MilsatMagazine

Northrop Grumman's STSS-D
They aren't just for missile defense any longer.

COMMAND CENTERS
Helfgott + Start, Inmarsat Government
Peeters of Track24 Defence
Karl Fuchs on Tactical Edge Battle Space
The Hosted Payload Alliance
Pulham + The Space Foundation

Cover image—Artistic rendition of the STSS-D satellite system
Courtesy of Northrop Grumman Aerospace

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Will Hosted Payloads Perform Demonstrations Or Operations? Working Out The Bugs

The Government Accountability Office (GAO) recently published an assessment of federal agencies' progress toward reducing satellite program costs by leveraging nontraditional, but innovative, approaches such as hosted payloads on commercial satellites.

By Bob Bishop, Northrop Grumman Aerospace Systems.

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DISPATCHES

Mobile Network To Support Afghan Mission

As the U.S. mission in Afghanistan evolves from full spectrum combat operations to a support role in helping Afghan forces take hold of their country's security, unit commanders emphasize the need for network mobility.

Warfighter Information Network-Tactical, or WIN-T, Increment 2, the Army's improved tactical network communications backbone, was designed to fulfill such a mission.

"As we reduce our presence in Afghanistan, it is absolutely critical that we continue to understand what is happening around us, to understand the operational environment," said Col. Sam Whitehurst, commander of the 3rd Brigade Combat Team, 10th Mountain Division (Light Infantry), during a recent training exercise at Fort Drum, in preparation for his unit's possible deployment to Afghanistan. "My ability to take the information that I am hearing from my team leaders, and then share it with all of our Afghan partners, so they can correspondingly help confirm or deny that information and share what they are seeing, is one of the most critical elements as we go forward into Afghanistan over the next year."

The mobile WIN-T Increment 2 network is being fielded as part of the Army's new capability sets. Capability Set 13, or CS 13, is the first of these fully-integrated fielding efforts, which are scalable and tailorable in design to support the changing requirements of current and future missions. CS 13 includes radios, satellite systems, software applications, smartphone-like devices and other network components that provide connectivity from the stationary command post to the commander on-the-move to the dismounted Soldier. WIN-T Increment 2 is the tactical communications network backbone that binds the capability sets together.

The Army began fielding CS 13 in October 2012 to 3rd BCT, 10th Mountain Division, which is based at Fort Drum, and to the 4th BCT, 10th Mountain Division, at Fort Polk, Louisiana. The two units are training with these advanced capabilities and preparing for possible deployment to Afghanistan with them later this year. The 101st Airborne Division (Air Assault) Headquarters has already been fielded with WIN-T Increment 2 elements, and two BCTs from the 101st are slated for full CS 13 fielding later this year.

If called upon to deploy, Army BCTs armed with CS 13 capabilities will serve as Security Forces Advisory and Assist Teams, or SFAATs, who will work with Afghan National Security Forces to improve their capability and help the Afghans secure their country as coalition forces reduce their presence. The coalition forces' footprint continues to decrease and many of the forward operating bases and fixed sites used to access the network are being dismantled.

As U.S. forces take down their fixed infrastructure and become more dispersed and mobile in conducting these support operations, they will rely on WIN-T Increment 2 for critical reach-back communications.

"If you take a look at what we're doing in Afghanistan right now, as U.S. forces start to reduce their presence, we're still partnered with the Afghan National Security Forces and continue to focus on their development, but we're doing it over greater distances," Whitehurst said. "We are distributed throughout the area on a much greater scale than we were before."

Having the capability to command and control the brigade on-the-move gives commanders the ability to extend their reach even as the Army reduces its presence. It will enable them to focus on the mission of developing the Afghan Security Forces, Whitehurst said.

WIN-T Increment 1, formerly known as the Joint Network Node-Network, began fielding in 2004 and provides Soldiers with high-speed, high-capacity voice, data and video communications down to battalion level units, at-the-quick-halt. It utilizes both satellite and line-of-sight capability for optimum network connectivity and bandwidth efficiency. WIN-T Increment 2 improves upon these technologies by providing Soldiers with an integrated network, which for the first time, provides mobility and reaches down to the company level. It further increases capability by introducing network radios to the architecture and enhancing Network Operations, a suite of integrated monitoring tools used by communications officers to command and control the network.

When it comes to combating the communication challenges created by Afghanistan's harsh and expansive terrain, WIN-T Increment 2 provides an advantage over previous capability. It enables communication signals to better reach over mountains and across deserts, said Capt. Jesse Ellis, commander of C company, 3rd Brigade Special Troops Battalion.

As SFAAT missions evolve, Soldiers will no longer be tied to fixed U.S. bases and secure network infrastructure, so maintaining communications through WIN-T Increment 2 while assisting the Afghans is a "tremendous capability" to bring to the effort, said Maj. Graham Wood, brigade communications officer for 3rd BCT, 10th Mountain Division

Story by Amy Walker, PEO C3T

DISPATCHES

GPS III Tests Are Successful

Artistic rendition of GPS III. Courtesy of Lockheed Martin.

A Lockheed Martin-led industry team has completed successful functional integration tests of the spacecraft bus and network communications equipment on the first satellite of the next generation Global Positioning System, known as GPS III.

The recent testing of GPS III space vehicle 1 (SV 1) bus—the portion of the space vehicle that carries mission payloads and hosts them in orbit—assured that all bus subsystems are functioning normally and ready for final integration with the satellite's navigation payload.

Systems tested included: guidance, navigation and control; command and data handling; on-board computer and flight software; environmental controls; and electrical power regulation.

The SV 1 satellite's network communication equipment subsystem that interfaces with the ground control segment and distributes data throughout the space vehicle also passed all tests as expected.

This milestone follows February's successful initial power-on of SV 1, which demonstrated the electrical-mechanical integration, validated the satellite's interfaces and led the way for functional and hardware-software integration testing. "The successful completion of the SV 1 bus functional check out validates that the spacecraft is now ready to begin the next sequence of payload integration and environmental testing, prior to delivery," said Keoki Jackson, vice president of Lockheed Martin's Navigation Systems mission area.

GPS III SV 1's navigation payload, which is being produced by ITT Exelis, will be delivered to Lockheed Martin's GPS Processing Facility (GPF) near Denver later in 2013. The hosted nuclear detection system payload has already been delivered and mechanically integrated. The satellite remains on schedule for flight-ready delivery to the U.S. Air Force in 2014.

GPS III is a critically important program for the Air Force, affordably replacing aging GPS satellites in orbit, while improving capability to meet the evolving demands of military, commercial and civilian users. GPS III satellites will deliver three times better accuracy and, in order to outpace growing global threats that could disrupt GPS service, up to eight times improved anti-jamming signal power for additional resiliency.

The GPS III will also include enhancements adding to the spacecraft's design life and a new civil signal designed to be interoperable with international global navigation satellite systems.

Lockheed Martin is currently under contract for production of the first four GPS III satellites (SV 1-4), and has received advanced procurement funding for long-lead components for the fifth, sixth, seventh and eighth satellites (SV 5-8).

The GPS III team is led by the Global Positioning Systems Directorate at the U.S. Air Force Space and Missile Systems Center. Lockheed Martin is the GPS III prime contractor with teammates ITT Exelis, General Dynamics, Infinity Systems Engineering, Honeywell, ATK and other subcontractors. Air Force Space Command's 2nd Space Operations Squadron (2SOPS), based at Schriever Air Force Base, Colorado, manages and operates the GPS constellation for civil and military users.
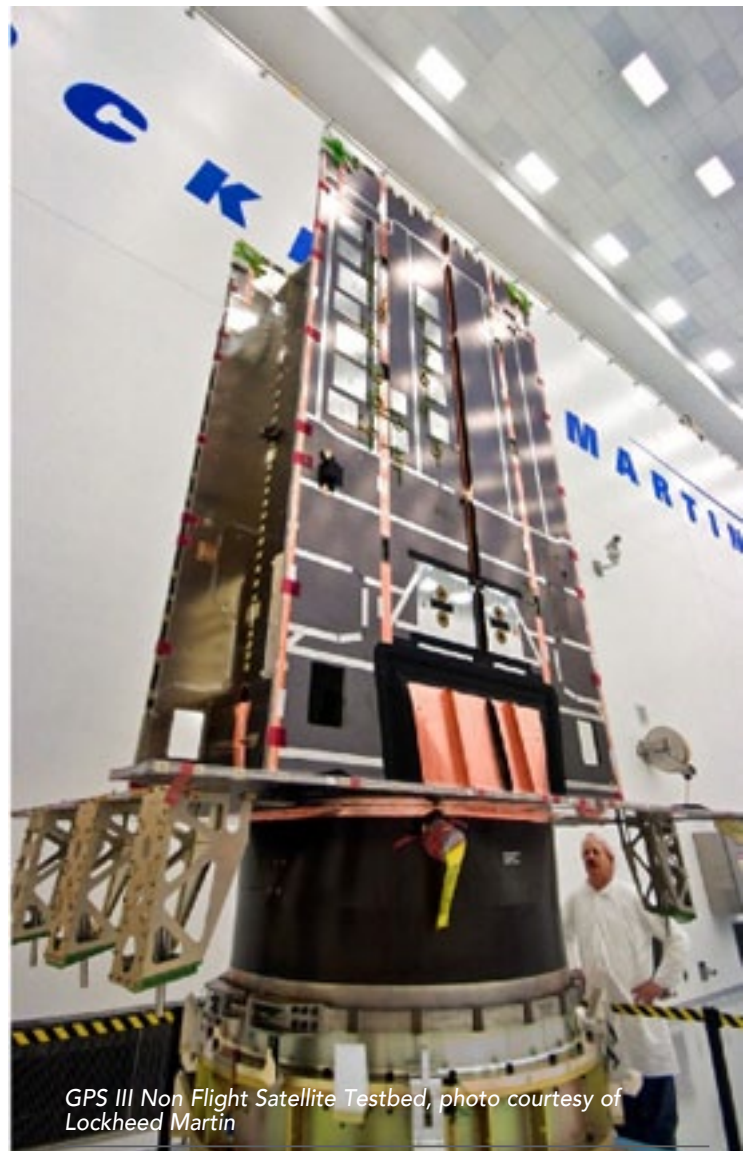
GPS III Non Flight Satellite Testbed, photo courtesy of Lockheed Martin

Making Their Presence Known For AEHF

Artistic rendition of the AEHF satellite.

COM DEV International Ltd. has completed delivery of a fourth flight set of hardware for the U.S. Air Force's Advanced Extremely High Frequency (AEHF) protected military satellite communications program.

Advanced EHF is the next generation of protected military satellite communications satellites and provides vastly improved global, survivable, highly secure, protected communications for strategic command and tactical military personnel operating on ground, sea and air platforms.

AEHF also serves international partners including Canada, the Netherlands and the United Kingdom.

COM DEV is under contract to Northrop Grumman Aerospace Systems, to supply six flight sets of electromechanical switches, passive microwave filters and Beam Select Switch assemblies.

Beam Select Switch assemblies provide high-speed switching, selectable attenuation and filters that reject undesired signals and provide the ability to adjust the level of the transmitted signals.

The fifth and sixth flight sets of AEHF hardware are currently in production at COM DEV's facilities at Cambridge, Ontario and Aylesbury, U.K.

The AEHF team includes the U.S. Air Force, Lockheed Martin Space Systems Company in Sunnyvale, California, as the AEHF prime contractor, space and ground segments provider as well as system integrator, with Northrop Grumman Aerospace Systems in Redondo Beach, California, as the payload provider.

Design Reuse Plays A Crucial Role

Artistic rendition of the Enhanced Polar System. Courtesy of NOAA.

Northrop Grumman Corporation has delivered the second of two payloads that will be hosted on government-owned satellites to bring next-generation protected, Extremely High Frequency (EHF) communications to users in the north polar region (above 65 degrees North).

Developed for the U.S. Air Force's Enhanced Polar System (EPS), the payload efficiently leverages hardware and software designs Northrop Grumman originally developed for Advanced EHF (AEHF) protected military communication satellites.

"Reuse of existing hardware and software resulted in a highly successful EPS payload development, providing a significant value for Americans," said Stuart Linsky, vice president, Communication Programs, Northrop Grumman Aerospace Systems. "As we did with the AEHF payloads, both EPS payloads were delivered ahead of the government need. Like the first EPS payload, the second successfully used flight-proven components, dramatically lowering development risk, cost and schedule of the highly advanced anti-jam payloads. As a result, we kept nonrecurring engineering costs and other expenses associated with first article satellites to an absolute minimum."

The EPS network will replace the current Interim Polar System and serve as a polar adjunct to the Advanced EHF system. Both EPS payloads feature an onboard processing unit similar to those on AEHF satellites but scaled down to meet reduced mission capacity requirements.

The payloads integrate functions of the Configurable On-board Router, Demodulator and Resource Control Computer/Security Equipment Computer on AEHF payloads into a single eXtended Data Rate Processing Unit on EPS.

EPS payload development started in 2008. The Air Force plans final operational capability for EPS for calendar year 2018. EPS consists of two EHF payloads hosted on government satellites, a Gateway Segment to connect modified Navy Multiband Terminals to other communication systems, a User Terminal Segment and a Control and Planning Segment (CAPS). Northrop Grumman was recently selected to develop the EPS CAPS to operate the EPS payloads.

Northrop Grumman's foundational payload control and planning capability leverages proven technologies from various heritage programs and the Common Network Planning Software system the company developed for the Wideband Global Satellite program to provide an affordable, scalable ground control capability for future protected satellite communications (SATCOM) growth. The MILSATCOM directorate at the Air Force's Space and Missile Systems Center at Los Angeles Air Force Base, California, is acquiring the Control and Planning and Gateway Segments.

"The successful scaling of AEHF components demonstrated by EPS provides a low risk basis for affordable protected SatCom with AEHF levels of protection at the cost of vulnerable unprotected SatCom," said Tim Frei, vice president, Communication Systems for Northrop Grumman. "EPS proves that we can transition Technology Readiness Level 9, anti-jam, low probability of intercept communications into new platforms at low cost and risk, providing real protected SATCOM at no more cost than unprotected SATCOM. This will be a game changer for the government. This is part of Northrop Grumman's broad affordability initiative, which seeks to combine the best commercial technologies with TRL 9-level government technologies. These components include Low Cost Terminals, lower cost satellites, payloads, launch and ground control."

A CRADA Agreement

The Space and Missile Systems Center has signed a Cooperative Research and Development Agreement (CRADA) with Space Exploration Technologies Corp., better known as SpaceX, as part of the company's effort to certify its Falcon 9 v1.1 Launch System for National Security Space (NSS) missions.

This cooperative agreement facilitates data exchanges and protects proprietary and export-controlled data. The CRADA will be in effect until all certification activities are complete.

A CRADA enables the Air Force to evaluate the Falcon 9 v1.1 launch system according to the Air Force's New Entrant Certification Guide (NECG). As part of the evaluation, SMC and SpaceX will look at the Falcon 9 v1.1's flight history, vehicle design, reliability, process maturity, safety systems, manufacturing and operations, systems engineering, risk management and launch facilities. SMC will monitor at least three certification flights to meet the flight history requirements outlined in the NECG.

Once the evaluation process is complete, the SMC commander will make the final determination whether SpaceX has the capability to successfully launch NSS missions using the Falcon 9 v1.1. SMC anticipates entering into additional CRADAs with SpaceX to evaluate its Falcon Heavy rocket and with Orbital Sciences for its Antares launch vehicle.

"Certifying Evolved Expendable Launch Vehicle for new entrants is in keeping with the Air Force strategic intent to promote the viability of multiple domestic EELV-class launch providers as soon as feasible," said Col. William Hodgkiss, Launch Systems director.

Currently, United Launch Alliance's Delta IV and Atlas V are the only certified launch vehicles capable of lifting NSS payloads into orbit. The addition of multiple certified launch vehicle providers bolsters assured access to space by providing more options for the warfighter to place needed capabilities on orbit. While certification does not guarantee a contract award, it does enable a company to compete for launch contracts. Those contracts could be awarded as early as Fiscal Year 2015 with launch services provided as early as Fiscal Year 2017.

DISPATCHES

DoD Doing All They Can...

Ashton B. Carter, Deputy Secretary of Defense

The Defense Department is doing all it can to minimize the effects of sequestration spending cuts, Deputy Defense Secretary Ash Carter told a "think tank" audience here today.

"We're doing everything we can to manage our way through this very difficult and abrupt circumstance," Carter said at the Center for a New American Security.

Carter said the $37 billion in fiscal year 2013 spending cuts would not be so bad for any one area if they were spread over all DOD accounts, but they cannot be, though DOD exempted warfighting accounts from any cuts."We protect that. We have to," Carter said. "It's a war."

The president exempted military compensation from sequestration, the deputy secretary said. "Then we exempted a number of critical functions from sequester, for example, nuclear deterrence, our ability to respond to crises ... and on down the line, taking some things off the table entirely," he added.

The department then tried to protect those things critical to the execution of U.S. military strategy, Carter said, and applied the $37 billion reduction to what was left.

"That hits particularly hard in the operations and maintenance accounts," he told the audience. "These are the accounts that support training, and as a result, military readiness plummets."

The Air Force has grounded 13 combat squadrons for the rest of the fiscal year. Navy officials have cancelled ship deployments and deferred maintenance. But the cuts hit particularly hard on the Army, Carter said. The Army has cancelled most of its major training events for the rest of the fiscal year. The deputy secretary said he does not know how long it will take to reconstitute this readiness following sequestration.

"At a minimum, [it's] embarrassing to be doing this, in the eyes of friends and foes alike, and at a maximum, [it's] unsafe," he said of the sequestration cuts.

The situation reinforces in the minds of national security leaders the necessity to be prepared for what might happen in the future, Carter said.

Story by Jim Garamone
American Forces Press Service

Persona Placed Into Orbit

A Soyuz-2.1B carrier rocket orbited a military satellite last week, the defense ministry's spokesman in charge of Russia's Aerospace Defense Forces said.

The rocket blasted off from the Plesetsk launch site in Russia's north at 22:37 Moscow time on Friday.

"The spacecraft separated from the third stage of the rocket as scheduled," Col. Dmitry Zenin said.

According to previous reports, the satellite is the second in the new Persona series of electro-optical reconnaissance satellites based on the Resurs DK remote sensing satellite.

The first Persona satellite (Kosmos 2441) was launched onto a sun synchronous orbit in July 2008 but reportedly malfunctioned in February 2009 due to a failure in electronic components.

Russia operates a network of about 60-70 military reconnaissance satellites, featuring updated imaging technology and an extended lifetime of up to seven years, according to open sources.

SDRs For The Middle East

Harris Corporation has received a $23 million order from a country in the Middle East as part of its tactical communications modernization program.

Harris will provide the country with Falcon III® radios, accessories, software, service and support as part of a transformational wideband tactical communications system. The system provides battlefield forces with greater command and control and situational awareness by transmitting tactical voice, video and data.

The system integrates a full suite of software-defined radios from the Harris Falcon III® RF-7800 family. This includes the lightweight RF-7800S, a soldier personal radio for full-duplex voice and data communications over 2 kilometers; the RF-7800M for wideband mobile ad-hoc networking; and the RF-7800W High-Capacity Line-of-Sight Internet Protocol radio for high-speed backhaul data communications. The order also includes networking components, accessories and spares.

Communicating With A Smaller Footprint

Communications Marines with the 22nd Marine Expeditionary Unit assemble the Hawkeye III Lite system during a communications exercise at Marine Corps Base Camp Lejeune, North Carolina, May 8, 2013. (Marine Corps photo by Sgt. Amber Blanchard/Released)

Communications Marines with the 22nd Marine Expeditionary Unit learned how to quickly establish communications using more efficient equipment and a smaller footprint at Marine Corps Base Camp Lejeune, North Carolina.

Setting up a small forward operating base, Marines from Joint Communications Support Element aboard MacDill Air Force Base in Tampa, Florida, introduced the MEU Marines to the Hawkeye III Lite system. The system is a lightweight communications satellite that provides a quick way to establish communications using a smaller footprint. The system is meant for missions that require a minimal amount of gear and personnel, such as a site visit. "If you have a small team that goes out, you don't need a big data package," said Staff Sgt. Christopher Webber, JCSE initial entry team chief and native of Altamount, Florida. "For us, we have three small suitcases and you can quickly give the team leader capabilities such as data, email and communication to the ship, to the MEU headquarters."

When the system is assembled and powered up, Marines can get remote Internet, live videoconferencing, surveillance or reconnaissance feeds as needed. The system minimizes the need to bring multiple vehicles and systems for small groups of Marines while allowing for appropriate security level communication between personnel. The system can operate on a range of security classification levels, depending on the task. The MEU employs a system similar to the Hawkeye III Lite that helps to streamline their capabilities as a quick reaction force. "It gives us the ability to deploy with small teams and provide full network capabilities," said Sgt. Andrew Lee, 22nd MEU cyber security manager and St. Louis native. "It provides the same capabilities as some of the bigger equipment."

Story by Sgt. Amber Blanchard, 22nd Marine Expeditionary Unit

Cover Feature
Missile Tracking Satellites Explore New Missions

By Rob Zmarzlak, STSS-D Program Manager, Northrop Grumman Aerospace Systems

The Space Tracking and Surveillance System Demonstration satellites are far more capable today than when launched four years ago thanks to enhancements that fully leverage their unique sensor suite—they aren't just for missile defense any longer.

Recent enhancements are taking full advantage of the twin satellites' highly advanced infrared (IR) sensors, transforming them from a missile defense experiment into a nearly operational system. Both spacecraft are performing adjacent missions including space situational awareness, technical intelligence, battlefield assessment, civil disaster support and environmental monitoring.

Simultaneously, improvements in mission planning, spacecraft and payload software, ground automation and power management have allowed a 10-fold increase in STSS-D's data collections workload, making the satellites far more capable today than when they were launched in September 2009. Their increased tasking provides mission utility beyond missile defense into other critical areas, while simultaneously adding value at a time when military budgets are the most constrained ever.

The U.S. Missile Defense Agency (MDA) notes that STSS-D's adjunct missions include tracking of space launches, on-orbit satellites, satellite re-entries, and collecting scientific background and scene data on space and terrestrial environments.

Make no mistake—their paramount mission remains precision missile tracking through all phases of flight. STSS-D continues to participate in numerous Missile Defense Agency (MDA) flight tests, regularly demonstrating 'Holy Grail'-type capabilities from Low Earth Orbit such as 'birth-to-death' and 'stereo' tracking.

This is a priority mission because the proliferation of ballistic missiles gives reckless regimes the ability to carry out devastating attacks against the United States, its deployed troops and its allies. A robust defense against these growing and evolving threats to U.S. national security requires tracking ballistic missiles from "birth-to-death" with emphasis on "midcourse" tracking to improve chances of intercept.
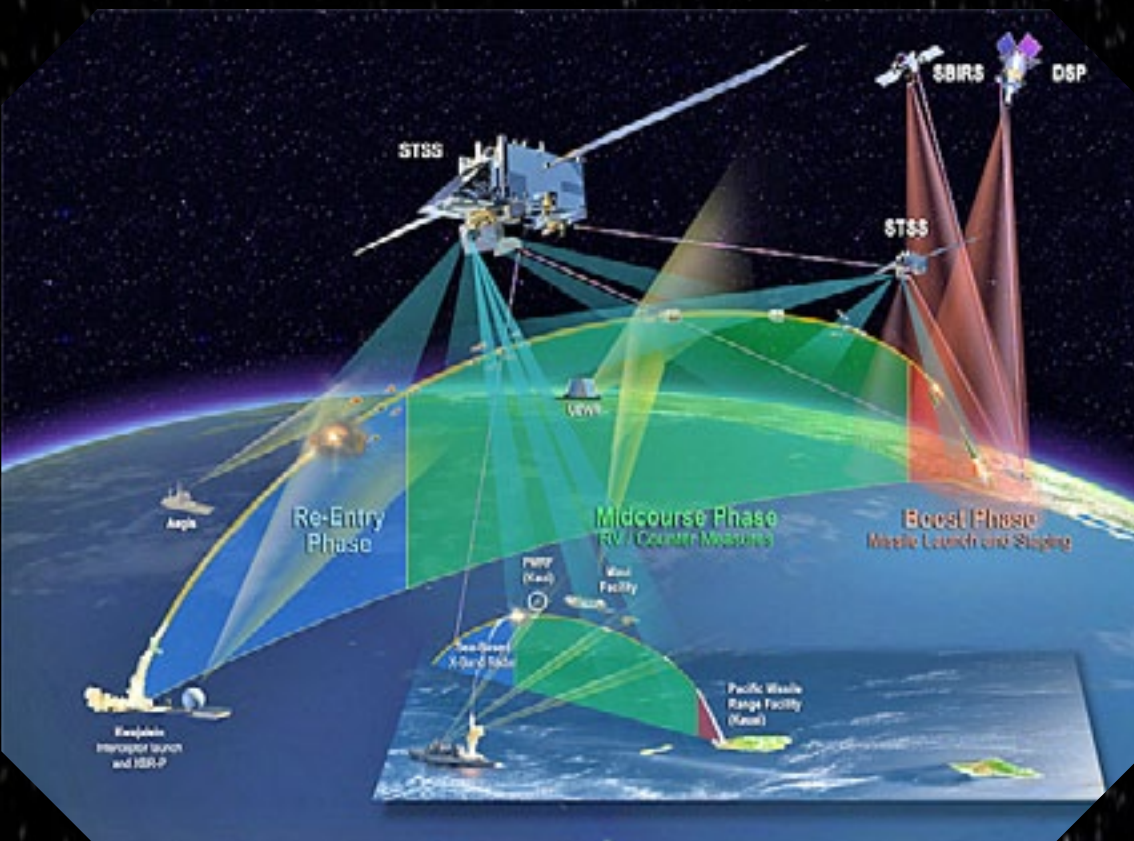
Midcourse is the longest phase, or about 80 percent of total flight time, when engines stop firing and deadly warheads are deployed. However, traditional radar and IR sensors can't always "see" them at this point. Without the ability to track missiles through midcourse, there's no hope of having an effective defense against them.

That's why each space vehicle has a pair of IR sensors: (1) A short-wave IR, fixed, wide-field-of-view acquisition sensor that looks above and below the horizon to monitor, autonomously detect and track missiles through boost phase; and (2) A narrow-field-of-view, gimbaled track sensor capable of tracking missiles from post-boost, through midcourse and then to reentry or intercept, using multiple IR bands.

Northrop Grumman is the prime contractor for both spacecraft and the operational ground station at Schriever Air Force Base, in Colorado.

Enhancements Benefit All Missions
Recent enhancements that make adjunct missions possible also make missile defense capabilities all the more resilient as well. A February test of a U.S. Navy Aegis Ballistic Missile Defense 'launch on remote' (LOR) concept is a case in point.

It proved that midcourse, space-based infrared tracking by STSS-D can alert Navy ships to launch interceptors accurately before their radars can see the incoming missiles—allowing the U.S. Navy to defend larger areas with fewer Aegis assets.

To accommodate Aegis LOR, system engineers had to develop numerous data flow options for getting data to an Aegis cruiser. A new external interface was implemented

and validated through early hardware-in-the-loop testing. So far, STSS-D has achieved LOR quality of service in six BMDS tests.

For another Aegis LOR test, the team arranged for the satellites to be cued remotely by another BMDS sensor—a function that didn't exist previously. The result: Both STSS-D space vehicles received the external cue, acquired the target and provided hundreds of seconds of valuable midcourse tracking data—including the first three-dimensional or "stereo" observations of multiple objects.

Improvements began shortly after Early On-Orbit Testing was completed. Northrop Grumman engineers knew the satellites had inherent capabilities to of their pre-launch design—if they could be performed efficiently.

STSS-D was built to be an on-orbit, research and development (R&D) platform to demonstrate the unique capabilities of a space-based sensor for the BMDS. It was never intended to be an operational system. Built-in limitations were appropriate for an experimental system with a mission life requirement of only two years.

This posed significant challenges as BMDS capabilities matured and MDA required the satellites' participation in all system-wide tests. It meant making complex interface upgrades and operational concept changes to adapt the demonstrators for much broader missions. These were the major challenges and results after improvements.

- **Manual Processes & Data Collection
  (Before Enhancements):** Operators had to use highly complex, manual processes for conducting all tasks because of STSS-D's role as an experimental space layer for the BMDS. Much of the planning for payload data collections was done in Southern California where the satellites were built, resulting in inefficiencies when employees / satellite operators at the Missile Defense Space Development Center (MDSDC) ground station in Colorado Springs, Colorado, needed to act in real time.

After Enhancements: The company developed test planning tools, test execution scripts and a collection parameter database organized by real-world target location and type, allowing employees at the MDSDC to plan payload data collections against real-world "areas-of-interest" and "targets-of-opportunity" in response to tip-offs from other systems or "national" data sources.

Planning these data collections at the ground station significantly reduced test planning and execution timelines from several days to a few hours.

Automated planning tools all but eliminated human mission planning errors. Operators currently maintain a command error rate of less than 0.0003 percent as data collections increased by a factor of 10—or from one to two each day per spacecraft to 10 to 12 per spacecraft daily. This quadrupled data collections in 2012, compared with 2011.

- **Anomaly Safeguards (Before Enhancements)**: A conservative, pre-launch design assured space vehicle safety by shutting down the payload in response to any indication of an anomaly. Although the built-in defense mechanism kept both satellites safe, returning a payload to operational status could take as long as several weeks.

  After Enhancements: Improvements to fault management monitoring and response processes resulted in a significantly shorter recovery to mission timeline from 12 days to two days.

- **On-Orbit Operating Time (Before Enhancements)**: At launch, satellite designers expected to operate each payload for 36 minutes per orbit—an improvement from the 10 minutes per orbit specification. But each orbital period currently is 112 minutes, leaving much capacity unused.

  After Enhancements: Payload per-orbit operating time increased to 75 minutes. Engineers designed and executed a series of experiments that demonstrated the safety of longer payload operating time, and verified there was sufficient power to accommodate extended operations.

- **Crosslink Resiliency (Before Enhancements)**: STSS-D demonstrators fly in tandem, separated by 3,000 miles. An RF relay establishes communications between one spacecraft that is out of view of a ground station through the other satellite, which is in range. The crosslink was intended to be used only once, during an initial on-orbit demonstration.

However, to fulfill mission requirements, systems aboard the satellite and on the ground must send data to other missile defense systems quickly enough to allow them to target and destroy incoming missiles. That requires fast data processing and communication links. They also must work under the harsh environmental conditions of space, which requires materials that can withstand radiation and cold temperatures.

After Enhancements: Modifications allowed routine use of the communications crosslink on back-to-back orbits, extending the operational utility from 20 minutes to more than 40 minutes for each crosslink operation.

Today, MDA says it plans to operate STSS-D into 2017—significantly beyond the satellites' two-year mission life and four-year design life. A former MDA director cited STSS as the "most capable sensor currently in the MDA sensor suite."

During 2011 congressional budget testimony, he stated, "Two recent flight tests demonstrated that STSS dramatically improved the precision of threat missile tracks and provided more accurate fire control quality data to the Aegis ships several minutes earlier than less accurate data provided by organic radars in the Aegis or THAAD systems."

Such accomplishments are validating the need for a space layer as a practical and affordable component for fulfilling the real-world mission of MDA's Ballistic Missile Defense System (BMDS). Lessons learned from the two STSS-D satellites are guiding decisions on the development of a fiscally sustainable, continuously available, future operational constellation and ground communications/processing system.

The satellites have only improved since the end of Early On-Orbit Tests in late 2010. They are continuing to increase their value to users and taxpayers as they perform a wider range of tasks and demonstrate why space-based sensors can be a ballistic missile's worst nightmare.

For more information, access the company' website *http://www.northropgrumman.com/AboutUs/BusinessSectors/AerospaceSystems/Pages/default.aspx*

About the author
Rob Zmarzlak was named program manager for Northrop Grumman's Space Tracking and Surveillance System Demonstration satellites in 2013 after managing launch preparation, launch, deployment, on-orbit test and extended operations and sustainment since 2007. Altogether, Rob has 30 years of experience in space and launch operations, systems engineering, and functional and program management of space programs including GeoLITE, NASA's Earth Observation Satellites, Future Imagery Architecture, Space Based Radar and restricted military programs. He also served 24 years active and reserve military duty in both the U.S. Navy and Army in the intelligence field, which includes several overseas deployments and NATO peacekeeping operations.

Cooperation For Tactical Edge Battle Space Communications' Interoperability + Excellence

By Karl Fuchs, Senior Contributor

June brings us the annual Joint User Interoperability Communications Exercise (JUICE) to demonstrate interoperability of new and emerging technologies by emulating the tactical edge of the battle space.

This worldwide event is hosted by the U.S. Army Communications Electronics Command (CECOM) Software Engineering Center (SEC) in conjunction with Strategic Command (STRATCOM). Of course, in every JUICE exercise, seamless connectivity is the main focus but every JUICE event has new and exciting themes. The primary themes for JUICE 2013 are ultra-portability, throughput and cyber security.

Quite often when discussing the portability of a remote terminal, the focus is simply on the device's physical size and whether the terminal is airline checkable, fits in aircraft overhead storage or meets the definition of man packable. Although the physical size is clearly important, JUICE will be evaluating terminal capabilities using a broader definition of portability.

One of the first tests of a MICROSAT terminal will be to time uniformed satellite communications personnel unpacking, pointing the antenna, joining the network and transmitting packets. Other aspects of portability will be evaluated including power consumption of the terminal and use of alternative power sources.

The JUICE 2013 test plan includes a series of tests designed to evaluate one of the most interesting power-saving features of a terminal to be introduced in quite some time—the Key-Line feature. The Key-Line feature allows an intelligent TDMA terminal to command an appropriately featured BUC to go into warm stand-by when the terminal is not assigned TDMA time slots.
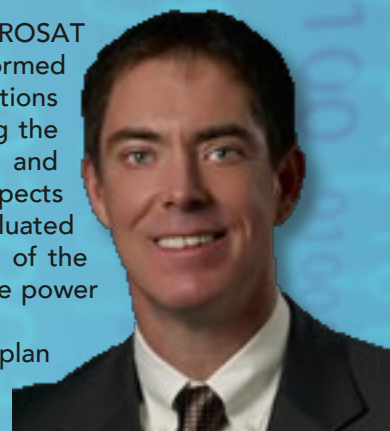
The JUICE 2013 test plan calls for a packet generator to simulate high, medium and low volumes of traffic to evaluate the impact on battery life. In other networks and tests, savings as much as 40 percent have been documented. A 40 percent battery life savings equates to a much more portable terminal regardless of configuration.

Naturally, size, weight and power (SWAP) is a major concern in a tactical, very small aperture terminal (VSAT), but performance is truly driven by the mission. Warfighters on the tactical edge have widely varying throughput and performance requirements based on mission type.

The applications demonstrated in JUICE will include voice, data and video. The applicability of a MICROSAT terminal—that is a terminal with a 65cm effective aperture antenna or even less, and weighs less than 35 pounds, to high throughput applications such as video—is determined by a number of factors including link budget and adjacent satellite interference limitations.

WIDEBAND GLOBAL SATELLITES

The JUICE tests will heavily use WGS X-band capacity. With very high Effective Isotropic Radiated Power (EIRP) and Gain/Temperature of the Wideband Global SATCOM constellation, as well as limited numbers of interference-causing X-Band satellites, we expect demonstrations to include full-motion video over MICROSAT terminals. Critical to missions using VSAT technology is the ability of a system to support high-priority traffic in a shared, over-subscribed network.

The most critical application is flash override voice traffic. It is essential, regardless of what lower priority traffic may be traversing the network, that flash override Multilevel Precedence and Preemption (MLPP) traffic be delivered with no degradation of call quality. In order to design the network to support such sophisticated Quality of Service, communicators must work in conjunction with multiple vendors across the entire link and develop a standardized definition for the per-hop behaviors of every device in the network.

Security is always a primary concern at the tactical edge—JUICE tests pay close attention to all aspects of security. In accordance with the Defense Information Systems Agency (DISA) Teleport Program Office (TPO) mandate, all remotes in the network must be under Transmission Security (TRANSEC) cover. In years past, TRANSEC was the primary security focus with an emphasis on seamless hub failover and global mobility under TRANSEC.

JUICE 2013 will focus on cyber security, which has always been a primary concern for all military networks. It has long been known that Non-classified Internet Protocol (IP) Router Network (NIPRnet) services touch the "dirty" Internet and are, therefore, vulnerable to outside attacks. JUICE network architecture will include several layers of network security with the first being routers and firewalls with very stringent access control lists.

Other controls include running separate servers with software specifically designed to watch for intrusion type of IP connections. To complete the cyber security package, every workstation and server in the network is required to be compliant with the latest Security Content Automation Protocol (S-CAP) release. S-CAPS, which have effectively replaced STIG (Security Technical Implementation Guides), can evaluate a system connected to the network for known vulnerabilities.

One of the greatest cyber security challenges is its ever changing nature. Both S-CAP and virus definitions need to be updated as new vulnerabilities are discovered. The JUICE event is providing an excellent template on how government and industry can better cooperate to ensure the timely rollout of new S-CAP and virus definition solutions.

The JUICE drills are one of the greatest examples of interagency, government and industry cooperation in existence today. Over the years, JUICE has provided valuable lessons on how to build seamless communications on the move networks, the most user-friendly TRANSEC implementations and more.

I expect this year's exercise to provide more valuable lessons which will greatly improve the way agencies, the government and industry work together to build the best communications networks for the warfighter.

About the author

Karl Fuchs is a Senior Contributor to MilsatMagazine and is also the Vice President of Technology for iDirect Government Technologies. He may be reached via email at *kfuchs@idirectgt.com*.

A Case In Point:
Afghanistan's NexGen Communication Moves

Throughout the ages, Afghanistan has been at the crossroads of many empires. The area's people and territory have faced conquest by the Greeks, Arabs, Mongols, Turks, British, Soviets and, following the September 11 attack on New York's World Trade Center, the United States.

This turbulent history, the rule of the Taliban and six years of civil war, have left Afghanistan a legacy of widespread poverty, decimated infrastructure, and, quite possibly, the largest concentration of land mines on Earth. Few nations in the 21st Century face the challenges that confront the nation's first democratically elected government today.

Communications have been essential to those who govern since the days of news travelling no faster than a horse could gallop. Recognizing the importance of communications, the World Bank issued a request for a proposal (RFP) in 2003 to construct a Government Communications Network (GCN) for Afghanistan's Ministry of Communications. The aim of the RFP was to provide voice and data services to ministries and government offices in Kabul, Afghanistan's capital, and to the provincial capitals, as well.

The winning bidder was Globecomm. But there may have been days when company executives wondered if winning the bid was such a great idea.

Changing Requirements

"The environment is about as challenging as it gets," said Globecomm vice president Paul Knudson, who manages the Afghan projects for the company. "Outside Kabul, there is little or no infrastructure, no roads and no electricity. Security is a continuing concern. We have had to unload trucks in the

middle of nowhere, hand-carry electronics across a stream, then get the truck across and reload it."

To make matters even more complicated, no sooner had the project been awarded than the specifications began to change. Globecomm discovered that the Ministry of Communications had, under a separate contract, purchased CDMA mobile switches from a Chinese company. They were providing local mobile service in "telecom islands" but had no outside connections. Interconnecting the switches and linking them to long-distance circuits became an unexpected priority. "It was a fundamental change," said Globecomm vice president Paul Johnson, who is the account executive for Afghanistan. "What we had originally planned to be a private network rapidly became a public network. We are, in effect, the backbone for a public telephone system, providing bandwidth, trunking, bringing traffic back to Kabul and providing international voice, video and Internet service. That's in addition to meeting the government's urgent need for connectivity."

Another important change involved the identity of Globecomm's client. Globecomm developed each project under the management of the Ministry of Communications. However, when the Ministry accepted systems upon completion, the assets were then transferred to Afghan Telecom. "The goal was to make the Ministry a true regulatory body," said Paul Knudson, "while Afghan Tel became the operator. With each new network, Afghan Tel gains assets and increased value that improved its ability to attract outside investment."

Multiple Projects

The IP-based Government Communications Network (GCN) links 42 ministries and offices in Kabul via fiber and microwave, and extends this core network to 34 provincial capitals via satellite. Satellite bandwidth also links dozens of CDMA mobile switches in the provinces with Globecomm's SatCell hosted switching system in the United States. All calls taking place within the footprint of each CDMA switch remain local, while calls between the switches, or outside Afghanistan, are routed through Globecomm's Network Operations Center (NOC). The GCN turned out to be the first of multiple projects awarded to the company by Afghanistan's government.

What followed the GCN implementations was the District Communications Network (DCN), funded by US AID, which aimed to push service into rural areas. Globecomm designed, installed and commissioned a satellite network connecting a hub in Kabul to police, fire and other essential services in each of Afghanistan's 337 legislative districts. The DCN provided voice and thin-route data as well as Internet access. Ongoing demand for the DCN has been tremendous, and Globecomm continues to work with Afghan Tel to expand the business plan and bring more revenue into the network.

IP-Based Platforms

The international gateway for voice, data and video, came next—this was funded by the Afghan Reconstruction Trust Fund (ARTF). The Ministry originally specified a DCME network,

the accepted technology, but accepted Globecomm's recommendation for an IP platform that was less expensive and far more flexible. In addition to gateway service for Afghanistan, the ARFT also provides a backup satellite facility for the GCN.

In two other projects, Globecomm has installed PABX switches at National Army bases throughout the country and has integrated them into an existing VSAT network. Also provided was a custom-designed satellite truck to the Ministry for mobile spectrum monitoring. With so much of the nation's telecommunications depending on satellite, the truck allowed the Ministry to more effectively regulate spectrum, issue licenses and shut down illegal operators.

Paul Johnson gives much of the credit for Globecomm's in-country success to its Afghan partner, Watan Telecom, and its Chairman and CEO, Mr. Rateb Popal.

"Mr. Popal worked with us early on to ensure that resources were in place to train the people needed to carry out the installation and commissioning of the work. Together, we have built the capacity of the Afghan workers and transferred a great deal of technology 'know how.' We now have Afghan technicians supporting the programs as they move from deployment to network operations and maintenance. I have been really impressed by their desire to learn and their level of commitment."

"The people of Afghanistan are thirsting for improvement in the quality of their lives," said David Hershberg, Chairman and CEO of Globecomm. "Our work is helping to meet that need. You can't possibly build an effective government without reliable communications. We're helping newly-elected legislators and cabinet members understand what it takes to legislate and govern. Our network provides videoconferencing among provincial officials so they can learn from each other and work together. Communications creates opportunities for commerce, to obtain finance and credit, to interact with NGOs and with the government. We're incredibly proud to be making this contribution, and endlessly impressed with the determination of our employees, partners and customers in Afghanistan."

Will Hosted Payloads Perform Demonstrations Or Operations?

Working Out The Bugs

By Bob Bishop, Northrop Grumman Aerospace Systems

The Government Accountability Office (GAO) recently published an assessment of federal agencies' progress toward reducing satellite program costs by leveraging nontraditional, but innovative, approaches such as hosted payloads on commercial satellites.

Released in April, just a few days before income taxes were due, GAO's report states that selected agencies are reporting savings in the hundreds of millions of dollars by implementing these proven practices.

It also notes the wide variety of capabilities hosted payloads are performing on orbit today—missile warning; an Internet router in space; navigation augmentation for civil aviation; ship tracking; and UHF communications to improve connectivity among Australia's deployed forces.

At a recent space event in Colorado Springs, Charles Beames, of the Office of the Undersecretary of Defense for Acquisition, Technology and Logistics, reflected on the role of commercially hosted government payloads as a less expensive way to perform technology demonstrations and competitive prototyping. He also mentioned the value they present towards future architectures that provide more resiliency.

Beames indicated a desire to get government laboratories and program offices to fly-test articles and to mature technology readiness levels (TRL) to TRL9 prior to going into full engineering, manufacturing and development.

The advantage of technology demonstrations is working out the "bugs" without affecting operations. Perhaps more importantly, it allows concepts of operation to be fine-tuned to determine final system requirements.

A common criticism of this approach has been that it can add years to program timelines, potentially yielding technology that is much older by the time such becomes operational.

According to the GAO report, there are more technology demonstrations using commercially hosted payloads than operational missions. Hosted Payload Alliance members were asked:

"Do you see future hosted payloads providing operational capability to military users, or will hosted payloads be mostly experiments and technology demonstrations?"

"There are a few selected National Security mission areas where the use of hosted payloads on commercial satellites will not be able to meet critical warfighter requirements, but those can be counted on a single hand. For all other mission areas, hosted payloads may not be the only way to accomplish the mission, but they certainly can play a role in adding diversity and resiliency to a mission area or augmenting that area. If we look beyond the National Security mission areas, I believe hosted payloads will play a key role in Science and Technology areas and in Civil space missions."
—**Timothy Deaver**, Vice President of Corporate Development, **SES Government Solutions**

"As the military moves towards a cost-efficient, disaggregated architecture, it seems logical that hosted payloads will play an increasing role in providing operational capabilities to the military services. In fact, we would not be surprised to see test and demonstration missions, in some cases, morphing into at least short term operational systems under a number of planned and unplanned circumstances."
—**Tim Logue**, Senior Director, Marketing and Sales, **Thales Alenia Space North America, Inc**.

"Hosted payloads of the future… and today… provide operational capability to military users. In fact, the most recent hosted payload delivered by Boeing is on the Intelsat 22 satellite. Launched on March 25, 2012, Intelsat 22 carries a hosted UHF payload that was purchased by the Australian Defence Force. Approximately half of that content has been provided back to the U.S. Government for use in the Indian Ocean Region. The ADF has indicated that the cost savings to them by using a hosted payload on a commercial satellite is 40 percent over the life of the program, when compared to a dedicated system. And, by the end of this year, we will see another launched, this one on Inmarsat 5, which will be carrying a military Ka-band switchable payload. If hosted payloads are used only for experiments and technology demonstrations, then we have failed as an industry to deliver innovative solutions that meet critical mission requirements."

—**James F. Mitchell**, Vice President, **Boeing Commercial Satellite Services**

"The U.S. government has a long history of hosting both technology demonstrations and operational payloads on its satellites to fill coverage and capability gaps. Prominent examples include the Nuclear Detonation Detection System on Global Positioning Satellites (GPS) and the Space Based Infrared System's Highly Elliptical Earth Orbit payloads. Technology demonstrations are an obvious choice for initial forays into hosting military payloads on commercial satellites because the real goal is to get the payload into space and measure its performance. Long-term, though, we see a different future for hosted payloads. The Federal Aviation Administration is pointing the way with operational Wide Area Augmentation System payloads on commercial satellites for air safety. A measured approach beginning with hosting on government-owned satellites will build business skills, technical acumen and confidence, leading to operational missions. This allows government agencies and their industry partners to use the hosted payload process to their best advantage."

—**Tim Frei**, Vice President, Communication Systems, **Northrop Grumman Aerospace Systems**

"For many years small experimental payloads have been placed on both commercial and government satellites to qualify new technologies. Recently NASA has begun to institutionalize this process by proposing to put some payloads such as Laser Communications, the Atomic Clock, TEMPO, and GOLD on commercial spacecraft. However, the benefits of leveraging commercial spacecraft for operational DoD payloads, such as OPIR, Space Situational Awareness, Environmental Monitoring and GPS augmentation, are so compelling that it is inevitable that we go in this direction. Hosted payloads offer a cost-effective solution, with routine access to space, for needed disaggregation and other governments such as the Australian Defence Force and the European Union are already reaping those benefits."
—**Eric Spittle**, President of **SSL Federal**

Join the Hosted Payload Alliance

From policy development to the acquisition and operation of hosted payloads, HPA is the platform for mission-specific dialogue and the principal source for subject-matter expertise. HPA represents the collective interests of its members by providing a forum to lead the future of hosted payloads.

Membership Benefits

» Access to officials in both the public and private sectors who shape the continued growth of hosted payloads
» Research & Analysis of the evolving trend of hosted payloads via case studies, benchmarking programs and comprehensive data collection
» Networking with industry leaders ranging from satellite and manufacturers to system integrators and launch service providers
» Engagement with influential audiences such as industry media, analysts and key decision-makers, and through speaking opportunities at HPA events
» Dialogue among fellow HPA members through communications such as member-only newsletters, strategy development sessions and committee participation
» Advancement of the dynamic business of hosted government payloads on commercial satellites

Membership Levels

Membership in HPA is open to any and all corporations, institutions, agencies, individuals, alliances, public interest groups or others interested in the benefits of hosted government payloads. HPA offers three exclusive classes of membership: Executive, Associate and Affiliate.

Executive Members: Corporations or partnerships that manufacture or operate commercial satellites and provide hosted payload capabilities on commercial satellites.

Associate Members: Corporations, partnerships, institutions, or not-for-profit organizations that engage in business with the operation of commercial satellites and providing hosted payload capabilities on commercial satellites.

Affiliate Members: Individuals, including consultants, employees of governments and independent contractors of government agencies who are interested in the manufacture, operation and provision of hosted payload capabilities on commercial satellites.

Applications for membership in the **Hosted Payload Alliance** will be evaluated and accepted at the discretion of the HPA Board of Directors.

Download the application PDF Membership Application form at http://www.hostedpayloadalliance.org/AM/Template.cfm?Section=Join and email to jmetzgar@hostedpayloadalliance.org

Command Center
David Helfgott, President + CEO, *Inmarsat Government*
Andy Start, President, Inmarsat Global Government

MilsatMagazine recently had the opportunity to discuss the recent acquisition of TC Communications by Inmarsat, especially as to how such will impact the Company's business in the APAC region of the world, as well as to learn more concerning these gentlemen and their careers.

MilsatMagazine (MSM)
What was your motivation for joining the Inmarsat Government business units?

Dave Helfgott
I was impressed by Inmarsat's solid industry reputation. The company has been recognized as a global leader for more than 30 years, delivering mobile satellite communication services to government and commercial customers, with a range of services that can be used on land, at sea or in the air. In addition, I was excited about the way Inmarsat's products and services are positioned in the U.S. government market. The launch of our Global Xpress service is testament

Dave Helfgott

to strategic thinking and a customer/user orientation, and it will set a new standard in mobile satellite communications.

Andy Start
Leading Inmarsat's Global Government Business represented a fantastic fit for my previous experience and my passion to be in a role that makes a real difference. Inmarsat recognized that there are fantastic growth opportunities in the global government market, and my experience of helping to deliver significant growth for Harris' international tactical radio business was directly relevant. Inmarsat has always been an organization focused on making a difference. It started its life as an inter-governmental organization focused on saving lives at sea. Today we continue this commitment but also make a much wider contribution. We help both governments and NGOs respond to just about every major disaster in the world, we support emergency service communications, critical national infrastructure, border security and help deliver telemedicine. Who wouldn't want to be part of that?

Andy Start

MSM
How were the government units formed and what role do they play within the Inmarsat plc group?

Dave Helfgott
Inmarsat Government was established to provide a single point of contact for Inmarsat to the U.S. government, both military and civilian, where customers can access various satellite, terrestrial and professional services that we provide. Through the combination of legacy Segovia, Stratos Government Services and other Inmarsat Government business units, Inmarsat Government delivers seamless, agile, rapid-response solutions and support services via two channels, per our Charter.

The first is indirect, where we rely on our trusted wholesale partners to deliver a full range of Inmarsat mobile satellite services. The second is direct via our proxy company, and provides a broad portfolio of mission-critical communication solutions in support of direct government contracts that require security clearances. These two delivery arms operate separately in serving the government market.

Andy Start
Inmarsat's Global Government business unit is established to serve the global government market, with the exception of the U.S. government sector. Like Inmarsat Government, we at Global deliver a broad portfolio of seamless broadband and narrowband mission-critical solutions, and managed network services to coalition forces throughout the European, EMEA and Asia-Pacific regions.

MSM
Communications solutions for the military aerospace government environment are so crucial to mission success and for saving the lives of our war fighters. How can ISR be delivered securely and rapidly?

Dave Helfgott
Inmarsat, as a whole, delivers well proven, rapid and reliable communication capabilities that meet the U.S. government need for flexibility and operational responsiveness, which include ISR solutions. For ISR specifically to be successful, you have to have global coverage, transportability and mobility. Today, our MSS services serve this market. Inmarsat's Global Xpress service will support all these missions in the future, whether they are manned or unmanned.

MSM
With a refocus by the U.S. government to the Asia-Pacific region, does Inmarsat Government rework its own priorities to ensure they are involved in these regions of the world?

Dave Helfgott
Inmarsat's global orientation is why we have always had just as much capacity in Asia-Pacific as we have had everywhere else—permitting our customers to "pivot" seamlessly as their plans change. This philosophy will continue in our Inmarsat-5 Global Xpress system; Inmarsat will be able to deliver more capacity to strategically important spots in Asia than any other commercial satellite provider, with the transportability and mobility that our users demand. Government customers require this flexibility globally, and throughout the Asia-Pacific region.

MSM
What specific mobile communication services are required by government customers operating in the Asia-Pacific region?

Dave Helfgott
The requirements in the Asia-Pacific region are no different than in other parts of the world. Inmarsat delivers a broad portfolio of global, seamless, broadband and narrowband mission-critical solutions and managed network services. These services also meet the highest security standards and are flexible, reliable, secure and affordable to our government end users.

Andy Start

The Asian market is developing rapidly as the economies in the region continue to strengthen. Asia has always been subject to challenging environment and weather issues, and this is becoming more significant as Global Warming impacts climate.

Following the Tsunami in Japan, the recent Earthquakes in New Zealand, fires in Australia and floods in Thailand we have increasingly been providing solutions to ensure government departments are warned early and can continue to operate effectively through these challenges.

MSM

Why did Inmarsat decide to acquire TC Communications?

Andy Start

The acquisition came about following our strategic decision to maintain the direct government business we had in four countries: Australia, Canada, New Zealand and the Netherlands. We appreciated the need to strengthen our engineering and solutions capabilities in these nations. Having taken this decision, we determined it was more effective to acquire TC Communications than to recruit and train a large number of new staff.

MSM

What does TC Communications bring to the table to assist Inmarsat in more fully offering solutions for the Australian and the Asia-Pacific region?

Andy Start

The strategic rationale is compelling. The acquisition of TC Communications brings strong VSAT, Wideband Global SATCOM system, aviation and solutions skills to Inmarsat's Global Government and Enterprise Business Units. These skills are particularly important to drive the take-up of Global Xpress in the enterprise and government markets following the launch of the first satellite later this year.

In acquiring TC Communications, Inmarsat has gained access to a professional team with a strong reputation for excellent customer service and technical expertise.

MSM

What positive impact will the TC acquisition provide to U.S. military forces serving in Asia?

Dave Helfgott

TC Communications has an excellent team, well known for providing high quality SATCOM solutions to the Australian Defence Force. As Inmarsat Government supports U.S. operations in the region, we will look for complimentary areas of support, especially between the U.S. government and Australia Defence requirements for interoperable SATCOM services

MSM

What are your thoughts regarding: Solutions negating satellite interference? How is Inmarsat working within these segments to bring viable solutions into play?

Dave Helfgott

End users continue to state that Radio Frequency Interference (RFI) is the single most important service issue relative to their use of satellite services. RFI disrupts data transmissions and other communication services, hindering their objectives. Satellite operators, manufacturers, organizations and end users prioritize enforcing standard practices to mitigate interference within their respective technical operations.

MSM

Looking back over your successful career, what project or projects truly bring you a deep sense of satisfaction?

Dave Helfgott

Looking back, there are many instances in which I am proud to have played a role. For example, earlier in my career, we were able to provide critical communications support during and in the aftermath of Hurricane Katrina. We also supported

the U.S. military and other government agencies with mission-critical communication and network services during Iraqi Freedom and Enduring Freedom.

I am proud that I was part of providing services and products toward the buildup of the Joint Network Node (JNN) program, which is now part of the Warfighter Information Network Tactical (WIN-T) program.

Here at Inmarsat Government, I'm inspired by our new, innovative products such as BGAN Converge and Global Xpress. I also am optimistic about our company's future: Inmarsat Government has positioned itself in a really unique place in terms of serving the U.S. government market today, and we plan to expand on that as we move into the future.

Andy Start

I've been lucky enough to be involved in many remarkable projects. It's hard to top being at the launch of a satellite and a launcher that your team has built, or the first flight of a jet your team has helped design, but it has been a truly humbling experience to work with the team at Inmarsat. It's a fantastic team, developing incredible technological solutions to real-world challenges.

A particular standout is the work we do with the aircraft and ships of the Australian Maritime Safety Authority to help provide complete situational awareness around the Australian coast. AMSA have saved thousands of lives over the last year and the system we provide has been instrumental in their effectiveness.

For further information, access the company's website
http://www.inmarsatgov.com/

About Dave Helfgott

As president and chief executive officer, Mr. Helfgott is responsible for the overall business strategy and direction for Inmarsat Government, a leading provider of secure and reliable mission-critical telecommunications to U.S. military and civilian organizations. Before being named president and CEO in May 2012, Mr. Helfgott was president of Inmarsat Inc and senior vice president of business development and strategy for the parent company, Inmarsat plc. In this position, he was responsible for development functions across the Group including strategic planning, M&A, new market development, technology strategy and government-policy outreach, as well as the management of strategic programs across Inmarsat's market sectors.

Prior to joining Inmarsat, Mr. Helfgott held leadership positions in the satellite communications and intelligence, surveillance, reconnaissance (ISR) technology market including: Cobham PLC, as president of the wireless ISR technology business unit; DataPath Inc, as president and CEO; SES Americom Government Services, as president and CEO

About Andy Start

Andy Start is the President of its Global Government business unit, dedicated to serving the global government market, with the exception of the U.S. government sector. In this role, Start spearheads all sales, marketing and delivery of solutions and services that meet the needs of such government customers around the world. He is responsible for customer-driven product and service innovation, determining both wholesale and retail go-to-market strategies, and driving the distribution of Inmarsat services to such government customers.

Mr. Start most recently served as President, International RF Communications at Harris Corporation and, prior to that ,was Managing Director and Vice President of BAE Systems Platform Solutions. He also served as Director of the Military Space business unit at Astrium where he was instrumental in the creation of the Paradigm service business.

New Times + New Opportunities
For Space Foundation

By Elliot Pulham, Chief Executive Officer, Space Foundation

"A pessimist sees the difficulty in every opportunity; an optimist sees the opportunity in every difficulty."—Winston Churchill

Even though I'm generally known to be a pretty optimistic guy, I don't mind telling you that my nerves were a bit frayed as the countdown clock neared T-minus-zero for the 29th National Space Symposium. As you'll know by now if you attended the event, and as you can read in our post-Symposium report throughout this edition of Space Watch, this year's Space Symposium was one of our best ever, and a triumph over adversity.

We have many great customers, partners and supporters from all over the world to thank for that. Many of our colleagues had their best Space Symposium ever. Government participation was certainly different from years past, but total participation once again surged past the 9,000 participant mark.

There's already been a lot of analysis of why the Space Symposium was so successful this year, despite the many reasons it could have failed. You can read all about the event in the pages of Space Foundations' Space Watch and in our News Briefs. Harking back to Sir Winston's famous quote, I'd like to focus instead on the two great opportunities I see emerging for the Space Foundation as a result of the difficulties we confronted this year.

Stronger Education + Discovery Enterprise

The first opportunity we're focused on is the opportunity to build a stronger, more vibrant education and discovery enterprise.

Education is absolutely critical and foundational to our mission. And for many years the Space Symposium generated a significant part of the money required for us to provide world-class science, technology, engineering and mathematics (STEM) education programs for teachers and students. This year that was not the case. For the sake of the Symposium, we made a strategic decision this year to give away (or "comp") a huge block of registrations for our U.S.
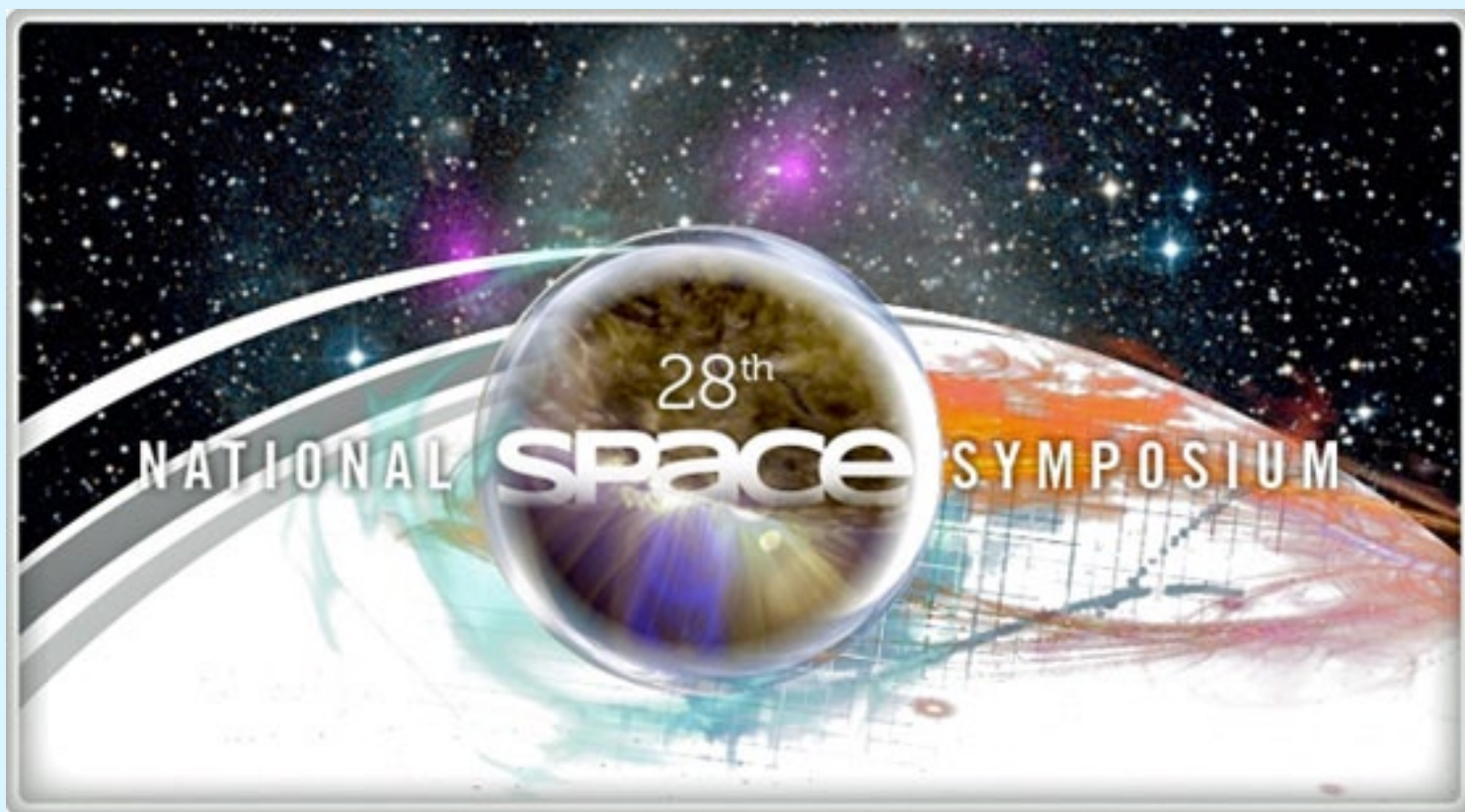
government customers. The upside was strong government participation. The downside was a huge hit in our ability to fund STEM education programs for the coming year.

What has been interesting is how this "difficulty" has provided the opportunity for us to have more direct conversations with our supporters about the value and importance of our education programs. And we're finding that people are much more interested in stepping up to help than we might have imagined.

A bit more than a year ago, we began marching in a new strategic direction to leverage our location, our spacious new headquarters, our outstanding teaching team, our expertise in curriculum and instruction and our terrific relationships with our industry partners with a plan to open an educational facility and Visitors Center.

We were successful in the endeavor, and, in October, opened the Northrop Grumman Science Center, featuring Science On a Sphere® (SOS) and the El Pomar Space Gallery. In February, we launched our Sphere SOS-based courses and have since introduced thousands of students to the wonders of our universe through this extraordinary teaching tool.

This year, we've decided to accelerate the development of our Visitors Center, fielding instead an education-inspired Space Foundation Discovery Center, which has the Northrop Grumman Science Center at its heart and will eventually include a teaching auditorium, laboratories, classrooms, more exhibits and a Space Technology Hall of Fame®.

In the five months since the Northrop Grumman Science Center opened, we've hosted more than 6,000 visitors for educational and informative programs here at Space Foundation headquarters. Thanks to conversations we had in the margins of the 29th Space Symposium, interest has greatly increased, and more than a thousand students are booked to experience Sphere education programs with us in the next month alone.

Meanwhile, thanks to grants from the Boettcher Foundation and the Anschutz Foundation, we've been able to accelerate our development of Phase 2 of the Discovery Center. Our own board recently authorized additional investments from savings to further accelerate the build-out. We had terrific meetings with many corporate partners during the Symposium and hope to announce additional major sponsorships of Discovery Center facilities in the coming months.

This summer will be our first test of full-time operations at the center. From early June through mid-August, we'll be offering a 10-week Summer of Discovery, with a different focus every week and special events certain to promote formal and informal education in the STEM and STEAM disciplines (STEAM adds an "A" for Arts).

During the Summer of Discovery we'll be rolling out new exhibits of space artifacts loaned by our colleagues at the U.S. Space & Rocket Center in Huntsville. We'll be unveiling a purpose-built, high-tech, high-touch interactive exhibit on space imagery, sponsored and provided by our partners at DigitalGlobe. We'll be unveiling a previously top-secret, experimental spacecraft that's been donated to us (details to be announced). We'll be putting the Scott Carpenter Station on display and we'll be hosting our first loaned exhibit from NASA, a Space Shuttle showcase called Conquering LEO.

Propelled by a strong vision, our initiative to develop a world-class space education destination is gaining fuel and momentum because the difficulty of this year's Space Symposium created the opportunity for us to engage our partners and supporters much more deeply than ever before in our education mission.

The Space Foundation Discovery Center will fill a critical void locally. Despite Colorado's status as the second-largest space state in the nation, the Rocky Mountain State has never had a space "museum," as such. And despite the importance of high-tech in the local economy, Colorado Springs has never had a science or technology museum. With your support, the Space Foundation will now fulfill both those roles.

However, our Discovery Center will be much more, as it is being built from the ground up with education at the core of its purpose. Distance delivery infrastructure will allow us to provide web-delivered education programs to teachers and students around the world. In addition to traditional web-based education models, we're engaged in ground-breaking work to use the Northrop Grumman Science Center to "sphere-cast" SOS lessons to other locations around the world.

Corporate vice president and president of Northrop Grumman Aerospace Systems, Gary Ervin, at the opening of the new science center.

development of our next generation space leaders and to facilitate the greatest business-to-business marketing environment in the industry. This evolution has served the industry well and will continue.

We learned this year that there's even more we can do to increase the content, value and resiliency of the Space Symposium. These ideas include adding strong technical content tracks and programs, offering high-value classified sessions, providing more venues for face-to-face meetings, embracing adjacent industries and many other ideas that, for competitive reasons, I'd like to keep under my hat for now. (If you've got an idea for us, feel free to email me at *epulham@spacefoundation.org*.)

There's no limit to where this can take us, and to the impact we can have on STEM education. This year's difficulty is providing huge opportunity. Please join us in this critically important mission!

Reinventing The Premier Space Gathering

The second great opportunity we see arising from the difficulty in fielding the 29th Space Symposium is the opportunity to vastly accelerate our continuous process of re-inventing for the future a conference that is already the worlds greatest space event.

Part of the secret to the Symposium's success in the current, budget- and travel-constrained environment, is the resiliency we have built in over the years by expanding well beyond the traditional, U.S. government markets. A decade ago we embarked upon programs to grow international participation, grow commercial and entrepreneurial participation, make the Symposium "ground zero" for the

To be sure, the Space Foundation believes that it is critically important that government employees be able to travel and to attend meetings and conferences. We think the current environment is not rational and that definite steps must be taken to "decriminalize" government travel so that our colleagues in government can get back to doing their jobs properly. We will work and fight hard to seek a more productive environment going forward.

That being said, tight budgets for everything from space procurement to travel are going to be the new normal for a while. We learned a lot about how to offer our government colleagues a lot of value for very little money this year, and that difficulty is something we also regard as an opportunity as we formulate plans for the 30th Space Symposium.

The View From Here is that, as Churchill said, there's an opportunity in every difficulty. We're committed to capitalizing on these opportunities to advance space-related endeavors to inspire, enable and propel humanity.

The redesigned medallion and ribbon, unveiled at the NSS Space Technology Hall of Fame Induction Ceremony.

Command Center
Giles Peeters, Defence Sector Director, Track24 Defence

Giles Peeters commenced his military communications career in the U.K.'s Royal Air Force (RAF) in 1989. He worked in the MoD's Defence Communications Security Agency (DCSA) as operations officer and procurement manager in the Satellite Service Delivery team before moving to the U.K. Government Communications Headquarters (GCHQ) Cheltenham in 2001. From 2004 to 2007 Peeters' significant expertise in commercial satellite communications proved invaluable in Iraq and Afghanistan as he provided front line tactical communication and deployment capability for Joint Helicopter Command. Peeters' final rank was RAF Squadron Leader.

In 2007 Peeters moved to the private sector and provided blue force tracking to NATO and the EU. Now Defence Sector Director at Track24 Defence, Peeters is the driving force behind the company's Commercial-Off-The-Shelf (COTS), Beyond Line-Of-Sight (BLOS), blue force tracking solution, Situational Command & Control (SCC) TITAN.

MilsatMagazine (MSM)
Mr. Peeters, please explain what is Track24 Defence's specialty?

Giles Peeters
Track24 Defence specializes in beyond line-of-sight, commercial off-the-shelf, blue force tracking (BFT) end-to-end solutions. The Track24 Defence communications backbone is built on secure Iridium and Inmarsat's satellite networks, along with cellular networks operated by commercial operators.

MSM
What does your role at Track24 Defence entail?

Giles Peeters
It's my job to assess the market and make certain we're continually developing solutions to meet customers' needs. Our development experience means we can create bespoke BFT solutions according to demand—perfect for fast response forces that need to go operational at short notice and over great distances. Traditionally, the defence sector can take months or even years to respond to operational requirements with suitable capability. This has made us quite popular with customers, as we can quickly roll out encrypted BFT solutions that enable huge increases in BLOS BFT capability.

A large part of my role also includes researching and identifying new territories that need situational command and control capability. When you can go to a military and instantly increase its situational command and control capability by 80 percent, our solution becomes hard to ignore.

MSM
What are the typical problems militaries suffer from in the communications sphere and how does your technology address them?

Giles Peeters
There is a growing realization that solutions developed for industrial warfare aren't suitable for conflicts fought amongst the people. Intra-community warfare in remote regions requires new tools that militaries just don't have. When I was in the MoD, BLOS comms was always at the top of the list of urgent operational requirements. This is because MILSATCOM availability is limited—even the Americans rely on commercial providers for around 80 percent of their satellite capability.

The other problem is the cost associated with this type of communication. MILSATCOM capability is extremely expensive. While commercial providers might not be able to provide as much satellite bandwidth, they can offer militaries huge increases in capability for a fraction of the price.

MSM
Is commercial satellite technology proving popular in the military sector?

Giles Peeters
In a word, yes. The only element holding it back is a concern regarding security. This is where the solution provider has to step up. Everything we pipe across communications networks through our SCC Titan solution, from positional data to text messages, is AES256 encrypted.

The other side of the security coin is all about solution sovereignty. Militaries naturally aren't keen to share backend resources with other militaries, allied or not. However, this is easily solved by providing server solutions that sit within military organizations, thus ensuring total data control and integrity.

MSM
Do you see commercial technology making even further inroads into the military sector in future?

Giles Peeters
I absolutely see this as being the case. You've only got to consider the recent announcements from the Pentagon regarding the suitability of Enterprise Service 10 on BlackBerry's Z10 and Q10 smartphones and PlayBook tablets, as well as Knox on Samsung's Galaxy S4, to get an understanding of how far commercial tech's already come.

Smartphones are powerful, and the apps they're now capable of running offer advanced BFT capability. In line with this, we've developed a command and control smartphone app called SMART24 with encryption.

It's also common knowledge that some of the commercial software out there is first-class. Take Google Maps for example. I honestly can't see another company surpassing the levels of detail and complexity that Google has already managed—therefore, the question for the military sector becomes, "How can we put this to work for us?" Service providers that are able to answers this question now now have a captive, interested audience to sell to.

MSM

What regions of the world are most interested in COTS BLOS tracking situational command and control?

Giles Peeters

I'm sure our competitors would love to know that! The regions BLOS blue force tracking technology, at the moment, are the ones in which only a basic comms infrastructure exists and are often countries protecting vast areas of territory that need flexible communications. If we can go into these territories and help organizations quickly increase their situational command and control capability, then commanders make more informed decisions that result in increased personnel safety and operational success.

MSM

How do you see the SCC Titan solution evolving over the same time period?

Giles Peeters

We're still educating this new market regarding situational awareness and what such really means. As we do this, our customers feed information back to us on their requirements and we develop our solution accordingly. This is how we envisage the SCC Titan solution developing over the next five years and this will ensure our solutions continue to offer fit for purpose capability for current military operations.

MSM

Will we see the military using smaller satellites, such as nanos and picos, for ISR missions and for BLOS acquisition, given this platform's lower manufacturing and launch costs?

Giles Peeters

The priority has been to get core satellite infrastructure with large bandwidth up and running for BLOS voice comms. Now that that's been realized, militaries can start thinking about smaller, more sophisticated SATCOM technology and how it can be used for intelligence, surveillance and reconnaissance (ISR) missions. Innovative M2M BLOS satellite use has seen our Whisper device evaluated for UAV coordination and ECM C2.

MSM

What SATCOM technologies do you believe will truly become comms and intelligence assets for the military over the next year or so?

Giles Peeters

An increased use of small commercial 'spy' satellites on elliptic orbits, and commercial satellite imagery, is to be expected. Providers able to supply near real-time detailed satellite imagery of any region in the world will find their services in high demand. Military use of COTS satellite solutions is increasing because they're cost effective and the private sector invests heavily in R&D.

MSM

Finally, given your wealth of experience in this industry and in the military, when you look back on your career, what projects bring you a true sense of satisfaction?

Giles Peeters

The project that immediately comes to mind is the introduction of BLOS voice comms into MoD helicopters in 2005/6 for use in Iraq and Afghanistan. This use of commercial technology to solve an urgent operational requirement is the inspiration behind SCC Titan.