THE GEOINT 2017 SYMPOSIUM
TUESDAY
JUNE 6, 2017

SHOW DAILY

BROUGHT TO YOU BY USGIF'S *TRAJECTORY* MAGAZINE

Riding the Data Wave

NGA DIRECTOR EYES AUTOMATION IN RESPONSE TO DATA DELUGE

By Matt Alderton

Seventy-three years ago today, approximately 156,000 American, British, and Canadian troops stormed five beaches on the northern coast of France. Their assault—D-Day—was a pivotal turning point in World War II and the largest amphibious military assault in history. That it succeeded was a credit not only to the thousands of men who left their lives on the sand that day, but also to the many intelligence analysts on whom General Dwight D. Eisenhower relied to plan and execute the Allied forces' invasion of Normandy, codenamed "Operation Overlord."

"Operation Overlord was fueled by some of the most important maps and charts and imagery intelligence in history," National Geospatial-Intelligence Agency (NGA) Director Robert Cardillo said Monday during a GEOINT 2017 keynote address, which he opened with a reflection on D-Day that he called a "pointed reminder of who we are and who we must be as an Intelligence Community."

"We exist for one reason: to advantage our decision-makers and the warfighters that deploy their decisions," Cardillo told the morning crowd. "And when those deployments transition from defend to defeat, we must ensure that their fight is not fair, and that we have the upper hand ... We're our own version of D minus 1. This is our time. In a world that has image scarcity in its rearview mirror and a data tidal wave on its horizon, we'll sink, we'll swim, or we'll ride this rising tide. I say we ride."

The director devoted the balance of his 30-minute address to explaining how NGA plans to "ride" the growing wave of geospatial data in order to deliver strategic advantage in what he called a "race for space and for time."

Automation and augmentation are at the heart of NGA's plans.

"If we attempted to manually exploit all of the imagery we'll collect over the next 20 years, we'd need 8 million imagery analysts," explained Cardillo, who said NGA already collects with a single sensor—every day—the data equivalent of three NFL seasons recorded in

> *see Data Wave p. 18*

"This is our time. In a world that has image scarcity in its rearview mirror and a data tidal wave on its horizon, we'll sink, we'll swim, or we'll ride this rising tide. I say we ride." —ROBERT CARDILLO, DIRECTOR, NGA


Dynamic Solutions.
Responsive GEOINT.
From exquisite sensors, commercial data management, and exploitation platforms to analysis as a service and dynamic GEOINT production, BAE Systems' solutions make GEOINT work for you.
Visit us today at Booth #1951 to learn more
www.baesystems.com/geoint-symposium
BAE SYSTEMS
INSPIRED WORK

table of contents

The USGIF Board of Directors introduced a new scholarship in honor of K. Stuart Shea. Read the full story on page 6.

DEPARTMENTS

FEATURES

WILLIAM SHATNER surprised the GEOINT 2017 audience Monday morning when he took the stage following a U.S. Army GRASS video he narrated in 1987. Shatner discussed the future of technology with USGIF Chairman of the Board The Honorable Jeffrey K. Harris.

FROM THE

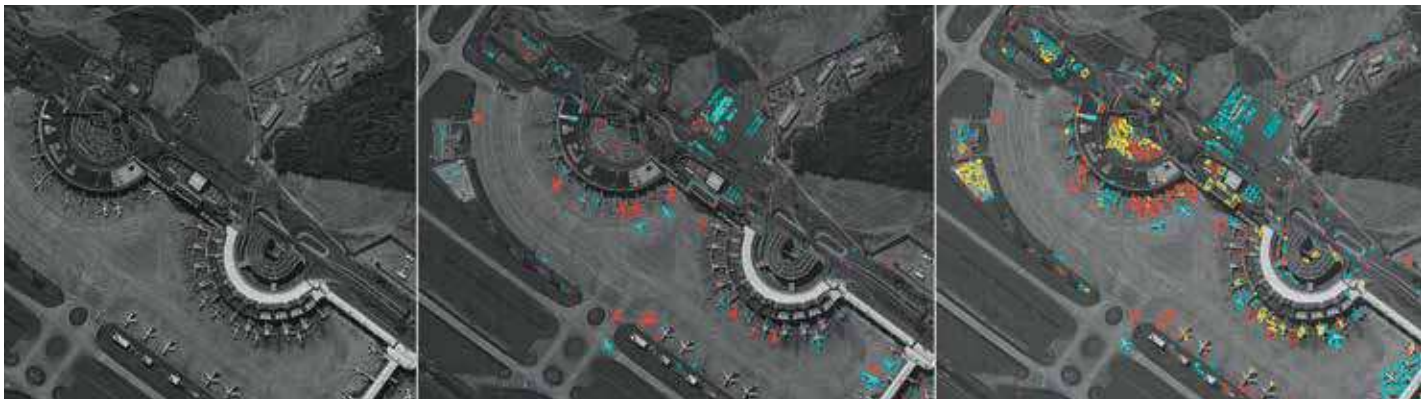


IMAGE COURTESY OF OBSERVERA

Observera's Electro-Optical Change Detection software is on display at Booth 625.

SAVING ANALYSTS TIME

OBSERVERA INTRODUCES ELCTRO-OPTICAL CHANGE DETECTION SOFTWARE FOR PANCHROMATIC IMAGES

By Lindsay Tilton Mitchell

Observera (Booth 625) is demonstrating its newest Electro-Optical Change Detection (EOCD) software at GEOINT 2017. EOCD automatically compares two panchromatic images of the same scene and provides raster products and vector detections as outputs.

"EOCD is the first fully automated processing capability to provide a useful product from panchromatic image pairs," said Observera CEO Todd Jamison. "Panchromatic imagery is such a challenge because of differences in collection geometry and sun geometry that simple techniques just do not work. With EOCD, we get reliable detections even with differences in look angles of 25 to 30 degrees."

Changes can be provided as a set of detections for storage in structured observation management databases or for use with GIS tools. The vector detections contain metadata that can be used by search and sort algorithms looking for activity around key facilities or for long-term patterns of life. The software is highly portable and has been applied to approximately 25 different sensors.

"EOCD saves analysts time by helping to prioritize what images to look at and where to look," said Observera Senior Analyst Terrance "Tee" Carty. "Analysts know their targets and expect to see changes in certain areas, but EOCD also highlights changes they might not have otherwise noticed—which leads to identifying second and third order indicators."

CLOUDY WITH A CHANCE OF SUCCESS

AMAZON WEB SERVICES MAKES THE CASE FOR CLOUD COMPUTING

By Matt Alderton

Missions used to be accomplished solely on the ground. In the Digital Age, however, they're also accomplished in the cloud. **Amazon Web Services (AWS) (Booth 1229)** is demonstrating how at GEOINT 2017, where its booth features the theme "Enabling GEOINT in the Cloud."

"We invite attendees to come by our booth to find out how AWS Cloud products and services are being used to speed innovation, build and deploy systems faster, lower computing costs, and leverage big data to deliver enterprise scalable applications that improve speed to mission," said Chris Bailey, manager, National Security Team, AWS. "AWS is demonstrating the broad range of AWS services available to quickly and easily build and deploy sophisticated big data analytics and geospatial solutions for the GEOINT mission."

Specifically, AWS is demonstrating the AWS Mobile Data Collection Platform using server-less technology, the Amazon API Gateway, and facial analysis via Amazon Rekognition and Amazon Alexa.

Additionally, there are demos by three members of the AWS Partner Network:

- CloudCheckr is showcasing its unified cloud management platform for the IC.
- Virtual analytics platform Databricks is demoing several GIS-related use cases, including terrain analysis and AIS ship tracking.
- BlackSky OpenWhere is highlighting its Authority to Operate (ATO) solution, which uses AWS Cloud services to reduce the time it takes to achieve ATO while simultaneously increasing security.

AWS is also raffling several prizes at GEOINT 2017, including an Amazon Echo, an Echo Dot, and an Amazon Fire TV.

FLOOR

EXHIBIT HALL HIGHLIGHTS

IMAGE COURTESY OF DATAROBOT

DataRobot takes a data set and finds the best model for it. Visit booth 1420 to learn more.

BUILDING BETTER MODELS

DATAROBOT SHOWCASES ITS ABILITY TO ENHANCE MACHINE LEARNING AUTOMATION THROUGH EFFECTIVE MODELING

By Jim Hodges

Erin Hawley tells the story of how **DataRobot (Booth 1420)** helped the Department of Defense integrate a system it had been struggling with for several months.

"We … took their data set in," said Hawley, public sector vice president for DataRobot, a five-year-old machine learning automation provider headquartered in Boston. "Within 20 minutes, we had come up with a better model."

Afterward, the DoD group was able to learn more quickly whether incoming data changed the analytic model, so data scientists could build another model to compensate.

Speed, ease of use, and price are the messages DataRobot brings to GEOINT 2017.

"We do two things," Hawley said. "We help agencies get insights into their own data a lot faster, and we build models for you. We take your data set and find the best model for it."

The company does so with its DataRobot platform, which provides hundreds of already-proved models and tests them on client data in competition, then generates a leaderboard on which models are listed in order of problem-solving effectiveness. Frequently the solution is a blend of different models.

"We're looking for agencies that are looking to use data science, machine learning, or artificial intelligence to solve a mission problem," Hawley said.

DataRobot employs 50 data scientists, she added. "Our top cases in the federal government … are people interested in cybersecurity."

IMAGE COURTESY OF MAPR

MapR Technologies is exhibiting at booth 1418 as part of the New Member Showcase.

NEXT-GEN BIG DATA

MAPR HIGHLIGHTS BIG DATA STREAMING CAPABILITIES FOR THE INTERNET OF THINGS

By Andrew Foerch

MapR Technologies (Booth 1418) provides the analytic backbone for organizations seeking to bolster their big data capabilities. The company's Converged Data Platform enables the global storage and sharing of GEOINT products while supporting the next generation of image classification deep learning algorithms.

At GEOINT 2017, MapR is sharing a booth in the New Member Showcase with partner GeodataIT to discuss innovative solutions in big data, biometrics, and cybersecurity.

"MapR is showcasing how we can help with global data storage while simultaneously supporting [customer] needs to automate many tasks such as image classification, object characterization and moving toward object contextualization," said MapR Field Marketing Manager Deborah Roszell.

The company is showing two primary items at the Symposium. The first is MapR Edge, a small footprint edition of the Converged Data Platform that addresses the need to capture, process, and analyze Internet of Things (IoT) data close to the source. MapR describes Edge as "the only big data streaming system to support global event replication reliably at IoT scale."

The company is also demonstrating a global data fabric with microservice applications and streaming capabilities.

"MapR has a unique and exceptional offering that is really next-generation technology," Roszell said. "The GEOINT Community will benefit from using our software and expertise to solve hard problems."

USGIF Working Group Snapshot

Many USGIF working groups are holding meetings, panel discussions, and networking events at GEOINT 2017. These events, taking place in River Level 006 A/B, are open to all Symposium attendees and exhibitors interested in the topic or seeking to learn more about a particular working group.

TUESDAY

Geospatial and Remote Sensing Law Working Group

Maximizing Effective Use of GEOINT Data and Small Sat Collection—Navigating Privacy and Data Protection Regulatory Issues
1-2 p.m.

Hear experts address key legal issues associated with small sat and other GEOINT data collection and processing. The panel will focus on: NOAA licensing requirements for small sat imagery collection including proposed new restrictions on imagery collection, requirements for data protection plans under NOAA licenses, and NOAA audit requirements.

- *Moderator:* Bob Strauss, senior counsel, Raytheon
- Anne Cortez, managing partner, Washington Federal Strategies
- Chris Hale, Cybersecurity Counsel, Raytheon
- Kevin Pomfret, partner, Williams Mullen

Small Business Advisory Working Group

Creative Contracting Techniques for Meeting Small Business Goals
2:30-3:30 p.m.

This meeting is a discussion with NGA senior acquisition leadership on small business participation and success in the NGA market. Key documents to be discussed and addressed are the June 2016 "Inspection of NGA's Office of Small Business Programs" and the working group's white paper "Small Business Challenges." Diana Hughes and Donna Logsdon from NGA will participate in the discussion.

Machine Learning and Artificial Intelligence Working Group

The State of Machine Learning and Artificial Intelligence in GEOINT
4-5 p.m.

While ML and AI have already shown promise in GEOINT applications, there remain many opportunities to build on successes and apply emerging technologies and techniques. This panel of government and industry representatives will share best practices/lessons learned and identify opportunities for new applications of ML and AI capabilities.

- Todd M. Bacastow, Director, Strategic Alliances, DigitalGlobe
- Juliane Gallina, Partner and Director, U.S. Federal Solutions, IBM
- Brian No, Analytics and Decision Systems Manager, Boeing
- Tom Reed, Director of Solution Architects, NVIDIA

WEDNESDAY

Young Professionals Working Group and Tradecraft & Professional Development Committee

Overview of USGIF's New Mentoring Program
8-9 a.m.

Help us identify essential aspects of USGIF IMPACT, a new mentoring program for GEOINT professionals. In this session, we will discuss typical mentoring relationships, why they do or do not work, and collect feedback from the audience. Prospective mentors should attend to share their mentoring experiences and to help shape the program. Attendees of this workshop will gain early access to program applications and materials.

USGIF Analytic Modernization Working Group

The Future of Analysis: A Visioneering Session
1-2 p.m.

Please join USGIF's new Analytic Modernization Working Group for a lively facilitated discussion focused on exploring analytic modernization. Our facilitators, OGSystems CEO Omar Balkissoon and Vencore Technical Director for Analytics Dr. Patrick Biltgen, will engage with participants to gather ideas and concepts key to the success of analytic modernization initiatives across the community. Ben Tinker, OGSystems visioneer, will illustrate the concepts discussed in real time.

USGIF Directors Announce New Scholarship

THE USGIF BOARD OF DIRECTORS INTRODUCED A NEW SCHOLARSHIP IN HONOR OF K. STUART SHEA

During Monday's general session, the USGIF Board of Directors introduced a new endowed scholarship in honor of K. Stuart Shea, one of the founders of USGIF and the first chief executive and chairman of the organization.

The K. Stuart Shea USGIF Endowed Scholarship will be awarded annually to Ph.D. students studying cartography, geography, or imaging science.

"I am honored and humbled by the recognition and am excited about the ability for young professionals to take advantage of the educational opportunities presented by the scholarship," Shea said.

USGIF Chairman of the Board The Honorable Jeffrey K. Harris emphasized the importance of building the next generation of geospatial intelligence experts.

"In establishing this scholarship, we recognize a leader in our community who shares our passion for the education of the next generation of GEOINTers." Harris said.

Following the announcement of the scholarship, Harris encouraged the community to give back as well.

"This week, we are asking all of you to donate $5 to support USGIF GEOINT educational programs—text 'GEOINT' to 27722," he said.

Further, Harris announced an anonymous donor has pledged up to $50,000 to match dollar-for-dollar any gifts or pledges made this week at **USGIF Booth 1647** toward the endowed scholarship.

"This is a great opportunity to support aspiring Ph.D. students as they advance their tradecraft," Harris said.

See a better world.®

DigitalGlobe Live
GEOINT 2017

TUESDAY, JUNE 06

1:00 pm SpaceNet: Accelerating Geospatial Uses for Machine Learning

1:20 pm PrecisionTerrain for Defense and Intelligence

1:40 pm Identifying Materials from Space Using SWIR Imagery

2:00 pm Location Intelligence Answers at Your Fingertips: Accessing the DigitalGlobe Platform

2:20 pm The Power of Cloud Computing and Web Services

2:40 pm Using ThinkTopic on GBDX for Large-Scale Car and Object Extraction

3:00 pm Multi-Source Data Normalization for GEOINT Brokering

3:20 pm Human Landscape: High-Precision Foundational Geospatial Data

3:40 pm Tradecraft at Scale: Timbr, GBDX and Rapid Algorithm Development

See our mission-critical GEOINT innovations at Booth 1139

Training Snapshot

This year, the GEOINT Symposium offers 56 hours of training and professional development opportunities. Visit the GEOINT 2017 registration desk to purchase training. Each training session is $25 for USGIF Members and $30 for non-members.

TUESDAY AFTERNOON SESSIONS 2-4 P.M.

Recent Advances in Deep Learning: Fusing Overhead and Ground-Level Views for Remote Sensing
University of Kentucky; UC Berkeley's International Computer Science Institute
River Level 006D
This tutorial provides an overview of recent advances in deep learning methods for automatically extracting geospatial information from ground level and overhead imagery.

Exploitation of the OGC OWS Context Standard for Shared Situational Awareness
ENVITIA
River Level 007A
This training session will provide an overview of the concepts of OWS Context, describe some of the key elements of the use of OWS Context, and show a practical demonstration of its use.

Cognitive Social Media Analytics Framework
IBM
River Level 007B
This training session teaches attendees the Cognitive Social Media Analytics Framework, which was developed to automatically extract key information and relationships expressed in Twitter text data.

Geospatial Intelligence Analysis using a Web-Enabled GIS
Esri
River Level 007C
In this course, attendees will learn to discover and use existing content to create web maps, applications, and groups as well as how to share finished products with others in an online environment.

Design Thinking Boot Camp: Delivering High-Value Mission Solutions
OGSystems
River Level 007D
In this hands-on workshop, learn the basic tenets of design thinking and practice observational and understanding techniques against a sample problem. The objective is to help attendees learn new ways to approach challenging problems, harvest ideas, explore new alternatives, and synthesize options.

WEDNESDAY MORNING SESSIONS 7-9 A.M.

Global GEOINT in Action GGDM Training
Army Geospatial Center
River Level 006C
This session explains the Ground-Warfighter Geospatial Data Model (GGDM), which provides a mechanism to consistently depict and use "common" geospatial vector data across Army programs, Marine Corps systems, and allies to ensure interoperability and compliance with the NSG Feature Data Dictionary.

Analysis Training on Activity Based Intelligence, Structured Observation Management, and Analytic Modeling
National Geospatial-Intelligence Agency
River Level 006D

Consolidated NGA Security Classification Guide
National Geospatial-Intelligence Agency
River Level 007A
Attendees will walk away knowing what the Consolidated NGA Security Classification Guide is and how it is applied by NGA.

Open Interfaces for GEOINT Data
Open Geospatial Consortium
River Level 007B
Open Interfaces are crucial to ensure interoperability of GEOINT systems interchanging geospatial information, imagery, and other data. This tutorial will provide an introduction of these standards and how they can be applied in a GEOINT scenario.

Synthesizing Intelligence

PANELISTS REFLECT ON THE CHANGING ANALYTICAL LANDSCAPE AT GEOINT FOREWORD

By Jim Hodges

GEOINT Foreword concluded with a panel discussion in which participants reflected on what they'd learned that day about the changing analytical landscape.

When asked what he had learned about the changing geospatial analytical landscape, Patrick Biltgen, technical director for analytics at Vencore, challenged the question. It lacks context, he said.

"We talk a lot about intelligence analysis," Biltgen said Sunday during a panel at GEOINT Foreword in which participants in the pre-conference science and technology agenda reflected upon the day's events. "The word analysis means to break apart. ... I'm going to gather data about all the parts, and I'm going to look at all of those parts."

What anyone who needs intelligence analysis really wants is synthesis, Biltgen said: "Synthesis ... literally means to compose." They want pieces of the puzzle assembled into a picture they can use to generate a forecast.

Is that the job of an analyst? It can be.

"We shouldn't be afraid of [automation] as analysts," Biltgen said of earlier references to emerging technology. "It's like, 'the machines are coming for your jobs.' So? We're going to be intelligence 'synthesists' instead of intelligence analysts."

Sue Kalweit, the National Geospatial-Intelligence Agency's director of analysis, agreed.

"What we're hearing is that automation is going to take our jobs away," she said. "For years, our analysts have wanted nothing but time back—the time to do more predictive analysis, the time to do research, the time to really delve into a problem. With the outset of more and more imagery, they've lost that time. Now, with the power of automation, we're able to give them back time to do that [predictive] analysis."

Also on the panel were Adam Maher, co-founder and president of Ursa Space Systems, Dr. Cordula Robinson, associate teaching professor at Northeastern University, and Dr. Amanda Ziemann, an Agnew National Security Postdoctoral Fellow with Los Alamos National Laboratory.

They offered candor in responses to questions about the changing face of analysis. For example, asked about the temporal element of geospatial analysis, particularly as applied to activity-based intelligence, Maher pointed to time as an enabler of forecasting. "The question you're trying to answer is what activity is happening," he said. "But what the boss really wants to know is what is going to happen."

Biltgen spoke of young analysts trending toward the immediate. Real-time data doesn't awe them as it sometimes does their elders.

"I work with a lot of our interns and our new hires and ... real time is normal for them," Biltgen said. "If you say to them, 'I have some data from yesterday, a paper device,' it's like 'yawn.'"

He continued, "The workforce that is entering has tremendous mastery of real-time data. They expect everything now. ... Motion is normal. Time is normal. Stuff happening right now is normal. I think as quickly as possible, we in the geospatial industry want to get those things into our workflows."

Although panelists represented government, industry, and academia, they all shared a common thread.

"You have to listen to your customers," said Maher, who added that communicating results to those customers could be difficult.

That's particularly true when customers are on the tactical edge.

"We live in two different worlds," Biltgen said. "There's the suit-wearing, highly networked, work in a big building ... and then there's all my stuff is full of dust. This is a constant challenge, not just from a data but from a tool standpoint. ... There are parts of the world where you can take a flash drive and tie it to a carrier pigeon and get it to the front faster than you can send it over the local coms."

Understanding these nuances is part of the changing analytical landscape as well.

Forward-leaning Perspectives

EXPERTS DISCUSS THE LATEST INTELLIGENCE ADVANCES IN AIR, SPACE, AND ANALYSIS

Sunday's GEOINT Foreword pre-conference science and technology day featured a series of "TED-like" talks—or "GED Talks" focused on GEOINT engineering and design. The talks were presented via three themed areas with three speakers for each.

AIR AWARE

BY MATT ALDERTON

Satellites are sexy. When it comes to understanding the world in which we live, however, space-borne platforms provide only part of the picture. Another, equally critical piece of the GEOINT puzzle belongs to airborne platforms, speakers illustrated during the first series of talks, titled "Perspectives from the Air: Aircraft, Dirigibles, and UAS." The presenters focused on three facets of aerial technology that together form a compelling whole.

First on the stage was Dr. Andrew Shepherd, director of unmanned aerial systems (UAS) at Sinclair Community College in Dayton, Ohio, who explained how commercial users can leverage UAS for land surveying, critical infrastructure inspection, and building information modeling (BIM)—all without a waiver from the Federal Aviation Administration (FAA), whose Part 107 regulations published in June 2016 allow "a broad spectrum of commercial uses for drones weighing less than 55 pounds."

Succeeding Shepherd was Mark Romano, senior product manager, Geospatial Solutions, at Harris Corp., who discussed manned platforms and the super-sensors they carry—such as Geiger-mode LiDAR. Like conventional LiDAR, Geiger-mode LiDAR can penetrate foliage and map 3D elevation, achieving ground-level insights unobtainable with other sensors. Though platforms equipped with conventional LiDAR must fly low and slow, those carrying Geiger-mode LiDAR can fly high and fast, collecting more data points per square meter. The result, according to Romano: more and better imagery.

The future of airborne imagery lies with machine learning, according to the session's final speaker, Eric Truitt, chief, Space & Intelligence Programs, Georgia Tech Research Institute. Eventually, he said, machine learning algorithms will observe how imagery analysts work and learn what analysts need from airborne imagery before they ask for it. Then the algorithms will automatically cue drones to collect the imagery analysts need, in the resolution and format in which they need it.

"They're going to go out and perform mission to a level we've never seen," Truitt concluded. "They're going to bring back data to the analyst, to the reporter, to the national and tactical decision-maker that's of a higher quality ... to help us win intelligence challenges and battles of the future."

Eric Truitt, chief, Space & Intelligence Programs, Georgia Tech Research Institute

THE CHANGING FACE OF ANALYSIS

BY MELANIE D.G. KAPLAN

The next series was titled "Perspectives on Analysis-as-a-Service/non-traditional GEOINT."

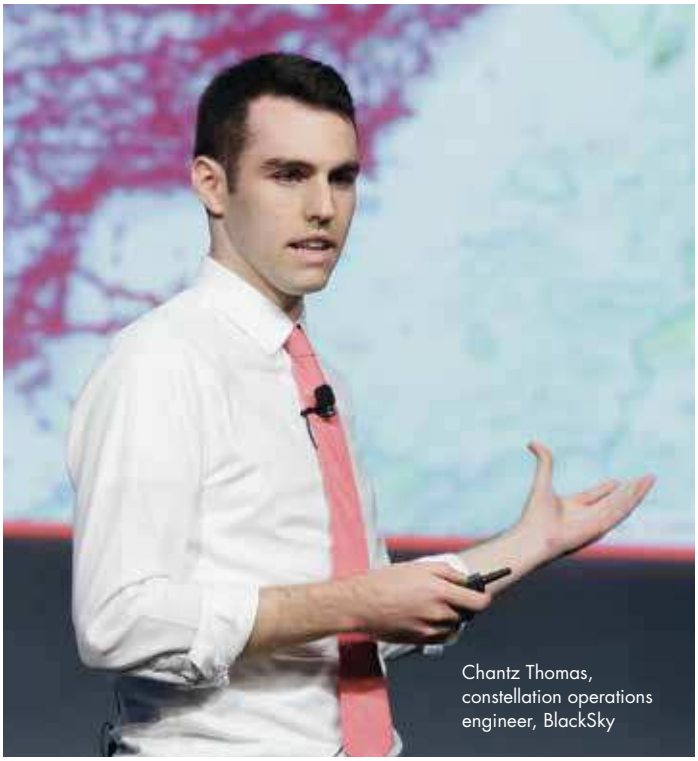
Steven Brumby, co-founder and chief science advisor of Descartes Labs, said a geospatial analysis revolution is underway, based on three things: the availability of data, the fact that we can now access supercomputing for pennies on the dollar compared to previous eras, and the fact that we now have algorithms to process the data.

"The sad fact of most imagery analysis," Brumby said, " is that

"They're going to bring back data to the analyst, to the reporter, to the national and tactical decision-maker that's of a higher quality ... to help us win intelligence challenges and battles of the future."

—ERIC TRUITT, GEORGIA TECH RESEARCH INSTITUTE

Matthew Chwastek, director, product management, public sector, Orbital Insight



Chantz Thomas, constellation operations engineer, BlackSky

nobody really wants pixels. They want answers."

Brumby discussed the automated process of producing maps and that machine learning can leverage the human-generated maps to produce new maps. He anticipates a future task for analysts will be to assess and clean up maps that are 95-99 percent complete when they emerge from the algorithm.

David Gauthier, director of the National Geospatial-Intelligence Agency's (NGA) office of Strategic Operations, said in the early days of GEOINT, there were three ways to access capabilities: build them, buy them, and share them. Today, he explained, with an explosion of capabilities in the commercial market, the focus is: lead, broker, and differentiate.

Gauthier said one of the best services to broker is analysis, because it costs less than inventing infrastructure, provides more access to non-traditional GEOINT data, offers more innovative analytic techniques, and allows more time for generating insights. Gauthier called on audience members to help NGA solve analysis challenges such as data quality control, perception and bias, and incoherence such as noise and negative gain.

In the future, Gauthier said, "We have to stretch the fabric of the discipline. We have to pull ourselves up continuously—Invent, innovate, so we can truly differentiate what we're inventing, building on the government side."

Finally, Matthew Chwastek, director of product management for Orbital Insight's public sector, talked about extracting and delivering analysis, whether it's a poverty map of Sri Lanka or a product that analyzes Wal-Mart's sales based on the number of cars in its parking lots. He said the confluence of machine learning advances, cloud computing, and satellite imagery has made it possible to understand the world in a different way.

He noted that the explosion of data means an even more important role for automation. "We did the calculations, and if every satellite that's scheduled to go into space by 2022 [does], you'll need 8 million people working full time every day looking at pixels."

Given this explosion of data, it's fortunate that many everyday tasks can be automated, Chwastek said, so the IC doesn't have to hire humans to analyze it all.

"I don't know about the audience here, but I don't think that's affordable for [anyone]."

SPACE-BASED REVOLUTION

BY ANDREW FOERCH

Commercial remote sensing experts agree: the community is in the midst of a revolution.

According to Robbie Schingler, co-founder and chief strategy officer of Planet, launch is the single greatest barrier to innovation in the remote sensing industry. Schingler voiced his support for secondary payload offerings such as cubesat deployer ISIPOD and NASA's NanoLaunch, a program for small, low-cost vehicles to deploy cubesats in space.

Just three months ago in India, 104 satellites were launched on a single rocket, shattering the world record three times over. Planet owned 88 of those satellites. When fully deployed at the end of this month, Planet's 150-satellite constellation will be able to function as a line scanner, imaging the entire surface of the earth every day.

Schingler also highlighted the sensor revolution on the ground, the need for open space situational awareness and traffic management protocol (similar to traditional air traffic management), and Earth observation trends such as pixel pattern analysis and machine learning.

Abe Usher, CTO of DigitalGlobe Radiant, said as remote sensing data increases in volume, machine learning and automation will become necessary to consume such large swathes of imagery. Usher discussed how proxy variables are being used to improve computer vision and automated perception of digital images. Pizza deliveries to the White House and Pentagon, for example, can indicate high-intensity national security planning and possible subsequent military action, as was the case in the nights leading up to the launch of Operation Desert Storm.

Modern machine learning algorithms can train computers to learn a level of human-like subject matter expertise and detect similar contextual clues.

"The technology is not perfect, but it's maturing. If we can do this for on-the-ground photos, why not do this with video?" Usher said. Usher isn't the first to pose such a question; off-the-shelf algorithms such as YOLO are mature enough to detect objects within video content faster than real-time.

DigitalGlobe is working alongside CosmiQ Works and NVIDIA to advance this sector of the tradecraft with an open data initiative called SpaceNet, which releases pre-labeled overhead imagery models into the public domain so others can create their own machine learning models for object identification.

That collaborative framework isn't exclusive to DigitalGlobe. Other remote sensing players like Spaceflight Industries have also recognized the necessity of open-source sharing if the industry wants to progress as fast as the tech it relies upon. Spaceflight's BlackSky imaging platform provides users access to internal satellite media as well as social media, traditional news media, and the user's proprietary material. For example, BlackSky Events—one of the platform's analysis offerings—used machine learning to gather relevant, publically available text data and visuals about the June 3 London attack within a matter of minutes.

According to BlackSky Constellation Operations Engineer Chantz Thomas, the company's other key offering is BlackSky Spectra, which provides automated feature extraction in addition to a web-based database of imagery from Spaceflight and other partners.

The Future of GEOINT Abroad

PANELISTS FROM THE ALLIED SYSTEM FOR GEOSPATIAL INTELLIGENCE DISCUSS THE EVOLUTION OF GEOINT IN THEIR RESPECTIVE NATIONS

By Jim Hodges

Participants in the Future of GEOINT panel discussion addressed a full room Monday morning.

Just after Congressman Joaquin Castro welcomed GEOINT 2017 to his hometown and thanked the industry for its work on behalf of the House Intelligence Committee, leaders of allied GEOINT nations described how it could be challenging to sell the discipline's value in their respective countries.

"From our people, there's sort of a lack of understanding about what GEOINT is trying to do," said Lt. Col. Damon Taylor, Director, GEOINT, New Zealand Defense Force. "A lot of the time, you show people and their eyes light up."

Taylor and other members of the Allied System for Geospatial Intelligence (ASG) took questions from Dustin Gard-Weiss, director of NGA's GEOINT Enterprise Office, Monday during a panel on the future of GEOINT. Panelists described steps being taken to advance geospatial intelligence back home, many of which involve culture change.

"Our mission is about is trust," said Col. Eric Vandenberg, Chief of Staff, Director of Intelligence and Partnerships, Canada. "Not just in what our customers have in the services we provide, but also the trust of our partners—whether it's our partners in the armed forces or international partners."

Most panelists said their country is enhancing GEOINT capabilities, in some cases from small levels. But leveraging new capabilities can also present challenges.

While trying to integrate with other government and military operations, Allison West, Assistant Secretary for GEOINT Foundation and Support, Australian Geospatial-Intelligence Organisation, is trying to expand her country's geospatial staff from 400 to 700. Australia is recruiting from a workforce of varying qualifications.

"It's a journey," she said, and then added, "And we're on it."

The United Kingdom has a diverse GEOINT workforce and boasts of its National Centre for Geospatial Intelligence, said panelist Aimee Tuffs. Like many nations, the UK aims to partner more with academia and industry.

Canada is embarking on a new model in recruiting, training, and

> "Our mission is about trust. Not just in what our customers have in the services we provide, but also the trust of our partners—whether it's our partners in the armed forces or international partners."
>
> —COL. ERIC VANDENBERG, CHIEF OF STAFF, DIRECTOR OF INTELLIGENCE AND PARTNERSHIPS, CANADA

supporting its civilian workforce, according to Vandenberg. She added the initiative is not just across the Intelligence Command, but the entirety of the nation's forces, and that civilians and military tend to serve in parallel rather than jointly.

All panelists represented nations sharing duty in the Middle East.

Canada, especially, is applying GEOINT lessons learned from its involvement in the Middle East. Like many countries, Canada separates its imagery analysis from other GEOINT functions, and that separation occurs in three to four Ottawa-based facilities. That is going to change, Vandenberg said, advocating for co-location of offices for all of GEOINT, first, then joining intelligence and operations offices.

"When we deploy overseas, we actually do quite well," he added, pointing to commands in which all intelligence operations are together, contrasted with the structure back in Canada. The country looks toward a Defense Policy Review due Wednesday for a signal on the future of GEOINT and GEOINT-operational synergy.

Vandenberg also said he is seeing culture shift when it comes to partnering with industry.

"I think we've been late to the game in acknowledging the value industry can provide to us," said Vandenberg. "In the past, we've tried to develop everything in house. Advancing technology has changed some minds in Canada."

Informing Policy

CONGRESSMAN JOAQUIN CASTRO WELCOMES GEOINT 2017 TO HIS HOMETOWN

By Melanie D.G. Kaplan

Congressman Joaquin Castro, representative of the 20th Congressional District, applauded the IC's professionalism and expertise in his welcome address Monday morning.

A native of San Antonio—nicknamed Military City, USA, and Cyber City, USA—Congressman Joaquin Castro applauded the GEOINT Community during his welcoming remarks at GEOINT 2017. The Congressman recognized the Intelligence Community's professionalism and expertise and stressed the importance of intelligence in informing policymakers in Washington.

In his third term in the U.S. House of Representatives, Castro serves on the House Permanent Select Committee on Intelligence as well as the House Foreign Affairs Committee. He represents the 20th Congressional District, which includes San Antonio, but more specifically, Port San Antonio and Lackland Air Force Base, large producers and consumers of geospatial intelligence.

"We're excited to have you back [in San Antonio]," Castro told the audience, noting the Symposium will return to his city once again 2019.

"Of all the places in the country where we think of the work going on intelligence, San Antonio is a very special place," he said.

Not only is the city home to the nation's largest joint base and one of largest federal populations in the country, but Joint Base San Antonio—and specifically the 25th Air Force—he said, play a crucial role in providing the multi-source ISR products and capabilities needed to conduct worldwide operations.

Through his work on the House Intelligence Committee—which he noted was an early supporter of USGIF—Castro is constantly reminded of the importance of the Intelligence Community and the organizations within that community providing policymakers with critical insight.

"Your work sheds light on the unknown and illuminates the space in which policymakers make tough decisions," he said. "I'm often reminded that intelligence is a collaborative process. Intelligence, especially geospatial intelligence, requires collaboration between military, industry, academia, and other agencies."

He added that the Symposium highlights the importance of intelligence sharing to identify emerging threats—from Osama bin Laden to Ebola and climate change to natural disasters. Castro said while many of the technologies and techniques used in GEOINT were first pioneered for military applications, they are increasingly universally applicable.

"Technologies developed here in the Intelligence Community, by academia, and by industry keep the United States of America competitive in a world economy that increasingly values innovation," the Congressman concluded.

"I'm often reminded that intelligence is a collaborative process. Intelligence, especially geospatial intelligence, requires collaboration between military, industry, academia, and other agencies." —CONGRESSMAN JOAQUIN CASTRO

USGIF
United States Geospatial Intelligence Foundation
MEMBER

Join Today as an Individual Member

Visit Booth #1647 to learn more

BENEFITS INCLUDE:

- Be a part of your professional association dedicated to the GEOINT community
- Significant discounts to all USGIF events
- Access to members-only events
- Participate in USGIF's Committees and Working Groups
- Ability to submit proposals for presentation opportunities at USGIF events
- And more…

INDIVIDUAL MEMBERSHIP LEVELS

Academic	$35
First Responder/Law Enforcement	$35
Government Employee/Active-Duty Military	$35
Young Professional	$35
Industry/Contractor	$99

3 year, 5 year and Lifetime memberships also available

connect.usgif.org

Data Wave *continued from cover*

> "It's time-consuming, manually intensive, redundantly processed, and it leaves a great deal of data undiscovered and unexploited. In other words, while it remains essential to our national security it's both very expensive and extremely inefficient. We must change this."
>
> —ROBERT CARDILLO, DIRECTOR, NGA

high-definition video. "Imagine you're a coach trying to understand the strategy of his opponent by watching every game and every play for three seasons, all in a single day … That's exactly what we ask our analysts to do when we don't augment them with automation. All this data, combined with dramatic improvements in computing power, represents a phenomenal opportunity."

Cardillo announced several new ways in which NGA is seizing that opportunity, the goal of which is to eventually automate 75 percent of the tasks NGA analysts perform, enabling them to spend less time completing rote tasks and more time answering complex intelligence questions.

For one, the agency is launching new GEOINT tools and services that make the case for automation, such as Beachfront, which automatically creates new coastline data using commercial satellite imagery. For example, vectors of the vast river delta system that separates India from Bangladesh would have taken a human analyst five hours to produce, but took Beachfront less than six minutes, Cardillo said.

In addition to new tools that leverage automation, NGA is appointing new leaders whose mission will be to realize its potential: William "Buzz" Roberts and Dr. David Bray.

Roberts, who currently serves as head of special programs for NGA Research, will become director of artificial intelligence, automation, and augmentation. His charge, Cardillo said, will be to successfully apply automation to one of NGA's most challenging data sources: full-motion video (FMV).

"If we continue to exploit FMV the way we do it today it will become an existential threat to NGA as it eats up more and more of our analytic capacity," Cardillo said. "It's time-consuming, manually intensive, redundantly processed, and it leaves a great deal of data undiscovered and unexploited. In other words, while it remains essential to our national security it's both very expensive and extremely inefficient. We must change this."

Bray, who is currently chief information officer at the Federal Communications Commission (FCC), will lead a new Office of Ventures and Innovation that will be tasked with driving innovation both within NGA and externally with its commercial partners. A major new initiative led by that office will be a public-private partnership between NGA and industry that simultaneously supports and advances the capabilities of both. The product of the partnership will be what Cardillo described as a "data brokerage" that will furnish industry with reams of historic data from NGA archives in exchange for cutting-edge algorithms produced by applying machine learning to decades worth of geospatial imagery and analysis.

"NGA sits on an amazing and broadly untapped resource," Cardillo said. "In a world of deep learning, historic data and ground truth are of immense value. Some have even called such data 'the new oil.'"

NGA Director Robert Cardillo invited Meghan Washington, the most junior NGA employee attending GEOINT 2017, to the Symposium stage to receive a challenge coin as he recognized the next generation of GEOINT professionals.

In a press conference after his speech, the director said NGA's data brokerage could potentially operate as a government-run non-profit corporation, which would be managed by an outside entity on behalf of federal stakeholders. "There's something called a B corporation [which is] essentially a government company," he said, acknowledging that such a structure would require legislative support to proceed. "I've begun those communications with the Hill, and I've gotten good early reception to it."

To demonstrate how a public-private partnership with NGA might work, Cardillo said the agency will soon launch a "Trafficking Data Challenge" whereby NGA will provide industry with geospatial data to use in developing solutions that model, track, and deter trafficking of humans, wildlife, drugs, and weapons.

"We'll run this in the same manner as our hackathons, with a team of experts assembled to judge the submissions," Cardillo said. "Let's consider the challenge a preview of that public-private partnership, because for the prizes we're not simply awarding money—you would be able to participate in a cooperative data project with NGA."

Three-quarters of a century after D-Day, GEOINT looks remarkably different. As it storms digital rather than physical beaches, however, the U.S. can secure victory now the same way as it did then, Cardillo said: by uniting around a single objective.

"In a world where so many things divide us, our mission brings us together," he concluded. "It unites our community and our focus. It reminds us just how closely connected we all are. And if we can do more than just see these connections—if we can honor them, if we can strengthen them—then that unity of purpose will inspire us and propel us onward. That unity will develop and deliver the next generation of intelligence that the world demands and our customers deserve."

NGA Director Robert Cardillo focused on the themes of automation and augmentation in his keynote address.

Army Veteran Robert Farnsworth Recognized with Lt. Michael P. Murphy Award

USGIF, THE DIGITALGLOBE FOUNDATION, AND PENN STATE PRESENT AWARD AT GEOINT 2017 SYMPOSIUM

USGIF CEO Keith Masback, Digital Globe Vice President of Corporate Communications Nancy Coleman, and Penn State Professor Dr. Todd S. Bacastow present Robert J. Farnsworth with the 2017 Lt. Michael P. Murphy Award.

Monday at GEOINT 2017, the 2017 Lt. Michael P. Murphy Award in Geospatial Intelligence was presented to Robert J. Farnsworth, a retired U.S. Army Reconnaissance Engineer. Farnsworth is currently a senior consultant of geospatial data for KeyW Corporation in support of the National Geospatial-Intelligence Agency (NGA). After serving 12 years in the U.S. Army, Farnsworth retired in 2009 following injuries sustained while deployed in support of Operation Iraqi Freedom.

Keith J. Masback, USGIF CEO, Nancy S. Coleman, Vice President of Corporate Communications at DigitalGlobe and a Board Member of the DigitalGlobe Foundation, and Dr. Todd S. Bacastow, Professor of Practice of GEOINT at Pennsylvania State University, presented the award to Farnsworth on the Government Pavilion Stage in the GEOINT 2017 Exhibit Hall.

The Murphy Award is named for Navy SEAL Lt. Michael P. Murphy, a distinguished Penn State alumnus. Murphy was killed June 28, 2005, by enemy forces during a reconnaissance mission in Afghanistan. For his selfless leadership and courageous actions, he was posthumously awarded the Medal of Honor. The Murphy Award recognizes achievement by a Penn State graduate who is serving or has served in the U.S. Armed Forces or IC. Recipients are chosen based upon demonstration of exceptional contributions to the discipline after completing Penn State's graduate certificate in geospatial intelligence.

Dr. Todd S. Bacastow, professor of practice in geospatial intelligence at Penn State, reflected upon Farnsworth's commitment to his education—even while facing combat. "Our program is online and has served military in combat zones," Bacastow said. "Robert was one such military student. I first met Robert in October 2007 through an email in which he described how he just passed the protective barriers in the front of the dining facility in Iraq when two mortar rounds landed close to him. He went on to say that he wanted 'to finish the three exams by Sunday, but may need another day or two.'"

Also receiving the 2017 Lt. Michael P. Murphy Award is U.S. Coast Guard Lt. Drew Cavanagh, who will be recognized at Penn State's Military Appreciation Day Nov. 11 in State College, Penn.

> "The ability to present this award at the GEOINT Symposium is a sobering reminder of the reason we all work so hard to continually improve the capabilities of the GEOINT Community."
>
> —KEITH MASBACK, CEO, USGIF

The generosity of USGIF, the DigitalGlobe Foundation, and faculty, staff, and friends of Penn State contributed to endowing the Murphy Award.

"USGIF is honored to be a part of supporting this annual award given in the name of Lt. Murphy," Masback said. "The ability to present this award at the GEOINT Symposium is a sobering reminder of the reason we all work so hard to continually improve the capabilities of the GEOINT Community. Our dedication to service members, first responders, emergency managers, and relief workers who depend on geospatial intelligence to accomplish their respective missions must never waver."

USGIF

Career Center

Find your next GEOINT job or employee on the online job board.

Find a Job

Search jobs & internships, create an account, and post your resume for employers to review.

Post a Job

List available positions and attract top talent.

careers.usgif.org

7:00-9:00a PROFESSIONAL DEVELOPMENT TRAINING & EDUCATION SESSIONS (RIVER LEVEL 006C-007D)

8:00-9:00a
Meeting – USGIF Modeling & Simulation Working Group (River Level 006A/B)

9:00-9:05a
Master of Ceremonies: Carmen Medina, Founder, MedinAnalytics (Hall 4A)

9:05-10:30a
Panel: The National System for Geospatial Intelligence (NSG)

- *Moderator:* Keith Masback, CEO, USGIF
- Robert Cardillo, Director, NGA
- COL Steven D. Fleming, Ph.D., U.S. Army (retired), Professor of the Practice of Spatial Sciences, Spatial Sciences Institute, USC
- Dr. Joseph F. Fontanella, Director, U.S. Army Geospatial Center, Army Geospatial Information Officer
- Dr. Suzette Kimball, Director, Civil Applications Committee
- Maj. Gen. William N. Reddel III, Adjutant General, New Hampshire National Guard

10:00a-5:00p EXHIBIT HALL OPEN (HALLS 2-3)

10:30-11:00a
Morning Coffee and Networking Break

11:00-11:45a
Keynote: "The Fourth Transformation" Robert Scoble and Shel Israel

11:45a-12:30p
Gen. Darren W. McDew, Commander, U.S. Transportation Command

12:30-2:00p LUNCH IN THE EXHIBIT HALL (HALL 2)

12:30-1:15p
Robert Scoble and Shel Israel Book Signing (Info Counter)

1:00-2:00p
Meeting – USGIF Geospatial & Remote Sensing Law Working Group: Maximizing Effective Use of GEOINT Data and Small Sat Collection—Navigating Privacy and Data Protection Regulatory Issues (River Level 006A/B)

1:15-4:00P
GOVERNMENT PAVILION STAGE (HALL 2, BOOTH 138)

1:15-1:30p
IGAPP Grand Challenge Award Presentation with Engility and NGA

1:30-2:15p
Analytic Modernization – Sue Kalweit, Director of Analysis, NGA; Bryan Weaver, Senior GEOINT Analyst, NGA; Dan DeGennaro, GEOINT Analyst, NGA; Brent Lines, GEOINT Analyst, NGA; and Chris Lauber, GEOINT Analyst, NGA

2:15-2:45p
Army Geospatial Enterprise: System Testing, Certification, and Interoperability – Dr. Joseph F. Fontanella, Director, U.S. Army Geospatial Center; and Army Geospatial Information Officer

2:45-3:15p
Bringing GEOINT to Civilian Agencies - Paul M. Young, Director, National Civil Applications Center, U.S. Geological Survey

3:15-4:00p
Understanding the Commercial GEOINT Activity – Michael Foster, Lead, Commercial GEOINT Activity, NGA; and Peter Muend, Lead, Commercial GEOINT Activity, NRO

2:00-4:00p
Professional Development Training & Education Sessions (River Level 006C-007D)

2:30-3:30p
Meeting – USGIF Small Business Advisory Working Group: Creative Contracting Techniques for Meeting Small Business Goals (River Level 006A/B)

4:00-5:00p
Meeting – USGIF Machine Learning & Artificial Intelligence Working Group: The State of Machine Learning and Artificial Intelligence in GEOINT (River Level 006A/B)

4:00-5:00p EXHIBIT HALL NETWORKING RECEPTION

5:00-7:00p YOUNG PROFESSIONALS RECEPTION (BROKEN CRUST CAFÉ, CONVENTION CENTER)

» WEDNESDAY, JUNE 7 AT-A-GLANCE

EXHIBIT HALL OPEN 10:00-3:00P

7:00-9:00a	**PROFESSIONAL DEVELOPMENT TRAINING & EDUCATION SESSIONS** (River Level 006C-007D)
8:00-9:00a	**MEETING – USGIF YOUNG PROFESSIONALS AND TRADECRAFT & PROFESSIONAL DEVELOPMENT COMMITTEE**
9:00-9:15a	**MASTER OF CEREMONIES: LETITIA A. LONG, USGIF BOARD OF DIRECTORS**
9:15-10:00a	**KEYNOTE: LT. GEN. JOHN N.T. "JACK" SHANAHAN, DIRECTOR FOR DEFENSE INTELLIGENCE, WARFIGHTER SUPPORT, OFFICE OF THE UNDER SECRETARY OF DEFENSE FOR INTELLIGENCE**
10:00-10:45a	**KEYNOTE: ADMIRAL KURT W. TIDD, COMMANDER, UNITED STATES SOUTHERN COMMAND**
10:45-11:30a	**KEYNOTE: LT. GEN. VINCENT R. STEWART, DIRECTOR, DEFENSE INTELLIGENCE AGENCY**
10:00a-3:00p	**EXHIBIT HALL OPEN** (Halls 2-3)
11:30a-1:00p	**LUNCH IN THE EXHIBIT HALL**
12:30-1:30p	**GOVERNMENT PAVILION STAGE: NGA ACQUISITION REPORT CARD** (Hall 2, Booth 138)
1:00-2:00p	**MEETING – USGIF ANALYTIC MODERNIZATION WORKING GROUP, "THE FUTURE OF ANALYSIS: A VISIONEERING SESSION"**
2:00-3:00p	**TASTE OF TAMPA/SEE YOU AT GEOINT 2018 EXHIBIT HALL CLOSING RECEPTION**

Accelerating next

The future belongs to the fast. And to help you accelerate, we've created a new company. One totally focused on what's next for your business of government.

Accelerating next

Hewlett Packard Enterprise

hpe.com