U.S. Army uniform featuring an Army Master Space Badge. Photo is courtesy of Carrie David Campbell.

teaches them the fundamentals or the 'science' of Space Operations."

Higher-level courses and seminars are also required as the officer progresses, and officers can also attend other training based on the specific requirements of the billet they are being assigned against. These courses include, but are not limited to, the Special Technical Operations course, Tactical Space Operations Course, Space Control Training, Joint Tactical Ground Station or Advanced Space Operations School courses.

While FA40 officers originally comprised the space cadre, the program expanded in 2007 to include other military occupational specialties and areas of concentration, as well as Department of the Army Civilians who perform duties in one of the five space mission categories. There are currently more than 5,000 personnel identified as members of the Army space cadre in all three components throughout the Army.

Connolly emphasized the importance of the growing Army space cadre. *"Our Army has an unrelenting dependence on space capabilities to execute unified land operations in support of the combatant commander's objectives,"* he said. *"The Army is one of the largest users of space*

and is also a provider of space-based capabilities. Accordingly, the Army needs Soldiers and civilians who understand the space mission areas and how space is integrated with other warfighting capabilities.

"The Army space cadre is an untapped resource within organizations; with the space domain being a contested environment, the importance of space-enabled capabilities and the Army space cadre will continue to grow," Connolly said.

Connolly added that every day, millions of Americans swipe credit cards for everything from bank transactions to gas purchases to renting movies, never realizing that each of those swipes relies on a space-based capability for success.

"In our society, space has become so normalized, that most are no longer paying attention," he said. *"However, as military and civilian leadership are increasingly exposed to the capabilities being provided to our national defense through and from space, the requirement to fully understand and employ offensive and defensive measures will only expand."*

"In the Army, FA40s will serve as the core of a cadre appropriately trained and educated to meet these challenges, but they will not be alone," Connolly added. *"Department of the Army civilians and other Soldiers will share the burden and to ensure success, their development and training must be a priority."*

Story by Jason B. Cutshaw,
USASMDC/ARSTRAT Public Affairs

DISPATCHES

Better Comms for Warfighters Goal of New General Atomics Contract

General Atomics Electromagnetic Systems has been awarded a Department of Defense Ordnance Technology Consortium (DOTC) contract from Advanced Technology International for the Army Resilient Global on-the-move SATCOM (ARGOS).

ARGOS is a satellite system intended to provide Ultra High Frequency (UHF) and Very High Frequency (VHF) Beyond Line of Sight (BLOS) assured communications and Unattended Ground Sensor (UGS) data capture capabilities for use by the United States Army.

Nick Bucci, vice president for Missile Defense and Space Systems at GA-EMS said that their team has demonstrated success in the rapid design, development, test, and launch of satellite systems like ARGOS, and that ARGOS will play an important role in delivering beyond the horizon assured communications for the Army Component and Combatant Commanders. A satellite-based system will provide assured communications for future warfighters whenever and wherever they need it.

The U.S. Army and Combatant Commanders are involved in countering transnational organized crime, humanitarian assistance/disaster relief, peacekeeping operations support, training and exercise, multi-national engagements, and human rights efforts. Not only will ARGOS support the needs of the U.S. Army, but also the Combatant Commanders and Partner Nations.

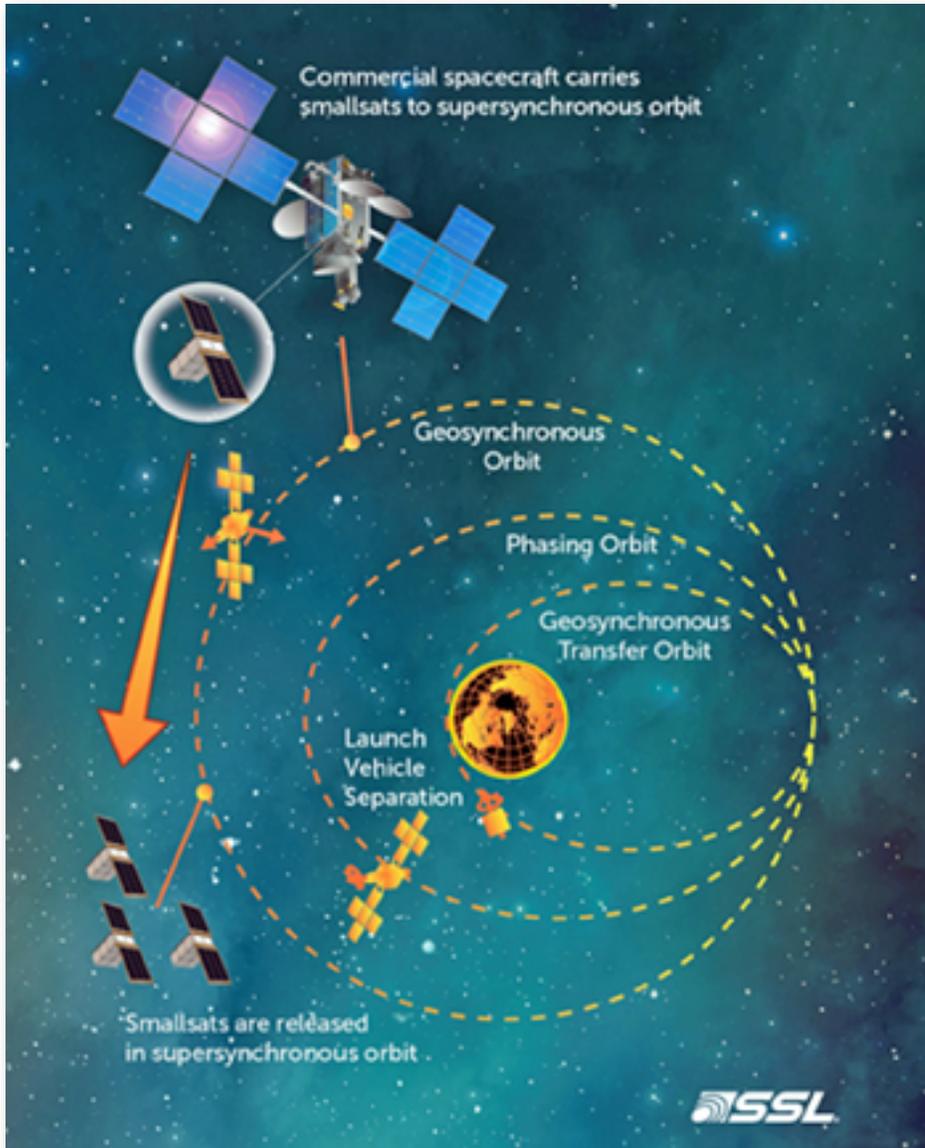
GA-EMS has successfully flown eleven satellites, providing concept to on-orbit integrated system solutions to support a variety of defense and aerospace applications. GA-EMS specializes in developing space satellite system solutions, including emerging technologies for 3U to 6U CubeSats

and small satellites that offer a high degree of configuration and payload flexibility.

www.ga.com/ems

DISPATCHES

SSL Partners with NASA JPL and University of Michigan for SunRISE



SSL, a business unit of Maxar Technologies (formerly MacDonald, Dettwiler and Associates Ltd.) (NYSE: MAXR; TSX: MAXR), has partnered with a team at NASA's Jet Propulsion Laboratory (JPL) and the University of Michigan (UM) selected by the agency to conduct a Phase A mission study under NASA's Explorers Program.

SSL's role in the mission, called the Sun Radio Interferometer Space Experiment (SunRISE), is to provide a ride beyond geosynchronous orbit (GEO) for a constellation of science-gathering smallsats. SSL

will use its Payload Orbital Delivery System (PODS) technology to dispense the small satellites on-orbit as free-flyers.

Mission Principal Investigator Justin Kasper, Associate Professor in the University of Michigan's Climate and Space Sciences and Engineering Department, will lead the SunRISE team that will use the small satellite constellation, operating as a synthetic aperture radio telescope, to address the critical heliophysics problems of how solar energetic particles are accelerated and released into interplanetary space. Heliophysics is the study of how

the Sun affects the environment of the Solar System. By sharing a ride to space on an SSL-built satellite with PODS, the SunRISE mission benefits from the frequency of commercial launch schedules and a significantly reduced launch cost compared to a dedicated mission.

SSL developed PODS in conjunction with the Defense Advanced Research Projects Agency (DARPA), with the expectation that it will play a key role in enabling cost-effective, high tempo access to space for small payloads on a wide variety of important commercial, government, and scientific missions beyond LEO.

NASA is also leveraging SSL's commercial capabilities and experience to help reduce cost on a variety of next-generation missions that enable groundbreaking robotics and automation technologies. These include a NASA Discovery Mission to explore the asteroid Psyche, the Restore-L mission to service satellites in LEO, and the Dragonfly program, which will demonstrate robotic satellite assembly on-orbit.

Richard White, the President of SSL Government Systems, added that the Payload Orbital Delivery System was developed as an innovative solution for smallsats that need to reach GEO and beyond. The PODS system helps to provide flight opportunities for cost-capped missions that wouldn't otherwise be feasible.

www.sslmda.com

clasp.engin.umich.edu

DISPATCHES

Hot-Fire Test for U.S.A.F. by Aerojet Rocketdyne

Another milestone for Aerojet Rocketdyne, as this company's hot-fire test of a controllable solid rocket motor was successful in demonstrating "the increased capabilities of an advanced, controllable solid rocket motor system."

This milestone was recently achieved by completing a successful hot-fire test of a controllable solid rocket motor under the U.S. Air Force Demonstration and Validation Post Boost Study A program.

Aerojet Rocketdyne CEO and President Eileen Drake said that this hot-fire test successfully demonstrated the increased capabilities of an advanced, controllable solid rocket motor system, and that applying this technology could provide increased mission flexibility and capability in a future post boost propulsion system.

Post boost propulsion systems are a critical element of strategic and missile defense systems for final payload positioning and deployment.

The Post Boost Study A program was aimed at identifying emerging propulsion concepts using a trade study approach and selecting high potential candidates for demonstration of technical maturity.

Vice President of Defense Advanced Programs Tyler Evans said this program allowed us to evaluate various advanced technology propulsion systems and select one of the most promising — a controllable solid rocket motor system for hardware demonstration testing. He continued that maturing

this critical technology now will undoubtedly pay future dividends as the nation looks to modernize its strategic deterrent capabilities in the coming years.

www.aerocketrocketdyne.com

DISPATCHES

ESPA Space Platform to be Developed for U.S.A.F. by Orbital ATK



Artistic rendition of the ESPASatellite™ platform. Image is courtesy of Orbital ATK.

Orbital ATK has been awarded a contract from the U.S. Air Force Space and Missiles Center (AFSMC) to build LDPE, or the Long Duration Propulsive Evolved Expendable Launch Vehicle (EELV) Secondary Payload Adapter (ESPA) space platform.

The innovative platform, positioned between the launch booster and a primary space vehicle, is used to carry small payloads or deploy smallsats.

Under the contract, Orbital ATK will design and manufacture the LDPE using its ESPASatellite™ platform. The award includes the initial LDPE, plus options for two additional systems and adds to the rapidly growing production of ESPASatellites that support a wide variety of customer missions.

ESPASatellite uses a modified EELV Secondary Payload Adapter ring as its structure and is capable of being launched aboard any

launch vehicle that meets the EELV standard interface specification.

The ESPASatellite platform provides a modular, cost effective and highly capable platform for hosting technology development and operational payloads.

ESPASatellite leverages work performed on the company-designed ESPA Augmented Geostationary Laboratory Experiment (EAGLE), which successfully demonstrated similar technology for the U.S. Air Force. In addition to EAGLE, two ESPASatellites are currently in production for other customers.

ESPASatellite provides power, pointing, telemetry, command and control for attached payloads or for small satellites that can be deployed from the vehicle.

Built to provide an even greater level of access to space, Orbital ATK's ESPASatellite can accommodate any combination of up to six hosted or 12 separable, free-flyer payloads in low and geosynchronous orbit.

Mike Larkin, the VP and GM for Orbital ATK's Satellite Systems Division, stated that ESPASatellite's game-changing capability is another example of Orbital ATK's ability to deliver innovative products that fill a need for customer. Based on Orbital ATK's flight-proven GEOSatellite product line the new ESPASatellite technology will provide a cost-effective ride to space for secondary payloads and offers maximum flexibility for orbit locations and deployment.

www.orbitalatk.com/

DISPATCHES

SES Government Solutions Gains GSA Inclusion

SES has announced that the U.S. General Services Administration's (GSA) Future Satellite Communications Service Acquisition (FCSA) program has awarded SES Government Solutions, a wholly-owned subsidiary of SES, a spot on the Complex Commercial Satellite Communications Solutions contract (CS3).

Industry awardees will be able to bid on opportunities with a budget ceiling of \$2.5 billion. The Indefinite Delivery/Indefinite Quantity (ID/IQ) contract vehicle has a ten year period of performance consisting of a five year base term plus a three and two year option.

CS3 helps to ensure that critical government communications are delivered using the top capabilities available in the market. According to the General Services Administration, CS3 awards were given to the highest technically rated offerors with a fair and reasonable price.

Complex solutions can include any combination of fixed and/or mobile satellite services, service enabling authorizations, components, and ancillary equipment such as terminals, teleports, and peripherals.

Pete Hoene, President and CEO of SES Government Solution, noted that CS3 gives the U.S. Government and its agencies another contract vehicle to

leverage the uniquely scalable and secure end-to-end managed-services SES Government Solutions provides.

This inclusion will allow the U.S. Government to take advantage of the company's most innovative offerings, including high throughput connectivity on SES' multi-orbit satellite fleet.

www.ses-gs.com

www.gsa.gov

DISPATCHES

Lockheed Martin Hands Over MUOS-5 to NAVSOC

The U.S. Navy's Communications Satellite Program Office, PMW 146, and Lockheed Martin have handed over full operational control of the fifth Mobile User Objective System (MUOS) satellite to the Naval Satellite Operations Center (NAVSOC).

This milestone followed the successful completion of the MUOS-5 satellite's on orbit testing and delivery of all operational products needed to "fly" the satellite. In April, the Navy, working with Army Forces Strategic Command (ARSTRAT), configured one of MUOS-5's two communications payloads — its legacy Ultra High Frequency (UHF) payload — for testing.

The handover of this satellite to NAVSOC clears the final hurdle allowing for ARSTRAT to provide the payload's final configurations to support the Navy's legacy UHF satellite communications mission.

Eventually, legacy narrowband UHF communications will transition to next-generation Wideband Code Division Multiple Access (WCDMA) capabilities. To facilitate that transition, all five on orbit MUOS satellites were intentionally designed with two communications payloads to support both Legacy UHF and WCDMA.

Early combatant commander testing of the on orbit WCDMA payloads began in July of 2016. The new MUOS capabilities will revolutionize communications for mobile forces with simultaneous, crystal-clear voice, video and mission data over a secure high-speed Internet Protocol-based system.



Users with new MUOS terminals will be able to seamlessly connect beyond line-of-sight around the world and into the Global Information Grid, as well as into the Defense Switched Network, as part of the Navy's worldwide cellular network.

Once fully operational, the MUOS network of five on orbit satellites and four relay ground stations will provide more than 10 times the communications capacity of the legacy UHF satellite system. MUOS' network already provides near-global coverage, including communications into polar regions. MUOS also has demonstrated successful communication of Integrated Broadcast Service (IBS) messages.

Mark Woempner, Lockheed Martin's director for Narrowband Communications, related that today, every Combatant Command in aircraft, ships, submarines, ground vehicles, as well as by troops in the field and special operations, rely upon secure, beyond-line-of-sight (BLOS) UHF

satellite communications provided by the Navy. ARSTRAT's final configuration of MUOS-5's UHF legacy payload allows the satellite to fully support the military forces in these Combatant Commands.

Today, there are more than 55,000 radio terminals currently fielded that can be upgraded to be MUOS-compatible, with many of them requiring just a software upgrade.

Woempner added that the company continues to receive great and constructive feedback on MUOS' capabilities as more users access the satellite's capabilities. Similar to a civilian cellular phone service, upgrades to this new secure global military cellular network are ground-based and designed in an AGILE software development environment.

The company continues to make upgrades to the system based on user needs and look forward to bringing its full capabilities to our warfighters.

The Navy's Program Executive Office for Space Systems and its Communications Satellite Program Office responsible for the MUOS program are based in San Diego, California. Lockheed Martin assembled and tested all five now-on-orbit MUOS satellites at its Sunnyvale, California, facility.

For additional information regarding MUOS-5, please access this the Lockheed Martin infopage at www.lockheedmartin.com/us/products/mobile-user-objective-system--muos-.html

DISPATCHES

U.S.M.C. Battlefield Comms Aided by Tech Support

The ultra high frequency spectrum is the military's workhorse, supporting more than 60 percent of Department of Defense satellite communication users.

A group of technical support officers, radio operators and electronics engineers from Marine Corps Tactical Systems Support Activity put that horse through its paces testing new satellite-capable technology aboard Marine Corps Base Camp Pendleton, California.

"The purpose of the test is to evaluate the Mobile User Objective System, or MUOS, waveform in a recent version upgrade," said Capt. Michael Billings, a technical support officer supporting MCTSSA's Program Engineering Support Group. *"We are also testing the new MUOS antennas and diplexers needed to use the MUOS waveform."*

The MUOS is the Defense Department's next-generation narrowband military satellite communications system. It will support a worldwide,

multiservice population of UHF band users, providing increased communications capabilities to smaller terminals while still supporting interoperability with legacy terminals.

MCTSSA provides engineering leadership and support for Marine Corps and joint service command, control, computer, communications systems by investigating current and emerging technology, executing developmental test and evaluation activities, and providing advanced technical expertise to support the warfighter.

During this test, MCTSSA assessed the RT-1949 tactical radio's ability to use the MUOS waveform for voice and data communication while on-the-move and at stationary positions, said Billings.

"When new and innovative C4 technology and devices are heading into the hands of Marines, or upgrades are being made to existing devices, it is our job here at MCTSSA to ensure those Marines get the best equipment possible," said Colonel Robert Bailey,

MCTSSA commanding officer. *"That is why our testing is so critical for overall mission success."*

MUOS is designed to support users that require mobility, high data rates and improved operational availability.

"This new satellite-based communications system will bring a vast amount of new capability to the Marine Corps, such as improved communications capacity that is more secure and reliable," said Major James Topping, PESG deputy director. *"The fact that this new system is interoperable with existing radios makes it more flexible to the user."*

MUOS adapts cellular phone network architecture and combines it with geosynchronous satellites to provide a new and more capable UHF system.

"MCTSSA has some of the smartest and most resilient personnel throughout the DoD," said Topping. *"Having them test MUOS is a great advantage to the program and will undoubtedly benefit the operating forces."*



MCTSSA, the only elite full-scale laboratory facility operated by the Marine Corps, is a subordinate command of Marine Corps Systems Command. MCTSSA provides test and evaluation, engineering, and deployed technical support for Marine Corps and joint service command, control, computer, communications and intelligence systems throughout all acquisition life-cycle phases.

*Story by Sky Laron
Marine Corps Systems Command*

George Zueck, an electronics engineer with Marine Corps Tactical Systems Support Activity, tests the tactical chat capability of a MUOS-ready manpack radio aboard Marine Corps Base Camp Pendleton, California. Photo is courtesy of the U.S. Marine Corps — Sky M. Laron.

DISPATCHES

NSR Predicts Expanding MILSATCOM Across Global Markets

NSR's newly released Government and Military Satellite Communications, 14th Edition report finds ongoing and expanding revenue growth across the global government and military markets.

Enabling connectivity on legacy platforms will continue to be the name of the game. Unmanned Aircraft Systems, Comms-on-the-Pause, and Maritime will comprise more than 60 percent of revenue growth over the next decade.

With nearly \$9 billion in retail revenues projected by the end of 2026, questions remain over the role of future proprietary military capacity, how a refocus on Asia Pacific will shape deployment strategies, and which market/s

provide the best role for commercially-sourced vs. military provided connectivity.

NSR Senior Analyst Brad Grady said, *"Facing continual pressure to reduce price, uncertainty around the role of MILSATCOM systems, and a quickly evolving threat matrix, the market is shifting towards mobility-first, commercially augmented capability."*

Overall, NSR finds managed services will play a larger role, HTS will be adopted, and some acquisition is likely to happen. However, what will be the mix between government and commercially provided connectivity or how many emerging opportunities will be 'new requirements' remains to be seen.

As sequestration still impacts readiness levels today, HTS will be a growing option for new ships, airframe, and locations. Government & Military customers will be slow to adopt these higher throughput offerings, but they will be in-step with the commercial markets in achieving capacity pricing declines for both FSS and HTS satellite capacity. This will help boost uptake and chart a path towards managed services for satellite providers to remain viable partners in the market.

"A PATH FORWARD" TO UNIFIED SATCOM

CRUCIAL CONSIDERATIONS FOR ACTIONABLE MILSATCOM

By Rebecca M. Cowen-Hirsch, Senior Contributor and Senior Vice President of Government Strategy and Policy, Intelsat General

Space is a highly challenging environment — as more and more countries launch and retire their spatial assets, the space surrounding Earth has become increasingly more congested.

From 2014 through 2016, there were 264 orbital launch attempts. This number of launches will only increase with time, with several aspirational concepts for mega-constellations under consideration.

Space is also an increasingly contested location, with an ever-expanding electromagnetic interference environment (EMI) — benign and hostile. Additionally, there is evidence of the use of anti-satellite technologies (ASAT), with dramatic kinetic effects against targeted satellites as well as the orbital environment, with the resultant debris.

With the acknowledgement by the U.S. government and the nation's Allied partners, the threats to satellites has evolved from a benign environment of solutions and discovery to a warfighting domain — just like air, land, sea and cyber. This, of course, has necessitated a shift in how the industry responds to and, more importantly, deters such threats.

The manner in which we respond will directly impact the missions of U.S. Department of Defense (DoD) users, who need immediate and assured access to resilient, robust and secure satellite communications (SATCOM) around the world, across the full spectrum of engagement.

Both the commercial

sector and government leaders have acknowledged the issues and are taking steps to work together to create a more protected and resilient space environment that will improve the space capabilities for our servicemen and women. Through collaboration, the U.S. has demonstrated the validity of the tremendous leadership support that has emerged for the development of an integrated SATCOM architecture.

This architecture also requires a strategy that meets the objective interests of rapid and cost-effective commercial innovation for greater resilience and operational diversity.

In the SATCOM industry, a business model exists that provides critical communication infrastructure, from end-to-end, that is a force multiplier for the warfighter with a major operational effect on a worldwide basis.

This model comes in the form of SATCOM as a Service (SaaS), which ensures reliable, affordable, robust and seamless state-of-the-art capabilities that are fully interoperable and compatible with government systems.

Though, even with the advanced maturity and ubiquity of telecommunications provided via SATCOM, there remains a divide between historical military acquisition and use of SATCOM through leasing of spectrum (MHz) versus how the industry provides and users buy services — as a capability to support the mission whether enterprise or consumer.



As a result, the adoption as well as the implementation of an integrated, unified architecture leveraging SaaS that provides the capabilities to meet mission requirements, still faces barriers. Technology is not the impediment; however, the process and cultural impediments are what need to be addressed.

One such impediment is budget. Not the lack of budget, but where the financing is actually derived, as the U.S. government predominantly pays for the nation's critical commercial SATCOM using Overseas Contingency Operations (OCO) funding.

One-year episodic, non-appropriated funding does not provide a stable foundation on which to acquire mission-critical SATCOM. This could also lead to the misperception that MILSATCOM is "free", while COMSATCOM is not. An integrated architecture that funds, in the appropriated budget, the entirety of SATCOM is essential.

Key SATCOM responsibilities are now distributed in a fragmented pattern across the Office of the Secretary of Defense, U.S. Strategic Command (USSTRATCOM) Joint Staff, each of the military service entities and the Defense Information Systems Agency (DISA).

Subsequently, military services acquire terminals and embed them into programs of record, with the effect that there may be no direct correlation to their respective communication information requirements, nor the supporting space system timelines; this can lead to misalignment, a series of stove-piped efforts and the lack of a cohesive operational capability.

Well known is that the traditional model of leasing spectrum from broadcast-centric fixed transponded satellites is inefficient, making COMSATCOM acquisition for the military a "guessing game" as to how much bandwidth will be needed and over which region.

This is ineffective and costly in an era wherein new flexible and affordable business models, such as SaaS, are available that greatly enhance efficiencies and responsiveness to meet DoD and other national security and federal government requirements.

Adopting these models into the architecture is a cultural shift whose time is overdue. Interestingly enough, this approach of "as a Service" is already widely employed across the government for a wide range of mission-critical telecommunication capabilities.

Today, the gap between current and desired SATCOM architecture and the misalignment of federal procurement process and organizational cultures create challenges that are resulting in increasing risk of the government's ability to meet military SATCOM requirements in this changed and contested environment.

To address these challenges, there has been some positive encouraging progress over the past year as our strategic leaders challenge the status quo, stressing the imperative to look at COMSATCOM as the indispensable foundation for the future architecture. These messages are seen in both the words and actions of some of the most insightful and demanding leaders, such as these:

General Jay Raymond, Commander, Air Force Space Command, announced in April the formation of the Space Warfighting Construct, which

will combine enhanced situational awareness and responsive command and control to support a vision of a space enterprise that can fight



through conflict. In addition, General Raymond unveiled the development of a **Battle Management Command and Control (BMC2)** system that will enable commanders to simultaneously maneuver space assets and direct defensive operations against multiple threats while maintaining space capabilities for military users.

These initiatives and the strategies behind them are necessary because space is contested, degraded and operationally limited, and the DoD must endure this environment to ensure maximum capabilities. They promise to make the **Space Enterprise Vision** a reality, by transitioning to a more robust and resilient architecture underpinned by better situational awareness and responsive command and control. They acknowledge that the national security objectives are achieved through partnerships among the U.S. government, its Allies and the commercial sector.

"When our battlefield airmen go into the fight today they do so with air, space and cyberspace in their quiver," General Raymond said. *"Space and cyber are the DNA of multi-domain integration. ... Our joint warfighting partners need to have space all the time. That's not a given anymore, we're hard at work to make sure that it is. And it is going to take the support of government, industry and the support of our international partners."*

Speaking during a June breakfast at the Air Force Association's Mitchell Institute for Aerospace Studies, **Air Force General John Hyten, Commander, USSTRATCOM**, noted that



in order to meet his three priorities — strategic deterrence, decisive response and a combat-ready force — the DoD must “go fast” and take risks, to accomplish advancements more expediently than our adversaries. That spirit of innovation and risk-taking still exists in the U.S., especially in the private sector, General Hyten said, as industry develops and tests innovative technology more quickly — and for a lower cost — than the military.

To illustrate the point, General Hyten said that if a commercial company was unable to build and deliver a large wideband commercial communications satellite in less than three years, they would be “out of business.” Hyten then asked, “With the wideband commercial side, why are we [DoD] even buying wideband satellites? Why don’t we have the commercial side that already built them in three years go ahead and buy them for us, and we’ll just lease it back or come up with some other arrangement in order to do that?”

The initiation in January of the **Analysis of Alternatives (AoA)** for wideband communication system on the part of the DoD has inspired optimism across the industry, and for good reason: Through the AoA, leadership intends to build the next generation of infrastructure to replace the legacy Wideband Global SATCOM (WGS) program and provide the U.S. government with a resilient architecture rather than just another copy of the satellite program.

In unprecedented fashion, this AoA has a Commercial Working Group intended to integrate perspectives and input from industry leaders about the best ways to move forward. This is a significant reflection of what the private sector offers to the military’s operational picture.

The U.S. Air Force announced in June that it plans to formally and permanently establish a commercial presence within the **Joint Space Operations Center (JSpOC)**. This follows the initiation of the **Commercial Integration Cell (CIC)** within the JSpOC in June of 2015, in which now seven commercial companies partner with the U.S. government via **Cooperative Research and Development Agreements (CRADA)**.

This partnership enables industry and the government to exchange technology and information on a collaborative basis, increasing the degree of integration, space situational awareness, and EMI resolution while enhancing the command and control capacity of the **Joint Functional Component Command for Space** under the **U.S. Strategic Command**.

Ongoing legislation activity also promises to build the forward momentum: the **National Defense Authorization Act (NDAA)** for Fiscal Year 2017 called for the consolidation and improvement of SATCOM acquisitions. Additionally, the House Oversight and Government Reform Committee approved and sent to the House floor the **Promoting Value Based Procurement Act of 2017**, which, among other limitations, would restrict purchase decision-makers from using **Lowest Price Technically Acceptable (LPTA)** to cases in which an agency “would realize no, or minimal, value from a contract proposal exceeding the minimum technical or performance requirements.”

The potential revising of LPTA standards comes as welcome news, particularly for SATCOM acquisition, as the LPTA methodology imposes an assembly-line mentality to contract awards. When SATCOM is treated as a commodity, the realities of mission complexity and a dynamic and evolving threat environment are disregarded.

The current LPTA approach is out of sync with the DoD leadership’s emphasis in space and its critical dependence on commercial for its resiliency requirements.

The **Fiscal Year 2018 NDAA**, which, as of this writing, was approved by the Congress and is headed to the President's desk for signature, offers a very significant shift and a clear opportunity for COMSATCOM to become an integral part of the SATCOM architecture. Among key provisions for national security space programs are changes in the space organization and management, in which the NDAA:

Requires the Commander of Air Force Space Command to serve a term of at least six years and provides the Commander with sole authority to:

Organize, train, and equip personnel and operations of the space forces of the Air Force.

Serve as the service acquisition executive for DoD space acquisitions, at the discretion of the Secretary of the Air Force.

Procure all COMSATCOM for the DoD one year after the NDAA date of enactment.

Terminates the Principal Department of Defense Space Advisor (PDSA) office and transfers all existing duties, responsibilities, authorities and personnel to an official (other than the Secretary of the Air Force) selected by the Deputy Secretary of Defense.

Terminates the Defense Space Council.

Terminates the Air Force Space Operations Directorate (A-11).

Re-designates the Operationally Responsive Space Office as the Space Rapid Capabilities Office.

Holds the Deputy Secretary accountable for ensuring the reorganization of space within the DoD.

Recommends the creation of a Functional Capability Board for space to improve joint space requirements and give the United States Strategic Command authority to approve any budget request for service terminals.

When these developments are looked at as a collective whole, government leadership clearly recognizes the importance of strategic and consistent leadership in space.

This extends to the SATCOM capabilities where COMSATCOM provides users with ready access to resilient, robust and secure capabilities across the full spectrum of engagement. Importantly, this is supported by evolving policies and a strategy that drives satellite acquisition away from the aforementioned piecemeal and antiquated procurement model, which may lead to removing decades-old impediments for success.

However, the government evaluations of SATCOM are critical for their effects rather than the perpetuation of the status quo or for an historical perspective. A cultural overhaul must take hold.

Imperative is that "commercial first" is looked at first to establish and invest in a viable, reliable future SATCOM architecture — "a path forward" to unified SATCOM. Through this path forward, military users will greatly benefit from a completely integrated SATCOM architecture in which trusted commercial operators lead real innovation, empowering the DoD to consider military SATCOM (MILSATCOM) and COMSATCOM as a holistic capability to best support military missions and yield the optimal effects.

As progression is made along this path, confidence will rise that government leaders and lawmakers will recognize that SaaS brings distinct, advantageous qualities to the emergent vision. As an end-to-end managed service capability, SaaS provides mobile, high-throughput connectivity the way military users seek it: easily, affordably and operationally available — anytime, anywhere.

Unified SATCOM is the path forward with commercial and innovative programs as the foundation supported by modern government business arrangements, inclusive of SaaS. With this, military users will have the reach, resilience and technology modernization to focus on, and successfully execute their missions, through contested domains.

As the ongoing and formidable challenges in space are addressed, the military should not settle for anything less — their crucial mission success demands such occur, and occur quickly.

Rebecca M. Cowen-Hirsch is Senior Contributor to MilsatMagazine and Senior Vice President of Government Strategy and Policy.



U.S. Navy's MUOS satellite.

THE HPA CORNER

THE RISE OF SMALLSATS

By Robert Clark, Hosted Payload Manager, Harris Corporation

The rise of the small satellite (smallsat) cannot be denied.

Marking this event's 30th year, the *SmallSat Conference* at Utah State University celebrated record-setting attendance.

Launch providers are setting records, as well. On February 14, 2017, the Indian Space Research Organization (ISRO) launched 104 satellites on a single vehicle, 81 of them for Planet, which has built its company on satellites in the nanosat class.

Why are smallsats so attractive? They decrease the cost of access to space dramatically. Companies such as SpaceFlight offer catalog pricing on affordable launches to the popular Sun Synchronous Orbit (SSO). This has enabled companies, such as Harris Corporation, to complement the firm's hosted payload mission solutions with end-to-end, smallsat-based, mission solutions for customers that desire a greater measure of mission control.

Is this the end of the Hosted Payload? I don't believe so, and for several compelling reasons.

Hosted payloads offer better access to certain orbits, notably geosynchronous. Shared operations expenses offer cost efficiency that are not found in dedicated smallsats.

Additionally, a host satellite typically has experts that manage the challenges of providing and licensing communications capabilities. Larger satellites have experienced development and integration teams and robust mission assurance to minimize the risk of premature failure. The hosted instrument displaces the least valuable capacity from a host satellite, often at better value than a dedicated platform can offer.

Competing approaches are in a tug-of-war to provide the best value access to space. Players in the smallsat market are moving to fill service gaps with dedicated smallsat launch, communications, and ground operations services emerging. Smallsat propulsion improvements will open more orbits.

Meanwhile, in the hosted payload world, NASA is leading the charge to put instruments in space, with a hosting services RFP imminent for the TEMPO instrument via the U.S. Air Force SMC's HoPS contract.



This column's question for HPA Members is . . .

In today's market, where do hosted payload missions offer best-value access to space?

"As aspirational proposals related to new lower orbit satellites scramble for attention, there is still a lot of uncertainty surrounding them. Success will not come before launches, testing, regulatory and investments, which will not come from the government. This is a long path forward when robust COMSATCOM capacity is needed today. It takes commitment from both government and commercial leadership together to ensure resilient MILSATCOM. For global mobile users, from ISR, to C3, to disaster responders, trusted commercial owner-operators understand the requirements and invest ahead of time for networks that are fully interoperable with military satellite systems.

"In a world where events emerge swiftly and unpredictably, government and military users must stand by ready to deploy anytime, anywhere and reliable satellite connectivity must follow them wherever they go."

—Rebecca Cowen-Hirsch, Senior Vice President, Government Strategy and Policy, U.S. Government Business Unit, **Inmarsat, Inc.**



"The rapid pace of technological development is driving industry demand for space assets with shorter development cycles and faster access to space. This environment creates valuable opportunities for hosted payloads, which provide fast access to space, and can serve a broad range of missions. These include commercial,

government, and science missions, for communications, space situational awareness, intelligence, surveillance and reconnaissance, missile warning, navigational augmentation, Earth observation and more. We're also seeing exciting new mission concepts enabled by the frequency to orbit that the hosted payload model offers.

"SSL has experience in integrating a wide variety of hosted payloads for commercial, government, and science customers, including x-ray sensors, imagers, and fully processed communication payloads. As demand for disaggregated space assets and lower cost missions grows, hosted payloads will continue to gain momentum as an important alternative to dedicated missions."—**John Higham**, Chief Architect, Advanced Concepts, **SSL**



"Payloads hosted on commercial GEO spacecraft leverage three key attributes:

1. Payloads are hosted on established busses, built by heritage manufacturers, and taken to orbit on proven launch vehicles
2. Payloads enjoy the benefit of residence on a long-life GEO spacecraft platform
3. Payloads are operated by experienced owner operators with a vested interest in the dependability of the platform

"Assembly of these attributes results in high probability mission success. This is especially important if the hosted payload (which originally could have been a 2-3 year demo) may continue to be operated well past the initial demo phase. Of additional importance is the secure operation of the payload and secure delivery of large amounts of data or RF services — both of which are done very well by established GEO operators using existing processes and in-place ground infrastructure.

"If a payload doesn't require a stable view from GEO, it can accept a large amount of program risk, is not required to be securely operated, can sustain occasional losses of data, and can be easily replaced/relaunched in case of failure then avenues for space access other than commercial hosting may be the preferred choice. Our experience suggests that when the benefits of commercial hosting are understood by the end user, commercial hosting becomes an obvious choice."—**Bryan Benedict**, Senior Director of Innovation & Satellite Programs, **SES Government Solutions.**



www.hostedpayloadalliance.org/

About the HPA

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

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

Editor's note

Also upcoming is the second annual **Smallsat Symposium** in Silicon Valley, which will be in session from February 5 to 8, 2018 - www.smallsatshow.com



The Anik G1 satellite, built by SSL for Telesat Canada, is an FSS multi-mission C- and Ku-band GEO spacecraft designed to support a variety of applications. The satellite carries an X-band government communications payload and is the first commercial satellite to possess substantial government X-band coverage over the Pacific, ideal for naval platforms.

STORM SCHOOL FOR ALL

A RAYTHEON FOCUS: TRAINING MODULES TO BUILD A WEATHER-READY NATION

TRUE OR FALSE? *When flood waters rise, the first thing you do is get to the highest ground.*

ANSWER: False. There is something more important to remember — the first step in a flood emergency: It's a practice called *Turn Around, Don't Drown* (TADD). Never drive into water.

That lesson and other important weather safety advice are featured in Raytheon's new *Weather-Ready Nation* training modules, now available online.

The courses were developed by Raytheon and hosted by the University Corporation for Atmospheric Research (UCAR), and they're free, available for anyone who might face severe weather — which includes just about everyone.

The training teaches how to prepare for, survive and recover from weather emergencies and is all part of the *Weather-Ready Nation* (WRN) *Ambassadors* program.

The program was established by the National Oceanic and Atmospheric Administration (NOAA) to help make citizens safer when weather-related disasters strike.

The program relies on a vast network of public/private partnerships to promote WRN messages, collaborate with NOAA, share success stories and serve as examples of weather preparedness.

"Raytheon was one of the first Weather-Ready Nation Ambassadors," said Brad Scalio, a Raytheon chief engineer and trained meteorologist. *"Because we offer so much weather tracking and predicting technology, we can make real, meaningful contributions to the Weather-Ready Nation goals. The program is action-oriented, and Raytheon is ready to put its technological and meteorological knowledge to work."*

The Raytheon-developed *Weather-Ready Nation* training modules — eight in all, each 10 minutes long and designed for grade-schoolers as well as adults ages 13 and above — were developed in partnership with NOAA, and are now available online.



Hurricane Sandy damages closed scenic Ocean Drive, which links south New Jersey's barrier islands. Over the last 10 years, U.S. weather-related deaths have averaged 638 annually, while property damage topped \$5 billion in 2014. Photo is courtesy of FEMA.



High flood waters cause the busy intersection of I-44 and Route 141 to close in Valley Park, Missouri, on January 1, 2017. Flooding is the leading cause of weather-related deaths according to the Centers for Disease Control. Photo is courtesy of FEMA.

The videos focus on the highest-priority actions to take before, during and after bad weather, and are tailored to each U.S. state. Someone in Denver, Colorado, for instance, would take winter weather training, while someone in Miami, Florida, might learn more about hurricane safety. Fellow Weather-Ready Ambassadors at UCAR helped to implement and host the modules online.

"UCAR is at the forefront of weather and climate research," said Rich Jeffries, director of The COMET Program at UCAR. "The Weather-Ready Nation Ambassadors program allows us to help bridge the gap between academia, government and industry. Working with Raytheon on the training modules yields the latest understanding of the weather for practical benefit for our nation."

At NOAA, Raytheon operates and maintains the data system used for all of the forecasts at the **National Weather Service** (NWS).

The Advanced Weather Interactive Processing System (AWIPS) ingests, analyzes and disseminates weather data collected across the globe and from satellites in space. The system also creates visualizations and assists NWS forecasters as they issue severe weather watches and warnings.

"Raytheon works closely with NOAA and the NWS to better understand the role technology plays in weather preparedness," Scilio said. "Raytheon employs many meteorologists who are dual-hatted as IT engineers. This broad expertise enables a deep understanding of the role technology plays in weather preparedness."

On the AWIPS program, Raytheon has been making incremental updates, recently finishing an upgrade at more than 140 NWS offices.

"Raytheon understands how to use technology such as high-performance computing and big data analytics to help make sense of the weather," said Scilio. "New consumer technologies, like mobile devices, have enabled better situational awareness for emergency responders and the public. Virtual weather training is a natural way to extend technology's reach to help create a Weather-Ready Nation."

www.raytheon.com

www.meted.ucar.edu/emgmt/wxreadynation/launch.htm

INTERFERENCE MITIGATION AND BEAM SWITCHING VALIDATED ON EPIC^{NG} SATELLITES

By Skott Butler, President, Intelsat General Corp.



Intelsat now has five of our new high-throughput Intelsat Epic^{NG} satellites in orbit, with four in service and IS-37e, launched last month, slated to complete testing and enter service in early 2018.

Two of the Intelsat Epic^{NG} design features often talked about are the enhanced ability to mitigate both intentional and accidental interference and the ease with which a user on the move, whether land, sea, or air, can switch from one spot beam to another as the beam crosses through the satellite’s footprint.

Intelsat recently completed a round of testing that validated both of these attributes. Attended by U.S. Department of Defense (DoD) observers, the first showcased the capability of the Intelsat Epic^{NG} platform’s advanced digital payload to work around efforts to interfere or jam the signals on the first Intelsat Epic^{NG} satellite, IS-29e.

The demonstration used a remote terminal transmitting video over the satellite to a hub Earth station. During the validation process, technicians transmitted an interference signal on the same channel used to transmit the video.

Once interference was detected, technicians were able to reconfigure the satellite and the remote terminal and quickly re-establish video transmissions. The reconfiguration did three things:

- 1) *It terminated the interferer at the satellite, thereby clearing the downlink*
- 2) *It provided a new, interference-free uplink channel*
- 3) *It connected the new video uplink channel to the original, now clear, downlink channel*

A fourth evaluation might have been done, but was not part of the test. The isolated interfering signal could have been delivered to a location of the customer’s choosing, which would allow them to characterize the signal to better understand the nature of the adversary.

This interference mitigation capability provides a level of reliability and security that is of vital importance to our customers. This is part of the company’s overall systematic defense-in-depth approach that detects, prevents and mitigates attacks so that mission assurance is greatly enhanced.

In the second test, an IS-29e was used to validate the beam-switching capabilities with General Atomics Aeronautical Systems and their Block 5 Predator B/MQ-9 platform.



Artistic rendition of the IS-29e Epic^{NG} satellite.



The Predator B MQ-9 Reaper®, equipped with a fault-tolerant flight control system and triple redundant avionics system architecture. Photo is courtesy of General Atomics.

Beam switching is crucial for UAS to be able to fly over wide areas and maintain a connection with the satellite, both for flight operations and transmission of sensor data.

The tests were performed at the General Atomics flight test facility adjacent to the Grand Forks Air Force Base in North Dakota.

During the tests, the UAS flew a round trip of 1,075 nautical miles, while switching between spot beams on Intelsat IS-29e. Command-and-control was verified as well as sensor data transmissions from the aircraft multiple times in both beams.

In the tests, closed loop control of the aircraft had less than five seconds of outage. This was validated over multiple beam switches.

Video transmission from the UAS had less than 10 seconds of outage during those beam switchovers. The additional time for the video was due to re-synching of the decoder at the receive site.

To conduct the testing, the FAA granted General Atomics a waiver that authorized the Block 5 MQ-9 to fly in airspace managed by air traffic controllers without the requirement of following it with a manned airplane, which was a first for both the FAA and General Atomics.

General Atomics has been developing UAS technologies for nearly 25 years and recently established a center in North Dakota to train UAS pilots and payload operators.

HTS platforms such as Intelsat Epic^{NG} are larger and more powerful than any previous satellites, delivering new capabilities to the nation's defense and other government customers.

Earlier tests had already been completed by the company to establish that the Intelsat Epic^{NG} spacecraft offer bandwidth efficiency improvements in the range of 165 percent on current networking hardware and up to 330 percent on next-generation ground networking technologies for small mobility antennas.

These latest tests demonstrate the ability to work around interference and smoothly move a signal from one beam to another on the satellite to maintain contact in flight providing further proof of the value of this constellation to our government and commercial customers.

www.intelsatgeneral.com/

The preceding article is courtesy of Intelsat General's SatCom Frontier infosite and editorial team.

SATELLITE, NOT WALLS, SECURE THE BORDER

AN SSPI “HOW SATELLITES MAKE A BETTER WORLD” PERSPECTIVE

By the Society of Satellite Professionals International (SSPI)

It can literally be a line in the sand or a fence made of concertina wire — a guard outpost on a busy road — a strip of unoccupied beach — a patch of trackless forest — a river snaking its way between two nations.

Invisible, yet vital, borders define where one place ends and another begins. Borders are in the mind and heart as well as the laws of a nation, and they represent a barrier or a beginning, safety or threat, opportunity realized or opportunity denied.

In June of 2016, the United Nations reported that a record 65 million people around the world had been displaced by conflicts that flared from Latin America and the Middle East to Western Asia and the Pacific Rim. Nearly 41 million were still living within their own countries but 24 million — including 100,000 children — were desperately trying to reach safety and opportunity in a foreign land.

Add in the illicit trade in drugs, guns and other contraband and it appears those invisible lines are under assault as never before. Everywhere, more prosperous nations feel compelled to defend their borders from intrusion even as they struggle with the moral and practical challenges raised by an ever-rising tide of refugees, smugglers and potential attackers seeking entry.

DEFENDING THE INVISIBLE

Australia has a coastline that stretches for 37,000 kilometers. How can such a vast expanse be monitored and managed? The only solution Down Under, as for most countries in the world, is satellite technology.

Satellite plays many roles in securing the border. The first is visibility. Earth observation (EO) satellites provide detailed images of hot spots where border crossings peak. In the U.S., the Department of Homeland Security shares data from military reconnaissance satellites with local, state and Federal agencies responsible for immigration and anti-smuggling programs. Sensors are able to penetrate cloud cover, detect chemical traces and even identify objects inside buildings.

India uses the RISAT and Cartosat spacecraft to capture still images as well as high-resolution video of the nation’s disputed borders. South Africa has used satellite imagery to track activity at border control posts between that nation and Zimbabwe. The imagery picks up new roads and tracks, massed vehicles, temporary settlements and even places where fences have been compromised by migrants seeking access to one of Africa’s most stable and prosperous countries.

CONNECTING THE MOVING PIECES

Visibility is not just a matter of sensors in space. Satellites also provide data, video and voice communications with aircraft, helicopters, ground vehicles and maritime vessels on border patrol. That makes it possible for widely scattered forces to share information and images, and to operate as a single unit.

Monitoring Australia’s coastline for illegal immigration and resource exploitation is only possible because satellite links a fleet of coast guard ships and small boats as well as camera-equipped surveillance aircraft. Satellite is even being used to link automated surveillance radar units set up at borders to detect moving targets over both land and water. They are particularly effective at spotting the tiny ultralight aircraft that drug smugglers use to bring their goods to market.



Unmanned aerial vehicles (UAVs or drones) have revolutionized warfare. They are also active in border patrols. Flown via satellite by remote operators, they can stay in the air for long periods of time and send video from the field, which effectively extends the reach of border control agencies for thousands of miles. So successful have drones been on the southern border of the U.S. that drug smugglers have begun hacking into their communications to throw them off course.

Ironically, the cyberattack involved another satellite technology: GPS. After gaining access to the drones' control system, the smugglers feed the aircraft fake GPS coordinates that send them hurtling across the sky to the wrong location. A new generation of low-altitude satellites is delivering a solution by transmitting navigation data at 1,000 times the power of GPS.

ADVANCED WARNING

Satellite technology helps stop people and goods at the border — but its greatest value may be keeping them from getting there.

The Automatic Identification System (AIS) is a tracking system that, by maritime law, is used on most ships to identify them and their location. When ships are near the coast, ground stations can pick up its signals — but on the open ocean, AIS connects to satellites overhead to make coast guards aware of potential trouble — whether illegal cargo or migration — long before it is in sight.

A combination of satellite radar and imaging technologies is helping immigration authorities in Europe monitor the size and changes at refugee camps on the edge of the Mediterranean and near Europe's land borders. That in turn makes it easier to predict future immigration attempts and, through preparation, save lives.

The European Space Agency (ESA) has recently launched Sentinel satellites to measure sea and surface temperature. It can detect subtle changes in surface temperature that suggest crops are failing, and shrinking harvests can trigger a new wave of migration. The same system will improve weather forecasting, warning coast guards of dangerous conditions at sea for migrants, and better track climate change, a long-term driver of migration.

Border security is ultimately about bringing together many different sources of information and making it available to a widely dispersed team. It runs the gamut from "eyes in the sky" to video from a drone or a text message from the field. The only technology in the world that can do the whole job is literally out of this world. With unsleeping vigilance, from thousands of kilometers overhead, satellites are standing guard.



This article was produced for Satnews Publishers and MilsatMagazine by the Society of Satellite Professionals International (SSPI)

See more stories and videos of satellite making a better world at www.bettersatelliteworld.com.

References

"Record 65 Million Displaced by Global Conflicts, U.N. Says," by Somini Sengupta, The New York Times, June 20, 2016.

"Surveillance," Wikipedia.com, June 21, 2016.

"Cartosat-2C to Boost Military Surveillance Capabilities," The Indian Express, April 12, 2016.

"Border Surveillance in South Africa," Airbus Defense & Space case study.

"Airborne Mobile Broadband for Government Missions," ViaSat, June 21, 2016.

"US Border Patrol Drones Hacked by Drug Cartels," www.hackread.com

"Securing the Border: Building Critical Mass with Commercial Satellites," Via Satellite, November 16, 2015.

"Bligher Border Surveillance Radar," Inmarsat.

"KVH Supports U.S. Customs and Border Protection Programs with SATCON Order from Global Technical Systems," KVH, February 18, 2014.

"Satellite Boosts Europe's Environmental, Border Surveillance," by Frank Jordans, Associated Press, February 16, 2016.

"Border Security Networks over Satellite," Koen Willems, Soldier Mod, Spring/Summer 2015.

[Photo credits (Commercial use allowed): Coast Guard – Brent Levin, Flickr Creative Commons. UAV – US Army Materials Command, Flickr Creative Commons]

HIGH THROUGHPUT ON THE HIGH SEAS FOR THE U.S. NAVY & ON ORBIT SERVICING

By Ryan Schradin, Executive Editor, Government Satellite Report, and Senior Contributor



Delivering network connectivity and advanced IT capabilities to ships at sea requires satellite.

There simply isn't a viable and reasonable alternative for delivering information to the middle of an ocean. This is why the Navy and many other maritime-focused federal agencies rely on satellites for keeping their sailors and ships at sea connected to senior leaders back home.

These ships receive a large number of services and capabilities thanks to their satellite connectivity. Satellite enables the sharing of high definition, actionable ISR data. It delivers morale welfare and recreation (MWR) services and it enables those onboard access to applications and IT services usually reserved for warfighters with two feet firmly planted on the ground.

However, today's advanced applications — including Satellite-as-a-Service (SaaS) and cloud services — and the need for increasingly high-quality ISR is drastically increasing the bandwidth requirements of ships at sea.

This sentiment was shared by Paul Damphousse, the Senior Director for Business Development at SES GS, who said, *"The requirements for throughput by themselves are increasing. That has a lot to do with where technology is going in general, where the demands of our naval leaders are going and where our required capabilities are going."*

Maritime agencies and the U.S. Navy are also innovating new technologies and platforms that can deliver enormous tactical advantages to our military while preserving the life of American servicemen and women. These new platforms — including autonomous and unmanned platforms — have immense upside, but also come with the downside of further driving up bandwidth requirements.

As Damphousse explained, *"...more and more maritime systems are becoming network-enabled. In addition to our traditional manned ships, submarines, and aircraft, the Navy is incorporating new unmanned semi-autonomous and autonomous platforms. All that data has to move throughout the battlespace or backhauled to operations centers."*

Combined, these new applications, advanced technologies and innovative platforms are forcing the Navy and other maritime-focused government organizations to find a way to deliver higher throughput and higher bandwidth connectivity to ships at sea.

According to a new whitepaper, *"High Throughput on the High Seas,"* from SES GS, the answer may still be directly in front of them — or, more accurately, above their heads.

In the white paper, they analyze increasing maritime bandwidth demands, and look at how today's new MEO and HTS constellations can deliver the requisite fiber-like connectivity that these organizations need all via satellite.

Regardless of where on the ocean ships may be stationed or traveling, the steerable beams of this next-generation of satellites can reach them.

And, with their closer proximity to Earth and focused spot beams, they can deliver extreme throughputs with much lower latency — making them perfect for powering the most bandwidth-hungry of applications.

To download a complimentary copy of the *High Throughput on the High Seas* whitepaper from SES GS, please visit ses-gs.com/govsat/resources/whitepaper-high-throughput-high-seas/.



Also, consider... the United States Navy has long been at the forefront of new technologies and IT. The Navy's consolidated IT networks are a technological marvel, functioning as both an administrative network and a warfighting tool.

However, relying on network capabilities out at sea creates challenges. Navy ships don't sail around the world with large cables connecting them back to the networks on land. That means satellite solutions are absolutely necessary to connect Navy platforms distributed across the globe to the networks, systems and applications that are necessary for accomplishing their mission.

The requirements that Navy platforms put on satellite solutions and networks is shifting as its IT capabilities and applications evolve — new, more advanced adversaries are increasingly capable of denying satellite communications through interference, jamming and even kinetic attacks. This recognition of global adversarial situations has created a need for new solutions that can offer additional resiliency in the face of an increasingly contested space domain.

To learn more about the Navy's demands and the new satellite technologies that can help to fill them, Paul Damphousse, the Senior Director for Business Development at SES GS, discussed the U.S. Navy's need for higher throughputs at sea with GSR...

Government Satellite Report (GSR)

According to Breaking Defense, the President and Naval leaders are looking to bolster the Navy fleet and ensure that it's ready and prepared to face our increasingly sophisticated adversaries. Does a larger fleet impact existing networks? Does an expanded fleet require additional throughput and connectivity?

Paul Damphousse (PD)

The answer to both of those questions is, "yes." Ultimately, the more platforms that you have, the more demand that you're going to have for additional

throughput. That means more bandwidth is going to be required.

Even beyond that — even beyond the sheer number of platforms — the requirements for throughput by themselves are increasing. That has a lot to do with where technology is going in general, where the demands of our naval leaders are going and where our required capabilities are going.

GSR

Let's explore that further. What network enabled capabilities is the Navy looking to enable? How do these new capabilities increase demand for throughput and bandwidth?

PD

Sure. Those new capabilities include the ability to do video teleconferencing (VTC), download large files, and the ability to monitor multiple high definition video streams simultaneously — just to name a few. Everyone expects higher throughputs and lower latencies and faster speeds, whether it's for logistics backhaul, operations, or simple comms.

For example, take situations where the Navy is employing direct, tactical kinetic strikes. The Navy and Marine Corps are employing tactical ISR platforms that are always overhead before, during and after strikes.

Those platforms are becoming more ubiquitous and part of our concepts of operations (CONOPS). Throughput and bandwidth are required to move those video images back to command and control nodes where decisions are being made.

Also, we're increasingly operating in what is sometimes referred to as an anti-access/area denial (A2AD) environment, where ships must operate in and around a denied battlespace.

Some of the potential adversaries now have long-range, stand-off weapons which can hold our maritime assets at risk far off-shore. In these instances, the adversaries are long past line of sight and out of direct communications range for Navy ISR and targeting solutions.

That pushes Beyond Line-Of-Sight (BLOS) where SATCOM becomes a far better solution.

Finally, more and more maritime systems are becoming network-enabled. In addition to the traditionally manned ships, submarines, and aircraft, the Navy is incorporating new unmanned semi-autonomous and autonomous platforms.

All that data has to move throughout the battlespace or backhauled to operations centers. This creates two-way requirements for high throughput, lower latency connections that can only be met with satellite.

GSR

Why is MILSATCOM — especially the new MEO and HTS SATCOM solutions — a good solution for filling these bandwidth requirements?

PD

HTS makes use of frequency reuse, enabling you to use beam cells and reuse the frequencies fairly close to one another. And that enables incredibly high throughput. These HTS satellites are sitting in GEO orbit and have the same latency as other systems, however, their throughput is much higher.

When SES GS points to their Medium Earth Orbit (MEO) constellation [formerly known as O3b], satellites that are closer to the Earth are being discussed at an operating altitude of 8000 km, or roughly 500 miles — latencies can be attained as low 150 ms and throughputs as high as 1.6 Gbps. That allows several elements, such as ISR and targeting with rich HD (potentially 4K video), offering a much more granular picture of the battlespace. A Geostationary Elliptical Orbit (GEO) satellite link has as much as a half a second or more of latency — in a tactical environment, that's sometimes far too long latency for real time decisions.

Just to reiterate, SES MEO satellites are considered HTS satellites. They offer the higher throughput of an HTS satellite, but they're also in a lower orbit and possess that lower latency, as well.

GSR

Adversaries of today and tomorrow will be more sophisticated and capable than adversaries of the past — with the potential to deny our military SATCOM connectivity through kinetic attacks on satellites and jamming. How do these MEO and HTS solutions deliver resiliency and mission assurance in space in the face of these threats?

PD

Admittedly, the company's space systems have some vulnerabilities today that were not present in the past. The paradigm has shifted with more state and non-actors able to adversely impact our space assets.

Space is now viewed as a contested environment, as opposed to the virtual sanctuary that once was fact.

When you have vulnerabilities in an architecture, placing all of the eggs in one basket is not a good idea.

There are a number of military satellites and communications systems that the military use. If those systems are compromised or degraded in some fashion, that could have a direct impact on operations.

However, when diversification is accomplished beyond the traditional government systems — and add a full suite of systems from commercial providers across multiple different orbits and bandwidth — that builds inherent resiliency into the system. In that environment, the government has a full suite of solutions and services to choose from should any part of the architecture be compromised.

In the case of the SES MEO constellation, individual spot beams are both steerable and have relatively discreet footprints on the Earth. For interference or jamming



to occur, the interferer or jammer would need to know where that beam was pointed and the ephemeris data of the satellite. If they figure out both of those things — which is pretty tough — the beam can just be steered in such a way as to null the jammer or interferer.

When you look at it holistically — having a suite of different solutions, different orbits, different bandwidths, and having these capabilities that are inherently difficult to interfere with or jam — the military can greatly improve their resiliency by embracing these solutions from commercial satellite providers.

GSR

What has the reaction been toward HTS and MEO solutions across the military?

PD

SES GS has had a variety of customers and military decision makers come through the teleport in Virginia to receive a demo of the capabilities that HTS and MEO can provide. They've also toured the company's ops center to see these solutions in action. Multiple MEO demonstrations aboard ships and in maritime environments have also been conducted.

Interestingly, the Marine Corps has been one of the most interested military organizations. The feeling is that MEO can be an enabler of new, advanced capabilities for Marine Corps expeditionary forces, and the Marine's agree.

There was an incredible and positive reaction to the MEO demonstrations at the recent conducted *Modern Day Marine Expo* in Quantico, Virginia.

What's even more exciting is that there is more MEO capacity coming online that the military can use in the near future. SES has four more MEO satellites being launched next spring — and then four more satellites being launched by the end of 2018. That's an additional 80 beams that will be available for military use soon.

During Thanksgiving week in November, Ryan offered his thoughts regarding why the military and United States government owes much to satellites.

Yes, satellites carry data and communications into places that lack terrestrial networks, satellites help to deliver actionable intelligence for senior leader examinations from the front lines and satellites also carry morale, welfare and recreation (MWR) content to deployed soldiers.

STRATCOM chief General Hyten stated, "I will not support buying big satellites that make juicy targets."

In satellite circles, resiliency is a major concern for the military. Space isn't an uncontested domain — there is serious congestion as well as an increased chance that satellites could collide or interfere with one another. And then there's the fact that adversaries are more advanced — capable of denying the nation's satellite capabilities via jamming and even kinetic strikes.

This sentiment was echoed by Air Force General John Hyten, the head of U.S. Strategic Command, at the Halifax International Security Forum. He said at that event, *"I watch what our adversaries do. I see them moving quickly into the space domain, they are moving very fast, and I see our country not moving fast, and that causes me concern."*

That concern could lead to some drastic action. General Hyten advocated for a complete reevaluation of how the military acquires satellites and builds out the militaries' space infrastructure.

The military has traditionally invested in "exquisite" satellite systems — large constellations that they developed, financed, launched and controlled themselves. These MILSATCOM satellite constellations require large amounts of time and money to build and launch. That makes them increasingly expensive sitting ducks for adversaries who will attempt to shoot down or disrupt their performance.

However, what's the alternative? The simplest may be a different approach to acquisition that distributes and disaggregates military communications across multiple government and commercial satellites. This could be done by leasing space on commercial satellites or by hosting military payloads aboard commercial satellites. Either way, such would increase resiliency and make it more difficult for even the most advanced adversary to disrupt U.S. military communications.

Satellite on the fritz? Aerospace companies are building a geek squad of space robots.

Satellites aren't cheap. It's extremely costly to build a satellite and also extremely pricey to launch that spacecraft into orbit. When so much expense is involved to build and operate something, it's nice to be able to fix it should a problem occur.

There's a reason why a car simply isn't junked when the battery dies to purchase a new car — a new battery is bought, instead.

Unfortunately for satellite communications providers, that luxury does not exist. There are no service shops in space (at least not in *this* galaxy... hmmm...) and there is no way to fix that major investment floating on orbit should something go terribly wrong. **At least... not yet.**

As a very thorough article in the *Los Angeles Times* recently discussed, a number of satellite companies are currently working on methods to fix satellites in space using robots. These service robots would attach to satellites in space, refuel and then repair them.

Unfortunately, even with major steps being made in recent years, many consider the concept to still be about a decade away from fruition. Aside from advancements being needed in the technology itself, there is a cultural issue that needs to be overcome.

Satellite companies are — understandably — somewhat conservative when it comes to their spacecraft. To use the car analogy again — you wouldn't be too happy if you owned a Ferrari and someone offering to refuel or repair the costly vehicle further disabled it. That also applies to expensive satellites.

However, when the technology has evolved and is completely proven, the ROI of repairing satellites in space could be too great for even the most conservative of COMSATCOM companies to pass up.

These articles republished, courtesy of The Government Satellite Report (GSR) and Executive Editor Ryan Schradin. He is a communications expert and journalist with more than a decade of experience and has edited and contributed to multiple, popular, online trade publications that are focused on government technology, satellite, unified communications and network infrastructure. His work includes editing and writing for the GovSat Report, The Modern Network, Public Sector View, and Cloud Sprawl.

His work for the Government Satellite Report includes editing content, establishing editorial direction, contributing articles about satellite news and trends, and conducting written and podcast interviews. Ryan also contributes to the publication's industry events and conference coverage, providing in-depth reporting from leading satellite shows.

The Government Satellite Report is sponsored by...

SES Government Solutions
www.ses-gs.com

EM SOLUTIONS

recon: Year in Review

By Dr. Rowan Gilmore, Chief Executive Officer, EM Solutions, and Senior Contributor

EM Solutions is respected globally for its premium maritime and land on-the-move satcom terminals, acknowledged as a technology leader in high speed communications from moving platforms.

The history of telecommunications has evolved with the company...

Public telecommunications in past decades was circuit-switched, organized hierarchically into groups and supergroups, analog in nature, and networked as either broadcast or point to point circuits.

The emergence of digital technology in the 1970s and 1980s was a seminal change for the telecommunications industry, since that technology allowed for massive improvement in spectral efficiency and witnessed the emergence of techniques, such as forward error correction (FEC), digital filtering and equalization that improved communications quality over poor lines.

The dominance of IP and then the emergence of the internet in the late 1990s was equally important, since packet switching has simplified multiplexing, improved accessibility, and expanded network architectures, while the connectivity of the Internet has provided the broadband

applications that have massively driven the growth of global telecommunications carriers. Then came the social media revolution in the 2010s; are we really better for that?

However, the physics of satellite communications (SATCOM) has always kept it apart. Long hops and limited power budgets place much lower bounds on signal to noise ratio and satellite practitioners look enviously at recent advances in terrestrial cellular networks, where MIMO antenna systems, high order modulation schemes, and low-cost terminals are meeting the ever growing demands for high speed data — where service is available. However, satellite still remains the only communications technology that is available any place, any time.

Recognizing early on that Ka-band solutions would be required to meet the growing data needs of the defence community, EM Solutions started to migrate many of its products to Ka-band in the mid-2000s and build them into more advanced systems.

Since 1998, the company had been developing bespoke and customized solutions for customers, which initially were the Australian Defence Force and local telcos. From its roots as a developer of solid-state power amplifiers, filters,



and oscillators it progressed up the value chain to develop high speed receivers and transmitters for radios, and now on-the-move terminals, to become the partner of choice for several European systems integrators and increasingly, defence forces around the world.

For example, the company's 80W Ka-band linearized BUC still remains the only airborne qualified solid-state BUC at this power rating on the market, and was first developed specifically for a customer in Europe.

EM Solutions has a long heritage of providing communications solutions to the military. In 2008, the company won an initial sponsorship from the Australian Army to develop a land-mobile Ka-band terminal. EM Solutions were fortunate to be able to test multiple prototypes over the Optus C1 satellite and to perfect the company's "monopulse" pointing technology before progressing to WGS certification.

The development of this unique pointing technology has taken the company on other fruitful journeys; for instance, EM Solutions designed and manufacture the E-band (80 GHz) radios operating at 10 Gbps that now link the New York financial markets, but also have application for high data rate ship-to-ship communications, offering ten times the speed of existing products.

How can a small Australian company be unique and relevant? By providing multi-band solutions, by being willing to customize SATCOM systems, and by developing superior technology, such as terminal stabilization.

In 2017, EM Solutions completed the installation of the firm's dual Ka-band Cobra terminals onto the Australian Border Force Cape Class fleet. The company's partnerships with Inmarsat and Intellian proved productive, enabling it to certify the terminals on the Inmarsat GX network as a fall back to operation on the WGS system.

EM Solutions then completed installation of its leading-edge tri-band Cobra terminal — which simultaneously operates in both X- and Ka-bands — for the Royal Australian Navy, and followed this with repeat orders for other naval vessels.

Meanwhile, the company's land-mobile terminal, the Taipan, has continued to roll out for a major European army (in X-band) as it will shortly for an army in Asia (in Ku-band). By aspiring to the level of "assured" communications, EM Solutions continues to cement its position as a company known for products unmatched in reliability and robustness.

The company's research with the University of Queensland also continued, testing innovative research on a novel reconfigurable Flat Panel Antenna — that aligns with the company's terminal strategy to offer both broadband and monopulse steered on-the-move operation. EM Solutions hope to report on success with its prototype early next year.

EM Solutions made a number of changes on the inside to accommodate the advancements happening externally. The company grew its talent base by 20 percent, adding diversity to its pool of human capital and strengthening its existing innovative capacity.

What else did EM Solutions do with its human capital? Well, they say there is nothing more Australian than spending time in somebody else's country — so this year,

EM Solutions did that, as well.

EM Solutions sent staff to the U.S., Canada, the UK, UAE, China, Korea and Japan, and secured more than \$6 million in orders from four continents.

EM Solutions sent its people to source suppliers, support terminal installations, participate in learning opportunities, attend conferences, and to meet the people with an appetite for change — the company's customers.

Those who stayed in Australia ensured that the innovation engine continued to hum. EM Solutions was named a Finalist in the 2017 Premier of Queensland's Export Awards in the categories of Innovation, Defence, and Manufacturing, as well as in the 2017 Brisbane Lord Mayor's Business Awards for Doing Business in Asia.

EM Solutions especially appreciates these local acknowledgements because such confirms the company is respected at home as well as by customers abroad.

Bringing the Australian Army's former Special Operations Commander, Major General Jeff Sengelman, to the company's Board was another important strategic step for EM Solutions. For a company heavily involved in the Defence industry, Jeff's experience is priceless and EM Solutions expect his insights to greatly improve the level of care and diligence EM Solutions owes to its Defence customers.

Two of the company's biggest advantages have been flexibility and innovation and these haven't waned. Innovation occurs by building on the shoulders of giants that have gone before — the real giants in the innovation puzzle are those customers who embrace innovation and are prepared to fund its development. Such customers push the technology envelope and drive innovation by demanding specialized requirements, new features, and performance improvements.

As 2017 draws to a close, EM Solutions salutes its customers who are the real heroes.

Author Dr. Rowan Gilmore is the Chief Executive Officer of EM Solutions and a Senior Contributor for MilsatMagazine. To learn more about the company and products, please access www.emsolutions.com.au.



HISDESAT

recon: A Year in Review

By Miguel Ángel Panduro, CEO of Hisdesat

In the field of government satellite communications, Hisdesat has worked intensively on the definition of a new government satellite communications program — SpainSAT NG — created to offer continuity to the firm's current generation of satellites, whose useful life extends until 2021.

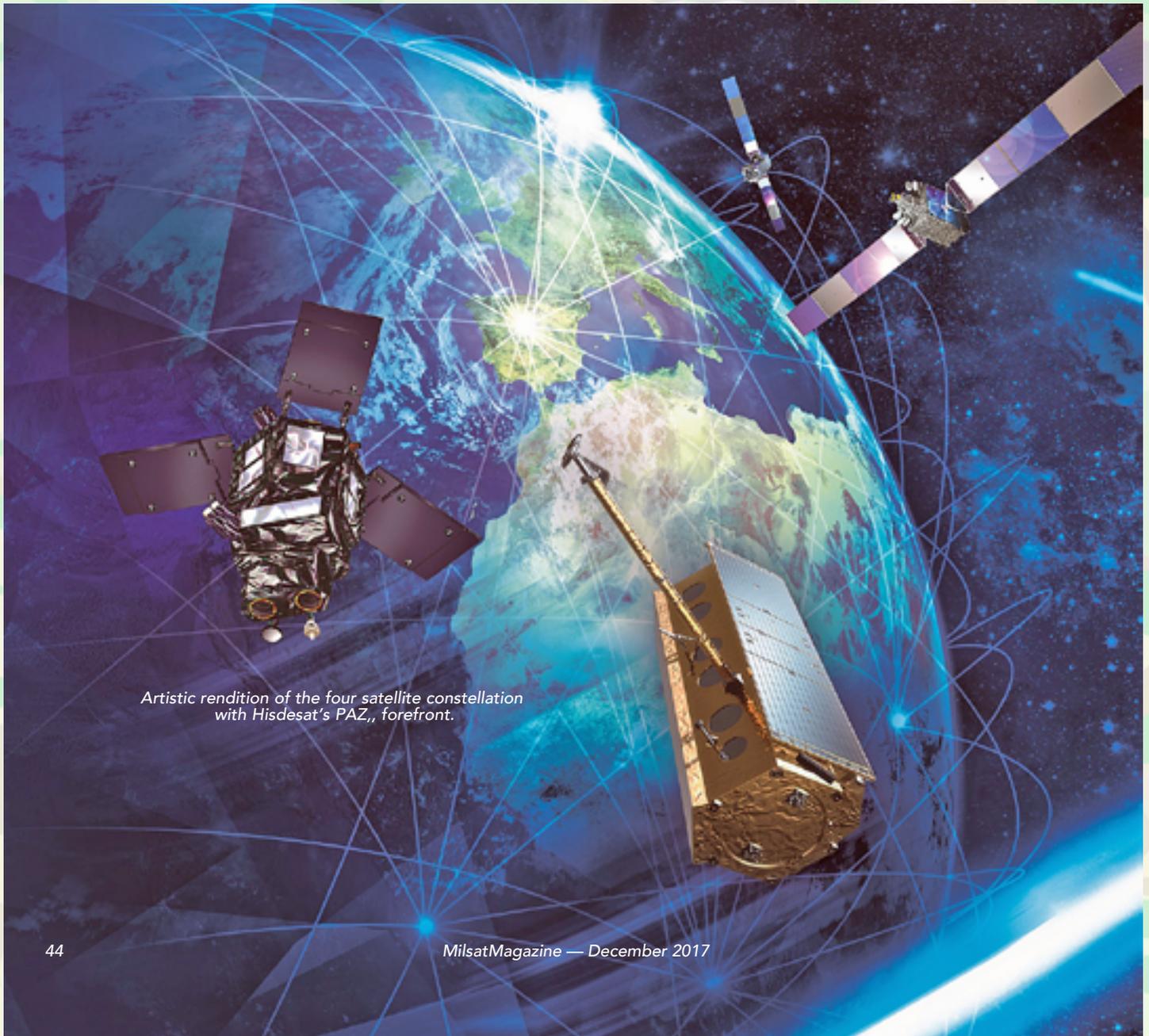
Xtar-Eur and SpainSAT, the company's two communications satellites, continue to operate in an optimal manner and provide the secure communications services demanded by the firm's national and international clients, including the U.S. Department of Defense (DoD).

The new program includes missions with capacities in the X-, Ka- and UHF-bands and integrates new innovative elements of the last satellite generation, which will allow Hispasat to be at the identical technological and operational levels of other large countries and space operators.

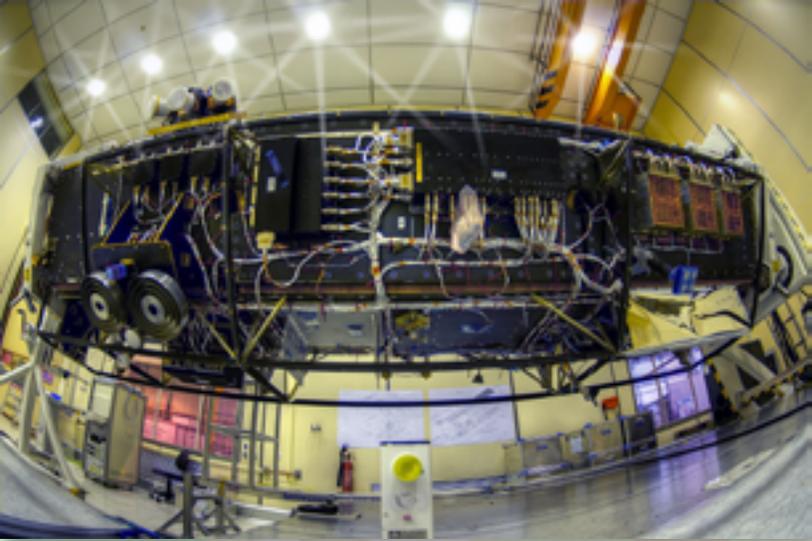
Military communications are an essential part of the Command and Control (C&C) capacity of the operations and deployments of the Armed Forces in the various geopolitical scenarios and Hisdesat continues to respond to those crucial demands, promoting new developments with investments in R&D.

In addition, the company has played a leading role in both the European Defense Agency (EDA) and the North Atlantic Treaty Organization (NATO), which has enabled the firm to increase their position, recognition and image on an international level.

The company is involved in the final phase of the consortium's feasibility study commissioned by the EDA, which is part of for a future European Government Satellite Program (GOVSATCOM) and is framed by the GOVSATCOM initiative launched by the European



Artistic rendition of the four satellite constellation with Hisdesat's PAZ,, forefront.



*Hisdesat's PAZ satellite.
Photo is courtesy of Airbus Defence and Space.*

Council of 2013. Spain plays a most important role in this development as the nation is also a leader in the program.

Hisdesat has also been in charge of the Industrial Advisory Group of NATO (NIAG) study regarding the "**Potential use of High Capacity Satellite Systems (HTS) in NATO.**" This study was comprised of 21 companies from nine nations.

The company has continued with a strategy that was initiated a couple of years ago of active participation in the working groups for this alliance, which will define the future capacities of SATCOM services within the "Future NATO SATCOM" in the 2019 to 2034 timeframe.

This strategy is aimed at aligning national interests with the requirements of the communications package that will enable Spain to become a future satellite provider for NATO through the new generation of government MILSATCOM / GOVSATCOM satellites that Spain will launch into operation at the start of the next decade.

Hisdesat's participation in the National Consortium for the development of the Space Surveillance Tracking (SST) reaffirms the firm's commitment that is focused on providing value to customers and of being a reference in those areas of space that are related to national security and defense.

Regarding Earth Observation (EO), the company committed to the Falcon 9 launcher from SpaceX to place the PAZ radar satellite into orbit with the launch scheduled for January 30, 2017, from the Space Launching Complex (SLC) 4E at Vandenberg Air Force Base in California.

Hisdesat engineers will operate and manage PAZ and the company's system upgrades will provide the highest levels of quality of service from the very start of satellite operations.

The company continues to count on the collaboration of INTA (owner of the Ground Control Centre of PAZ) to ensure the expected efficiency of the satellite's services.

The PAZ satellite incorporates as the main payload an active sensor with Synthetic Aperture Radar (SAR) technology to provide images of different sizes and resolutions during day and night hours and regardless of the weather conditions. These capabilities will allow Earth Observation (EO) for multiple applications, government and commercial, including requirements for very high-resolution images, below the meter size.

The satellite will be able to capture more than 100 high-resolution images and cover an area of more than 300,000 square kilometers per day. PAZ will orbit Earth at 15 revolutions per day at a height of 514 kilometers and with a speed of seven kilometers per second. Given the satellite's slightly inclined, quasi-polar orbit, PAZ's Earth coverage will offer an average 24-hour revisit time.

As secondary payloads, the PAZ satellite will carry an ICE-CSIC Radio Occultation and Extreme Precipitation experiment (ROHP) as well as an AIS receiver from the Canadian company, exactEarth — Hisdesat is the largest shareholder of that company, and for the first time, a simultaneous merger of SAR and AIS data can be acquired, enabling the best possible monitoring of the maritime environment around the world.

The satellite's main contractor was Airbus Defence & Space and the build of PAZ involved a consortium of 18 Spanish companies and universities.

The PAZ satellite will be located in an identical orbit as the German satellites TSX and TDX to form a SAR constellation. This constellation will be exploited by Hisdesat and Airbus DS GEO to offer a shorter revisit time as well as a greater number of images for clients.

In relation to the company's other businesses, it is worth highlighting the evolution of the firm's AIS satellite services company in Canada — exactEarth — which together with Harris Corporation, placed into service five satellites of the AIS constellation, which now reaches nine and allows for the tracking of more than 250,000 ships worldwide in real time (S-AIS).

exactEarth also launched eight satellites with Iridium NEXT, marking a milestone in the global maritime industry. This system has more than 70 payloads that can provide actionable data in seconds and provides users with significant advances in maritime safety and efficiency.

Hisdesat's future prospects are exciting and the company will continue to work to achieve new goals, all the while offering strategic value to customers as well as meeting the demands of various markets — 2018 will be an evolutionary year for Hisdesat.

Author Miguel Ángel Panduro is the Chief Executive Officer of Hisdesat. To learn more about the company and products, please visit www.hisdesat.es.



HUGHES

recon: Year in Review

Hughes experienced another great year in 2017 as the company continued to build on the firm's market leadership in broadband satellite systems and services around the globe and notably establishing the groundwork for long-term opportunities supporting the military and federal, state and local civilian agencies.

Following its successful launch from Cape Canaveral in December, 2016, EchoStar XIX — the world's largest capacity communications satellite — was put into service in March, joining the existing EchoStar XVII and SPACEWAY 3 broadband satellites to provide more than 300 Gbps capacity covering the vast majority of North America and parts of Central and South America. Designed with Hughes JUPITER™ System technology, EchoStar XIX is a multi-spot beam, Ka-band satellite that is the cornerstone of the new HughesNet® Gen5 service, which is capable of delivering 100 Mbps download speeds to individual VSAT terminals.

Beyond creating bold new possibilities for consumer and enterprise customers nationwide, the new service from

SATELLITE BACKUP SERVICE

One major initiative underway today in the U.S. is the adoption of Next Generation 9-1-1 (NG911) systems. Many Public Safety Answering Point (PSAP) locations have reported unpredictable network outages along with this new IP-based technology adoption due to various reasons. These interruptions are caused by severe weather or just technology flaws and human errors leading to failures between the local access facility and the connection to the PSAP regional point-of-presence (PoP).

Hughes has designed a seamless network backup solution leveraging satellite technology which does not rely on vulnerable terrestrial infrastructure. By adopting NG911 architectures that include this kind of satellite backup solution, PSAPs will gain the benefit of enhanced network availability in accessing next-generation capabilities like text-to-9-1-1, image/video communications and accurate cellular caller location.

EMERGENCY COMMUNICATIONS

Satellite has proven to be invaluable in emergency response efforts following disasters like hurricanes Katrina and Sandy. Most recently, Hurricanes Harvey, Irma and Maria brought a level of destruction that hasn't been seen for years, wiping out local infrastructure and leaving people, businesses, aid organizations and government agencies without reliable communications. Hughes partners with government agencies and NPO's to provide communications capabilities for first responders and in Puerto Rico alone, deployed hundreds of terminals in support of relief efforts, working with local hospitals, pharmacies and the airport authority, among other organizations.

EIS

This year, Hughes announced the company will be offering telecommunications products and services through the General Service Administration's (GSA), Enterprise Infrastructure Solutions (EIS) contract. Hughes partners as a subcontractor to prime contract awardee Level 3 Communications on this 15-year vehicle for telecommunications requirements. As agencies prepare to transition their contracts from the old Networx contract vehicle, the years ahead will see substantial task order activity, with agencies using EIS to heed the call to modernize their network technology.

Under EIS, agencies will be able to supplement their existing networks with next generation satellite broadband to connect "last mile" sites that still struggle to get adequate operational bandwidth. Hughes also brings a terrestrial broadband offering as part of a managed services model to deliver each site the best available service technology, whether it be cable, fiber, DSL, 4G or satellite. Hughes has developed a cutting edge managed SD-WAN solution that adds new levels of network automation to drastically improve cloud-based application performance and overall



Artistic rendition of the EchoStar XIX Ka-band satellite.

Hughes has opened up game-changing opportunities for the public sector — ultimately translating into more speed, more data and more advanced features for the many different applications of federal, state and local governments. These include:

REMOTE CONNECTIVITY

Recognized by the FCC as the only broadband internet service with 25 Mbps downloads available nationwide, HughesNet Gen5 brings high-speed connectivity to any government office or remote site, such as park stations, which aren't reached by terrestrial providers due to high cost of infrastructure. Only satellite offers affordable and scalable high-speed connectivity virtually anywhere. Agencies can also employ satellite broadband to establish hybrid networks, which use a blend of terrestrial fixed and wireless network technologies to increase network availability and application performance.

network availability. Beyond reducing overall cost by leveraging the low cost-per-bit of broadband, a critical byproduct of the Hughes Managed SD-WAN solution is added layers of security features to protect agencies from the rising number of threats from hackers.

CS3

This year, Hughes was also added to the GSA's Complex Commercial SATCOM Solutions (CS3) contract and will compete for various requirements of the \$2.5 billion, 10-year vehicle. Following its CS2 predecessor, CS3 is the third generation of similar offerings through this contract family and under it, Hughes will aim to deliver government agencies industry-leading custom satellite network technology to support various requirements:

1. *Interactive Services*
2. *Continuity of Operations (COOP)*
3. *Broadcast Satellite Service*
4. *Direct Customer Operations*
5. *Steady State Operations*
6. *Emergency Responder Operations*
7. *Mobile SATCOM*

WCAS SATCOM STUDY

Hughes was selected for a study program this past summer to support the U.S. Department of Defense (DoD) in planning how to make the most of the latest satellite communications technology, winning two awards under the Wideband Communications Architecture Study (WCAS) contract. Hughes is the prime on one study award and a subcontractor to an award won by the Kratos Communications team and will deliver a wide-ranging commercial perspective on how different satellite systems can interoperate for wideband government applications.

MOBILITY DRIVES INNOVATION

Mobility has become the driving factor in military customer's requests for communications solutions. More powerful in-flight connectivity for fixed-wing aircraft, and Comms-On-The-Move (COTM) capabilities for airborne, maritime and ground operations were just a few of the steps we took this past year to improve capabilities for military users.

In March, the Hughes HM200 modem was recognized by industry at the Satellite Show in Washington D.C. as the top aero mobility SATCOM innovation by the Mobility Satellite Users Association (MSUA). It can be paired with any size of qualified antenna to connect a mobile platform to the satellite and then to one or more ground stations, anywhere in the world, supporting a superior level of mobile video, voice and data, even in the harshest environmental conditions.

Hughes launched the unique HeloSat Solution that provides reliable in-flight satellite connectivity for a full 360-degree range from the aircraft.

Hughes innovation led to the introduction of the HM500 ManPack Terminal—a light, multiband satellite terminal providing on-the-pause communications for forward-deployed teams, whether on the battlefield, on a search-and-rescue mission or conducting aerial disaster assessments.

PROTECTED COMMUNICATIONS

Taking the network out into the field requires advanced waveforms and cyber security measures for operation in contested environments. Today's increasing threats from more sophisticated adversaries have created significant security challenges for military SATCOM users. To help counter this development, Hughes engineers created specialized satellite waveform algorithms that can address enemy detection and different types of RF jamming tactics.

Hughes is also working with state-of-the-art LPI/LPD waveforms that provide additional resiliency against these new and more sophisticated threats. Compatible with commercial Ku- and Ka-band satellites, the solution is now a commercially available anti-jam solution for operation in contested environments.

UAV SATCOM APPLICATIONS

Hughes is looking forward to continuing the firm's work supporting General Atomics Aeronautical Systems, Inc. (GA-ASI) to provide satellite communications on their "Type-Certifiable" Predator B remotely piloted aircraft (RPA) known as SkyGuardian. The new SkyGuardian aircraft will provide next-generation capabilities, integrating enhanced safety and reliability systems that will enable RPA to fly within civilian airspace, along with an increased payload capacity that will support a wide variety of mission sets. Hughes is upgrading the UAV's satellite communications system with the HM400 modems which are enhanced versions of the HM200, designed for the specific requirements from General Atomics.

LOOKING FORWARD TO 2018 AND BEYOND

In 2018, Hughes will continue moving forward with developing the company's JUPITER™ 3 ultra-high-density satellite, which, when launched in 2021, will provide a dramatic increase in broadband capacity to meet rising demand across North and South America. With planned offerings at speeds of 100 Mbps, JUPITER 3's coverage will be optimized to cover key areas of demand for capacity.

This kind of satellite innovation together with developments for smaller and lighter terminals as well as the company's partnership with OneWeb will offer governments and their militaries cutting-edge capabilities that can be deployed rapidly and securely to meet their evolving missions.

www.hughes.com

ND SATCOM

recon: Year in Review

By Dr. Michael Weixler, Head of Product Marketing, ND SatCom

Why was ND SATCOM so successful in 2017? In a nutshell...

- *Extended cooperation with tier one companies like AIRBUS Defence & Space on projects in Europe*
- *Framework contracts for integrated logistic support with different European armed forces concluded*
- *Teamed with new technology experts in the 3G/LTE domain — in line with ND SatCom's cellular network vision — to build deployable network solutions using SKYWAN 5G modem technology for defence, NGOs and enterprises*
- *Implemented SKYWAN technology portfolio for Thales and various other companies at a level now dominating ATC network deployments across Africa*
- *Award for the delivery of 10 COTM systems for the South African broadcaster SABC*

Defence News

For the military sector, "Making Missions Possible" is the apt slogan for ND SatCom. The company's reputation for being a reliable long-term partner is underscored by serving as a reliable supplier and logistics partner for military ground units as well as for investing in the extension and expansion of existing ground infrastructure in the field.

New projects and upgrades are benefiting from ND SatCom's work ethic and customer-centricity: the firm's teams are onsite, they ascertain and understand the end users' needs and they ensure the products are 100 percent operational — where and whenever needed.

SKYWAN networks have been, or are currently, being deployed for: (1) a military project in India, (2) a SKYWAN COTM network for Myanmar and, (3) a network for MoD Oman with fixed, mobile, and maritime solutions based on SKYWAN 5G. ND SatCom won these large-scale projects after several months of testing and evaluation.

At AFCEA (April of 2017), ND SatCom presented their joint solution with RUAG Defence: RUAG ARANEA is a platform for tactical communication relying on SKYWAN 5G for voice and data transmission via satellite in the most efficient way for vehicles or portable stations.

ND SatCom's ground segment expertise is well positioned to the communication need of multinational forces, e.g., NATO. Due to upcoming demand for leadership support, ND SatCom was awarded a contract to deliver new systems and upgrade existing solutions for land, air, sea and Special Forces for rapid deployment.

In November, the company's SKYWAN 5G technology passed initial system tests — on time — for a military ground-segment solution. This is the first step towards more comprehensive field trials. The encryption plug-in card (field-upgradeable and announced for 1H2018) will make this product more secure and even more attractive.

In 2017, ND SatCom continued building and demonstrating solutions for 3G/4G cells with highly reliable connectivity to an MNO's core network or private enterprise network. For example, one demonstration at Pacific Endeavor (an event by U.S. Command for disaster relief organizations in the Pacific Region) featured rapid deployable LTE cells. Another was hands-on training exercises where Speedcast and General Dynamics used SKYWAN 5G as the satellite link. SKYWAN 5G was chosen due to its TCO savings and easy integration into flyaway terminals of major U.S. manufacturers.

The business unit "Defence" is partner for the German armed forces satellite ground network supporting with Integrated Logistic Support (ILS). ND SatCom is primarily responsible for full lifetime maintenance of the many mobile ground station elements.

ATC News

"Installing Reliability" is ND SatCom's mission when it comes to this vertical market. With 99.95 percent TDMA channel link availability and master node redundancy, SKYWAN networks epitomize reliability.

ND SatCom is the supplier-of-choice for the Brazilian "System House" Atech, an Embraer subsidiary specializing in critical mission solutions for the defence and public safety, air traffic management and corporate market sectors. In 2017, ND SatCom provided for Atech a SKYWAN network with fixed and portable sites for building an ATC network for civil and governmental purposes.



The Thales group selected SKYWAN 5G to modernize Bolivian ATM telecommunications with a nationwide VSAT Network. For Air Traffic and Navigation Services (ATNS) and Agency for the Safety of Air Navigation in Africa and Madagascar (ASECNA), more ATC networks using SKYWAN are in the roll-out phase in Africa.

Broadcast News

When a broadcasting company in a cost-sensitive region, such as Africa, invests in a Communication-On-The-Move (COTM) solution for media contribution, such is a bold and forward-thinking decision. Multiple new SNG vehicles are in the pipeline to significantly improve the daily workflow of newscasters in this region.

ND SatCom has orchestrated the world's first combination of the firm's Satellite-On-The-Move (SOTM)-capable VSAT technology — SKYWAN — a cost-efficient SOTM antenna and the satellite capacity-allocation planning tool Media Fleet Manager. This combination is also being rolled out for ND SatCom's customer SABC, a broadcasting company in South Africa. ND SatCom realized several SNG projects during 2017. The largest ones have been rolled out for Hungarian TV operator HDT and the Finish broadcaster YLE.

Customer Perspective: 2017 Highlights

In mid-2017, the SKYWAN 5G firmware release R1.3 introduced additional QoS mechanisms, node redundancy up to N+M, a doubling of the TDMA channel number for a network bandwidth up to 320Mbps, and an increased DVB-S2 receive data rate for the end-user to more than 80Mbps per remote station. For safety critical networks, this release implemented an open interface to external crypto devices for TDMA-layer payload encryption.

After intensive interop tests with 3G and LTE equipment, SKYWAN 5G nodes backhauled cell-to-core and interconnected cells-to-cells out of the box. eNodeB manufacturers experienced new network topology options with SKYWAN 5G — from simple point-to-point backhauling to meshed cell groups where topology limitations are in current eNodeB implementations.

Additionally, LTE component manufacturers identified and are planning feature extensions in future firmware to benefit from OpEx savings and higher user experience in enterprise or closed networks with the use of SKYWAN 5G.

BU Broadcast developed a new web interface for the company's antenna control units (ACU 50x0), which provides the possibility to more easily control the antennas through the use of tablets or smartphones.

ND SatCom's 2017 Business Overview

ND SatCom's formula for success keyed on highly reliable solutions at reasonable price points. The firm's revenue grew significantly in 2017, due in part to project wins for ATC networks. In Europe, especially in the military sector, the order backlog increased considerably, with major long-term maintenance contracts awarded until 2025.

In the North American market, SKYWAN 5G attracted new customers from the commercial and military (DoD) sectors. SSi Micro, a new Canadian customer, selected SKYWAN 5G to build a VSAT network, a decision likely influenced by both service and technology advantages of local on-site training and SKYWAN 5G's unique cascading capabilities. DoD customers are currently evaluating SKYWAN 5G's new bandwidth pooling capabilities and encryption features.

With its regional affiliates, ND SatCom significantly increased business successes. With a surge of almost 30 percent in revenue vs. 2016, the company's global sales team outperformed themselves.

The business unit "Broadcast" surpassed its target and achieved 120 percent of last year's result. The driver for this success was the company's field proven technology, delivery on time and excellent cooperation between customers and engineering and support teams. Based on the SKYWAN portfolio, the business unit "VSAT" won all projects it sought for ATC networks.

Company Goals For 2018

- *Build on the achievement and momentum of 2017 with the continuing strong growth in all verticals through new business opportunities with the existing customer base and generating new leads*
- *Continue to develop and enhance the company's organization by recruiting and retaining top talents to successfully serve international customers*
- *Expand the business into new regions and territories that are fitting to the business model*
- *Focus on driving forward the SKYWAN 5G product businesses for enterprise and cellular networks with a stronger focus on Africa*
- *Continue successful partner strategy as a supplier of key components and integrated solutions*

Author Dr. Michael Weixler is the Head of Product Marketing for ND SatCom. For additional company information, please access the company's infosite at www.ndsatcom.com.



NEWTEC

recon: Year in Review

By Koen Willems, Market Director Government, Humanitarian and Defense SATCOM at Newtec, and Senior Contributor

Newtec can safely say that 2017 brought a continuation of the worldwide events that started in the pivotal year of 2016, with the Western world seeing a growth in security concerns.

As a consequence, government and defense budgets have been increased to face upcoming threats and natural or man-made disasters. Newtec is pleased to be able to contribute to making the world a safer place by introducing innovative and disruptive satellite communication technology.

GLOBAL WARMING'S DISASTEROUS EFFECTS

Worldwide geopolitical events, conflicts and disasters have a direct impact on the satellite communications (SATCOM) market. Hurricane Irma, a record Category 5 storm, caused extensive damage across the Caribbean. In St. Martin, the storm swept away 95 percent of the island's houses, displacing families and ripping apart infrastructure including terrestrial communications. When first responders arrived at St. Martin and the other affected islands in the Caribbean, the only way to establish rescue programs, logistics and situational awareness reports was through SATCOM.

Via a network of service providers and satellite operators, Newtec provided SATCOM technology to support the entities who were rebuilding the Caribbean islands' infrastructure. The quicker the basic infrastructure is rebuilt, and hotels active again, the faster tourists return and money to fund restoration efforts for houses, hospitals and communities becomes available.

GROWING COMPLEXITIES

Organizing disaster relief efforts is a complex operation. In most cases, the different NGOs, government and defense agencies active in the region bring their own satellite communication equipment and have individual satellite service and bandwidth contracts in place.

These individual contracts depend on the area of operations and throughput requirements throughout the different stages following a natural disaster — these CAPEX and OPEX elements make relief efforts expensive. By increasing the efficiency of these operations, more money can become available to boost the effectiveness of such relief efforts.

Newtec observes identical behaviors in military operations across Africa and the Middle East. In Europe, initiatives are established to improve the efficiency and effectiveness of disaster relief efforts, military operations and government services over satellite.

The European Union (EU) took an important step toward a substantive defense capacity in November, to jointly develop European military abilities among nations and to make them available for operations separately or in coordination with NATO. This effort aims to reduce the fragmentation of European military spending and promote more joint projects to reduce duplication and waste.

In 2010, the first steps for a 'Pooling and Sharing' of European military capabilities were already in place through the Ghent Initiative. This idea reached the satellite market around 2014 — the idea is to set up a European Agency that can coordinate the pooling and sharing of satellite bandwidth and assets by 2020.

To prepare for such European capabilities, ESA has launched precursor programs that will run from 2017 to the end of 2019. Newtec has been involved in both 'GovSatCom' precursor programs that were launched in 2017, looking after the ground segment technology and equipment.

TIME FOR DISRUPTION

The Newtec Dialog® VSAT platform gives government and defense satellite operators the flexibility to embrace the complexity of pooling and sharing programs, as well as disaster relief and military operations. In all these operational scenarios, different platforms (on-the-move, on-the-pause or fixed) need

to be connected to a single platform and exchange a variety of services (video, voice or data-based) for a large range of applications.

Every Service Level Agreement (SLA) needs to be respected and all services require individual throughput and availability be addressed. Simultaneously, the satellite link must be resilient, secure and provide seamless communications. Newtec combines all these stringent requirements in this VSAT platform.



“The importance of having an efficient, flexible and affordable VSAT platform is key for today’s and tomorrow’s government and defense operations.”

and service sector. In 2017, the company was at the cusp of High Throughput Satellites (HTS), with launches planned for LEO, MEO and GEO constalltions in the comng years. Some satellites will use wideband or spot beam technology, some a combination of a global beam and operational spot beams. Satellites will be able to adapt the shape of the beam according to changing military operations, or use beam hopping technology to shift capacity from one beam to another on the fly in response to demand on the ground.

Disruptive VSAT technology, such as Newtec Dialog, does take new satellite constellations into consideration as well as the increased usage of on-the-move and on-the-pause platforms in government, military and disaster relief applications. Here, different technologies such as the next-generation Newtec Mx-DMA waveform, Doppler compensation, very low signal-to-noise (SNR) spreading MODCODs (to compensate for smaller or phased array antennas), as well as seamless beam switching, interact on board the Newtec Dialog platform to ensure seamless, efficient and resilient satellite links for vessels, airborne platforms and land vehicles.

High throughput is no longer the pure single carrier service domain but can now also be offered in shared VSAT capacity. This will benefit Intelligence Surveillance Reconnaissance (ISR) networks connecting different bandwidth-hungry sensors onboard land, airborne or seafaring platforms to a Newtec Dialog hub, giving the end-users high definition granularity ISR products to improve decision making.

In the satellite business, companies must be ahead of the game and act upon world events and emerging technologies. Newtec has subscribed to the 5G revolution, hybrid networks, connected vehicles and the Internet of Things (IoT) and has signed agreements with industry leaders to investigate and develop technology fit for tomorrow’s communication standards.

From the defense, government and first responder perspective, the important SATCOM focus should be on security, resilience, efficiency and service availability, as well as ease of use, quick installation of remotes and a straight forward set-up of a satellite network — with Newtec Dialog, first responders and deployed military personnel can establish satellite connectivity in a matter of minutes without time-consuming human intervention from the Network Operation Center (NOC).

The innovative Newtec Mx-DMA® return waveform on board the Newtec Dialog platform adds to the equation by offering 20 to 50 percent better efficiency when compared to legacy waveforms.

Having an innovative and disruptive VSAT ground segment in place is great, but that needs to be paired with innovation in the satellite

NEWTEC IN 2017

Newtec is experiencing double-digit revenue growth for the fourth year in a row — close to 20 percent — not many companies in the satellite industry can claim a similar growth rate. The rise in business is directly linked to the success of the Newtec Dialog platform in the broadcast, cellular backhaul, mobility, VSAT broadband and government markets.

Important company wins were achieved in the commercial SATCOM markets as well as in the government and defense market across the globe.

For example, a U.S. Department of Defense (DoD) entity has selected the Newtec Dialog platform to deploy a network connecting hundreds of remote sites worldwide.

Several European defense departments have selected Newtec for their welfare programs and in the U.S. airborne ISR programs upgraded their Newtec modems to benefit from the DVB-S2X standard’s increased efficiency. The Newtec Dialog VSAT platform was also installed in the U.S. for a large first responder network which is dedicated to America’s police, fire fighters and emergency medical services.

2018 OUTLOOK

2018 looks to be exciting and promising from a business and product development point of view. The importance of having an efficient, flexible and affordable VSAT platform is key for today’s and tomorrow’s government and defense operations.

The increase in demand for the Newtec Dialog platform has resulted in the need for an extra assembly line in the Newtec manufacturing plant. Additionally, the Newtec Dialog offering will be extended with the XIF hub, fit for the upcoming HTS constellations and a range of modems able to demodulate widebeam carriers up to 500 Mbaud. Furthermore, government and military on-the-move platforms will be able to switch transparently from one satellite beam to another while also protecting the confidentiality of their operations — keep a close watch on Newtec over the coming months.

Author Koen Willems is Market Director Government, Humanitarian & Defense Satcom at Newtec and Senior Contributor to MilsatMagazine. To learn more about the company and products, please visit www.newtec.eu.

“The important SATCOM focus should be on security, resilience, efficiency and service availability, as well as ease of use, quick installation of remotes and a straight forward set-up of a satellite network.”



SPECTRA GROUP

recon: Year in Review

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

This has been a truly memorable year for Spectra Group UK with the continued enhancement of the company's flagship SlingShot® product.

The SlingShot developments culminated in an exciting news announcement at the recent Defence and Security Equipment International (DSEI) show in London. While earlier in the year, the product addressed the growing worldwide menace of cyber-attacks with the launch of Spectra Cyber Security Solutions by the company.

EXTENDING PARTNERSHIP WITH AIRBUS

In September, Spectra selected the DSEI event as the ideal platform wherein to announce an extension of the SlingShot sales partnership with Airbus.

SlingShot is a cost-effective solution that enables secure BLOS COTM (Beyond Line Of Sight Communications-On-The-Move) using in-service tactical radios that are connected to a global, commercial satellite network provider.

Before the development of SlingShot, high priority military forces and government agencies had access to tactical BLOS communications only through scarce UHF TacSat or HF radios. Neither were able to deliver flexible and resilient communications on the move.



Spectra Group's SlingShot converts in-service tactical radios to Beyond Line of Sight (BLOS)

SlingShot's emergence offers dedicated bandwidth for secure communications, while creating a BLOS communications network that can extend over thousands of kilometers. This is a capability that Airbus will be able to offer their entire customer base as a fully managed service.

Spectra is delighted to extend the firm's strategic relationship with Airbus who will offer SlingShot as a managed service called TREX (Tactical Radio Extension). Working with Airbus' worldwide sales team to supply SlingShot builds on the two years of successful delivery to

the UK. This relationship shows the strength and importance of SlingShot in defence and national security market places.

When enabled with SlingShot, in-service tactical radios can use commercial L-band SATCOM for secure BLOS Command & Control COTM, delivering essential capability across multiple roles.

Whether it be interoperability for inter-agency or coalition operations, reliability for emergency services during disaster relief, or robust access to biometric databases for border protection, the voice and data capabilities over extended distances between multiple platforms makes SlingShot a unique and powerful solution.

This year witnessed further upgrades to the SlingShot system with the launch of new power options and the SlingShot Satellite Emulator (SSE).

A Universal Power Supply Unit and AA Battery Cassette deliver greater power flexibility and the SSE — an L-band satellite emulator — enables full offline system testing, training and operational system support without using the live satellite channel.

TAKING ON THE CYBER ATTACKERS

Cyber-attack has been identified as one of the four highest priority and most pervasive of risks faced by the UK and Allied nations — the others being international terrorism, international military crises and major accidents or natural hazards.

Information derived from corporate data is now vital to everyday business operations and ensuring its confidentiality, integrity, availability and security must be of paramount importance to any organization.

Some £1 billion[1] was lost to online crime (March 15 to March 16), with seven in ten[2] business leaders admitting they have not taken any action to protect their business and employees from financial fraud.

From a SATCOM perspective, the subject of cyber threat and cyber security related to satellite communications has been a hot topic for some time and continues to be a focus of great concern for the satellite market.

When using satellite connectivity, generally data has to pass through public and private terrestrial networks — the security focus shifts to ensuring end-to-end data integrity throughout the network, identifying and rapidly rectifying any risks.

Spectra is highly experienced and well-placed to provide advice and services to counter the increasing threat of cyber-attack and information exploitation. The company has been delivering cyber solutions through the firm's existing satellite and terrestrial networks business — the launch in February of Spectra Cyber Security Solutions was a natural progression for the product and the company.

Spectra Cyber Security Solutions provides defense-in-depth, with proactive testing, to identify vulnerabilities in networks and procedures and protect data. Auditing of logs and the identification of threats and potential or attempted attacks, from internal as well as external sources, is a vital part of a robust security system.

Spectra has the expertise and experience to produce highly bespoke security solutions to protect against cyber-attacks from wherever they might stem. Extensive experience successfully designing, delivering and maintaining networks for military organizations and government agencies is a major thrust of the company's ever-growing expertise.

High-grade solutions are designed to integrate seamlessly with business architecture, minimizing downtime, ensuring data is available as and when required and is kept secure and protected from attacks throughout its lifecycle.

EXTENDING END USER ENGAGEMENT

In March, Spectra participated successfully in the 2017 Army Warfighting Experiment (AWE17). AWE17 was a non-secret experiment run jointly by UK MOD departments, DE&S (Defence Equipment & Support) and DSTL (Defence Science & Technology), and this concluded with a VIP presentation at Copehill Down Village near Warminster, Wiltshire.

AWE17 was established as a forum to look at ways mature technologies available from industry could solve specific problems. The process first identified potential solutions and then after a progressive series of demonstrations, tests and trials, Spectra's SlingShot system emerged as one of the successful technologies presented following three rounds of selection.

The aim of the final stage of AWE17 was to place the product into the hands of the user. British Infantry, Royal Marines and a squad from the U.S. Army participated in the live trials, which comprised training and Section exercises on Salisbury Plain and Platoon exercises prior to the final Company battle exercise.

The final exercise saw a company grouping deployed for 72 hours in a tactical scenario against a peer enemy force. SlingShot performed exceptionally well throughout the experiment and received positive recommendations for future implementation.

CORPORATE COMPLIANCE

Spectra updated their British Assessment Bureau ISO 9001 accreditation to ISO 9001:2015, demonstrating that the company is committed to continual improvement and that a Quality Management System is in place that leads to high levels of performance and customer satisfaction. The ultimate goal of the certification is to highlight companies that are "best-in-class" and provide services, products and skills that are not only industry leading, but also offer fantastic value and experiences to customers.

Spectra Group also achieved Cyber Essentials in 2017 on top of the company's existing ISO 27001 accreditation.



While the latter demonstrates an effective information management system, governing security of information and network systems, Cyber Essentials forms a robust and stringent checklist that security companies must meet to be considered eligible to work with highly sensitive information and government level security contracts.

A BUSY YEAR ELSEWHERE

Spectra is once again honored to support next year's *Soldiering On Awards*, held in March. The Soldiering On Through Life Trust encourages support for the UK's Armed Forces Community through an annual showpiece occasion focused on highlighting the outstanding achievements of those who have served their country and individuals and groups who work together with the Armed Forces Community. Spectra sponsored the Sporting Excellence category, which recognizes the six finalists that have overcome their disability or injury to excel in the field of sport, as either an individual or as a team.

Spectra sponsors and participates in a wide range of charitable events, including the SSAFA race day at Chepstow. The SSAFA charity provides unprecedented support to thousands of serving service personnel as well as Veterans.

Closer to home, and on a personal note, Spectra Group achieved recognition within the business community and was listed in the Top 100 small suppliers to UK central government — I was honored to accept, on behalf of Spectra, the *Business Man of The Year* award as voted by readers of *Battlespace*.

This award is a clear reflection of the hard work and effort the Spectra team invests, day in and day out, to provide customers with excellent service and superb products.

REFERENCES

[1] *Get Safe Online & Action Fraud* June 16

[2] *Get Safe Online & Action Fraud* October 16

Author Simon Davies is the Chief Executive Officer of Spectra Group (UK) Ltd. as well as a Senior Contributor to *MilsatMagazine*. For additional details regarding the company and products, please visit spectra-group.co.uk/



SPEEDCAST

recon: Year in Review

By Mike Carew, Vice President, Government Services, Speedcast

Without question, 2017 has been a year of growth and transformation for Speedcast.

From a government services perspective, and for the company as a whole, the year was ignited by the acquisition and integration of Harris CapRock. For a company steeped in strategic growth, this integration has been a catalyst, positioning Speedcast as a leader in key energy, maritime and cruise markets supporting thousands of ships, rigs and enterprise customers globally. This has developed Speedcast into a unique company in the industry — a company possessing many strengths.

Speedcast's unparalleled strength of network includes 40 teleports accessing more than 70 satellites with global C-, X-, Ku-, Ka-, L- and UHF-band coverage.

The company's strength of experience spans more than 30 years delivering customized and managed services to critical customers.

The firm's strength of partnerships with satellite operators, equipment manufacturers and local entities help us to deliver and support Speedcast products and services anywhere in the world.

Furthermore, the strength of more than 1,300 people, in 40 countries and in every business function, who are passionate about creating an agile, responsive work environment, allows Speedcast to support our customers' needs no matter what.

Additionally, the Harris CapRock acquisition also helped to transform Speedcast's government industry aspirations. The scale and reach of the company's expanded global infrastructure sets the foundation for cost effective, innovative solution development, which is paramount for success in the government market

This expansion has enabled organic growth with additional resources and broader service offerings and is the launch pad for additional market-specific acquisitions — particularly the addition of UltiSat to the portfolio this November.

A COMPANY POSITIONED FOR GROWTH

The inherent strengths of an integrated Speedcast resonate in government and military markets, positioning Speedcast well to meet the demands of a changing market.

While requirements and spending can vary greatly by country and agency, there are common themes that have emerged in recent years that remain consistent today.

Budgetary pressure drives hard decisions on program spending and many times requires governments to do more with less. However, demand for big data is growing and is being led largely by intelligence, surveillance and reconnaissance (ISR) demands and the need for real-time, battlefield decisions based on those ISR sources. As military spending turns the corner in the next few years, a doubling of the market for the company is anticipated.

Commercial satellite communications (COMSATCOM) always has, and always will, play a critical role in the delivery of creative solutions to meet Speedcast's government customers' expanding mission requirements.

Satellite operators are building new high-throughput satellite (HTS) constellations, which also feature enhanced resilience and security features.

Terminal and modem original equipment manufacturers (OEMs) are building smaller, militarized and encrypted products.

With such upgrades, Speedcast sits in a unique position by remaining technology agnostic to create a network of networks. The firm is continually investing in infrastructure and consolidating new capabilities across satellite operators and OEMs.

The company has the scale to deliver robust, resilient and secure solutions based on customers' unique requirements and budget constraints.

The new Speedcast infrastructure is built for government services anywhere around the globe. The company has a 30 year history of delivering critical communications in the harshest of environments, where interruptions put lives and missions at risk.

Speedcast's tagline, "*The Critical Communications Company*," comes with great responsibility and a substantial commitment to government customers as the need for resilient, reliable, global communications, while understanding the risk and consequence should such services be unavailable, and to accept the heady responsibility of guaranteed delivery.

EXPANSION IN THE GOVERNMENT MARKET

As with Speedcast's commercial divisions, the Harris CapRock acquisition has also been a catalyst for the company's government teams with the immediate addition of cleared, U.S.-based staff supporting government growth in the U.S. and internationally, as well as a number of strategic and longstanding international government contracts.

The added resources and infrastructure have helped Speedcast facilitate more direct sales as well as expanded the growth of the firm's indirect sales model, which is important for global success.

As an Australian company listed on the Australian Securities Exchange (ASX), and with offices in 49 countries, Speedcast continues to build from the firm's natural strengths in Australia and Asia.

Speedcast is executing the first year of a multiyear contract with an Australian government agency to install new wideband management terminals for the agency's vessels.

Going beyond fixed and mobile satellite solution connectivity to the Australian government, Speedcast is also delivering a full network management system. Customized for the customer, the management solution consists of equipment, software, monitoring, maintenance and support, meeting the agency's stringent security and quality requirements. This effort demonstrates the diversity of Speedcast's government services portfolio and our strategy to grow this sector with true value-added, customer-focused solutions.

A further testament to Speedcast's investment in the government market, specifically within Australia, is the Adelaide team's recent multi-year contract with the Australian government to provide mission-critical VSAT services, equipment, training and support to scientific research teams at the three Australian Antarctic research stations — Mawson, Casey and Davis, plus the base on Macquarie Island.

With the equipment and network enhancements provided by Speedcast, the research teams will be able to use four times their current throughput, significantly expanding the operational and crew morale capabilities at each site. The criticality of satellite communications in environments as unforgiving as the Antarctic demonstrates the confidence and trust Australian government customers hold in Speedcast.

Customer intimacy is also instrumental to Speedcast's growth, with end-user demonstrations and hands-on training an important focus. This August, Speedcast participated in the Multinational Communications Interoperability Program (MCIP) Annual Pacific Endeavor 2017 (PE17) exercise in San Jose, California, sponsored by the U.S. Pacific Command (USPACOM).

Senior communications leadership from more than 22 pacific nations attended PE17 to develop greater interoperability among nations when responding to Humanitarian Aid and Disaster Relief (HADR) events. Speedcast participated in the SATCOM training event, providing classroom instruction followed by several hours of hands-on training.

Using 95cm and 1.3m flyaway terminals with both star and mesh modem technologies via Speedcast's Houston teleport, more than a dozen communications officers were able to assemble and bring into use both terminals and activate live video streaming calls. Events such as this, especially for HADR operations, instill familiarity and confidence with SATCOM equipment and solutions, improving readiness and mission execution when responding to disasters.

ADVANCEMENT THROUGH ACQUISITION

The capstone event of Speedcast's government growth strategy has undoubtedly been the \$100 million acquisition of UltiSat and the formation of a dedicated government division completed in November.

With a team of 150 satellite communications professionals, UltiSat has been delivering customized SATCOM solutions to the U.S. government, global government and nongovernmental organizations (NGOs) for the past 15 years. The synergies achieved with the addition of UltiSat will pay immediate dividends.

The structure and leadership of the division will be derived from UltiSat, allowing the team to hit the ground running immediately. With direct access to U.S. government and global government contract vehicles at a time when government spending is on the rise, the government division can leverage the scale and resilience of the Speedcast architecture to deliver innovative solutions and enhancements globally.

The business development teams around the world benefit from UltiSat services becoming available to existing customers, along with the infusion of significant resources and expertise in government contracting, product and service development, delivery and support. The acquisition brings capabilities to ensure that Speedcast is well positioned for continued growth in the government market in 2018.

LOOKING TO THE FUTURE

Government and military markets have been stabilizing over the past 12 to 18 months, following several years of downturn. New opportunities are materializing and spending for satellite communications is expected to grow in many countries, with an anticipated doubling in growth of the government market by 2025.

The COMSATCOM industry has, and will continue to play, a pivotal role in finding solutions to governments' communications needs. Across the board, the industry recognizes the importance of the government customer and continues to develop commercial constellations, products and services with government users in mind.

The investments completed in 2017 will position Speedcast as a leader in the government sector. Equipped with an unprecedented network capability and scale, a pedigree of government service development and delivery, and the ability to harness the power and features of our satellite operator and OEM partners under one roof, Speedcast creates enormous potential and value to governments and militaries around the globe.

At Speedcast, the delivery of products and services critical to invaluable government customers will ensure the company's ongoing successes during 2018.

Author Mike Carew is the Vice President of Government Services at Speedcast. For additional information regarding the company, please visit the firm's infosite at www.speedcast.com



34TH SPACE SYMPOSIUM

SPACE FOUNDATION
The Broadmoor Hotel, Colorado Springs, Colorado USA
April 16 - 19, 2018

Featuring...

Gen. John "Jay" W. Raymond, USAF
Commander
Air Force Space Command

Gen. John E. Hyten, USAF
Commander
USSTRATCOM

Join Us for Unrivaled,
Powerful, Face-to-Face
Collaboration!

Featured Panels

- ◆ James Webb Telescope, the Latest on Tomorrow's Observatory
- ◆ Military Use of Commercial Space
- ◆ NASA ITech: Innovation for Exploration
- ◆ Return to the Moon – The View of the International Legal Community
- ◆ The Economics of Deep Space

Targeted Tracks

Symposium Program

Tech Track*

Cyber 1.8 Classified*

New Generation Space Leaders*

*Separate registration required.

Year After Year – We Deliver!

"Fantastic! This was the best networking and business experience of 2017!"

"This is always a mind-blowing event of genius!"

– April 2017 Space Symposium Participant Survey

LAST CHANCE FOR BEST SAVINGS!

On Standard Registration
Best Rate Ends 1.19.2018

REDUCED PRICING!

Active-duty Military and Government
Some meals included

SpaceSymposium.org • +1.800.691.4000 • Share: [in](#) [f](#) [t](#) #34SS

Official Media Partner

