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USSOCOM Commander Seeks
Real-Time Data Fusion

GEN. THOMAS SHARES HOW THE STORY OF USSOCOM'S FUTURE HAS ROOTS IN THE PAST

By Jim Hodges

Two epiphanies tell the story of how Gen. Raymond A. Thomas sees the future of U.S. Special Operations Command (USSOCOM), which he leads. The first involved a Defense Innovation Group that visited USSOCOM two years ago, Thomas said Tuesday during his GEOINT 2018 keynote address. That group included Erik Schmidt, former executive chairman of Google parent company Alphabet, who lauded USSOCOM for its people and ability to create prototypes.

"But it was [another] comment that really stuck with me," Thomas continued. "[Schmidt] said, 'General, you are terrible at deep learning.' He went on to say, 'I know you live in a world of wicked problems, but I bet if I spent a moment, a bit of time under your tent, I can solve every one of your wicked problems through simple up-down switches and application of advanced algorithms and mathematics.' He was absolutely certain he was right. And I was absolutely certain I was about to bounce him out of the car here on Bayshore [Boulevard]."

The audience chuckled while Thomas explained that he restrained his impulse and paused to think.

"It struck me that he was absolutely right. Most of our critical processes across the domains of processing, exploitation, and dissemination of publicly available information, and captured enemy material, to name a few, would be drastically improved by leveraging the methods that industry is already putting to very effective use."

The second epiphany came two weeks ago during a tour of a data fusion center in New York City. Thomas watched as data was gathered from around the city by sensors that capture five to eight million license plates each day, along with vectors of shots fired, domestic disputes, and more. The data was fused with historical perspective and threat assessment information then assimilated and disseminated to 36,000 officers on patrol through a secure communications network.



Gen. Raymond A. Thomas discusses the future of U.S. Special Operations Command during his Tuesday keynote at GEOINT 2018.

"The people to solve this problem are in this room. There's one missing link, and I ask you to think obsessively about it: the customer."

—GEN. RAYMOND A. THOMAS, COMMANDER, USSOCOM

> see Data p. 15



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EXHIBIT HALL CLOSING RECEPTION

Join USGIF this afternoon in the exhibit hall from 2 to 3 p.m. for a networking reception to close out the GEOINT 2018 Symposium. Discuss highlights of this week’s event with colleagues and start making plans for GEOINT 2019 in San Antonio while enjoying Tex-Mex cuisine, prickly pear margaritas, and other refreshments. Plus, take advantage of the last opportunity to explore the trade floor of 250 exhibitors showcasing services, solutions, and technologies for your mission needs.

FROM THE



HawkEye 360 plans to geolocate radio frequencies and map the electronic spectrum using three-satellite clusters in low-Earth orbit.

IMAGE COURTESY OF HAWKEYE

READY FOR LAUNCH

HAWKEYE 360 SMALL SATS READY TO MAP RADIO FREQUENCIES AND THE ELECTRONIC SPECTRUM

By Jim Hodges

Hawkeye 360 (Booth 500) has tested its analysis gear terrestrially and in small airplanes, but there remains one step to prove their theory about the value of radio frequencies in GEOINT.

"[Launch] can't come soon enough," said company co-founder and CTO Chris DeMay of three small satellites sitting in a clean room in Canada, waiting for a ride into low-Earth orbit aboard a SpaceX Falcon 9 booster in August.

Hawkeye's objectives include geospatial mapping of radio frequencies and the electronic spectrum. The logic is that radio frequencies are valuable in discovering anomalies in the maritime domain, DeMay said. So, too, is the electronic spectrum, which could yield cybersecurity solutions.

Hawkeye 360 also has customers interested in its RF data as a layer among other data in geospatial analysis. The company is looking to build partnerships while it awaits launch of the first three of its planned 30 small satellites.

"We have the responsibility to explain to the world how we are posturing ourselves as a GEOINT source of data," DeMay said. "We want to help demonstrate that we believe our analytics are ingestible by the GEOINT Community."



PHOTO COURTESY OF UNIVERSITY OF DENVER

Students gain valuable hands-on experience in the University of Denver's UAV Ground School course.

ACADEMIC THOUGHT LEADERSHIP

THE UNIVERSITY OF DENVER'S GIS PROGRAM PREPARES NEW AND RETURNING STUDENTS TO EXCEL

By Andrew Foerch

At 26 years old, the **University of Denver's (Booth 1013)** Geographic Information Systems (GIS) program is one of the nation's oldest higher education programs focused on geospatial studies.

"We make sure our instructors aren't just experts in foundational GIS, but also that they're keeping pace with the future of the industry," said Sarita Field, the program's enrollment manager.

Denver offers a 48-credit master of science in GIS that prepares students to interpret geospatial data and solve problems using GIS technology. Master's degree students begin their studies by earning a GIS graduate certificate through University College, Denver's school of professional and continued studies designed for working adults. That certificate requires students to take two concentration courses and four electives before they seek admission to the department of geography and the environment to complete the rest of their degree.

Courses are offered in a variety of specialties, including crime mapping and analysis, hydrologic modeling, photogrammetry, and recently a ground school for UAV operation. To graduate, those enrolled must plan and execute a project focused on remote sensing, internet mapping, or image processing.

The GIS program is largely geared toward adults returning to academia to advance their careers or begin a career in a new field. Thus, the certificate program and the master's degree are both available entirely online as well as on campus.

Fields wants all potential students to remember: "The sooner you start, the sooner you finish. If returning to school is something you've been thinking about, go for it."

FLOOR

EXHIBIT HALL HIGHLIGHTS



IMAGE COURTESY OF PURE STORAGE

AI is unleashed thanks to AIRI, an integrated server and storage solution from Pure Storage and NVIDIA.

UNLOCKING AI

PURE STORAGE SHOWCASES AI INFRASTRUCTURE PLATFORM DEVELOPED IN COLLABORATION WITH NVIDIA

By Matt Alderton

Artificial intelligence (AI) today is where the internet was 20 years ago: on the cusp of transformational change. Like the internet before it, AI needs increased power and speed in order to cross the Rubicon from a promising technology to a disruptive juggernaut.

Pure Storage (Booth 701) returns to the GEOINT Symposium after a three-year absence because it believes AI's moment of truth time has finally come.

"What brought us back to [the GEOINT Symposium] is [NGA Director Robert Cardillo's] vision of having machine learning and AI to help process geospatial data to help the analyst focus on the really hard problems at hand while improving speed of mission," explained Marci Neill, federal marketing lead at Pure Storage.

The company is spending GEOINT 2018 showcasing AI-Ready Infrastructure (AIRI), an enterprise-level converged infrastructure platform it developed in partnership with NVIDIA.

AIRI integrates DGX-1—NVIDIA servers designed explicitly for deep learning applications—with FlashBlade: a next-generation storage solution designed by Pure Storage for use with AI and machine learning platforms. Their combined effect, according to Neill, is increased power and speed that will help unlock and unleash AI's full potential within the GEOINT Community.

"A high-performance data platform is required to support modern geospatial solutions at scale," concluded Neill, who invited Symposium attendees to visit Pure Storage not only to learn more about AIRI, but also to enter a raffle, the winner of which will take home a set of the company's beloved growlers.

TRAINING SPECIAL FORCES

VATC'S EPIC READY VISUAL AWARENESS PLATFORM ALLOWS USERS TO BUILD AND SHARE 3D MODELS OF TRAINING ENVIRONMENTS AND MORE

By Phillip Swarts

Special operations forces need geospatial information, and they need it fast. That's why **Visual Awareness Technologies and Consulting (VATC, booth 700)** is deploying the "EPIC Ready" platform to ensure troops have the information they need while training to enter a battlespace.

"[EPIC Ready is] a visual awareness program," said VATC spokesperson Nancy Fernandez. "It's a virtual map and you can pinpoint different scenarios. Like if you know two weeks in advance you're going on a mission ... you'll know where everything is from all your areas, where you're going, what's available and what's not available."

Founded in 2003, the Tampa-based company developed EPIC Ready to assist in training Special Forces and to analyze troop



IMAGE COURTESY OF VATC

VATC has built SOF-driven training and exercise solutions for distributed mission operations since 2003.

performance following training exercises.

The platform aggregates digital information of an area to provide a detailed and accurate representation of that environment. It also allows users to build and share 3D models of training environments so different groups and organizations can ensure they're using the same plans for training exercises.

According to VATC, EPIC Ready is already assisting several customers across the U.S. Defense Department.

Government Pavilion Stage Highlights

RECAPS ON NGA'S CIBORG CONTRACT VEHICLE, THE AUSTRALIAN GEOSPATIAL-INTELLIGENCE ORGANISATION, DIUX, AND TRAINING STANDARDS

This article was amended from the original version.



The Government Pavilion Stage provided perspectives from senior leaders across the GEOINT Community.

Leaders from government, military, industry, and academia shared insights and business opportunities Monday afternoon at the **Government Pavilion Stage (Booth 117)** in the GEOINT 2018 exhibit hall.

AUSTRALIA FORTIFIES GEOINT CAPABILITIES IN NEW 10-YEAR PLAN

BY MELANIE D.G. KAPLAN

Following his participation in the GEOINT Ops panel, Chris Hewett, assistant secretary for capability and development with the Australian Geospatial-Intelligence Organisation (AGO), gave a standalone presentation on the Government Pavilion Stage.

Hewett appealed to industry representatives to partner with

AGO, the Australian Department of Defence's lead geospatial and imagery intelligence organization.

"Please make contact with us if you want to be part of our journey from here on," he said, directing the audience to AGO's new website.

The website also includes AGO's new 2018 Defence Industrial Capability Plan, which sets out a comprehensive plan for Australia's defense industry.

By 2028, according to the plan, Australia will require a larger, more capable, and prepared defense industry that has the resident skills, expertise, technology, intellectual property, and infrastructure to support the Australian Defence Force. The plan also identifies entry points for businesses looking to join the industry.

Given the increasing demand for and investment in AGO in the next decade, Hewett said the organization sees a much larger role for industry players, but also a very different role than they've taken in the past.

"We're moving from a paradigm in which industry told us what to deliver to reverse that and very much driving the deliveries," Hewett said. "We're looking to develop a more sophisticated industry engagement model in which AGO is the systems integrator. We know our business best, but we recognize that industry knows technology best. It gives us the level of agility that our customer demands."

Hewett said AGO will maintain its key partners while looking to engage with small and medium Australian enterprises as well as international businesses. The Defence Innovation Hub is available for Australian startups to pitch ideas to the defence department and secure funding.

A GEOSPATIAL TRAINING MAKEOVER

BY MELANIE D.G. KAPLAN

Twice a year, Erik Kleinsmith, associate vice president of strategic partnering for American Military University, teaches military history at his children's high school, using methods he knows will resonate with students.

"I bring out a table full of miniatures and assign leaders," Kleinsmith said during a panel titled, "Beyond Training: GEOINT Skill and Knowledge Transfer." "These kids get into it so much that I now have groupies eating lunch with me in the cafeteria because they love talking history, and they want it presented as

Learn more about AGO at www.defence.gov.au/AGO.

an immersive gaming environment. If I gave it to them in a straight lecture, they'd all be asleep."

Panelists explored what it will take to train the intelligence workforce in a fast-paced environment.

Julia Bowers, CEO of Pearl Analysis and a member of the USGIF Board of Directors, differentiated between training and knowledge transfer. "Training, for me, is direct and structured, scheduled and uncomfortable," she said. "Knowledge transfer is a conversation. It's customized to the audience and inspiring. I think training really needs a makeover."

Bowers encouraged industry to revamp training, starting with making the environment comfortable (snacks, casual attire) so the conversations can be uncomfortable. She favors two classes for every topic, each lasting 15 minutes—not hours or months.

Collin Agee, senior Army operations advisor to NGA at the Army GEOINT Office, stressed the importance of storytelling in transferring knowledge. NGA Director Robert Cardillo has a policy, Agee said: "Anytime someone gives a briefing, they have to first tell their story."

Dan Scott, director of NGA College, said training must be delivered faster, better, and cheaper. "In the future," he said,

"it's about lifelong learning. You're going to have to re-tool yourself several times in your career."

Kleinsmith said when someone asks him how to get into intelligence as a career—whether it's a high schooler or college graduate—he tells them to do something else first. "We steal [intelligence analysts] from the military, from law enforcement, and from other professions," he said. "We convert them through training and education."

DIUX AIMS FOR FASTER GEOINT CONTRACTING

BY PHILLIP SWARTS

New acquisition paths could help lots of companies sell GEOINT products and services to the U.S. government—not just established businesses but start-ups too, said Army Col. David Robinson in another standalone presentation.

As the acting military deputy for the Defense Innovation Unit Experimental (DIUx), it's Robinson's job to bring in some of those new technologies and companies.

Established by former Defense Secretary Ash Carter during the Obama administration, DIUx has authorization to use "Other Transactional Authorities," or special contracting vehicles authorized by Congress to not follow normal contracting guidelines.

For example, Robinson said DIUx can finalize contracts in three to four weeks; it's decisions

"We're looking to develop a more sophisticated industry engagement model in which AGO is the systems integrator. We know our business best, but we recognize that industry knows technology best."

—CHRIS HEWETT, ASSISTANT SECRETARY FOR CAPABILITY AND DEVELOPMENT, AUSTRALIAN GEOSPATIAL-INTELLIGENCE ORGANISATION

can't be protested; and it can structure payments quickly so start-ups don't have to wait years for financial support.

The goal is to get new ideas and technology into the hands of the military as quickly as possible, Robinson said.

"The fact is we are being outpaced in the technical realm by near-peer and peer adversaries," he continued. "If we don't find another way to bring innovation—that takes place in this country largely—to our [the DoD], then we're going to get out-stripped and we're going to get beaten."

Robinson said he's not concerned about disrupting current contracting vehicles.

"The bottom line is that this could potentially perturb a very tried and true, long-standing procurement and acquisition apparatus that we have really grown a culture around," he said.



A panel of representatives from NGA and GSA gave an update on the roughly year-old CIBORG contract vehicle Monday afternoon at the Government Pavilion Stage in the exhibit hall.

Attendees networked after the Government Pavilion Stage presentations.



“So on the edges of that might be some fear that the business cases of old are on some shaky ground. I, for one, think that’s just fine. In fact, I know that’s why Congress has put that in the appropriations acts—because it wants to stimulate that kind of innovation.”

NGA’S CIBORG ADVANCES

BY PHILLIP SWARTS

NGA officials said they’re pleased that a year-old effort to connect the government with GEOINT contractors and streamline the acquisition process seems to be on track.

When NGA Director Robert Cardillo announced the Commercial Initiative to Buy Operationally Responsive GEOINT (CIBORG) last year, the

agency “only had a handful of vendors that we were aware of that offered geospatial products and services,” said Will Jackson, the program’s NGA lead.

During the past year, Jackson said NGA has now identified more than 100 new vendors who could provide geospatial technology of benefit to the agency.

“We’re moving in the right direction, but we want to continue to see movement in having access to technologies that the commercial market space is offering,” Jackson said.

Likewise, he added, the effort has identified 200 vendors NGA may have overlooked and needs to re-contact.

“We want to continue to leverage and understand what products and services are out there so that we can go out there and purchase it,” Jackson said.

NGA has also partnered with the General Services Administration—in charge of most of the acquisition for the federal government—to come up with new ways to reach companies.

Jill Thomas, director of IT Schedule 70 at GSA, said CIBORG has experienced success with an effort dubbed “Springboard.” Rather than earning certification from a track record of corporate experience—which tech start-ups and small companies may not have—Springboard allows companies to substitute the industry experience of their executives and key personnel instead.

“We have been successful in bringing new and emergent tech companies onto the schedule that have less than two years existence,” she said. “Our first ‘Springboard’ is a multi-million dollar order.” ☺

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GEOINteraction Tuesday
Tysons, VA



September 19-20

trajectoryXyzt
Santa Monica, CA



October 16-18

Tech Showcase West
St. Louis, MO



November 12-16

GEOINT Community Week
Northern Virginia



November 17

GEOGala
McLean, VA

Dr. Edward M. Mikhail Receives USGIF's 2018 Lundahl-Finnie Lifetime Achievement Award

MIKHAIL HONORED FOR ACADEMIC CONTRIBUTIONS TO THE GEOINT COMMUNITY



Celebrating a career devoted to supporting the Intelligence Community, USGIF awarded Dr. Edward M. Mikhail, professor emeritus at Purdue University, with the Arthur C. Lundahl-Thomas C. Finnie Lifetime Achievement Award.

USGIF announced Dr. Edward M. Mikhail, professor emeritus of civil engineering at Purdue University, as the 2018 recipient of the Foundation's Arthur C. Lundahl-Thomas

C. Finnie Lifetime Achievement Award. Mikhail is the 14th individual to receive this prestigious award and was recognized on stage Tuesday at GEOINT 2018.

"Dr. Mikhail has been devoted to supporting the Intelligence Community, fostering the development of new tradecraft, and teaching and inspiring the next generation of GEOINT professionals," said The Honorable Jeffrey K. Harris, chairman of USGIF's Board of Directors. "[The Board] is happy to recognize the lifetime achievements of this distinguished and accomplished academic whose tireless efforts have helped us all measure and geo-locate with improved precision and accuracy."

Mikhail dedicated 50 years of his professional life to supporting

the Intelligence Community. He joined Purdue University in 1965 and established what became a nationally and internationally leading graduate program in geomatics engineering. Although he is retired from the university, Mikhail continues to support the graduate program as a mentor to younger faculty and Ph.D. students. Mikhail's impact can be seen not only through the knowledge imparted to his students, but also in the many books and publications he has authored.

"I am profoundly honored to receive this award," Mikhail said. "As the only educator to be selected, I consider myself very privileged to join such a respected group of outstanding past awardees who have been stalwarts in safeguarding the security and well-being of our nation. In fact, I believe this award should be rightly given to my former graduate students who have developed into exceptional scientists and engineers, leading the GEOINT Community to cutting-edge technological advances."

Mikhail has also received technical recognition awards from the U.S. Government Office of Research and Development and the National Reconnaissance Office, and was selected as an honorary member of the American Society for Photogrammetry and Remote Sensing.

The Lundahl-Finnie recipient is nominated and voted upon annually by the USGIF Board of Directors. This distinguished award is named for Arthur C. Lundahl and Thomas C. Finnie, celebrating their accomplishments—in imagery analysis and mapping, respectively—and their legacies within the GEOINT Community. 🌐

"As the only educator to be selected, I consider myself very privileged to join such a respected group of outstanding past awardees who have been stalwarts in safeguarding the security and well-being of our nation."

—DR. EDWARD M. MIKHAIL, PROFESSOR EMERITUS, PURDUE UNIVERSITY

2018 USGIF Award Winners Announced

OUTSTANDING ORGANIZATIONS AND INDIVIDUALS ARE RECOGNIZED FOR CONTRIBUTIONS TO THE GEOINT COMMUNITY

At GEOINT 2018, USGIF announced this year's recipients of its annual Awards Program. The USGIF Awards Program recognizes the exceptional work of the geospatial intelligence tradecraft's brightest minds and organizations pushing the community forward. Award winners are nominated by their colleagues and selected by the USGIF Awards Subcommittee.

"As with all previous awardees, each of the individuals and teams selected for the 2018 USGIF Awards have a wonderfully unique story to be told," said Kevin Jackson, USGIF Awards Subcommittee Chair. "Stories of exceptional achievement that develop, promote, and advance the GEOINT tradecraft, but more importantly, positively effect our lives and the lives of others all around the world."

THE 2018 USGIF AWARD WINNERS ARE:

1. *Academic Achievement Award*
Dr. Kathleen M. Carley, professor, Carnegie Mellon University
2. *Community Achievement Award*
Foundation Career Service Team, National Geospatial-Intelligence Agency
3. *Military Achievement Award*
Dr. Richard Massaro, USACE-ERDC Geospatial Research Lab
4. *Government Achievement Award*
Glen Canyon Dam Modeling Team, the U.S. Bureau of Reclamation and Autodesk Inc.
5. *Industry Achievement Award*
SpaceNet Team



Building to Scale and “Creating Anew”

ODNI'S SUE GORDON SAID TODAY'S INTELLIGENCE COMMUNITY IS BETTER THAN EVER, BUT HAS NEARLY DEPLETED THE CREATIVE ACTS OF ITS PREDECESSORS.

By *Melanie D.G. Kaplan*

In her keynote speech before a packed house at the GEOINT 2018 Symposium, Susan M. Gordon, the fifth Principal Deputy Director of National Intelligence, briefed the audience on current global threats, challenged the Intelligence Community (IC) to experiment at scale, and set the stage for changes in the future.

“What will be different now?” Gordon asked. “It will be different because it must be ... and because I control the budget of the Intelligence Community.” The audience responded with a round of applause.

Gordon—who served for 27 years at the Central Intelligence Agency and was deputy director of the National Geospatial-Intelligence Agency from 2015 to 2017—today focuses on advancing intelligence integration across the IC, expanding outreach and partnerships, and driving community innovation. She began with a “quick romp around the world,” chronicling threats to U.S. democracy:

- Russia will continue to use the tool of influence because it's cheap, low-risk, and offers what they perceive as plausible deniability. They're likely to pursue more aggressive cyber attacks, and they continue to advance their nuclear weapon systems at a rate we haven't seen in many years.
- China will continue to expand its WMD options and diversify its nuclear arsenal as well as grow its space-based reconnaissance efforts. This year, like last, China will conduct more space launches than any other nation.
- Iran remains the most prominent state sponsor of terrorism and

an adversary in the Middle East, especially in Syria, Iraq, and Yemen.

- Despite the potential for upcoming negotiations, North Korea poses a significant threat to the U.S., not just because of its nuclear capability and missile arsenal, but also because of the country's stunning cyber capabilities.

According to Gordon, the IC is better equipped than ever to monitor and potentially respond to such threats: “better collectors, better technologists, better analysis, better talent than I've ever seen walking through our doors.”

But, she warned, “We've almost used up the creative acts of our predecessors. Since we can't draft on them, we—everyone in this room—are going to have to learn to create anew.”

To that end, she said she would help agencies not only build an innovation engine but also strongly support experimenting at scale—which isn't happening enough.

Gordon said in the future, the Office of the Director of National Intelligence (ODNI) would double down on capability building, human resources, data strategy, and partnerships with the Department of Defense. Investing in artificial intelligence (AI) is important, she said, but cautioned that we must also invest in human critical thinking.

“I love that we are building people whose first language will be Python, but it isn't going to be enough that someone's program in Python creates an algorithm that allows us to do something if we don't understand how it makes mistakes,” she said. “With all the work that's going on in single-domain AI, we actually have the potential to make the



Principal Deputy Director of National Intelligence Sue Gordon challenged the Intelligence Community to be more creative and focus on the future.

problem worse in the short haul, because we will be able to put more information in front of our analysts with still limited ability to sense-make.”

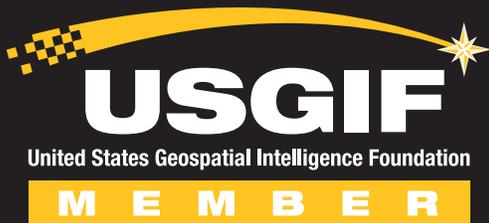
In these difficult times, Gordon said, the mission of the IC remains the same. She said the Community must maintain ruthless, disproportionate, and relentless advantage.

“That's all there is. You have to know a little bit more a little bit

faster, or we won't get where we need to go,” she said.

Gordon voiced her confidence in the Community and the ability of its members to take on programs and projects.

“The real magic happens when you understand your craft and listen to the universal challenges,” she said, “And you go back and say, ‘I know what I can do about that.’” ☺



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Delivering Mobile App Solutions in Months, Not Years

AVIATION MOBILE APPS & KELLY TECHNOLOGY NAMED 2018 WINNERS OF THE IGAPP GRAND CHALLENGE



NGA director Robert Cardillo and Lynn Dugle, CEO of Engility, presented the IGAPP Grand Challenge 2018 award to Bill DeWeese, CEO of Aviation Mobile Apps.

At GEOINT 2018, Engility (Booth 737) announced the 2018 Innovative GEOINT Application Provider Program's (IGAPP) award winners. NGA Director Robert Cardillo, Engility CEO Lynn Dugle, and Amanda Brownfield, senior vice president of Engility's Intelligence Solutions Group, presented the awards.

Aviation Mobile Apps was selected as the \$20,000 grand challenge winner for the Position Reporting app. Position Reporting provides the ability for a user to instantly and discreetly send a distress message with an optional geo-location to a customizable contacts list via phone call, SMS, or email—without affecting mobile communication channels.

Kelly Technology was selected as the \$5,000 grand challenge

runner-up for the Oceans Now app, which provides a holistic picture of the most current ocean conditions, weather forecasts, surface conditions, and atmospheric data. This is taken from a variety of sources and is viewable in a user-configurable, geospatial, rotatable, and zoom-able 3D globe.

"By providing three different mission areas for private sector app developers to tackle during our Grand Challenge, the IGAPP program delivered thoughtful, user-defined apps that greatly assist Department of Defense personnel with personnel security, operations, and situational awareness," Brownfield said.

The IGAPP Grand Challenge is an annual contest in which IGAPP-approved app vendors participate in a two-month "hackathon," building and delivering mobile apps addressing a variety of DoD-mission needs. During each Grand Challenge, IGAPP removes development guesswork through Vendor Opportunity Packages that contain vital information captured from hundreds of interviews with DoD and

IC personnel during DoD Tech Showcases at military installations throughout the world.

This year, there were a record number of participants vying for these awards, with a total of eight vendors compared to three in 2017. These developers delivered 12 mobile apps available for free download to DoD and IC users.

NGA's IGAPP contract vehicle was first conceptualized and provisioned by Engility. The contract continues to bridge the gap between NGA and private sector app developers. Engility acts as the "trusted broker" for mobile app procurement, and by delivering specific user needs of a demographic typically unavailable to private developers, removes barriers to entry without incurring any up front development costs. Compared to a typical formal acquisitions model, meaningful apps are now delivered in months instead of years.

Discover more information about IGAPP and how you can participate at the Engility booth, and attend the daily "Apps on Tap" information session in the booth each afternoon from 3:30-5 p.m. 🌐



Amanda Brownfield, senior vice president of Engility's Intelligence Solutions Group, spoke at the Innovative GEOINT Application Provider Program (IGAPP) awards ceremony.

Data *continued from cover*

“Think of it as the cop on the beat—or the soldier on patrol—who has all the information that he or she needs ahead of time, or as much information as we can provide them,” Thomas said. “[That, combined] with the most aggressive machine learning approach possible to discern and figure out what they need to know. And the ability to real-time see what they aren’t seeing in a crowded room or a crowded space with the help of these sensors.”

After witnessing the art of the possible, Thomas said he hopes to steer USSOCOM in a similar direction.

In a way, the NYC data fusion center brings to reality what an Army master sergeant told then Gen. Stanley McChrystal during a 2003 after-action review in Iraq attended by Thomas.

The soldier drew a battle sketch on a white board, Thomas said. It included what he believed were sensors on hand, and those he also believed should have been on hand.

“We’re good, but you need to make us so much better,” Thomas recalled the master sergeant telling the general. “His demand was, ‘I want it all, and I want it on a 3-by-3 screen on my watch. I also want a local-access network so I can operate no matter where I am.’”

The master sergeant was a visionary, Thomas said, and his vision extends to today in Syria, where 2,000 mostly Special Operations Forces withstand interdiction designed to disrupt communications on a regular basis. Both sides of the conflict understand the value of intelligence.

“So what does it take to get there?” Thomas said of New York City’s capability and the master sergeant’s demand. “It takes a boldness that, arguably, we aren’t quite approaching. It takes getting over our fears. We have the people. We have the opportunity right now. If that’s not compelling enough, our adversaries are already clipping along at an

extraordinary rate to be there. Taking it one step further, how far do you think it will take for a totalitarian regime to take the applications of machine learning and cross them over into security approaches. ... We have to compete.”

He drove the message home for the audience.

“The people to solve this problem are in this room,” he said with a challenge. “There’s one missing link, and I ask you to think obsessively about it: the customer.”

Thomas leads a combatant command that involves about 8,000 special operators in 90 countries, along with thousands of support personnel, including 75 detailed from the National Geospatial-Intelligence Agency.

USSOCOM is a voracious consumer of GEOINT data, but also a strong contributor.

“In fiscal year 2017, we collected 127 terabytes of data in captured enemy material alone,” Thomas said. “Every year the number increases exponentially.”

That doesn’t include full-motion video and publicly available intelligence, he added.

“To put it in perspective, the Osama Bin Laden raid resulted in only 2.7 terabytes of data,” Thomas said.

As many other GEOINT 2018 speakers have already done, Thomas pointed to a need to share intelligence data more freely. It’s becoming a litany in an Intelligence Community adapting to multilateral operations.

“As we seek solutions, we have to get over our fear of sharing information,” Thomas said. “Right now, information sharing is the coin of the realm of my force. As much, or as important, as being man-to-man with people out in the field is our ability to share information with them.” 🌐

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Winning the Remote Sensing Game

PANEL DISCUSSES WHAT IT WILL TAKE TO CONQUER COMMERCIAL REMOTE SENSING

By Matt Alderton



A varied group of leaders from industry explored the future of commercial remote sensing during a general session panel discussion moderated by Jeff Tarr of USGIF's Board of Directors.

To geospatial enthusiasts, space nerds, and opportunistic investors, commercial satellites are sexy. But are they sustainable?

That was the question volleyed on stage Tuesday during “The Future of Commercial Remote Sensing,” a GEOINT 2018 panel focusing on the business of commercial remote sensing. Led by moderator and USGIF Board member Jeff Tarr, former CEO of DigitalGlobe, the hour-long discussion circulated among six distinguished panelists, each representing a unique corner of the commercial remote sensing marketplace: John Murtagh, head of strategy at Airbus Defence and Space; Dr. Walter Scott, founder of DigitalGlobe and chief technology officer at Maxar Technologies; Robbie Schingler, co-founder and chief strategy officer at Planet; Jane Poynter, CEO of WorldView; David Potere, co-founder and CEO of TellusLabs; and Julie Baker, co-founder and vice president of operations at Ursa.

The panel commenced with a splash of cold water on the industry’s face as each of the panelists on stage was asked to justify his or her company’s existence.

“There are more than 30 companies that are operating Earth-observation satellites or have announced their intentions to do so. And there are more than 100 companies that are planning to help customers make sense of the data,” observed Tarr, who predicted the future demise of many current start-ups. “Given the very large number of players in this space, why do you believe you will be among the winners?”

The consensus among panelists was that success is contingent on collaboration.

“For people to be successful, you need to team together and be part of the greater community,” Baker said.

The reason teamwork is so essential, panelists agreed, is that commercial remote sensing derives its value not from pixels, but from insights. And the best, most reliable insights are the product of collective rather than individual wisdom.

“To answer really tough questions ... no one sensor is going to [be enough],” Potere said. “So finding ways to play well together so we can bring the context to the table that we need to solve problems without ruinous engineering burden on our front is, I think, going to be a really important factor.”

Another really important factor will be artificial intelligence (AI) and machine learning, which will be essential as the industry further pivots from building platforms that collect data to developing solutions that exploit it.

“What [machine learning] allows us to do is deal with a volume of data that is beyond daunting for any individual human,” Scott said. “In one day’s collection for the DigitalGlobe constellation it would probably take a human something like 85 years to go chew through all that data. So it’s just not practical.”

In a future where AI is baked into virtually everyone’s business model, what will differentiate one company from the next will be the quality of its algorithms, panelists predicted.

“You need to be able to trust the result of the algorithm, and that involves extensive training of the algorithms,” Scott continued. “That’s one of the reasons why we’ve supported a number of efforts to create large-scale training sets, so that they improve the quality of the algorithms over time.”

Until algorithms reach peak maturity, the companies poised to dominate are those that can best exploit human resources alongside technology.

“What helped us build [TellusLabs] a couple years ago was high-quality feature engineering. And by that I mean taking the raw data feeds from [commercial satellites] and making them physically meaningful,” Potere said. “That takes domain experience. We call it human-led machine learning. That means we’re hiring meteorologists and agronomists—people that really know the domain that we’re focused in—and we’re not letting deep-learning systems reinvent 50 years of remote sensing science.”

Clearly, commercial remote sensing companies face many challenges. Those at their helms, however, remain bullish about the opportunity.

“Not [everyone] will make it,” Tarr said. “But those who do will play an important role in making our world a better, more transparent, and safer place.” ☺

Creating a Lifetime of Learning

LGS INNOVATIONS PLEDGES SECOND \$7,500 DONATION TO USGIF'S EDGEOCATION GIVING FUND

LGS Innovations (Booth 344) for the second year donated \$7,500 to USGIF's EdGEOcation Giving Fund. The fund supports USGIF's K-12 educational outreach program, which helps the Foundation create and provide GEOINT learning materials for classrooms, sponsor STEM events, judge science fairs, donate materials to underserved schools, and much more. All this is done with the goal to introduce students to STEM fields and get them interested in the geospatial sciences at an early age.

"Science and technology innovation is our life blood at LGS," said Ray Ivie, president of integration and operations solutions for LGS Innovations. "Like most companies in the U.S., it has become more challenging to find

and compete for STEM-educated young people. Therefore, we strongly support investment in programs like USGIF's. We chose to support the USGIF EdGEOcation Giving Fund so that we can be directly involved with their mission of bringing hands-on STEM initiatives to classrooms to spark interest in young students toward STEM education and careers."

LGS presented a check to the USGIF Board of Directors during a luncheon Monday at GEOINT 2018 in Tampa, Fla. 🌐

To learn more about USGIF's K-12 program visit usgif.org/education/K-12. To donate visit usgif.org/education/donate.



Ray Ivie (back right), president of integration and operations solutions for LGS Innovations, presented the company's donation to the USGIF EdGEOcation Giving Fund.



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7:00-9:00a

Training and Education Sessions (Rooms 20-25)

8:00-10:00a

USGIF's Modeling and Simulation Working Group Discussion (Room 19)

9:00-9:15a

Master of Ceremonies: Brig. Gen. Michael G. Lee, USAF (Ret.), Division Vice President, Aerospace & Technology, Jacobs (Ballroom A-C)

9:15-9:45a

Keynote: Lt. Gen. Charles Q. Brown Jr., Deputy Commander, U.S. Central Command

9:45-10:15a

Keynote: Brig. Gen. Hans Ilis-Alm, Senior National Representative for Sweden, Chairman of Coalition Forces, U.S. Central Command

10:15-11:15a

Panel: Analytics Driving Action

Moderator: Dr. Erin Simpson, Director, Strategic Analysis, Northrop Grumman

- Dr. Sarah Battersby, Research Scientist, Tableau Software
- Auren Hoffman, CEO, SafeGraph
- Jeff Jonas, CEO, Founder, and Chief Scientist, Sensing
- Dr. Karen A. Miller, Scientist, Los Alamos National Laboratory

10:15-11:00a

Morning Refreshments, Sponsored by DataRobot

10:00a-3:00p Exhibit Hall Open (East-West Halls)

12:00-2:00p Lunch in the Exhibit Hall

12:00-2:00p Government Pavilion Stage (West Hall, Booth 117) Sponsored by Oracle

12:00-12:30p – “Commercial Imagery and the NRO: The Way Forward”

- Peter Muend, Director, Commercial Systems Program Office, NRO

12:30-1:00p – Jeff Sloan, Team Lead, National Unmanned Aircraft Systems (UAS) Project Office, Department of Interior

1:00-2:00p – “NGA Acquisition Restructuring”

Moderator: Justin Poole, Deputy Director, NGA

- Diana Hughes, Office of Small Business Programs, NGA
- Christy Monaco, Chief Ventures Officer, NGA
- Tanya Pemberton, Director, CIO-T Services, NGA
- Nicole Pierce, Senior Procurement Executive, NGA
- Jennifer Schnarre, Associate Director for Capabilities, NGA

2:00-3:00p Exhibit Hall Networking Reception

5:00-7:30p GeoXchange Networking Dinners (Sign Up at Registration)



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