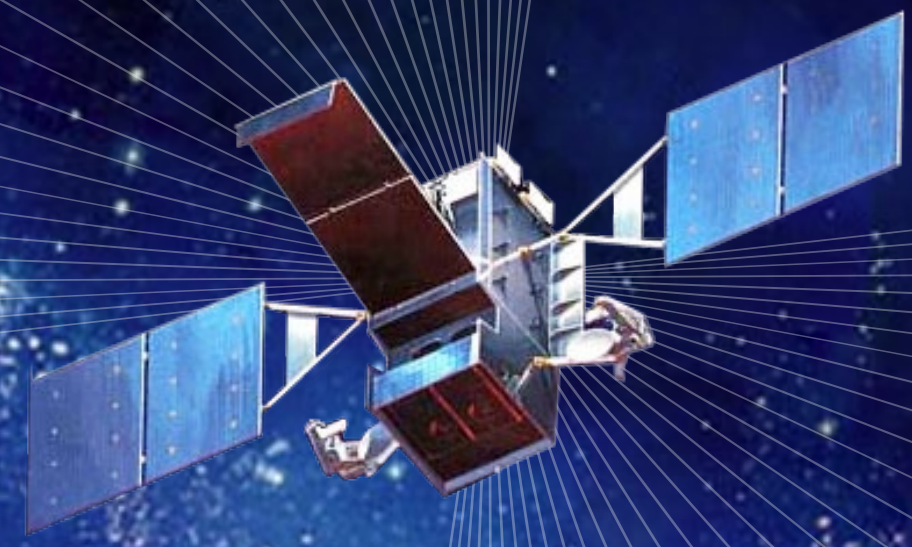
SatCom For Net-Centric Warfare November 2009

MilsatMagazine



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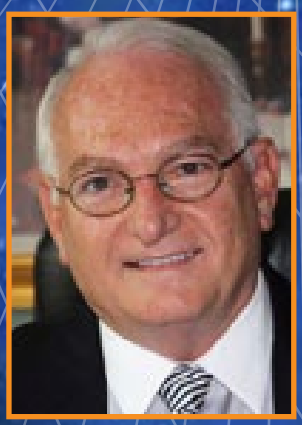

MASTHEAD CONTENTS

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INTELSAT
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Launching any issue of our MilsatMagazine publication is an exercise in delight — the cooperation received from industry professionals, military commanders and government organizations is most appreciated — we relish the opportunity to learn something new each and every day, thanks to the informative articles, telephone calls, visits at trade shows, and press releases. The amazing factor is how well the MILSATCOM industry remains so flexible and viable, day after day, week after week, and month after month, to preserve and protect — a true testament to the creative approaches taken to product and marketing by various MILSATCOM market segments.

We enjoy hearing from you and appreciate receiving your promotional materials and feature articles that are of great help to others in our industry. As we all wish to put our best foot forward, here are a few recommendations that would allow us to help you with your presentations in ***MilsatMagazine*** and our daily and weekly ***SatNews*** offerings.

For your announcements, product photos are a marvelous value add — if sent with a press release, this saves our editorial staff time in attempting to locate the appropriate image for the story or the news release. Unfortunately, if too much time is required to locate an image, due to our daily deadlines, your company's announcement will not have the graphic to enrich the presented information.

This also holds true when you forward information regarding personnel and/or executive team changes at your organization, company or command. If you could include a photograph of the individual(s) you are referencing, such would be of tremendous help in ensuring correct identities. Making corrections requires additional time at our end of the production cycle and, if a print issue, the correction may not be made due to the expense of a repeated print run. Additionally, if the targeted issue is also a PRINT issue (and this is *very* important!) — we must receive 300 dpi .jpg or .pdf files...

We hope you enjoy this particular issue, which offers some highly interesting expertise and insight into the MILSATCOM industry. We welcome your comments regarding the magazine and the SatNews daily news site... and we enjoy hearing from you regarding articles you would like to submit for publication. No one person can know everything about our industry, and if not for the expertise of professionals such as yourself, the stagnation would be staggering.

Here is the **MilsatMagazine** calendar for 2010. The editorial department will publish articles of interest in each issue, regardless of that issue's theme, if relevant to our thousands of international readers. "Themes" are guidelines for companies and authors who wish to introduce themselves to our readers. We heartily recommend you schedule your editorial space now...

2010 Editorial Calendar, MSM

JANUARY
Deadline: December 15
ISR (Intelligence, Surveillance, Reconnaissance)

MARCH (PRINT ISSUE)
Deadline: February 15
Advanced MILSATCOM

MAY
Deadline: February 15
New Technologies: From Satellites To UAVs/UAS

JULY/AUGUST
Deadline: June 7
The Warfighter—Command + Control To Field Ops

SEPTEMBER
Deadline: August 10
Military Satellites

NOVEMBER (PRINT ISSUE)
Deadline: October 11
Theme: COTM + COTS

Thanks for visiting with us... and now let's hear from those who are the true experts in this crucial industry — *the editors*

AeroVironment's Raven B UAS Goes Dutch

AeroVironment, Inc. (AV) (NASDAQ: AVAV) has announced the Military Aviation Authority of the Netherlands (MLA-NLD) has issued a Military Type Certificate (MTC) for the Raven® B NLD MUAS, the first such certificate issued in the Netherlands in the Micro-Unmanned Aerial Vehicle category. This certificate permits Dutch military personnel to operate Raven systems in designated Dutch airspace.

The AeroVironment Raven B system was selected by the Netherlands Ministry of Defence, acting through its Defence Materiel Organization (DMO), after performing an open competition in 2007. Key elements resulting in its selection were hand-launchability, reliability, ease of use, robustness, and demonstrated in-theater operational performance and logistics support. The DMO subsequently purchased Raven B systems and support services, including training of military users.

The Raven unmanned aircraft is a 4.2-pound, backpackable, hand-launched sensor platform that provides day and night, real-time video imagery for "over the hill" and "around the corner" reconnaissance, surveillance and target acquisition in support of tactical units. U.S. armed forces use Raven systems extensively for missions such as base security, route reconnaissance, mission planning and force protection.

Boeing + U.S.A.F. Celebrate WGS' Winning Ways

Boeing [NYSE: BA] and the U.S. Air Force have received a Department of Defense (DoD) "Top 5" excellence award for systems engineering on the Wideband Global SATCOM (WGS) program. WGS is the DoD's highest-capacity communications satellite and provides assured, high-data-rate connectivity to U.S. warfighters and their allies around the world.

WGS satellite Members of the Air Force-Boeing WGS team accepted the award on October 28 at the National Defense Industry Association's (NDIA) Systems Engineering Conference in San Diego. Each year, the Department of Defense and NDIA recognize up to five defense programs that have demonstrated superior systems engineering practices that result in outstanding program performance.

WGS satellites address the military's growing need for high-bandwidth communications, ranging from transmission of full-motion video and sensor data gathered from unmanned aerial vehicles, to video teleconferencing among military leaders around the world, to provision of quality-of-life services such as e-mail, news, and special event broadcasts for deployed troops. Boeing is currently under contract to build six WGS satellites for the Air Force. WGS-1 was placed into operation over the Pacific Ocean in April 2008 and WGS-2 entered service over the Middle East in August 2009. Both satellites are meeting and, in some cases, far exceeding mission requirements. WGS-3 is scheduled for launch later this year.

Bundeswehr Bets On Heron UAV For Afghan Ops

IAI Heron UAV Germany has added itself to the countries leasing UAV services for the Afghan conflict — the country signed a contract with Rheinmetall Defense and their partners at Israel Aerospace Industries to provide an unspecified number of Heron UAVs as the SAATEG (System zur Abbildenden Aufklarung in der Tiefe des Einsatzgebietes). Rheinmetall's KZO tactical UAV began operating in Afghanistan in 2009, but the Heron is a larger UAV with much better endurance and payload.

The "multi-million Euro" contract will see the Bundeswehr lease the UAV system and support from Rheinmetall for 1 year, with an option for a 2 year-extension. Flight operations will commence by mid March 2010, backed by an in-theater 24/7 maintenance and support center.

CapRock's New Paradigm

CapRock Government Solutions assigned a multi-year, multi-transponder strategic purchase agreement with UK based Paradigm Secure Communications Ltd. making CapRock the company's first Network Service Provider to the U.S. military and Intelligence community. Paradigm owns and operates a fleet of military hardened geosynchronous communications satellites with both X-band and UHF payloads. Although Paradigm has signed on other distributors of capacity on its Skynet 5 satellite fleet, this agreement makes CapRock the company's first Network Service Provider to the U.S. military and Intelligence community.

Access to commercially provided X-band communications has become increasingly important as a means to augment military satellite capabilities, the demand for which continues to outpace supply. With the addition of access to Paradigm's hardened and protected X-band capacity, CapRock (formerly Arrowhead Global Solutions) now has the ability to offer a wider variety of X-band services tailored to each unique government requirement.

In December 2008 CapRock signed a similar multi-year, multi-transponder purchase contract with another commercial X-band provider. The initiative has been highly successful, resulting in the deployment of over 200MHz of bandwidth and multiple protected networks for the U.S. Government. When combined with other agreements, CapRock is now the single largest network provider of commercial X-band services to the U.S. Government.

"To support our clients' expanding requirements for in-theatre communications, we've taken a proactive approach and prepositioned both bandwidth and infrastructure in areas of high demand," said CapRock Government Solutions President, Tom Eaton. "We've expanded our strategic investments in X-band infrastructure and new services so they will be available when and where our government clients need them. This pioneering arrangement with Paradigm exemplifies CapRock's strategy of anticipating, investing in, and then meeting the demand for innovative remote communications solutions."

"At Paradigm, we continuously look for partners who not only understand the unique challenges of government missions and how to deliver trusted end-to-end solutions, but also have the ability to add their own value to our X-band capacity," said Paradigm Managing Director, Keith Norton. "CapRock has a proven reputation as a premier provider of managed satellite network solutions operating in some of the world's toughest environments. We are very pleased to add CapRock to our family of distributors and to have them as our first Network Service Provider to the U.S. military and Intelligence communities."

CapRock's Paradigm-based services are designed for sensitive missions that may require resilient, operationally secure, military-grade solutions. Originally commissioned under contract with the British Ministry of Defense, Paradigm owns and operates a state-of-the-art military grade satellite fleet which includes electromagnetic-pulse hardened satellites, built-in anti-jamming capabilities, configurable global and spot beam coverage and MAC Level I security certification.

As Paradigm's Network Service Provider to the U.S. military and Intelligence community, CapRock will offer both off-the-shelf subscription services and custom-designed satellite networks. As part of its end-to-end X-band services, CapRock provides complete remote terminals, including man-portable, quick deploy and communications-on-the-move systems, as well as space segment and teleport services. These offerings are unique in that they are commercially available solutions designed from inception to support military and intelligence missions.

In addition to the recent Paradigm agreement, CapRock currently provides over 3.5GHz of managed communications services across some 40 satellites in X, C, Ku, and Ka bands. CapRock is a facilities-based service provider and owns and operates a global infrastructure of five teleports, four 24x7 network operations centers and eleven regional field service centers.

Comtech Converters' Contract Capture

Comtech EF Data's Converters Comtech Telecommunications Corp.'s (Nasdaq:CMTL) Tempe, Arizona-based subsidiary, Comtech EF Data Corp., received a US$1.0 million order for SATCOM equipment from a government contractor. The equipment will be used by the United States government to support military communications.

The order specified a variety of Comtech EF Data's frequency converters, including the UT-4514 Ku-Band Up Converter, the DT-4513 Ku-Band Down Converter and the LBC-4000 L-Band Up/Down Converter System. Comtech EF Data's lineup of indoor converters provides frequency conversion between the traditional IF frequencies of 70/140 MHz and L-band, as well as translation from these IF frequencies and C-, X-, Ku- and Hotbird RF bands. Based on rack mountable chassis, the products feature low phase noise, high gain, gain compensation, redundancy and the patented daisy chain switching.

Harris MILSATCOM Efforts Has A Terminal View

Harris Corporation (NYSE: HRS) has successfully completed system qualification testing of a satellite terminal that will provide U.S. Navy personnel onboard frigates, cruisers and destroyers with access to the Internet, video and other broadband services. Completion of the testing moves the Commercial Broadband Satellite Program (CBSP) Unit Level Variant (ULV) contract into the initial production phase.

Under the contract, Harris will supply as many as 55 advanced, 1.3-meter satellite terminals with X- and Ku-band capabilities. With 10 times the bandwidth currently accessible onboard Navy ships, the terminals will enable the Navy to augment MILSATCOM by supporting essential mission requirements and providing high-speed Internet access and video communications to frigates and other Unit Level classified ships.

Harris was awarded the five-year, potential US$77 million, Indefinite Delivery/Indefinite Quantity (IDIQ) contract in 2008, and delivered the first terminal for qualification testing in just six months. The CBSP program is a Rapid Deployment Capability acquisition designed to reduce the time required to deliver critical/emerging warfighting capabilities.

ICS + Squire Tech's Interactivity Inclusions

Incident Communications Solutions, LLC (ICS), an IP-Centric mobile and tactical communication solutions provider, has delivered its self-contained communication solution in partnership with Squire Tech Solutions, LLC. The ICS pCom™ 355 is the latest in a line of comprehensive, turnkey communications solutions which include the TICS® Tactical Incident Communications System, the Comms-ONE® SUV and other Mobile Command Systems featuring advanced IP networking and communications.

ICS + Squire incident trailer Building upon the strengths and versatility of the pCom™ 300, developed by Squire Tech Solutions, this first-of-its-kind self contained site power, lighting, tower, and communications mobile infrastructure system offers a seven day on-board diesel fuel supply, power generation system, auto-acquisition satellite antenna, NEMA4X equipment enclosure, and pneumatic tower on a robust, small, trailer-based platform. The ICS pCom™ 355 builds upon this platform and adds features and functionality providing comprehensive communications interoperability and key capabilities for Public Safety, Military and Civilian Federal markets.

The ICS pCom™ 355 offers a complete incident response communications suite including: Cisco Unified IP communications, ICS Outrigger™ Network Extension Module (for expansion of services into fixed facilities), Analog FXO and FXS ports, Cellular voice gateway modules, Raytheon's ACU-M Interoperability Switch with 4 Motorola XLT mobile base units, and integrated on-board MTR-2000 VHF Continuous Duty Repeater.

The entire system is designed to be deployed in under 15 minutes by frontline public safety personnel with no intervention from IT. Once operational, the system provides ICS Tactical-IP™ high-speed broadband satellite connectivity capable of 3Mbps downlink and 1Mbps uplink, ICS Tactical-Voice™ VoIP services, Radio Interoperability and On-scene radio communications in the most austere environments.

Lockheed Martin Spurs SBIRS Testing Onwards

GEO-2 satellite (USAF) U.S. company Lockheed Martin has initiated new testing on its geosynchronous orbit satellite to support missile threat defense capabilities. The Company says its Space-Based Infrared System, or SBIRS, GEO-2 spacecraft designed to provide early warning of missile launches is undergoing a series of tests known as the Baseline Integrated System Test phase.

The tests are all part of an effort to demo the satellite's readiness ahead of the environmental test phase, the phase critical in preparation for future launch. "Getting our second satellite integrated and into system testing is a major accomplishment for the program," Lt. Col. Heath Collins, commander, SBIRS Space Squadron, said in a statement.

"It couldn't have happened without the skill, professionalism, and dedication of the combined SBIRS team. This is yet one more step towards providing revolutionary missile warning capabilities to the warfighters and national decision makers in the coming years."

Lockheed Martin's GPS IIR-3 Packs In 10 Years Of On-Orbit Ops

GPS IIR-M photo (LMC) The third Global Positioning System Block IIR (GPS IIR-3) satellite, designed and built by Lockheed Martin [NYSE: LMT] to provide significantly improved navigation capabilities for military and civilian users worldwide, has reached 10 years of successful on-orbit operational service. The satellite was launched on October 7, 1999, and is one of 30 GPS spacecraft currently on-orbit, providing critical situational awareness and precision weapon guidance for the military. The constellation also supports a wide range of civil, scientific and commercial functions — including air traffic control, ATM banking, and the Internet.

As the prime contractor for the GPS IIR program, Lockheed Martin Space Systems, Newtown, Pennsylvania, designed and built 21 IIR spacecraft for the Global Positioning Systems Wing, Space and Missile Systems Center, Los Angeles Air Force Base, California. The final eight spacecraft, designated Block IIR-M, were modernized to enhance operations and navigation signal performance for military and civilian GPS users around the globe. The current fleet of Block IIR and IIR-M satellites within the overall GPS constellation has reached more than 100 cumulative operational years on-orbit.

The U.S. Air Force's next-generation GPS spacecraft, known as GPS III, being built by a Lockheed Martin-led team that includes industry partners ITT of Clifton, New Jersey, and General Dynamics of Gilbert, Arizona, is proceeding on-schedule in the Critical Design Review (CDR) phase of the program. GPS III will improve position, navigation and timing

services and provide advanced anti-jam capabilities yielding superior system security, accuracy and reliability. The nexgen GPS IIIA satellites will deliver significant improvements over current GPS space vehicles, including a new international civil signal (L1C) and increased M-Code anti-jam power with full earth coverage for military users. The team is in the process of executing 70 individual CDRs for all GPS III Space Vehicle subsystems, assemblies and elements. The review phase will culminate in the third quarter of 2010 with a final Space Vehicle CDR that will validate the detailed GPS III design to ensure it meets warfighter and civil requirements. The team is on track to launch the first GPS IIIA satellite in 2014.

ViaSat's Down Under Development

ViaSat Inc. (NASDAQ: VSAT) has been selected by BAE Systems Australia to supply satellite ground stations for a high-speed upgrade to Australian Defence Force (ADF) MILSATCOM. The ViaSat X- and Ka-band satellite antenna systems are part of a network designed to provide Australian forces with enhanced access to the Australian Defence Wide Area Network, ADF headquarters, and support elements.

The network will be using bandwidth capacity on the Wideband Global SATCOM (WGS) system in cooperation with the U.S. Department of Defense, and other Australian defense satellites. The US$9.4 million contract order is for multiple 9-meter Ka- and 16-meter X-band Earth terminals and services, with delivery scheduled for the third quarter of calendar 2011. The new terminals will be installed at the ADF Satellite Ground Station in Western Australia (SGS-West). The SGS-West facility, being built by BAE Systems, is a complement to a similar system in Eastern Australia. In addition to faster data throughput, the new system is designed to increase the survivability and mission coverage needs of the ADF.

COMM OPS
WAITING FOR OBAMA

by Elliot Holokauahi Pulham, CEO, ***Space Foundation***

Samuel Beckett's classic play, "Waiting for Godot," "follows two days in the lives of a pair of men who divert themselves while they wait expectantly and unsuccessfully for someone named Godot to arrive," according to Wikipedia. "They claim him as an acquaintance, but in fact hardly know him, admitting that they would not recognize him were they to see him. To occupy themselves, they eat, sleep, converse, argue, sing, play games, exercise, swap hats, and contemplate suicide — anything 'to hold the terrible silence at bay'."

And that pretty much describes the state of play in the space industry — ***Waiting for Obama***.

It has been a year since the election of *Barack Obama*, campaigning under the banner of "*Yes, We Can*."

Sadly, for the space industry, it has been a year of "*No, We Can't*," as we continue, like *Beckett*'s *Estragon* and *Vladimir*, to await the arrival of someone whom, based on campaign promises, we only thought we knew.

I will be the first to admit that I was excited and enthused about candidate *Obama*'s promises to reinvigorate the nation's space programs; infuse purpose, energy, and funding for NASA; and restore our national investments in high technology.

And, in fairness, I must acknowledge that the President has had many other issues to deal with, perhaps even more important issues — although I would argue that nothing is more important to national security and economic security, and nothing is a better investment in economic vitality and national economic stimulus, than the exploration, development, and utilization of space.

Nonetheless the fact remains that, when it comes to space policy and programs, this administration has done nothing remarkable during the first 25 percent of its term. Despite moving quickly to put a transition team in place at NASA, the White House, unable to contend with a few highly opinionated voices in Congress, took months longer than expected to appoint Charlie Bolden as the agency's administrator.

Prospects for positive action from the administration in the commercial and national security space sectors look no better. Again, the right words were spoken during the campaign, but we're still "*Waiting for Obama*" to do something about **ITAR** reform.

The huge number of unfilled political appointments at the Pentagon seems symptomatic of presidential disdain for the national security community — certainly something that does not bode well for military, security, and intelligence space, the essential backbone of U.S. national defense. (As recently as a few weeks ago, some 40 percent of Pentagon political appointments were reportedly unfilled.) White House support

for a ban on "space weapons" remains undefined, unexplained, and, thus, disconcerting in the extreme.

Certainly, there is a great deal of interest in the report of the "*Augustine Commission*" on the future of U.S. human space exploration (the *Review of U.S. Human Space Flight Plans Committee Report*). But, again, there has been no White House response. Further, there are two separate commissions, one chartered by Congress and the other by the White House, conducting U.S. national space posture reviews. It is unlikely that the *Augustine Commission* findings and recommendations will be acted upon independently of these two reviews — which, predictably, started out with energy and enthusiasm, but have bogged down as the cold realities of political horse trading have entered into the equation.

While we continue to hope for something dramatic and positive to happen, it is more likely that we won't really understand where this administration is coming from on space issues until we see the president's budget proposal in early 2010. Just as NASA's exploration strategy is to "follow the water," our means of understanding this administration's attitude toward space is going to be to follow the money. And we all know the old cliché: no bucks, no Buck Rogers.

Waiting for Godot has been famously described as a play which "has achieved a theoretical impossibility — a play in which nothing happens, that yet keeps audiences glued to their seats." The view from here is that Godot provides an apt analogy. ***We are Waiting for Obama, and doing our best "to hold the terrible silence at bay."***

About the author

Mr. Pulham was named chief executive officer of the Space Foundation in 2001. Pulham leads the premier team of space and education professionals providing services to educators and students, government officials, news media, and the space industry around the world. Before joining the Foundation, he was senior manager of public relations, employee communication, and advertising for all space programs of Boeing, serving as spokesperson at the Kennedy Space Center for the Magellan, Galileo, and Ulysses interplanetary missions, among others.

COMMAND CENTER
MAJ. GEN. (RET.) MARSHAL WARD, INTEGRAL SYSTEMS

Major General (Ret.) H. Marshal Ward is the Chief Operating Officer of Integral Systems. He offers more than 40 years experience in the aerospace and defense industries. Previously, he served as Vice President and General Manager for the Space Systems and Electronics business area of BAE Systems. In this position, he was responsible for the inception of the business area and its growth by 2008 to US$270M in revenues.

Before joining **BAE Systems**, General *Ward* served 35 years with the **U.S. Air Force**. He retired as Director, Special Programs, in the **Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics**. General *Ward* served as the principal staff assistant and advisor to the Under Secretary of Defense for Acquisition and Technology on all programs protected under special access controls.

During his military career, he was the recipient of numerous awards and commendations including the *Defense Superior Service Medal*, which is awarded to members of the United States military who perform "superior meritorious service in a position of significant responsibility." General *Ward* holds a BS in Meteorology from **Florida State University**, an MBA from **Auburn University**, and is a graduate of **National Defense University**'s *Industrial College of the Armed Forces*.

MilsatMagazine (MSM)

General, would you please tell us a little bit about yourself? And do you continue to fly?

H. Marshal Ward

I was born during the dawning of the space age and I can remember quite vividly back to the evening of October 1957, when the Soviet Union launched Sputnik and I, as a young boy, joined my neighbors in the street to search the heavens for a glimpse of this remarkable scientific feat. That event released a passion for space within me that would stay with me forever.

I wanted to become an astrophysicist and solve the mysteries of the universe. But as the fifth of eight children in a family where money was scarce, college was out of the question. Fortunately, the Air Force offered me that opportunity to go to college, so I enlisted and completed college as a Staff Sergeant. In 1969, I attended Officer Training School and was commissioned a second lieutenant. I spent the next 35 years serving in the Air Force in a variety of fascinating assignments including flying into hurricanes as a flight meteorologist, flying the C-141 Starlifter around the world as an aircraft commander, serving on the Air Staff and the Joint Staff as an action officer working command, control, communications and intelligence issues, and, of course, finding my way back to the business of space.

As much as I love flying, my passion for space has kept me out of the cockpit as I decided to pursue opportunities to work in the space mission area to help build the space capabilities that will advantage and protect the soldiers, sailors, airmen, and marines that serve our country with honor and courage. It's a small price to pay.

MSM

How did you manage the transition from an exceptional military career to decision-making positions in the commercial world?

H. Marshal Ward

The transition was fairly seamless. I find that the common ingredient between the military and the commercial world is people. If you understand what motivates people, what their value proposition is, and you treat them with respect and dignity, you'll find that there isn't that much difference between the two.

What the military does particularly well is create an environment of trust. In combat, you have to trust the individuals you serve with to hold up their end of the bargain, as you depend on them and they depend on you — when you have shared values, when you have common objectives, trust comes more easily.

In the commercial world, trust is just as important a concept, but sometimes values are not always shared, due to the competitive nature of the business. Trust is harder to develop. Certainly, decision making is far easier when conducted within an environment of trust and is always far more effective.

MSM

Based on your more than 40 years experience in the aerospace and defense industry — 35 years with the U.S. Air Force — what do you see as the most pressing issue(s) facing the satellite communications industry? How can these issues be addressed?

H. Marshal Ward

Over the years, I have gained a tremendous respect for the role that space communications

plays in national defense, in providing services that enrich our personal daily lives as well as for the reliance of our nation on space communications to conduct diplomatic, informational, military, and economic activities.

For example, military commanders rely on space communications to provide the situational awareness that is needed to properly command and control their forces. At a time when more and more nations are flying satellites into space, and the orbital highways are becoming more congested, the risk of collision, or interference, is increasing. Our industry must do all we can to ensure space communications are not interrupted by the way we design and protect our systems and networks.

Moreover, our nation must work with the international community to ensure the safe passage of goods and services in space as we have done on the ground, on the sea, and in the air.

Another issue is the availability of usable bandwidth, especially during times of crisis. First responders and the military depend on satellite communications for command/control capability and communicating with governments, relief organizations, and soldiers on the ground.

The industry must adapt to provide enough capacity to deliver information and bandwidth to support the needs of a variety of users. At the same time, we must realize that it is a never-ending cycle: as bandwidth is created, people develop new uses for that bandwidth, thus driving the need for still more bandwidth!

One solution to this issue is to build a better network of satellites that can be joined with international partners to develop an Internet-like capability in space, allowing us all to maximize and leverage bandwidth. This way, bandwidth can be shared and moved to wherever it is needed. Of course, we would also need innovative ways to control access and transmit data, while also addressing the challenges of protecting information. I know that many companies are already developing pieces of such a comprehensive system.

For example, Integral Systems has technology that monitors and protects satellite data links. However,

a truly comprehensive approach will require government and industry around the globe to come together to achieve a viable, long-term solution.

MSM

If you were still Director, Special Programs in the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, what would you advise satellite communications' companies to consider and present when dealing with the Defense Department?

H. Marshal Ward

Companies must recognize they are full members of the national security community. Each satellite is an opportunity to drive additional revenue and provide more capabilities for national defense. They should work with the Defense Department to provide additional capability on current and planned satellites where it makes sense to support national security and defense.

Transmitting real-time data is absolutely critical. When there are interruptions in service, we don't always know why that has occurred. Satellite companies have to be able to detect, characterize, geolocate, and report interferences to one location. With that information, appropriate action can be taken to correct the situation for the future.

MSM

Prior to joining Integral Systems, you spent time at BAE Systems as Vice President and General Manager for the Space Systems and Electronics business area. How did this experience prepare you for your current position as Chief Operating Officer Integral Systems? Why did you join Integral Systems?

H. Marshal Ward

BAE is an excellent company. I spent eight years there as a general manager with profit and loss responsibility. That hands-on experience taught me a lot about how to be successful in managing a business in the space industry.

At Integral Systems, I was offered an opportunity to help shape and grow a smaller company with a unique position in the satellite command and control markets and with innovative technologies that, I believe, will make this company very relevant for the future of space and its increasing association with terrestrial networks.

Integral Systems is loaded with talented and motivated employees and a strong, well-grounded leadership team. It was an opportunity to work with a company that is completely focused on serving the current and future space needs of our country with products that will help solve some of the industry's most pressing challenges in both the satellite and ground systems markets. With my passion for space, it was an offer I could not refuse.

MSM

Dealing with the personnel issues within the military as opposed to a civilian environment can be a most exacting task — how do you see yourself handling such matters at Integral Systems?

H. Marshal Ward

People are people. Although they may have different experiences and different training, I find that most people want to do a good job and feel like they are making a difference. I want to keep our employees strategically focused and innovative, while at the same time perform the task at hand. The people I dealt with in the military were of the highest caliber and I find the same is true in industry.

MSM

As you step into your position, what do you see as your top three priorities? How will they impact MILSATCOM users?

H. Marshal Ward

My priorities for Integral Systems are clear: First, we will continue to execute on our commitment to delivering value to customers and shareholders. An excellent example of this is our Command and Control System Consolidated (CCS-C) program, where we continue to deliver our satellite control solution to the Air Force on-time, on-budget, and with capabilities that have allowed the Air Force to exceed the cost and manning reduction goals of the programs.

Second, we will grow the business by making the investments in people and technology that can meet the needs of our customers. We invest almost 5 percent of revenue into independent research and development (IR&D) at Integral Systems. It is a point of pride among our employees that our products and systems are known to be highly relevant, innovative and responsive to our customers' needs.

As an example, our employees have integrated our newly acquired satID geolocation technology into our Monics signal-monitoring product to create what we believe is the most advanced satellite signal interference detection, characterization, and geolocation solution available. We intend to continue this tradition of innovation and customer focus and bring outstanding products, systems, and services to our customers.

Third, we will give our employees the means to be successful by providing them with the right training and tools as well as helping them understand how much we value their work and their dedication to meeting the needs of the nation, as well as that of the global community.

MSM

How will Integral Systems work with various government agencies and the political establishment to ensure our nation remains militarily strong and steadfast in the face of so many challenges?

H. Marshal Ward

Integral Systems serves multiple customer segments in and out of government: military, civil, intelligence and commercial. Each of these communities has a different set of needs. The military requires service at the "speed of need" so that they have the information they need to make decisions rapidly.

Civil government needs to produce and analyze the data from sensors to support science missions at organizations, such as NASA and NOAA. The intelligence community wants "exquisite" data to provide the best possible information to decision makers.

Commercial markets are focused on meeting their customer's needs while driving revenue. In addition to understanding and meeting the needs

of customers, we are also a company that deals directly with the government. Thus, we must always remember that we are stewards of the taxpayers' hard-earned money. We make it a point to listen to our political leaders and to work closely with them to deliver value.

MSM

How will you continue to serve the nation?

H. Marshal Ward

I believe all of us who are patriotic citizens and members of the aerospace community continue to serve our nation each and every day. I am privileged to have an additional opportunity to leverage my experience as a former Air Force general officer and serve as a senior mentor for the Air Force Space Commands' Schriever Wargames.

These periodic wargames postulate a future environment and tests the capability of projected forces to engage and succeed in meeting national objectives. They help the Air Force to better understand how best to organize, train, and equip their space forces to provide the space superiority that our fighting forces need and how an alliance of our commercial and allied partners might be exercised to the advantage of the whole of governments. The lessons learned from these wargames are important factors in shaping policy and in resource allocation decisions.

I am also privileged to serve in a similar capacity in support of the larger Air Force's Futures Games 09 which looks 20 years into the future to test the capabilities of projected air and space forces in a stressed environment to, once again, help shape decision making today so we are better prepared for tomorrow. It is always gratifying to work with the many talented and dedicated men and women who serve our nation today.

Integral Systems, Inc. has just announced the Company's wholly-owned subsidiary, **Integral Systems Europe** *(***ISE***), has opened a new facility in the United Kingdom. Located near Newcastle upon Tyne, ISE UK will provide satellite operators, telecommunications providers, broadcasters, cable operators, and content providers, government agencies, and the military, with the company's recently-launched* **Earth Station Integrated Solutions** *(***ESIS***).*

With the addition of ESIS, Integral Systems can offer turnkey ground systems solutions for all types of satellites, using entirely in-house resources. The new facility will provide ESIS for the telecommunication networks satellite ground segment, as well as Telemetry, Tracking and Control (TT&C) ground systems. A typical turnkey system might also include the following products from Integral Systems subsidiaries:

- ***Satellite Control provided by EPOCH IPS from Integral Systems***
- ***Network Management, and Monitor and Control (M&C) from Newpoint Technologies.***
- ***Carrier Monitoring and an Earth Terminal developed by SATCorporation.***
- ***Interference Geolocation from RT Logic.***

In addition, ESIS provides system design and engineering, installation design, integration and testing, and in-service maintenance support, as well as on-site field services. This new capability in Integral Systems' solutions portfolio provides customers with a "one-stop shop" for their satellite control requirements.

"Integral Systems is the premier provider of ground systems for all types of satellites," said Bruno Dupas, President, Integral Systems Europe. "With the addition of the UK facility and its spearheading of ESIS, customers can rely on Integral Systems as the solution provider for all aspects of their ground systems."

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PRIORITY BRIEFING
SWIFTBROADBAND FOR UAVS

by Andy Beers, Thrane & Thrane

In a market which already relies on satellite communications, the integration of high-speed connectivity is a highly exciting prospect.

The ***Unmanned Aerial Vehicle*** (**UAV**) sector is categorized as one of the military and defense industry's most interesting and promising markets. Having grown dramatically over the past decade with proven success on the frontline in theatres such as Iraq and Afghanistan, pilotless aircraft, along with the systems that support them, are now well established with demand set to increase throughout the next 10 years and beyond.

Unmanned Aircraft play a crucial role in military operations, covering vast areas of land and sea, carrying out critical operations and collecting data that may be imperative to the success of the mission. The obvious advantage is that pilotless aircraft can undertake live-fire operations that would otherwise be too dangerous for manned aircraft, therefore eliminating all risk to aircrews.

Core to the success of ***Unmanned Aircraft Systems*** (**UAS**) has been the continual development and advancement in the various technologies that make them operationally viable. Systems have become more sophisticated in support of increasingly complex and challenging requirements. In this respect, the development of satellite communications is no different than other technologies, and for the aeronautical market has been a major factor in the extension of missions further afield, particularly as the need for satcom data links has become critical to the advancement of UAS operations.

A huge amount of information can be obtained in the sky, which has resulted in unmanned aircraft becoming increasingly significant for day-to-day operations. Satellite communications systems onboard UAVs are used to relay imagery, voice and additional sensitive data to ground control stations for analysis which may be imperative to the success of a mission and the safety of ground forces.

Based on this, satellite communication has become essential for an extensive range of military applications including command and control, logistics and UAV video and data transmissions. And to meet the increasingly demanding requirements of more complicated, longer range **BLOS** (*Beyond the Line Of Sight*) operations, high-speed connectivity is needed.

Broadband For The Sky

Introduced in October 2008, ***SwiftBroadband*** is **Inmarsat**'s broadband-for-the-sky service, designed to meet the demand for more bandwidth across all areas of aviation. The service is set to have a major impact on the UAV market, providing high-speed IP connectivity of up to 432 kbps per channel as well as enhanced management control. SwiftBroadband also provides specific high performance packages for military applications, while also facilitating secure and reliable access to command and control information resources on the ground, enabling improved situational awareness.

Furthermore, Inmarsat SwiftBroadband brings significantly greater bandwidth capability and 'always-on' IP connection combined with the availability of compact, light-weight avionics. The service allows for video streaming, imagery and other data to be moved over the internet much more efficiently, as well as enabling a new, higher level of quality in voice over the AMBE for channels embedded within the SwiftBroadband service. In addition, the SwiftBroadband service cost could be as much as 70 percent less expensive over the previous *Swift64* service.

As a leading satellite equipment manufacturer for the aeronautical, land mobile and maritime sectors, Thrane & Thrane has a well-established relationship with global military and defense markets, with

several UAV market references. The company's latest addition to its aeronautical product family, Aero-SB Lite, is one of the market's first SwiftBroadband solutions. Enabling real-time video, voice and data links between aircraft and ground control stations, the system is suitable for a wide range of UAV applications.

Having provided systems such as ***Aero-M*** to high profile UAS programs for several years, **Thrane & Thrane** is well placed to develop SwiftBroadband solutions. ***Aero-SB Lite*** provides a number of critical benefits, where traditional **LOS** (*Line of Sight*) methods, such as microwave and radio transmissions, no longer meet the requirements of the mission.

For instance, the SwiftBroadband solution can be used for transmitting video and other sensitive data gathered by sensors onboard the aircraft, via satellite to a variety of ends. In addition, UAVs can also use the voice capabilities of Aero-SB Lite as a voice relay to the ground, and can also allow for encrypted voice when necessary.

Low Profile Solutions

The Aero-SB Lite system remains in line with Thrane & Thrane's strategy to provide very compact and lightweight solutions. The complete package, which includes an *Intermediate Gain Antenna* (**IGA**), weighs 17 pounds. This makes it the lightest system of its kind on the market to date. It also incorporates a router, built in WiFi, PBX, Beam Steering Unit, high power and low power noise amplifiers and diplexer in a small MCU *Line Replaceable Unit* (**LRU**).

It is the size and weight of the system, combined with the amount of bandwidth that can be offered to a platform that is critical to the success of SwiftBroadband and in turn Aero-SB Lite.

Thrane & Thrane Aero-SB Lite

In order to gain increased intelligence, UAVs will be challenged to fly further and for longer periods of time. To achieve this, systems onboard must be compact and lightweight, while at the same time enabling real-time communication so that the speed at which information is received is improved.

Looking ahead, the unmanned aircraft market has huge potential for growth over the next 10 years. As an imperative support mechanism for UAV and UAS, satellite communications are likely to benefit from continued growth of the industry. It is clear that the unmanned aircraft market is one of the fastest growing segments in the aeronautical industry, highlighted by strong interest and record breaking attendance numbers at this year's **AUVSI** held in Washington D.C. The growth potential here is phenomenal and looks poised for a protracted period of evolution and development.

At Thrane & Thrane, we are extremely excited about what the future holds for UAV & UAS and SwiftBroadband, and have no doubt that our products are set to benefit as the quantity and type of unmanned platforms and missions continues to grow globally.

About the author

Andy Beers joined Thrane & Thrane in January 2007 as North American Channel Sales Manager. He currently holds the position of Director, Aeronautical Sales for the Americas Region. He is responsible for sales of Thrane & Thrane's portfolio of SATCOM solutions to both business aviation and military/government market segments. Beers has been in the aviation industry for the past 14 years. Prior to joining Thrane & Thrane, he led sales activities for a well known aircraft electronics manufacturer, Rosen Aviation, as Vice President of Sales & Marketing and was a member of its leadership team. During his career, Beers has worked directly with aircraft OEM accounts as well as retrofit and refurbishment centers worldwide.

About Aero SB-Lite

Aero-SB Lite is a highly compact flying broadband solution, especially as broadband is an integral element in today's communications. When travelling the globe, the need to be able to swiftly log-on to corporate networks, use a PDA, surf the Internet, and talk on the phone, is a crucial requirement. The Aero-SB Lite broadband solution offers full featured office mobility anywhere and at low cost, with speeds up to 332 kbps. A light version of the Aero SB+ SwiftBroadband solution, the Aero-SB Lite is also a complete solution, for Voice and Data, with a wide array of embedded features that include:

- ***VoIP connectivity***
- ***High speed internet***
- ***Low cost voice***
- ***Built-in router for intelligent connectivity support and multiple user support***
- ***Built-in Ethernet switch for supporting numerous wired laptops and/or EFBs***
- ***Built-in wireless LAN for supporting numerous wireless laptops and/or PDAs (this function can be disabled)***
- ***Built-in PBX for supporting numerous handsets***
- ***ISDN connectivity***
- ***Secure communications capable (STE, STU, KIV and HAIPE compatible)***

Aero-SB Lite can operate in different data modes depending on the users' requirements. Quality of Service (QoS) may be selected to ensure guaranteed bandwidth in steps with a pay-per-minute plan, or there is the always-on background connection where users only pay for the amount of data transferred.

Plus, the price of voice is reduced by 75 percent when the users's own compatible handset is used when talking.

Latest Aero-SB Lite Implementations...

Thrane & Thrane and Embraer announced the SwiftBroadband solution Aero-SB Lite is to be installed onboard the new Embraer Legacy 450 and Legacy 500 Executive jets. Aero-SB Lite is a light and most compact SwiftBroadband solution that will provide Legacy 450 and 500 passengers with an extensive range of voice and Internet services, including data speeds of up to 432 kbps.

Aero-SB Lite is a single compact and lightweight package and exceeds the ongoing requirement to provide an office in the sky. Once integrated aboard the Legacy 450 and 500 aircraft, the system will be operating via a High Gain Antenna installed in the vertical stabilizer, which provides the best possible use of the global Inmarsat SwiftBroadband service. Additionally, Aero-SB Lite offers built in WiFi capability and VoiP technology, where users can use their own compatible handsets or WiFi enabled PDA devices. The data and voice functionality of Aero-SB Lite can be used simultaneously to ensure total flexibility for the end-user.

COMMAND CENTER
KENNETH J. TOROK, JR., BOEING

Ken Torok is vice president of Navigation and Communication Systems, responsible for leading Boeing's MILSATCOM and Navigation businesses, including Wideband Global SATCOM (WGS), Global Positioning System (GPS) IIF, and Mobile User Objective System (MUOS) Payload program execution and mission success. He was appointed to this position in August 2008.

Prior to this assignment, *Torok* was vice president of **National Systems**, overseeing several proprietary programs of national significance. *Torok* has also held positions as director of Space Technology Programs, director of Satellite Operations, and vice president and general manager of National Security Programs, leading all proprietary programs at the **Boeing Satellite Development Center**.

Torok also served as program manager for *the Modular Communications* programs. Through *Torok's* leadership and partnership with the government team, the first of these systems was successfully delivered on time and under budget. The programs received the customer's highest award and the **David Packard Award for Excellence in Acquisition**. Earlier in his career, *Torok* held various line and technical management positions, primarily in payload systems engineering and communications systems analysis.

Torok received a Bachelor of Science degree with distinction in electrical engineering from **Cornell University** in 1983. He also received his Master of Engineering from Cornell in 1984 as a Hughes Master Fellow. Torok has completed the Executive MBA program at the **University of California, Los Angeles**, the Management Development Program at the University of Southern California and the Hughes Program Manager Development Course. Torok is also a recipient of the *Joe E. Sanders Leadership Award*.

MilsatMagazine (MSM)

Ken, it appears as though you've been in the space business for most, if not all, of your career. How did you end up there?

Ken Torok

As an undergraduate at Cornell, I became interested in pursuing graduate studies in electrical engineering. I was fortunate to be selected for the *Hughes Master Fellowship Program,* which supported my education goals, brought me to sunny southern California, and most importantly gave me the opportunity to work in an incredibly exciting field — Hughes was at the center of the developing space business. After all these years working on state-of-the-art space systems with the most creative and capable people, for customers dedicated to missions supporting our national defense and saving lives, I can't imagine doing anything else. Working with the **Space and Missile Systems Center** over the past year has been the latest exciting chapter in a career full of wonderful opportunities.

MSM

GPS is one of the programs you oversee. It's really become integral to the military and civilians alike, hasn't it?

Ken Torok

Yes, it has. It's almost hard to remember how warfighters completed their missions without GPS. And we're continually amazed at what the commercial market is doing with GPS. In fact, the commercial market has created expectations with soldiers who would like access to the same functionality they have at home when

they are deployed, as they have at home. GPS was created by the U.S. Department of Defense to enhance U.S. military warfighting capability, but it is available for use, free of charge, to anyone with a GPS receiver. Since its development, the system has seen a proliferation of use by the civilian community and new applications are continuously being found. This increased civil and commercial use of GPS, coupled with lessons learned from years of military operations and experience during *Operation Desert Storm, Kosovo*, *Desert Shield* and *Iraqi Freedom*, drove a desire to modernize the system — augment its capabilities while sustaining the current GPS mission. In response to new civil demands and the emerging doctrines of navigation warfare, the U.S. Air Force was charged with directing and procuring improvements to the GPS constellation. **Boeing** was selected to support the Air Force in architecting the future of GPS, guiding the introduction of new capabilities and technologies into a new operational control ground system and modernized ***Block IIF*** satellites.

MSM

What's GPS IIF?

Ken Torok

GPS IIF is the next-generation series of GPS satellites. GPS is a space-based, worldwide navigation system providing military and civilian users with highly accurate 3D position and timing information 24 hours a day in all weather conditions.

The GPS IIF satellites will bring more capability and improved mission performance to the GPS constellation. GPS IIF is the product of Boeing's experience with 39 successful satellites from the ***GPS Block I and Block II/IIA*** programs and more than 30 years of teamwork with the Air Force. Twelve new IIF satellites will form the core of the constellation for many years to come.

GPS II-F
(illustration courtesy of Boeing)

MSM
How much more capability will GPS IIF deliver?

Ken Torok
A key to the IIF design was to build in growth flexibility to accommodate new or evolving requirements, as well as other upgrades. Each satellite delivers twice greater navigational accuracy than heritage satellites as well as more robust signals for commercial aviation and search and rescue. Included is the military signal "*M-code*" with variable power for better resistance to jamming in hostile environments. IIF is compatible with existing receivers and has a 12-year design life to provide long-term service and reduced operating costs. Additionally, an on-station, reprogrammable processor directly receives software uploads for improved system operation.

Boeing's innovative pulse-line manufacturing approach is being used to deliver the IIF fleet. Similar to a traditional airplane assembly line, the IIF pulse line efficiently moves a satellite from one work area to the next in a steady rhythm, like a pulse.

MSM
Ken, what recent successes has GPS IIF experienced?

Ken Torok
In preparation for the first GPS IIF launch, Boeing shipped a IIF satellite from the factory in El Segundo to Cape Canaveral Air Force Station in Florida. ***Space Vehicle 2*** (**SV-2**) was used at the launch site to execute a *consolidated system test* (**CST**), which is a set of one-time, system-level design validation tests involving the space vehicle, the ground-based control segment, and user equipment. SV-2 was also used as a "pathfinder" to validate satellite transportation processes and equipment, and the launch site test program, procedures, and equipment. After completion of the CST and pathfinder activities, SV-2 returned to El Segundo in September to complete system level testing.

The first GPS IIF satellite (**SV-1**) is being prepared for shipment to the Cape to support the Air Force's planned launch schedule. The GPS IIF satellites will be launched, initialized, and operated with the Boeing *Operational Control Segment* (**OCS**) ground system. OCS was successfully delivered to the Air Force in 2007 and is currently operating all of the on-orbit GPS satellites. The complete system cutover to OCS from the legacy ground segment was accomplished without even being noticed by users worldwide!

MSM
Let's discuss your other programs. What's happening with the Wideband Global SATCOM (WGS)?

Ken Torok
Great things. WGS is the Defense Department's highest-capacity communications satellite, offering a major increase in bandwidth for airmen, soldiers, sailors and Marines. In June, Boeing successfully transferred control of the second WGS satellite, ***WGS-2***, to the U.S. Air Force, which will monitor and control the new satellite from **Schriever Air Force Base**, Colorado. WGS-2 was declared ready for Department of Defense operational testing after rigorous ground testing, a successful launch and a thorough on-orbit checkout.

Brig. Gen. *Samuel Greaves*, vice-commander of the Air Force's Space and Missile Systems Center in Los Angeles, recently said, "The Air Force could not be more pleased with the performance of the WGS government-industry team and, of course, the performance of this important satellite. We have high expectations in the MILSATCOM Systems Wing, and this team has once again proven that it is fully capable of meeting that challenge."

The WGS system is augmenting and will eventually replace the ***Defense Satellite Communications System*** (**DSCS**) constellation. ***WGS-1***, which Boeing delivered to the Air Force in January 2008, and ***WGS-2*** together are capable of handling more than 25 times the capacity of the entire DSCS constellation. Troops in the Pacific region have reported dramatic improvements in communications throughput over

WGS-1, and WGS-2 is making a significant difference for warfighters in the Middle East.
It is very gratifying to know these satellites are having real, positive impacts immediately after being placed into service. The Air Force has already ordered six WGS satellites. ***WGS-3*** is being readied for the next launch later this year. The remaining three satellites, which have a special Radio Frequency (RF) Bypass payload upgrade to support wideband *Airborne Intelligence, Surveillance, and Reconnaissance* (**AISR**) platforms such as the ***Global Hawk*** UAV, are in various phases of production. These latter three satellites are part of the WGS Block II program, and that program is performing very well from a cost and schedule standpoint.

There has been a lot of discussion lately about all of the unique features in WGS that make it particularly suitable for military use. The RF Bypass — which provides a 400 MHz transponder — is just one example. WGS also has a number of features specifically to monitor, control and protect communications such as the X-band phased array antennas, which allow beams to be shaped to avoid interference. The digital channelizer provides point to point, multicast, and broadcast capability between X-band and Ka-band users, great improving interoperability.

To meet ever-growing wideband communications needs, the Air Force is making plans to buy additional WGS satellites to field an eight-ball (eight-satellite) constellation. With the cancellation of the ***Transformational Satellite Communications System*** (**TSAT**), we are working with the Air Force to leverage the excellent performance and inherent growth capability of the WGS satellite to address important unmet mission needs, such as AISR support and anti-jam communications-on-the-move. This is a tremendous opportunity to provide rapid, low-risk and cost-effective service to the warfighter.

MSM

You have another program in your portfolio — the U.S. Navy's new Mobile User Objective System (MUOS) communications system. What's happening there?

Ken Torok

Boeing has delivered the first *Legacy UHF Communications Payload* and the first *User to Base Payload* to MUOS prime contractor Lockheed Martin. The F1 spacecraft payload has been integrated on the spacecraft and initial testing has been completed. MUOS is a constellation of satellites that will provide narrowband communications services to mobile and fixed equipment used by U.S. military personnel around the world. The Legacy UHF Communications payload allows the Navy to use existing UHF ground- and space-based communications systems.

Boeing is under contract to build, test and deliver Legacy UHF Communications payloads and User to Base payloads for the first four MUOS satellites. We anticipate that the option for the F5 satellites will be exercised next year.

Delivering the first Legacy and User to Base payloads is another important milestone in Boeing's long history of providing ultra-high-frequency communications to the U.S. Navy and ultimately to the warfighters. Our MUOS team did an excellent job leveraging Boeing's UHF and digital signal processing expertise to deliver payloads that meet performance requirements and promise to deliver vital services to the warfighter.

MSM

Our final question, Ken — what new opportunities are you eyeing?

Ken Torok

In addition to the evolution of the WGS program, we are pursuing various approaches to addressing MILSATCOM requirements, including a new emphasis on hosted payloads. We are already on contract with commercial satellite services provider Intelsat to provide a hosted UHF payload that will be used by the **Australian Defense Force**. Hosted payloads provide an excellent way for needed capabilities or new technology demonstrations, such as Lasercom, to be provided rapidly and cost effectively. We are also exploring risk mitigation options to extend and enhance the GPS OCS ground segment to ensure GPS system continuity.

Changing budget priorities and evolving mission requirements provide a wide range of opportunities for the creative and talented Boeing workforce to work with the Air Force and our other customers on new and innovative system solutions.

COMM OPS
A COTM SOLUTION

by John Rattigan, President, iDirect Government Technologies

Satellite communications is a critical technology for modern military operations. For units deployed around the world, it provides a high-speed communications backbone. It connects soldiers to each other and to central operations. And it enables them to stay united with friends and family back home.

Recent advances in satellite technology are bringing even greater advantages to military organizations. Soldiers can deploy a wireless broadband network on a moving ground vehicle, deep water fleet, military aircraft or even a UAV. Satellite equipment is now engineered to withstand harsher environments, and portable systems can fit inside a soldier's rucksack, ready to be activated at a moment's notice.

This past June, soldiers, marines, sailors and airmen gathered at the annual ***Joint Users Interoperability Communications Exercise*** (**JUICE**), held in **Fort Monmouth**, New Jersey, and across military locations around the world. The goal was to push the limits of the satellite industry's latest technologies.

iDirect Government Technologies (**iGT**) was on-site to demonstrate the capabilities of several key next-generation military-grade satellite technologies. Over a stretch of 19 days, the iDirect platform was put to the test, successfully proving that it can meet multiple core and emerging military demands.

Clocking Higher Speeds With COTM

Currently, one of the biggest trends in military communications is mobility. Constant connectivity between field personnel and central command is a priority, as they share data and respond to ever changing conditions. Even Unmanned Aerial Vehicles (UAVs) are using satellite technology for reconnaissance and two-way data communications.

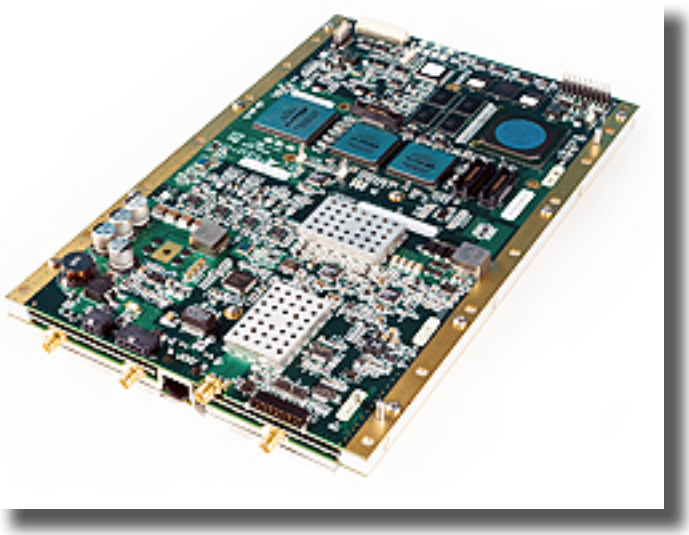
One of the key exercises at **JUICE** involved a 15-mile route designed to test-drive iGT's COTM capabilities. A designated iGT COTM vehicle left the exercise field and maintained a live video teleconference with **Ft. Monmouth** and a **Joint Task Force Forward Operating Base**. Using an **L-3 *Datron*** Ku-band antenna system, the iDirect network sustained connectivity for 35 minutes, passing under overpasses and through heavily wooded areas in the Fort Monmouth vicinity, at speeds of up to 65 miles per hour.

With the iGT COTM solution, a vehicle in the field becomes broadband enabled, capable of supporting Internet, voice, data and video services. iDirect's ruggedized satellite routers fit in the rear of a vehicle, a low-profile antenna installs on top, and inside the cabin, users benefit from wireless connectivity on laptop computers and Voice-over-IP phones.

Testing New Portability Standards

While COTM represents a significant advancement for satellite communications, the size of the equipment has limited it to larger vehicle applications.

To address this, iGT recently introduced a new iConnex e850mp satellite router board that's half the size of current product standards. It packs iDirect's full suite of mobility and advanced platform features into a compact, lightweight board. This highly portable, low-profile setup can fit into a



iDirect eConnex e850mp connectivity board

soldier's rucksack, using a very light bidirectional antenna for voice, video and data connectivity during battlefield operations.

At ***JUICE***, a ground task force integrated iDirect's e850mp satellite router board into a portable L-3 Panther terminal to support mobile X-band connectivity. The router was configured with multiple hubs, allowing troops to accomplish simulated objectives while on the move.

This new standard in portable technology delivers several critical advantages. Soldiers now have the ability to receive battlefield imagery that identifies potential threats, transmit situational video back to base, receive command and control information, or even transmit X-rays and imagery of a wounded soldier back to doctors who can interpret the injury and advise proper treatment regimen.

Ensuring Network Uptime + Security

As today's military relies heavily on satellite IP communications, preserving network continuity is essential to keeping operations running smoothly. The ***iDirect Network Management System*** (**NMS**) can automatically identify network issues and quickly resolve them before they impact users.

To test the platform's continuity of operations capabilities, military personnel configured the iDirect network in an end-to-end *Transmission Security* (**TRANSEC**) compliant mode. During TRANSEC operation, JUICE simulated a hurricane disaster which rendered the Fort Monmouth network infrastructure unusable. The network outage was detected by the iDirect NMS operating from an iDirect ***iConnex e800*** board integrated into an ***L-3 Cheetah***. The iDirect system performed a seamless switchover to an alternate teleport, maintaining connectivity without human interaction. The remote sites seamlessly re-initiated video, voice, and data operations, while remaining fully TRANSEC compliant.

"This year's JUICE event provided an opportunity to evaluate of some of the latest advancements in military communications technology available for today's warfighter. These advancements are critical milestones in improving the safety, mobility and awareness of soldiers in the field. Our successful test results affirm our commitment to supporting the military's need for reliable, real-time voice, video and data applications in the most demanding situations where there is no room for error."
— ***John Ratigan, President, iDirect Government Technologies***

Higher Data Rates Reached

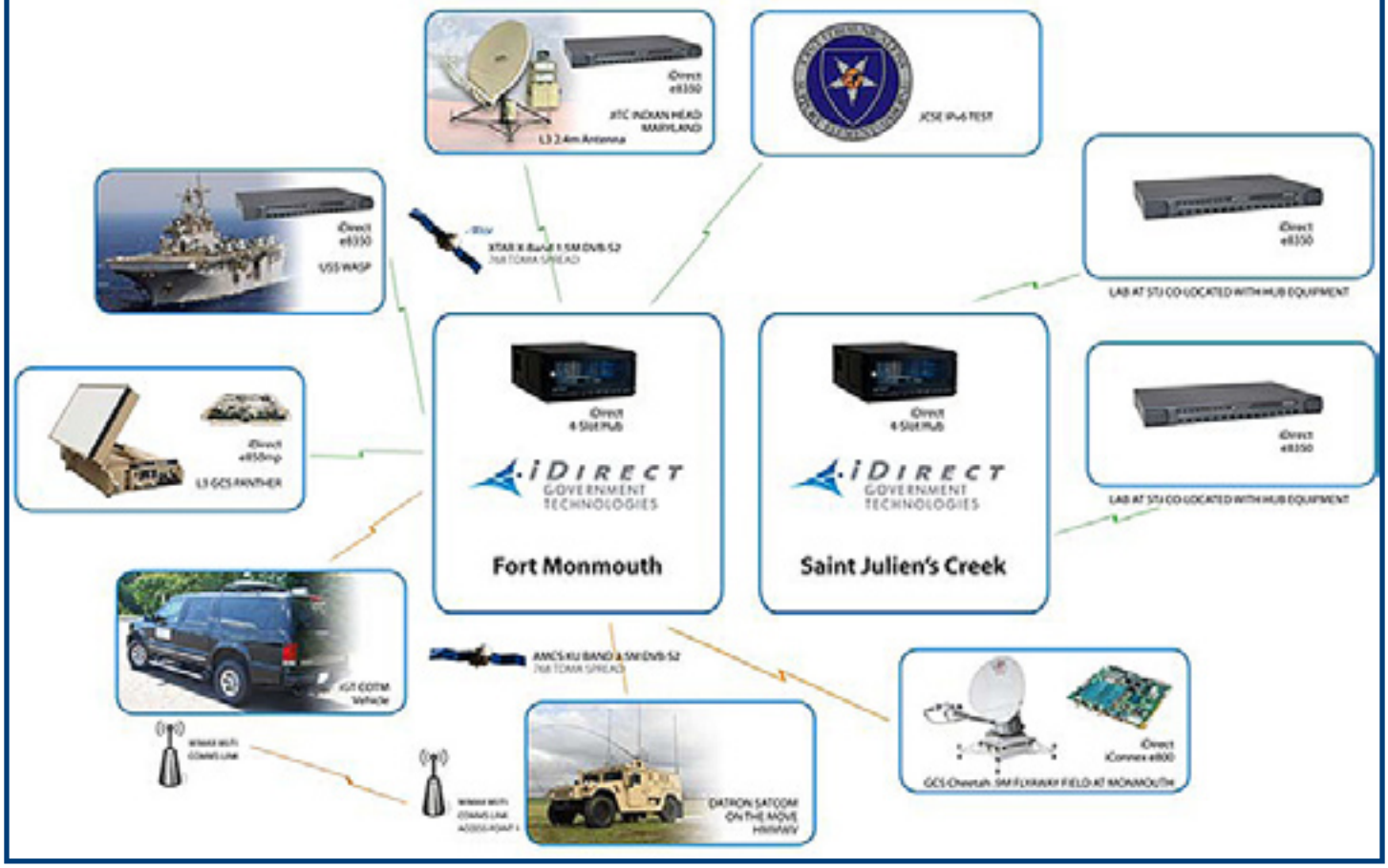
The U.S. Navy conducted over-the-air testing with iDirect's ***Evolution*** DVB-S2 platform as a potential replacement for its legacy system. In this high-profile exercise, an Evolution network was configured and run on the *USS Wasp* in Portsmouth, Virginia.

The Evolution platform successfully integrated into the naval communications infrastructure. After several days of high-volume network activity, the Navy reported significant improvements in bandwidth efficiency and throughput, especially under adverse weather conditions.

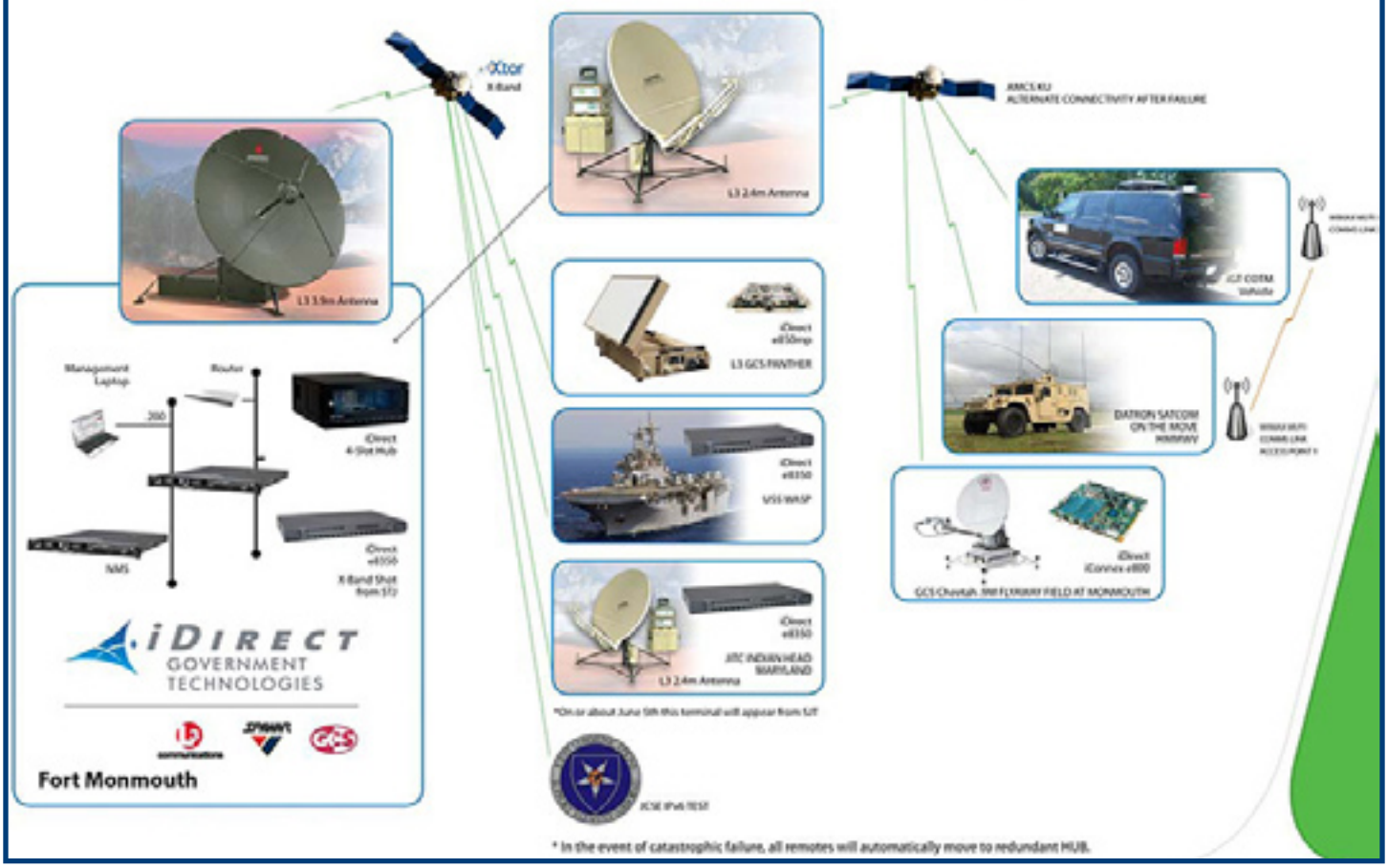
A Platform For Every Military App

Today, soldiers across the globe are turning to high-speed satellite broadband for voice, video, and data connectivity in the field. Military organizations depend on the iDirect platform for reliable satellite-based IP communications they count on to fulfill their objectives, whether that's on the ground, in the air, or at sea.

iDirect Network Connectivity Before Catastrophic Failure



iDirect Fort Monmouth Transmission Connectivity - JUICE 09

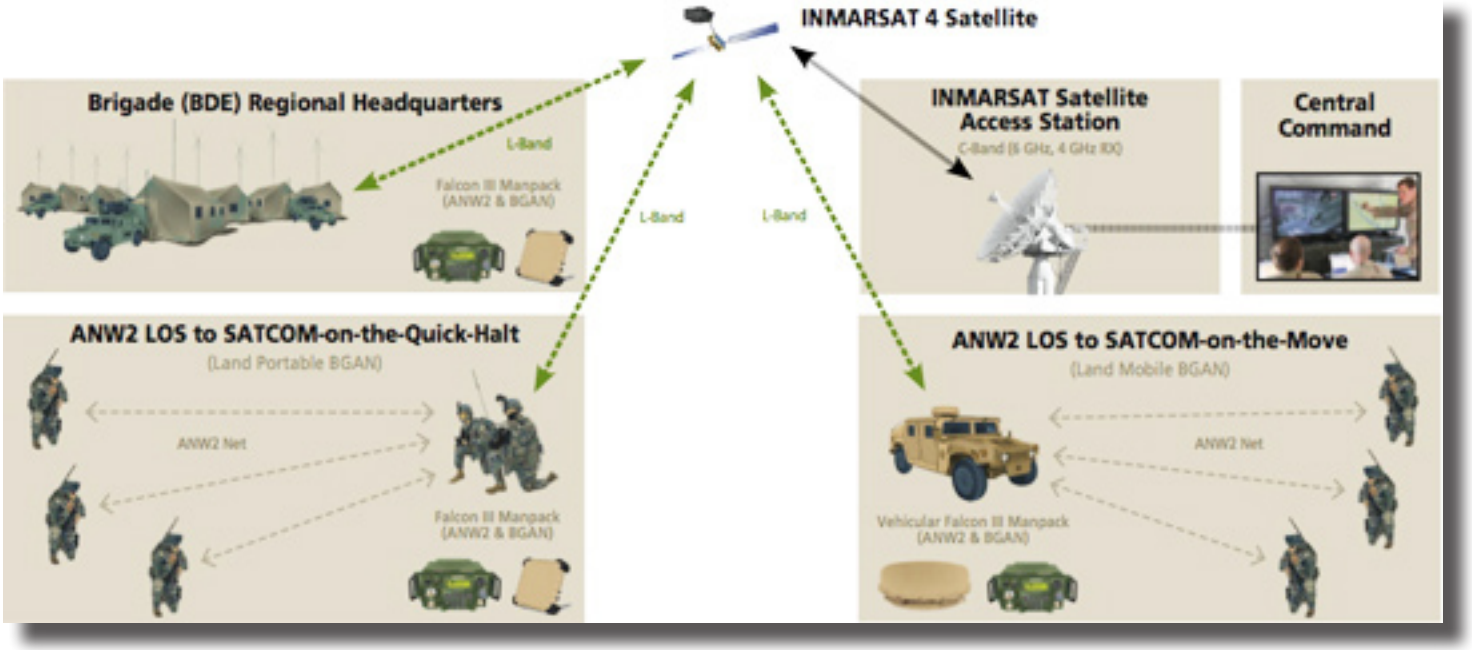


ASSET ANALYSIS
SATCOM BROADBAND ENTRY BY HARRIS

In October of 2009, Harris Corporation added broadband satellite data capability via a software upgrade to their U.S. military's Joint Tactical Radio System (JTRS)-approved Falcon III® AN/PRC-117G wideband networking radio. The new features will facilitate global, high-data-rate communications between senior military commanders and personnel at the tactical edge. Integration of the AN/PRC-117G radio with the Harris RF-7800B family of ruggedized Broadband Global Area Network (BGAN) satellite terminals provides warfighters with unique end-to-end, Type-1 secure beyond-line-of-sight (BLOS) network communications connectivity. The Falcon III AN/PRC-117G is the first JTRS-approved tactical radio to offer Type-1 secure access to high-bandwidth applications such as streaming video, reconnaissance information and biometrics — in addition to narrowband legacy waveforms.

The AN/PRC-117G delivers advanced wideband line-of-sight voice and data networking capabilities through the Harris-developed Adaptive Networking Wideband Waveform (ANW2), which provides a high speed mobile backbone capable of supporting video and other data intensive applications. The new software upgrade will allow users to extend the range of ANW2 data to beyond-line-of-sight by linking the AN/PRC-117G to the BGAN network through the RF-7800B. The combined system offers throughput rates of up to 2 Mbps over the BGAN network when using embedded TCP/IP acceleration and compression, thus reducing INMARSAT costs. It is the only integrated, military-rugged, wideband SATCOM on-the-move system capable of seamlessly maintaining high-speed, end-to-end Type-1 encrypted IP data across an extended battle space.

The addition of BGAN data mode to the AN/PRC-117G also provides global over-the-horizon "reach-back" capability, connecting operators with senior commanders. This capability allows for faster and more informed decision-making, improved mission efficiency and troop safety. Harris has developed both a Class 2 Land Portable BGAN terminal for dismounted applications and a Class 10 Land Mobile BGAN terminal for vehicles on the move. Both terminals use the Inmarsat-4 BGAN satellite constellation. They are available to domestic and international customers. The Falcon III AN/PRC-117G radio is certified by the Joint Interoperability Test Command (JITC) as compliant with Demand Assigned Multiple Access (DAMA) military standards and upgradable to access the Mobile User Objective System (MUOS), both for transmitting high-bandwidth voice and data over tactical military satellites. The radio also has received certification for Type-1 information security from the National Security Agency.



Tactical Area Communications System Using the RF-7800B Terminals

MilsatMagazine (**MSM**) asked *William Beamish* of **Harris Corporation** to afford us additional information as to why the Company made the decision to enter the market for broadband SATCOM terminals.

William Beamish

Harris Corporation has made significant investments to develop advanced wideband tactical radios for use by the U.S. Department of Defense and its allies. The radios are geared to run wideband waveforms, such as the Harris-developed *Adaptive Networking Wideband Waveform* (**ANW2**) as well as others.

However, ANW2 is a line-of-sight waveform. This requires radios to be in relative proximity to one another in order to communicate. Today's warfighters require *beyond-line-of-sight* (**BLOS**) capabilities, especially considering the challenges of mountainous and urban terrain found in such regions as Afghanistan and Iraq.

The ***RF-7800B*** product line was developed to provide warfighters with wideband, on-the-move, BLOS capability in a system to extend wideband networks at the brigade level and below. **Inmarsat**'s ***Broadband Global Area Network*** (**BGAN**) is the only available world-wide wideband satellite solution for customers needing mobility, reliability, as well as capacity.

MSM

What are the key capabilities of the Harris RF-7800B BGAN terminals? How is the Harris offering different from competing terminals and why is this significant?

William Beamish

The ***Harris RF-7800B BGAN*** line offers high-performance, ruggedized satellite solutions for voice and data connectivity in SATCOM-on-the-move and SATCOM-on-the-quick-halt applications. For dismounted applications, the ***RF-7800B-DU024*** is a Class 2 Land Portable BGAN terminal that provides Internet Protocol data rates up to 492 kb per second;

Harris RF-7800B-VU104 Land Mobile BGAN Terminal

while for vehicles on the move, the ***RF-7800B-VU104*** is a Class 10 Land Mobile BGAN terminal that provides the same maximum data rate.

Both terminals meet the **MIL-STD-810F** standards for ruggedization, meaning they will continue to operate in dusty, humid, cold, or other challenging environments where commercial-quality BGAN units typically fail. These terminals are also configurable and controllable through a laptop computer and enable co-site operation with existing VHF/UHF 50 Watt radio systems.

Additionally, the RF-7800B terminals are designed to increase throughput over the BGAN network up to rates over 2 Mbps through Harris-developed TCP/IP acceleration and compression algorithms. This is significant because it dramatically decreases operational costs.

Another significant advantage of these terminals is they provide to military customers their integration with Harris wideband tactical radio systems. When combined with the ***AN/PRC-117G*** or ***RF-7800M Falcon III***® networking radios, the terminals offer automatic and seamless beyond-line-of-sight range extension of wideband networking data, world-wide connectivity to classified resources, and end-to-end high-grade information security.

MSM

What is the current landscape in the BGAN terminal market? What are customers seeking?

Harris AN/PRC-117G(V)1(C) Type-1 wideband multiband multimission radio with internal SAASM GPS

William Beamish

Customers are looking for a way to extend data networks to beyond-line-of-sight, down to the company level. At the same time, there is a need for greater bandwidth. Warfighters today require wideband channels to send increasingly large files, including video, pictures, and other data, that cannot travel over narrowband networks. Deployed personnel also need to tap into the Tactical Internet remotely to access secure resources and other widely dispersed data bases. The RF-7800B provides each of these capabilities in a ruggedized, affordable package, today, while customers await the arrival of next-generation military satellite technology.

MSM

What does Harris see as the role/future of wideband satellite communications, and how is the company positioned to help bring it to the field?

William Beamish

Wideband systems are the most significant advance in tactical communications for the United States military and its allies in quite some time, and this area will only grow in significance. Satellite communications play a critical role in wideband systems with their ability to move data beyond-line-of-sight for operational considerations and over-the-horizon for reach-back to forward-operating bases and headquarters. Wideband communications allow for the use of streaming video — a critical tool for intelligence gathering and on-demand access to the Tactical Internet from the field. As other wideband satellite systems come on line, this will further accelerate the use of applications that are bandwidth-intensive. As the operational costs come

down, these systems will become more available for personnel lower in the force structure.

Harris is leading this transition, applying the expertise in tactical communications to develop the RF-7800B BGAN terminals as well as the most advanced wideband tactical radios. The Falcon III manpack radios — the ***AN/PRC-117G*** and ***RF-7800M*** — each allow users to transmit voice and data at on-air rates of up to 5 Mbps.

The radios offer a frequency range of 30 MHz to 2 GHz, which is a four-fold increase from current radios, and significantly reduced size and weight. The RF-7800B terminals complement the capabilities of the radios by extending their functionality around the world.

MSM

What significant milestones have been achieved? When will the RF-7800B BGAN terminals become operational?

William Beamish

The RF-7800B BGAN terminals have each received Type Approval from **Inmarsat**, certifying them for operation over the Inmarsat Satellite Communications System for simultaneous voice and broadband data connectivity. The Harris terminals have been fully tested to meet **MIL-STD-810F** standards for military ruggedization and **MIL-STD-461E** standards to eliminate electro-magnetic interference with co-located radio systems. The RF-7800B is operational and in full production — systems have been deployed to several European and Middle Eastern countries, as well as the U.S. Department of Defenses (DoD).

MSM

What are some of the key challenges facing the DoD in satellite communications, and what can Harris offer to resolve those challenges?

William Beamish

Today's military is facing a huge increase of traffic on satellite systems that is creating bottlenecks. Given the increasing hunger for more and more bandwidth, and the already saturated nature of existing SATCOM channels, many of today's warfighters can not get the access they need, when they need it. Next-generation mobile broadband satellite connectivity is still years away.

Harris has applied its expertise in communications to provide working solutions today. For instance, the RF-7800B powers a BGAN data mode in the AN/PRC-117G and RF-7800M manpack radios to provide seamless beyond-line-of-sight communications to meet requirements for using existing commercial, off-the-shelf solutions and other commercially available technologies.

MSM

Harris is offering the RF-7800B as a stand-alone product, as well as part of a wideband tactical communications solution. Can you explain the wideband system and what it provides for users? Why is it unique?

William Beamish

Harris Corporation has developed two man-portable radios that currently deliver advanced wideband voice and data networking capabilities to the field through the Harris Adaptive Wideband Networking Waveform. This waveform currently provides warfighters with access to high-data rate applications over line-of-sight links—essentially delivering cable modem Internet access performance to the dismounted soldier without traveling over a phone line, fiber-optic line, or transmission tower.

The range of ANW2 can be extended by automatic routing through a beyond-line-of-sight media. The radios have proven their ability to operate other wideband waveforms as well. The RF-7800B line is a crucial piece in extending the wideband networking system to beyond-line-of-sight. One significant advantage of these BLOS links is the ability to extend the range of the radio's data transmission capability across the world—literally connecting a soldier at the edge with senior military. More immediately, however, the BLOS functionality provides over-the-horizon "reachback" capability, providing real-time links between front-line warfighters and commanders at higher echelons.

This enables the network to remain fully connected in any kind of terrain, and allows real-time communications that provide the ability for military organizations to operate with a faster operational tempo and more information than ever before.

About the author

Bill Beamish is currently the Product Line Management Director for Falcon III Manpack Radios for the Harris RF Communications Division. In this capacity, he manages the AN/PRC-117G, RF-7800M, and Tactical BGAN products. Prior to assuming his current assignment, he was the HF Radio Product Manager for several years. Mr. Beamish joined Harris in 1980 as an Electrical Design Engineer. Earlier in his career at Harris, he lead the Harris HF Automatic Link Establishment (ALE) and the Automated Data Communications teams.

AGS

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COMMAND CENTER
COL. SCOTT LARRIMORE, SBIRS SPACE GROUP COMMANDER

To offer some insight into the leadership behind this crucial program, MilsatMagazine delved into Colonel Larrimore's background — we asked him about what prompted him to join the U.S.A.F. as a career officer, as well as what other postings he has experienced during his career, including his most enjoyable duty station. The Colonel offered the following information as to his qualifications to manage the SBIRS Space Group at the Space & Missile Center at Los Angeles Air Force Base in California.

Colonel Larrimore

I would first like to thank you for the opportunity for this interview, as ***SBIRS*** is a very important program as we push forward toward our fist ***GEO*** launch. I am extremely proud to be an integral part of the technical cutting edge that provides security for our nation.

To share a little about myself, I graduated from Princeton University in 1986 with a degree in Mechanical and Aerospace Engineering. I hold graduate degrees from Purdue University in Astronautical Engineering and George Washington University in International Affairs. As an Air Force officer, I've held several assignments, including Squadron Command at the **National Reconnaissance Office** and I was an Air Force Fellow at the **Institute for Defense Analyses**. I have experience in technology development, acquisition, and space operations.

My most memorable assignment was when I was stationed at **United States European Command** in Stuttgart, Germany. I was a political-military affairs officer working the *Partnership for Peace* program and a desk officer for Kosovo, Serbia, and Montenegro. It was great working with emerging democracies as they prepared for defensive cooperation with the United States and NATO partners. Stuttgart was also a great base from which to travel throughout Europe to see historic and beautiful sites and to meet people from many different and diverse cultures.

MilsatMagazine (MSM)

Colonel, the funding of our nation's security programs is undergoing severe examination through new political processes in Washington D.C. — the defunding of TSAT is just one example. How will you be able to continue to support SBIRS as a "must have" mission, as well as ensuring that the much-needed enhanced missile warning capabilities remain fully funded? What steps can you take at your level of the operation to support these missions?

Colonel Larrimore

The ***Space Based Infrared System Program*** (**SBIRS**) has been identified as a Key National Security Program. It is the only program in the country that develops space systems to provide early warning to our nation. In order to help ensure continued funding, it is important for the program to stay focused and execute on the acquisition commitment of the first two spacecrafts, ***GEO-1*** and ***GEO-2***, as well the ***SBIRS Follow-on Program*** (**SFP**).

The ***Infrared Satellite Systems Wing*** (**ISSW**) has an extremely committed force of men and women working together each day, totally focused on program execution. As the Commander of the ***SBIRS Space Group***

(**ISSG**) I am proud to lead a team of individuals supporting Space Segment of the SBIRS Program.

MSM

The U.S.A.F.'s DSP Flight 14 continues in operation today, even after 20 years of on-orbit operations. How does DSP integrate with SBIRS? Is this simply a case of ensuring redundancy in case of a catastrophic failure of one system or another? What is the purpose of DSP?

Colonel Larrimore

DSP is a legacy program that has been operating since the 1970's. The DSP program was designed for Missile Warning and the spacecraft are in geosynchronous orbit. SBIRS will be picking up the operational continuum of that missile warning to carry it into the future.

SBIRS Highly Elliptical Orbit (**HEO**) provides infrared data from the polar region. The integrated ground network has the capability of fusing the HEO and DSP data together to provide a greater amount of information more quickly to the warfighter.

The GEO satellites will be in the same orbit as DSP. These spacecraft will have a faster revisit rate for "normal mission data" and higher sensitivity to see emerging threats earlier. Once on-line, this data will be fused with DSP and HEO data, in turn providing faster, more reliable information to deployed forces.

MSM

What role does Space Based Infrared Systems (SBIRS) play in helping to protect the United States?

Colonel Larrimore

SBIRS has four Mission Areas, those being...

1. ***Mission Warning, providing faster, more accurate reporting on the theater and strategic missile launches***
2. ***Missile Defense, supporting effective operations of missile defense systems against national and theater threats***
3. ***Technical Intelligence, gathering data to characterize a variety of infrared signatures to enable rapid identification of events***
4. ***Battlespace Awareness, supplying comprehensive infrared data to help characterize battlespace conditions, and supporting force protection, strike planning, and other missions.***

These four mission areas, for the SBIRS program, provide early views of the targets, can see the targets longer and more frequently than other sensors, and can provide amazing data collects to the combatant commanders.

MSM

What is the composition of the SBIRS constellation? Are future satellites planned for SBIRS?

Colonel Larrimore

SBIRS is comprised of (a) two HEO sensor payloads aboard host spacecraft already hosted in the *Molniya Orbit*, and (b) four geosynchronous (GEO) satellites that will complete the current SBIRS system.

MSM

What are the target missions for SBIRS?

Colonel Larrimore

The target mission is to provide timely, reliable and accurate missile warning information. The program has global and theater functional requirements to support strategic and theater ballistic missile warning. SBIRS has emerging capability to support national and theater missile defense.

MSM

What technologies are incorporated into these satellites?

Colonel Larrimore

The heart of the GEO Payload is the infrared focal planes. The GEO satellites will use two IR sensors, a scanner and starer. The Ground system processes the raw data and quickly fuses SBIRS and DSP information for delivery to the operational users.

MSM

How does SBIRS relay its information to command and control centers, and what actions can be taken once crucial data has been received from the satellites? Has the revisit time improved for SBIRS, as compared to DSP?

Colonel Larrimore

SBIRS relays data on a secure communications link for normal, survivable, and endurable operations. The SBIRS revisit time has increased from that of DSP. The downlink is 24X7 real time to the Ground relay stations, and the data passes though secure links to the control center. The fused data is analyzed to create potential tracking data and graphically shown to the operator. The data collects, fusion and transmission process is operated by the **460th Wing**.

The following is a possible example of response time and use of data. During a theater conflict, short range missiles, as well as missiles launch by submarines, can reach their targets within 7–10 minutes. In such a case, a theater commander would use the data to respond immediately by ordering troops in the threatened area of his command to take cover and don chemical warfare gear.

In the case of a missile launch from the Eurasian Land mass to the U.S., the warheads would arrive about 30 minutes after launch. Responses to this warning would have to be made within that 30-minute timeframe.

MSM

What wing(s) are tasked for SBIRS operations? Where are the relay stations for the SBIRS ground segment?

Colonel Larrimore

The Wings tasked for the SBIRS operations are the **460th** and **14th SWS**. The relay stations are located at the following locations:

- ***RGS-E near Harrogate England***
- ***RGS-P near Alice Springs Australia***
- ***RGS-M2 at Buckley AFB***
- ***RGS-B at Schriever AFB***

MSM

There have been discussions as to software problems with SBIRS' fail-safe programs as well as some mechanical defects, such as with its gyroscopes. Can the software be fixed to ensure better SBIRS performance? And are these problems one reason why 3GIRS-RR has been instituted? If such is the case, how can citizens feel assured SBIRS will work correctly when, and if, needed due to hostile missile launches? If these fixes cannot be accomplished, what sort of coverage gap are we looking at for the activation of a follow-on system?

Colonel Larrimore

The *Flight Software Subsystem* (**FSS**) that controls the spacecraft is complete. The integration and spacecraft testing has demonstrated the software to be very stable and of extremely high quality. The FSS is currently in *Software Item Qualification Testing* (**SIQT**), which reviews the fail modes on the spacecraft and the payload. The *Common Gyro Reference Assembly* (**CGRA**) failure during ***GEO-1*** testing surfaced inadequate soldering technique of jumper wires; investigation and disposition are in work.

U.S. citizens can be assured that the payload and spacecraft undergo rigorous testing, including Thermal Vacuum tests, to insure they can withstand the flight-like environment. The SBIRS combined team is working diligently with the contractor to verify that the product is sound and that it will perform once launched.

MSM

Where do you see our nations' defense heading over the next few years, especially given budget cutbacks and the removal of land-based missile defense systems in Europe? Is this indicative of a move away from U.S.A.F. to U.S. Navy missile defense programs?

Colonel Larrimore

The U.S. Air Force will follow the directions of the Commander In Chief and the Congress using whatever assets are available.

The following ***MilsatMagazine*** questions were answered by **Air Force Space Command's Space and Missiles Center** spokespersons...

MSM

How can the U.S.A.F. encourage additional recruitment into its service, and why should such opportunities be considered by today's men and women of military service age? What are the benefits to such?

SMC

The Air Force has made great strides in creating a new core of space professionals — better trained, equipped and organized to move into the future. The Nation is counting on us for the critical edge that space can provide. To become a part of exciting and cutting edge technology is a benefit to those individuals who want a challenge and to work in new uncharted territory.

MSM

Would you please define and describe the U.S.A.F.'s 3GIRS-RR program, which we understand is the follow-on to SBIRS?

SMC

3GIRS is a space-based Infrared technology maturation and risk reduction effort. Key technologies include large format focal plane arrays, electronics, optical components, cryogenic coolers, thermal control systems, Wide-Field-Of-View, Full-earth staring data processors and algorithms. The technology developed by 3GIRS could be considered for technology insertion into current or future programs.

MSM

Incorporated into the 24x7x365 global coverage of 3GIRS-RR, would you please tell us about the Wide Field Of View (WFOV) staring sensors? Why are they better than the sensors incorporated into SBIRS? Who developed these sensors for the program?

SMC

WFOV staring sensor technology has several advantages. As staring sensors, they do not have gimbals or steering mirrors which simplifies assembly, integration, and test as well as operations. The staring sensors provide continuous coverage without the revisit delays in DSP and SBIRS scanning sensors. The WFOV sensors are also more sensitive allowing detection of dimmer targets. Put together, the staring and improved sensitivity can provide significant benefits to missile warning and missile defense. XR has contracts with **SAIC** and **Raytheon** for WFOV sensors and payloads. In 2008, SAIC and Raytheon delivered sensors for ground testing and are now on contract to mature those sensors into flight qualified payloads.

About the Space and Missile Systems Center

Air Force Space Command's Space and Missile Systems Center, located at Los Angeles Air Force Base, California, is the U.S. Air Force's center of acquisition excellence for acquiring and developing military space systems. SMC consists of six space systems wings and three groups responsible for GPS, military satellite communications, defense meteorological satellites, space launch and range systems, satellite control network, space based infrared systems and space situational awareness capabilities.

EVENT FOCUS
DOD COMMERCIAL SATCOM USERS' WORKSHOP

The Satellite Industry Association (SIA) is a Washington D.C. based trade association that represents the leading satellite operators, service providers, manufacturers, launch services providers, and ground equipment suppliers across the globe. Since 1995, SIA has been the unified voice of the satellite industry on policy, regulatory, and legislative issues that affect the commercial satellite industry. The association actively promotes the benefits and uses of commercial satellite technology and its role in national security, homeland security, disaster relief and recovery, and the global information infrastructure and economy. As the commercial satellite industry's lead advocate, the SIA continually monitors the international and domestic regulatory landscape and works to advance satellite interests both at home and abroad. SIA member companies are actively involved in reviewing and commenting on spectrum, regulatory, telecom, international trade, export controls, government procurement, national defense, homeland security and industry trends among other key issues.

One of the most important events for the SIA is the ***DoD Commercial SATCOM Users' Workshop.*** This is the SIA's flagship event and is a part of the **SIA SATCOM Workshop** series. This event will be held from December 8-10, 2009, at the conveniently located **Hyatt Crystal City** hotel in Arlington, Virginia, located at 2799 Jefferson Davis Highway, at Ronald Reagan Washington National Airport. The phone is 1-703-418-1234 or +1 800-223-1234. This annual event brings together government leaders from **DoD** Combatant Commands, Services and Agencies as well as commercial satellite industry operators, service providers, integrators, ground equipment suppliers, and manufacturers. Join Government decision-makers from AFRICOM, EUCOM, SOCOM, SOUTHCOM, STRATCOM, CENTCOM, TRANSCOM, OSD/NII, DISA, NSSO, Army, Marine Corp, White House Communications Agency, SPAWAR, and many, many more for this important conference.

There are many reasons why attending the DoD Commercial SATCOM Users' Workshop makes sense... attendees will be provided with current information on the DoD's Commercial SATCOM needs, requirements and concerns including information about DoD's near-, mid- and long-term operational capabilities, capacity and protection requirements. Plus, the challenges and concerns of U.S. Combat Commands, military services, as well as DoD and Civil Agencies will be outlined. There is also the opportunity to meet with key government satellite users and engage in open discussions with all, gleaning information perhaps unavailable elsewhere. Additionally, this is a venue where the latest technologies will all be exhibited, encompassing space and terrestrial capabilities as well as present commercial solutions available to DoD SATCOM users. And let's not forget, the visibility of the individual participants is increased with the leading defense and civil agencies!

The DoD Commercial SATCOM User's Workshop is an unclassified conference and the U.S. Strategic Command co-sponsorship does not constitute federal endorsement of SIA or any other sponsors of this workshop. Registration for this important conference may be completed directly online at...

http://www.dodsatcom.com/registration.htm

Tuesday, December 8

8:00 am – 8:30 am — Registration — Government Only Hyatt Regency – Regency Landing (Ballroom-B Level)
8:30 am – 11:00 am — Government Only Sessions
11:00 am – 12:30 pm — Luncheon
12:30 pm – 1:00 pm — General Registration — Hyatt Regency – Regency Landing (Ballroom-B Level)
1:00 pm – 1:30 pm — Welcome
1:30 pm – 2:00 pm — OSD/NII Update
2:00 pm – 2:15 pm — Break
2:15 pm – 3:00 pm — DISA Update
3:00 pm – 3:30 pm — Future SATCOM Overview
3:30 pm – 5:00 pm — Mission Assurance Panel
CFE, Protection, Industry Data Warehouse,EMI/EFI— Moderator – Mike Vance, USSTRATCOM/J661
5:30 pm – 7:30 pm — Welcome Reception – Hosted by Intelsat Genera — Hyatt Regency – (Ballroom-B Level)

Wednesday, December 9

7:30 am – 8:00 am — General Registration — Hyatt Regency – Regency Landing (Ballroom-B Level)
8:00 – 8:10 am — Welcome
8:10 am – 9:30 am — COCOM Panel – Geographic — DoD's Geographical Needs & Industry's Business Case
Moderator – Maj. Shane Neubauer, USSTRATCOM/J661
9:30 am – 9:45 am — Break
9:45 am – 11:00 am — What's Next for SATCOM Capacity — New Satellite Network Approaches Post T-SAT
11:00 am – 12:00 pm — COCOM Panel – Functional — DoD's Functional Needs & Industry's Business Case
12:00 pm – 1:30 pm — LUNCHEON – KEYNOTE SPEAKER
1:30 pm – 2:45 pm — Mission Mobility — Lighter, Faster, More Nimble
2:45 pm – 3:00 pm — BREAK
3:00 pm – 4:15 pm — Bandwidth Optimization – Making the Most of What You've Got
Management, Efficiencies, Economies of Scale, Sharing
4:15 pm – 4:30 pm — Wrap-up
5:00 pm – 8:00 pm — Exhibitor Showcase Reception – Hosted by Hughes Network Systems — Hyatt Regency Washington Room (Ballroom-B Level)

Thursday, December 10

7:30 am – 8:00 am — REGISTRATION — Hyatt Regency – Regency Landing
8:00 am – 9:15 am — KEYNOTE SPEAKER – RADM Janice M. Hamby – Vice Director of C4 Systems (J6) Joints Chief of Staff (confirmed)
9:15 am – 10:30 am — Services Panel — DoD's Organizational Needs & Industry's Business Case
10:30 am – 10:45 am — BREAK
10:45 am – 12:00 pm — SATCOM Tools — Fielding, Integration, and Supporting the Warfighter
12:00 pm – 1:30 pm — LUNCHEON – Featured Speaker
1:30 pm – 2:45 pm — Hosted Payloads — Past Models and Unique Payloads
2:45 pm – 3:00 pm — BREAK
3:00 pm – 4:30 pm — Executive Perspectives
Leadership Views on the DoD's Satcom Policies, from Inside and Out
4:30 pm – 5:00 pm — Workshop Wrap-Up

PRIORITY BRIEFING
ANTI-PIRACY ASSISTANT = LRIT

by Henrik Dryholm, Market Development Manager, ***Thrane & Thrane***

Maritime SECURITY CENTRE

18/04/2009 17.35 UTC

A Belgian owned and flagged stone carrier was hijacked probably by Somali pirates early this morning in the Somali Basin. The 1800 tons vessel POMPEI with home port Bruges was en route to Durban/South Africa without any cargo. It was hijacked in position 0245S 05648E, 700 nautical miles east of the African coast and 150 nautical miles north of the Seychelles islands. With its crew of 11 sailors (2 Belgians, 1 Dutch, 3 Croats, 5 Filipinos) the vessel is now heading North-West towards Somalia at slow speed. No further details available at the very moment.

The POMPEI was registered with the Maritime Security Centre of EU Naval Force ATALANTA and was following exactly advice given, particularly by staying outside the recommended 600 nautical miles from the Somali coastline.

On April 18th, 2009, Dirk Traen of Belgium's international dredging and land reclamation specialist Jan De Nul N.V. received the news all ship operators fear: One of his company's vessels had been forcibly taken by pirates off the Gulf of Aden.

As chairman of the **Jan De Nul N.V.** crisis center, *Dirk* was responsible for the release of the 10 man crew and the vessel, a side stone dumper named ***MV POMPEI***. The painstaking negotiations lasted more than two months, time in which Dirk and his team gained first hand experience of dealing with pirates. They also found out that the ***Ship Security Alert System*** (**SSAS**) and, although not designed for anti-piracy, the recently introduced ***Long Range Identification and Tracking*** (**LRIT**) system, can be vital assets in piracy situations.

Jan De Nul Group is committed to mitigating the risk of piracy attack and ensures its company crews are prepared when traveling through piracy hot spots. Each vessel, according to international regulation, has a ship security plan and, in the case of MV POMPEI, specific measures had been taken to avoid attack en route from Dubai to Durban, via the Seychelles and the notorious Gulf of Aden. But even though she was sailing more than 800 miles off of Somalia's coast, well clear of the usual trouble zone, and only 80 miles from the Seychelles where she was due to bunker, MV POMPEI was about to become the next victim of pirates.

"There is always a ship security plan onboard so the crew were alert and prepared," says Dirk. "They had procedures in place, although they shouldn't have needed them in the area they were in. And because it was not an at risk area, it also wasn't covered by **ATALANTA**, the organization that provides Navy ships to guide and protect merchant ships."

In spite of doing everything in their power, MV POMPEI was attacked and boarded. When it happened, according to crew reports, the takeover was quick. Not being armed, the crew was unable to present any meaningful resistance. At least one shot was fired, although it seems that this was meant as a warning.

The Crew were easily pacified and relieved of their mobile phones and any other way to contact home.

This left the pirates in control of the vessel's SATCOM systems. However, for reasons unknown, they allowed the ***Ship Security Alert System*** (**SAILOR TT-3000SSA**) and **SAILOR TT-3000LRIT** to continue transmitting.

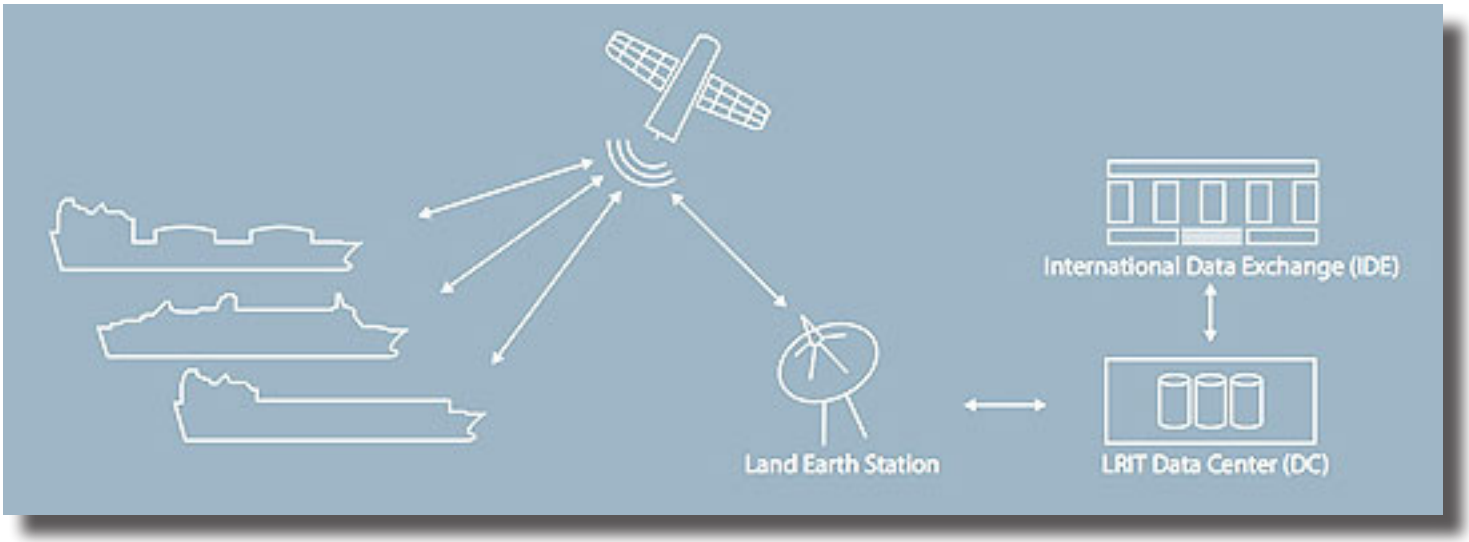
MV POMPEI

This meant Dirk and his team, in addition to the Belgian military and other authorities, could clearly track the MV POMPEI at all times during the hijacking.

LRIT is a recent amendment to *Chapter V* of the ***International Convention for the Safety of Life at Sea 1974*** (**SOLAS**), which introduces new mandatory position reporting obligations for **SOLAS** vessels. It came into force on January 1st, 2008, with compliance required by December 31st, 2008. It demands that SOLAS vessels automatically transmit their identity and position with date/time at 6-hour intervals. They must also be capable of answering requests from member states and LRIT data centers for immediate position reports and be able to change the time interval between reports to a maximum frequency of every 15 minutes.

"The combination off SAILOR SSAS and LRIT was very useful when the MV POMPEI was under control of the pirates as we had accurate, regular reports of the vessel's position, so we could always see if the ship was moving," explains *Dirk*. "And it did move. Firstly, for just half a mile, which was due to the monsoon. Later on, though, it moved 25km to the North. But because of reports from the SSAS and LRIT, we knew where MV POMPEI was positioned at all times."
This kind of information is very useful to the authorities during a piracy event. Because the attack on MV POMPEI was a crime against Belgian citizens, the Government scrambled into action and **Jan De Nul N.V.** had the support of several agencies, including the crisis center in Brussels, *The Ministry of Foreign Affairs* and the *Belgian Navy* and *Air Force*. It was a large operation but thankfully, one that ended peacefully on June 28th, 2009.

"We paid a ransom that was delivered by airdrop," says *Dirk*. "The pirates were all onboard and they counted the money in the presence of the master as a witness. They divided the money on the ship itself and then waited for the right moment to get off the ship, for their own security. I suppose in the Gulf of Aden it's dangerous for everyone, even the pirates



SAILOR® TT-3000LRIT
Long Range Identification and Tracking System

themselves. In the morning, there was a call from the master to say that every pirate had left the MV POMPEI and the crew were free and safe, which was a huge relief to everyone involved."

The **SAILOR LRIT** aboard MV POMPEI had, fortunately, been fitted aboard shortly before the ship left Dubai. Although it was just one factor in securing the safe release of vessel and crew, Dirk believes that both SSAS and LRIT have an important role to play in piracy negotiations.

"SSAS and LRIT don't prevent piracy but their position reporting allows you to follow a vessel's planned route. If there is a strange deviation from the voyage plan you can immediately see that something is wrong, allowing you to react much earlier," says Dirk. "First contact with the pirates was actually four days after MV POMPEI was boarded, but because of the SAILOR SSAS and LRIT onboard, we already knew that something was happening."

"During a hijacking, you can only rely on electronic communication. We never saw the pirates, we never met them and we were not at the table to discuss the ransom. There's a brick wall before you and through that wall you have to communicate, but on their terms. The SAILOR LRIT was different, because it gave us accurate information, when we needed it, on our terms," concludes *Dirk*.

About the author

Henrik Dryholm is Market Development Manager for Tracking at satellite equipment manufacturer Thrane & Thrane. As the company's tracking specialist, he has played a part in bringing the benefits of LRIT to the maritime industry.

The Battle Against Somali Pirates
European Union Action Plans

The Maritime Security Centre – Horn of Africa (MSCHOA) aims to provide a service to mariners in the Gulf of Aden, the Somali Basin and off the Horn of Africa. It is a Coordination Centre dedicated to safeguarding legitimate freedom of navigation in the light of increasing risks of pirate attack against merchant shipping in the region, in support of the UN Security Council's Resolutions (UNSCR) 1814, 1816 and 1838.

Through close dialogue with shipping companies, masters and other interested parties, MSCHOA will build up a picture of vulnerable shipping in these waters and their approaches. The Centre, which is manned by military and merchant navy personnel from several countries will then coordinate with a range of military forces operating in the region (notably EU NAVFOR) to provide support and protection to mariners. There is a clear need to protect ships and their crews from illegitimate and dangerous attacks, safeguarding a key global trade route.

To do this effectively, MSCHOA needs to know about merchant vessels approaching, transiting or operating in the region. This website offers ship owners, ships Masters and agents the facility to register their details securely with MSCHOA, update positions of their vessels and receive information and guidance designed to reduce the risk of pirate attacks.

*MSCHOA has been set up by the EU as part of a European Security and Defence Policy initiative to combat piracy in the Horn of Africa. This work commenced with the establishment of EU NAVCO in September 2008. This Coordination Cell working in Brussels established linkages with a broad cross section of the maritime community and provided coordination with EU forces operating in the region. In November 2008, the Council of the European Union took a major step further by setting up a naval mission — **EU NAVFOR ATALANTA** — to improve maritime security off the Somali coast by preventing and deterring pirate attacks and help safeguard merchant shipping in the region. From mid-December 2008, an EU Naval Task Group, supported by maritime patrol aircraft, will be operating in the region. Both **MSCHOA** and the **Naval Task Group** are under the command of Rear Admiral Peter Hudson, based at Northwood, United Kingdom.*

Attempts to coordinate counter-piracy operations are not new. MSCHOA is one of a number of centres providing a service to mariners and our aim is to cooperate as closely as possible with all those organisations, minimising the number of agencies that the ship owner or master needs to deal with.

Deeply concerned by the outbreak of acts of piracy and armed robbery off the Somali coast, the Council of the European Union decided to launch EU NAVFOR Somalia military operation in support of UN Security Council Resolutions 1816, 1814 and 1838, as part of the EU's overall action to stabilise the country.

This undertaking, the first ever EU maritime operation, is conducted within the framework of the European Security and Defence Policy (ESDP).

In September 2008, the Council established a small coordination cell in Brussels (EU NAVCO) to support surveillance and protection

operations led by certain Member States in the Somali region. Then, on November 10, 2008, the Council of the European Union adopted a Joint Action on EU NAVFOR Somalia. EU NAVCO operations were subsumed into the Maritime Security Centre (Horn of Africa). The Mission formally launched on 8 December 2008. Since then MSC(HOA) has provided a significant, coordinated military presence in the region.

Operation ATALANTA is an EU Military Mission established in accordance with United Nations Security Council Resolutions 1814, 1816 and 1838, to contribute to the deterrence and repression of acts of piracy and armed robbery off the Somali coast.

At any one time the EU NAVFOR will be comprised of as many as six Frigates and three to five Maritime Patrol Reconnaissance Aircraft (MPRA).

The mission is divided into three key areas:

- **The protection of United Nations World Food Program Shipping delivering humanitarian food aid to Somalia**
- **The protection of merchant vessels transiting through the Gulf of Aden or in proximity to Somalia**
- **The deterrence and repression of acts of piracy and armed robbery off the Somali coast**

The following EU Member States have committed assets to EUNAVFOR — Greece, France, Belgium, Sweden, Netherlands, Norway, Germany, Italy, Spain and UK.

EU Warships are working closely with World Food Program. So far, food deliveries into Somalia will feed more than 2 million people. The force has been heavily involved in counter piracy in the Gulf of Aden, helping to protect many of the 2,5000 ships that transit the region every year.

With up to 95 percent of EU member state trade (by volume) transported by sea, and 20 percent of global trade passing through the Gulf of Aden, EUNAVFOR provides considerable focus to safeguard trade through this strategic area.

In between routine or baseline operations, EUNAVFOR conducts focused operations aimed at achieving specific effects within a given area or time window. By concentrating forces to achieve specific effects, EUNAVFOR can provide influence, deterrence or insight into legitimate and illicit activities in order to better co-ordinate future activities to deter piracy and armed robbery and thus reassure legitimate merchant mariners.

One of EU NAVFOR's latest operational successes occurred on the morning of November 5th — a General Cargo ship and a Bulk Carrier were attacked in the Gulf of Aden. Cooperation between EU NAVFOR and NATO prevented two more hijackings.

Early in the morning, MV Theoforus I, a Panama flagged Bulk Carrier was attacked by pirates using automatic weapons and a Rocket Propelled Grenade. The ship took evasive action until the arrival of a NATO Turkish naval vessel TCG Gediz on the scene. The warship neutralized a suspected skiff in the vicinity of the attack position and weapons and pirate paraphernalia were seized.

A few hours later, MV BBC Thames, a Liberian flagged General Cargo Ship, reported being under attack. EU NAVFOR German warship

EU NAVFOR German warship FGS Bremen

FGS Bremen was immediately tasked to support the Cargo ship and the Bremen's helicopter was launched. The attackers fled, but Bremen found a skiff in the vicinity and, on sighting the helicopter, the skiff stopped. FGS Bremen conducted a boarding — weapons, ammunition and RPG grenades were found and seized.

Then, In the afternoon of November 5th, EU NAVFOR Netherlands warship HNLMS Evertsen handed over 43 Somali castaways to the UNHCR in the Republic of Djibouti. The Somalis were rescued by Evertsen in the Gulf of Aden more than a week ago, having been abandoned by the driver of their boat who, with two accomplices, returned to Somalia in an accompanying boat.

EU NAVFOR Netherlands warship HNLMS Evertsen

The 43 persons, including nine women and seven children (two of whom were infants) were abandoned by human smugglers in a skiff in the Gulf of Aden after an engine failure. When detected by EU NAVFOR warship Evertsen,

during her counter piracy patrol in the Gulf of Aden, they had been adrift for two days. Because the engine was beyond repair and the weather deteriorating, they were taken on board Evertsen to ensure their safety.

In seeking a humanitarian solution to this particularly compelling situation, and in the spirit of regional burden sharing, UNHCR has welcomed the generous offer of the Republic of Djibouti to allow for the disembarkation of the group on its territory to determine their international protection needs by UNHCR.

While the rescued Somalis were on board she continued her task in Operation ATALANTA, protecting vulnerable shipping and deterring and disrupting piracy.

What is the United States undertaking to assist in the anti-piracy cause? For starters, The Seychelles and the United States of America have stated their firm commitment to a coordinated effort in the combat against piracy in the western Indian Ocean.

This agreement initiated the arrival of several U.S. military ***MQ-9*** *Unmanned Aerial Vehicles (UAV) aircraft in Seychelles to be used for joint anti-piracy surveillance program, all at the request of the Government of Seychelles. This landmark cooperation follows the signing of a Status of Forces Agreement (***SOFA***) in July 2009 with the USA.*

The Seychelles and the **U.S. Africa Command** *participated in a demo of the drones to be used to detect Somali pirate boats that have continuously wreaked havoc in maritime activities and traffic in the western Indian Ocean. The U.S. military invited journalists and members of the High Level Committee on Piracy to view the exercise.*

The Head of the High Level Committee on Piracy, Minister Joel Morgan, said that when you consider the UAV's capabilities, such is yet another clear message being sent out to the pirates — no criminal activities will go undetected.

"This UAV program specifically, will be able to help monitor large areas and detect the presence of pirates who operate in small boats which are often difficult to spot. This surveillance activity will complement and reinforce the other military assistance we are already receiving. This cooperation is a concrete example of the commitment of the U.S. to improve maritime safety and security in the Western Indian Ocean. This assistance to the people of Seychelles is very much appreciated," said Minister Morgan.

A statement in full support of this action was also made on behalf of the **U.S. Embassy** *in Mauritius, by the Public Affairs Officer Mr. Craig White.*

Map of Somalia and Indian Ocean piracy area

Just in...

Following a dramatic increase in pirate attacks in supposed piracy safe-zones over the last fortnight, the ***Merchant Maritime Warfare Centre*** *(**MMWC**), a U.K. based, non-profit counter-piracy organisation recommends that the maritime industry implements full counter-piracy measures and* ***MARSEC Level 2*** *on all vessels sailing from the bottom of the Red Sea, across to the Indian Coast line and as far south as the Mozambique channel. To support this, the MMWC free of charge counter-piracy Ship Support Service is now available to all vessels sailing in the Indian Ocean.*

*"Based on the recent turn of events, the military presence in the Gulf of Aden is forcing the pirates further out, which combined with the current favorable weather means that the traditional piracy hotspot is expanding to the point that vessels sailing over 600 miles from the coast of Somalia may be at risk of attack," comments Nick Davis, Director, **MMWC**. "This is spreading the thirty or so warships primarily patrolling the Gulf of Aden very thin, so it is up to vessels and operators to ensure that they are prepared to avoid hijacking, as it's now almost impossible to predict where pirates may strike."*

The most recent event, the hijacking of bulk carrier 'Al Khaliq' took place some 700 miles abeam of Mombasa on the morning of 22nd October 2009 whilst a number of fishing vessels and bulk vessels have also been attacked well beyond the traditional pirate waters in the Gulf of Aden over the last few weeks.

Additionally, a Chinese bulk carrier hijacked on 19th October 2009 was in fact sailing in a so-called piracy safe zone nearly 850 nautical miles off the coast of Somalia at the time of the attack, so had not made any specific counter-piracy arrangements. Had the vessel been better prepared then it's possible that the hijacking could have been avoided.

"With developments off the east coast of Africa and in the Indian Ocean changing rapidly, the MMWC is dedicated to providing vessels transiting the area with the best counter-piracy support and intelligence possible as part of our free of charge Ship Support Service," continued Nick. "The last few weeks have shown that there is currently no real safety zone, so it is more important than ever for vessels to be prepared and we are committed to enabling this by 23rd October 2009 — offering our comprehensive Ship Support Service at no charge."

The MMWC Ship Support Service was developed as a key part of MMWC. At its core is 24/7 advice to Masters, managers and owners, when transiting piracy hotspots. It is provided by MMWC's staff of seasoned maritime security specialists who have conducted many transits themselves and are able to provide expert advice, support and intelligence to ensure that vessel and crew are prepared to the highest degree.

Operators wishing to sign-up to the MMWC Ship Support Service can do so immediately by calling ***+44 (0) 845 26 99 801****, or through the MMWC website at* ***www.mmwc.org****.*