THE GEOINT 2019 SYMPOSIUM
TUESDAY
JUNE 4, 2019
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Shaking Up the CIO Role

INTELLIGENCE COMMUNITY IT EXECUTIVES ARE EVOLVING FROM 'TRADITIONAL' TO 'TRANSFORMATIONAL'

By Matt Alderton

Literally and figuratively, IT departments have seen the light. They were once relegated to dark, out-of-the-way offices with a mission to preserve the status quo. Externally, new technology was rampant. Internally, however, legacy systems reigned supreme. In turn, IT leaders were medics; instead of architecting strategic solutions, they spent their days triaging complaints and applying operational band-aids to administrative cuts and scrapes. Their charge was to minimize IT spend, not to maximize IT potential.

But that was then. With technological change now coming in torrents instead of trickles, organizations are drowning in disruption. Because they're holding the lifesavers, IT departments have been invited out of the basement and into the boardroom. Suddenly, IT professionals who once felt like hermits now feel like heroes.

As in private industry, leading change in the Intelligence Community (IC) are CIOs, whose evolving role was the subject of a panel discussion Monday at the GEOINT Symposium. Titled "CIOs: Moving from Chief Information Officers to Chief Innovation Officers," the discussion left no question: IT leaders don't just support the mission; increasingly, they drive it.

"We've watched the role of CIOs change a lot over the past 10 years in government, in particular; inside the Intelligence Community; and also, across industry," observed moderator Jill Singer, vice president of national security at AT&T Public Sector and Wholesale Solutions.

Singer kicked the session off by asking panelists—Annette Redmond, director, Technology and Innovation Office, Intelligence and Research Bureau, Department of State; La'Naia Jones, deputy chief information officer of the Intelligence Community, Office of the Director of National Intelligence (ODNI); Juliane Gallina, chief information officer, Central Intelligence Agency; and Mark Andress, chief information officer, National Geospatial-Intelligence Agency—to describe how their roles have changed.

"The chief information officer primarily started as more of a technology or technologist role, looking at information and data processes,

> *see CIO p. 16*

From left to right, AT&T's Jill Singer moderates a panel discussion among Intelligence Community CIOs Annette Redmond, Juliane Gallina, La'Naia Jones, and Mark Andress.

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>
> —JILL SINGER, AT&T

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TAKE A "DIP" IN SUPPORT OF K-12 EDUCATION

USGIF aims to raise $5,000 at GEOINT 2019 to fund the shipment of its Portable Planet map of North America to schools across the nation. Help us meet this goal by simply "dipping" your credit card at the DipJar, located at USGIF Booth 1511, to automatically donate $25.

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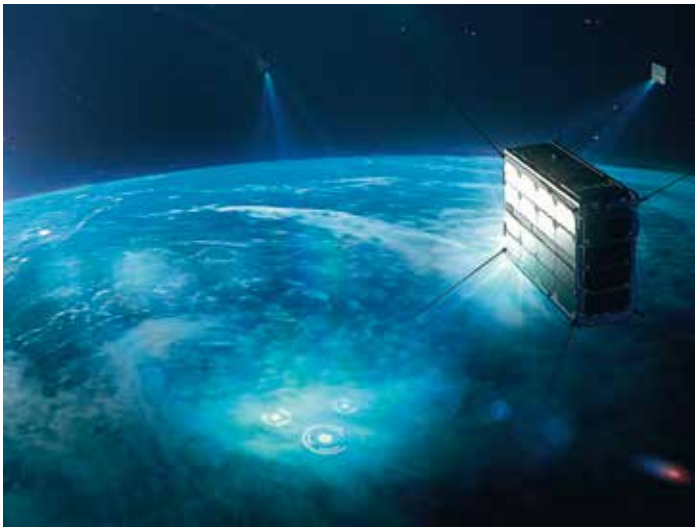


IMAGE COURTESY OF KLEOS

The first four Kleos nanosats are scheduled for a mid-2019 launch.

ISR FOR MARITIME SECURITY

KLEOS SPACE TO LAUNCH FLEET OF RF-SCANNING NANOSATS

By Rob Pegoraro

Kleos Space (Booth 1527) has large ambitions for a squad of small satellites. The Luxembourg-based firm plans to launch a fleet of nanosatellites to scan for radio frequency (RF) signals from ships and other seaborne platforms—data it can then analyze and sell as a service to defense, law enforcement, and commercial customers.

"Kleos is targeting the global intelligence, surveillance, and reconnaissance (ISR) market, focusing on the maritime security industry," CEO Andy Bowyer wrote via e-mail. "Maritime security applications for Kleos include monitoring of illegal fishing, illegal immigration, sea smuggling and contraband (e.g. drugs smuggling), and environmental monitoring (e.g. illegal oil bunkering)."

The first four Kleos nanosats are scheduled for a mid-2019 launch from Mahia, New Zealand, aboard Rocket Lab's Electron launch vehicle. Bowyer called the first mission "a technology demonstration" capable of delivering daily reports; the company's full planned constellation should offer "near-real-time" observation around the globe.

Kleos was founded in 2017, when British space engineering company Magna Parva spun it out as a separate company.

Bowyer said Kleos' goal at GEOINT 2019 is to "engage end users and routes to market, looking to expand the understanding on what the art of the possible is when the Kleos RF data layer is integrated into the usual GEOINT sources."

BETTER TOOLS FOR ISR MANAGEMENT

MICROSOFT BRINGS TACTICAL VEHICLE TECHNOLOGY DEMONSTRATOR TO GEOINT 2019

By Rob Pegoraro

"MTV" is not an abbreviation usually associated with GEOINT, but for **Microsoft (Booth 609)** it is the centerpiece of the Redmond, Wash.-based company's GEOINT 2019 exhibit.

In this scenario, "MTV" stands for "Microsoft Tactical Vehicle," a technology demonstrator built around a SUV packed with a suite of sensors and an array of onboard computing. The target customer: armed services in need of better tools to manage intelligence, surveillance, and reconnaissance operations.

"The MTV and its solutions focus on the changing technological landscape required to support tomorrow's solider on the battlefield, such as augmented and virtual reality for advanced mission planning and tactical edge computing devices that deliver advanced analytics and artificial intelligence capabilities," spokesperson Julie Smith wrote via email.

"The military's complex operations require command-and-control technologies and processes that enable and secure the mission," she continued.

Smith said Microsoft is also showcasing GEOINT services and capabilities based on its Azure, Office 365, Dynamics 365, and Bing Maps products, adding, "The cloud can improve manual tasks, logistics and supply-chain operations, predictive maintenance, and more."

Microsoft's exhibit also features Surface Hub, its combination of Windows 10 touchscreen and digital whiteboard, set up to demonstrate how teams can collaboratively explore geospatial data visualizations.

PHOTO COURTESY OF MICROSOFT

Microsoft Technical Specialist Jim Ford with the company's Microsoft Tactical Vehicle, which will be on display at GEOINT 2019.

FLOOR

EXHIBIT HALL HIGHLIGHTS

IMPROVING HUMAN WELL-BEING

USC PROGRAMS FOCUS ON SPATIAL SCIENCES THAT BENEFIT HUMAN SECURITY

By Lisbeth Perez

Through innovative undergraduate and graduate programs **The University of Southern California's Spatial Sciences Institute (SSI) (Booth 1831)**—which has earned USGIF Collegiate Accreditation—prepares students and young professionals to develop spatial thinking, reasoning, and technological acumen to address global challenges. Some primary areas of focus for SSI include the intersection of spatial sciences with urban planning and design, health, and intelligence, according to faculty member Ret. Col. Steven D. Fleming, Ph.D., professor of the practice of spatial sciences.

In its undergraduate program, students learn about ways to work toward environmental sustainability. Those pursuing SSI's Human Security and Geospatial Intelligence minor focus on the use of location-based analytics to gather, interpret, and implement actionable intelligence and to produce geospatial solutions.

SSI's online graduate certificate and master's degree programs in GIS and Human Security and Geospatial Intelligence provide a range of educational options for professional and leadership advancement. Its interdisciplinary Population, Health and Place Ph.D. program provides training for careers in research, teaching, and applied work at the intersection of demography, public health, and spatial sciences.

At GEOINT 2019, SSI is providing information on its GEOINT-related academic programs. Additionally, SSI is showcasing its GEOINT research, including the One World Terrain (OWT) project in collaboration with the Institute for Creative Technologies (ICT), USC's University Affiliated Research Center. The OWT project is developing a set of 3D global terrain tools that can replicate the coverage and complexities of the operational environment.

PHOTO COURTESY OF AN-MIN WU, SSI

Andrew J. Marx (left), former Air Force officer and associate professor with SSI and ICT, and Jason T. Knowles, former Naval officer and adjunct associate professor with SSI, demonstrate the collection of drone data for students off Catalina Island as part of USC's Spatial Data Acquisition course.

STREAMLINING THE RFP PROCESS

EDGEWORTHBOX SHOWCASES 21ST CENTURY PLATFORM FOR PROPOSAL SUBMISSION

By Kristin Quinn

First-time GEOINT Symposium exhibitor **EdgeworthBox (Booth 1830)** is highlighting what it calls "A Bloomberg machine for the RFP process," according to founder and CEO Chand Sooran.

"We want to make large-scale acquisition simpler, fairer, faster," said Sooran, who is drawing upon his background in finance to do so. "We've built a cloud-based solution that acts as a layer that can be used individually or with existing technology."

One challenge the platform seeks to address is that of finding the right suppliers to submit proposals. For example, out of 100 potential contractors perhaps only three are fully equipped to solve the problem outlined in a RFP, and others offer only a partial solution.

"If none of those three suppliers submit a proposal then you end up buying from one of the other 97 who submits," Sooran said. "You may end up commonly overpaying for a second-best solution."

EdgeworthBox's platform employs a 21st century approach to circumnavigate the tedious and repetitive process contractors endure to register as a vendor with numerous government agencies. The company aims to serve as a clearinghouse for both administration and data.

"Register with us once and give the information needed to be a vendor of record with any buyer on the platform," Sooran said, adding the platform will also include social networking tools for both buyers and suppliers to tell their stories.

Training Snapshot

The GEOINT 2019 Symposium offers 50+ hours of training and professional development opportunities. Each training session is $25 for USGIF Members and $35 for non-members. Please visit the GEOINT 2019 registration desk to purchase training.

TUESDAY AFTERNOON SESSIONS 2-4 P.M.

Computer Vision at Global Scale: Build & Deploy a Machine Learning Model

Descartes Labs
Room 301A
This course will demonstrate the techniques required to train an ML-based CV model and deploy it at scale across a large region. The results will be analyzed and considerations for global-scale analysis will be discussed. Attendees will leave this class with practical skills of training a CV model, deploying it at scale, and with initial understanding of some of the design trades required when working across large geographic areas.

Geospatial Data Fusion: Leveraging Automation Services & Machine Learning to Generate Higher Value Intelligence Using Existing Tradecraft Tools

General Dynamics
Room 302C
This course provides a brief overview of automation frameworks and how they can be leveraged to increase situational awareness and mitigate user bandwidth issues. Attendees will be introduced to visualization techniques and correlating phenomenology like WAMI and FMV through visualizing tracks and imagery. Discover tools and concepts that visualize and correlate automatically-generated information using visual and non-visual data types from sources such as Project Maven.

The Five Habits of the Master Thinker: A Practical GEOINT Exercise

Pherson Associates
Room 301B
Great analysis is based on five key critical thinking skills that enable us to assess hard national security problems, anticipate the unexpected, and avoid mistakes. Participants will practice operationalizing the five habits on a simple GEOINT-based scenario using six techniques that help overcome mindsets, organize information, diagnose problems, explore different ways of thinking, and avoid surprise.

Using OSINT to Identify Locational Data

Recorded Future
Room 302B
In this course, attendees will receive training on how to use open-source intelligence (OSINT) to identify, collect, understand, analyze, and incorporate locational data. The training session will focus on GIS and analysis tools and deliver knowledge of the OSINT element and approach to GIS to successfully capture, store, manage, and visualize location data.

Harnessing the Power of UAS for Human & National Security Applications

University of North Carolina Wilmington
Room 301C
This training session offers a discussion on UAS-based operations for human and national security applications that often require the use of synchronized UAS flights or sensors beyond the visible part of the electromagnetic spectrum. Important lessons learned for mission planning, flight execution, UAS and sensor selection, crew management, and navigating the current regulatory framework will be discussed. Attendees will acquire baseline knowledge in UAS selection, regulatory framework, mission implementation and planning, and imagery and product generation.

WEDNESDAY MORNING SESSIONS 7-9 A.M.

LiDAR Workflows in GIS

Esri
Room 301B
This session will teach best practices for working with LiDAR data in ArcGIS. Attendees will learn LiDAR basics and fundamentals as well as the best practices for managing, editing, visualizing, and sharing it in 2D and 3D. They will also learn several workflows for deriving useful information products from LiDAR data as well as performing 2D and 3D analysis on LiDAR-derived products.

The Global RF Layer for the GEOINT Community

HawkEye 360
Room 302C
This class presents a new domain of geospatial information—the global Radio Frequency (RF) layer. This course will help users effectively utilize an RF foundational data layer captured by satellite-based remote sensing. Attendees will learn how to access and visualize global RF data using GIS and analysis tools. Subject matter experts will provide a full view of how RF analytics can directly support global security.

Artificial Intelligence Demystified

Hexagon U.S. Federal
Room 302B
This course will provide a basic understanding of different AI techniques, terminology, and application frameworks, including the skills necessary to develop AI-based geospatial applications and real-world examples of how AI is being applied to solve geospatial problems. Knowledge gained can then be applied in a variety of ways, such as seeding ideas for applying AI to geospatial problems, evaluating proposals, better understanding the true usefulness of applications, interacting with and managing development teams, identifying appropriate staff and gaps for AI development projects, and so on.

Mobile Awareness GEOINT Environment (MAGE)
The National Geospatial-Intelligence Agency (NGA)
Room 302A
MAGE is a mobile app designed to operate in a low-bandwidth or disconnected environment. Ideal for disaster response personnel, urban search and rescue teams, and others that need interactive content, MAGE users can capture geo-tagged pictures, audio, or video and use these media files to annotate entries and instantly share that information with others. MAGE is an open-source product NGA has enabled for use throughout the geospatial enterprise.

Fostering Bottoms-Up Innovation in Large Solution SAFE
OGSystems
Room 301A
This course will help attendees understand how agile MVP features and success criteria can be managed alongside legacy requirements to meet the needs of a large government organization. Attendees will be introduced to technique and tool configurations that foster agile innovation in a way that maintains enterprise visibility and configuration control. They will also see how JIRA, JIRA Portfolio, Confluence, and Tableau can be implemented to provide visibility, metrics, and dynamic reporting.

Efficient & Effective Data Fusion of Open and Intelligence Data Sources to Protect U.S. Interests
Oracle
Room 301C
Attendees will be trained on new tools that enable geospatial data scientists and novice users to leverage a comprehensive portfolio of geospatial analysis functions in a drag-and-drop environment to create new intelligence data and then to visualize multiple dataset mashups in real time. Attendees will learn how to quickly uncover geospatial relationships and achieve optimal performance in geospatial structured data that cover a variety of spatial model formats.

Back by Popular Demand: The Innovation Corner

The Innovation Corner (Booth 1943) was such a hit in the GEOINT 2018 exhibit hall, USGIF has brought it back for an encore at GEOINT 2019.

The Innovation Corner features lightning talks that focus on GEOINT applications conducted by scientists, academics, analysts, and other community professionals. Each talk is seven minutes and focuses on subjects relevant to the GEOINT 2019 theme "Human-Machine Teaming & Innovation Yield Mission Success."

TUESDAY AFTERNOON LIGHTING TALKS

1:30-2:20 p.m.

Innovative Results: Why R&D Transition Matters
> Marianne Kramer, Chief of Technology Transition, IARPA

Space-Based High-Resolution Global Fiducials Imagery Time-Series for Outreach, Research, and Education
> Bruce Molnia, Ph.D., USGS

Turning Big Data into Actionable Intelligence
> Forest Danford & Laura Patrizi, Sandia National Laboratories

Global Cropland Fire Emissions Accounting Using OPIR Sensing
> Nancy French, Ph.D., Michigan Tech Research Institute

Lessons Learned from Commercial Data Curation Services and How We Can Apply Them to Our Craft
> Bryan Lane, ODNI

GEOINT in the 2020 Census: A Civilian Agency Use Case
> Peter Reid & Andrea Johnson, U.S. Census Bureau

2:25-3:15 p.m.

GEOINT Analysis in the Age of Automation
> Kevin Ayers, NGA

Near Real-Time AI Satellite Imagery Insights Leveraging Amazon Ground Station, Sagemaker & GBDX
> Dan Getman & Luke Wells, Maxar/Amazon Web Services

A Lightweight, Robust Exploitation System for Temporal Stacks of UAS Data: Use Case for Forward-Deployed Military or Emergency Responders
> Andrew Marx, Ph.D., Yu-Hsi Chou & Kevin Mercy, University of Southern California

Machine Learning for Flight Planning Systems
> Kalyan Vaidyanathan, BAE Systems

The QuakeFinder High-Resolution Magnetometer Array: Forecast Earthquakes, Monitor Solar Storms & More
> Daniel Schneider, Stellar Solutions Inc.

Space, Ground, and Cloud: An Infrastructure Framework for Real-time Analytics
> Dan Brophy, Capella Space

3:20-4:10 p.m.

Human Geography: To Infinity and Beyond
> Elizabeth Lyon & Jaremy Leach, NGA

Automated Material Mapping for Humanitarian Assistance and Disaster Relief
> Bill Baugh, Maxar

Wildfires: A Machine Learning Approach to Calculating Changes in Rate of Spread and Direction of Movement
> Zachary Mostowsky, Next Tier Concepts, Inc.

Augmenting the Analysts Through AI Agents: Implication in Concept of Operation and Change Management
> Mathieu Goebel, Earthcube

Common Operating Picture for Situational Awareness and Safety
> Mike Zipperer, BAE Systems

Machine Learning for GEOINT: Computer Vision on the Edge
> Anthony Calamito & John Dombzalski, Mapbox

USGIF Working Group Snapshot

Multiple USGIF Working Groups are holding meetings or panel discussions at GEOINT 2019. These events, taking place in Room 303AB, are open to all Symposium attendees and exhibitors interested in the topic or seeking to learn more about a particular working group.

TUESDAY

Machine Learning and Artificial Intelligence (MLAI) Working Group

Taking MLAI from Good Idea to Operational Environment

10-11 a.m.

Join the MLAI Working Group for a fun and interactive session to learn how AI and ML can be integrated into geospatial missions and how to get involved in the working group.

NGA Advisory Working Group (NAWG)

NGA/Industry Acquisition Optimization: A Joint Advisory Panel Exchange

1-2 p.m.

The NAWG will review 2018 and upcoming 2019 events that enable how industry and NGA engage in acquisition and procurement activities. This joint NGA/industry panel will discuss mutual insights and actions taken based on events such as Reverse Industry Day, Cross Table Discussion, and other events. Learn about upcoming NGA/industry acquisition advisory activities and how you can participate.

Small Business Advisory Working Group (SBAWG)

Understanding the Integrated Project Office (IPOs) and Opportunities for Small Businesses

2-3 p.m.

The SBAWG panel will introduce the NGA IPOs (Analysis, Collection, Foundation, Data Services, and Infrastructure) and staff members to GEOINT 2019 attendees. The panel members will discuss their specific mission focus areas, unique challenges, and how small businesses can assist the IPOs in meeting their missions and small business objectives.

WEDNESDAY

St. Louis Area Working Group (SLAWG)

SLAWG at GEOINT 2019

8:30-10 a.m.

At the SLAWG meeting, hear local Saint Louis, Mo., leaders discuss their work around GEOINT workforce development, education and outreach, entrepreneurship, and more in the city's emerging geospatial ecosystem. SLAWG's goal is to clarify pathways for education and training for geospatial careers and certifications in the St. Louis region, and to identify needs for new pathways to integrate with existing efforts.

NGA Seeks Partners to Help "Show the Way"

AGENCY DIRECTOR VICE ADM. ROBERT SHARP DISCUSSED THE 2025 STRATEGY, AUTOMATION, AND MORE IN GEOINT 2019 KEYNOTE

By Jim Hodges

NGA Director Vice Adm. Robert Sharp gave his first GEOINT Symposium keynote Monday.

Vice Adm. Robert Sharp starts every week at the National Geospatial-Intelligence Agency (NGA) by playing a song over the public address system. Upon taking the helm as the agency's seventh director in February, the selection was Aretha Franklin's "R-E-S-P-E-C-T," which he called "our central core value."

Monday in San Antonio, Texas, Sharp played Peter Frampton's "Show Me the Way" for the GEOINT 2019 audience.

"At NGA, we exist to show the way—to literally get you from point A to point B, to help illuminate options and inform decisions or to carry out actions with precision," Sharp said in what was his first GEOINT Symposium keynote address.

The sentiment was in reference to "Mission Today," Goal No. 3 of the agency's four-pillar 2025 Strategy.

Goal 1 is taking care of the agency's "greatest asset—our 'People,'" Sharp said.

Goal 2 is "Partnerships." "To put it bluntly, without partnerships, you're weaker … and you're more apt to fail," he continued.

He pointed out that networks can be established with partners from across government, industry, and academia, in addition to allies.

The agency is up to more than 70 bilateral international partner agreements, according to Sharp. Some of the accomplishments achieved through partnerships include sharing human geography data among 12 countries, elevation data with 31, and mapping data with 32.

"I was schooled by a great leader, [Gen. Stanley McChrystal], who used to often say, 'It takes a network to defeat a network,'" Sharp said. "When it comes to how we define and build our own network, we're only limited by our imaginations, and our willingness to create meaningful relationships."

NGA's fourth Goal, "Mission Tomorrow," was the primary area of interest for many of those in attendance hoping to learn more about the agency's Artificial Intelligence, Automation, and Augmentation (AAA) initiative.

"If you're looking for an area to partner with us, I highly recommend you focus on … AAA," Sharp said.

In a press conference following his speech, Sharp included AAA as the top priority among "three things that are necessary to moving us forward." He then cited: modernizing IT infrastructure, ground infrastructure, and data storage and processing; and interaction with industry and academia as additional priorities.

NGA arrived at GEOINT 2019 with abundant copies of its "Tech Focus Areas: Hard Problems List," which included technology to aid in data analytics and visualization, advanced GEOINT exploitation, activity and Earth modeling, data collection and discovery, and business intelligence.

Sharp also discussed the agency's planned Next NGA West campus in St. Louis, Mo., at which 20 percent of the workspace will be unclassified, enabling the agency to work with more uncleared partners.

Like so many in the geospatial field, Sharp envisions a future that is machine-aided, not necessarily machine-driven.

"Our goal is to partner with machines so that we can make best use of the exponential growth in volume and source of data, letting machines do what machines do well and analysts do what analysts do even better—think critically and solve problems," Sharp said.

Asked what attributes future NGA employees should possess, he named intellectual curiosity and a capacity for critical thinking.

One question from the audience sought amplification. The questioner queried Sharp about how younger members of NGA's staff could gain a greater voice within the agency. He agreed that was important, saying, "Great ideas have no rank."

"When you create an environment in which ideas can flow from junior to senior, that's when the magic happens," Sharp responded.

Digital GEOINT Transformation Across Disciplines

JUNIOR GEOINTERS SHARE THEIR SUCCESS STORIES WITH NGA'S MAGE APP

By Lisbeth Perez

Digital natives were the highlight of a special opening presentation Monday morning.

> "The technology is customizable. As you see here, you have civil affairs and agriculture—two very different missions."
>
> — BENJAMIN FOSTER, NGA

GEOINT 2019 featured a special opening presentation Monday morning with junior geospatial intelligence professionals—"digital natives" brought up in the age of digital technology—alongside senior leaders.

USGIF Board Member Carmen Medina moderated the discussion, while Esri founder and president Jack Dangermond and The Honorable Jeffrey K. Harris, chairman of USGIF's Board of Directors, posed questions to the digital natives.

Benjamin Foster, technical lead for GEOINT Services Capabilities at NGA, spoke about the agency's responsibility to build technology that supports digital innovation throughout the GEOINT Community.

"Our team is the enabler behind these stories," Foster said with regard to NGA's MAGE (Mobile Awareness GEOINT Environment) app.

"The technology is customizable. As you see here, you have civil affairs and agriculture—two very different missions," he continued in reference to fellow panelists Marine Corps Staff Sergeant Aljune Lerio and Katie McGaughey.

Lerio, a noncommissioned officer with the 91st Civil Affairs Battalion, spoke about how digital technology such as MAGE aids his team when working in austere, potentially dangerous areas.

"We were able to use the mobile digital system and it does everything. Now we are moving a lot faster," Lerio said.

With MAGE, information is gathered and sent directly to headquarters.

"They can see our assessment and can connect with us and ask questions and see where we are," Lerio continued.

On March 2, 2018, MAGE proved its value to his team. When Al-Qaeda attacked the French Embassy in Burkina Faso in West Africa, primary, secondary, and tertiary systems went down. Immediately, the team used MAGE to locate team members and American children in the area.

"That day we learned that we needed digital integration for tactical assessment on the ground," Lerio said.

McGaughey, a senior crop assessment specialist with the U.S. Department of Agriculture (USDA)'s Foreign Agricultural Service, shared how her team employs MAGE to gather agricultural production data on a global scale.

Historically, her team travels with a lot of equipment, including cameras, laptops, and GPS devices. But now all they need are handheld mobile devices.

"We [took MAGE] to the field to collect agricultural data," McGaughey said, explaining that their goals are to provide support to American farmers, to enable global market transparency, and to identify hot spots for food insecurity.

"This is the take-home message, leveraging technology allows us to more accurately report on the global agricultural food production, which is important, because food security is a key component to national security," she said.

Harris concluded the panel by asking a fundamental question: "The dissemination of these products requires trust. This collaboration requires trust. Do you guys trust each other?"

Unanimously, the digital natives on the panel answered, "Yes."

Lerio said he tested MAGE first and asked questions his leaders would ask about the system.

"Trust the app first and then trust the developers working on the app," he said.

What the Intelligence Community Can Learn from Hollywood

CHRIS EDWARDS AND KEVIN SURACE EXPLORE HOW MODERN VISUALIZATION TOOLS COULD BE USED BY THE U.S. INTELLIGENCE COMMUNITY—AND ITS ADVERSARIES

By Rob Pegoraro

"Game of Thrones" and "Avengers: Infinity War" offer some useful lessons for national security types, and they don't involve ways to incorporate fire-breathing dragons or Infinity Stones into the battlespace.

Instead, look to how Hollywood has used modern visualization tools to tell its stories and consider how the same capabilities can advance analysis in the intelligence and defense sectors.

Sean Roche, associate deputy director for Digital Innovation at the Central Intelligence Agency; Chris Edwards, founder and CEO at the The Third Floor, a visualization studio based in Los Angeles and London; and Kevin Surace, a frequent speaker on AI issues and CEO and CTO of the Palo Alto, Calif., AI software testing firm Appvance; discussed these possibilities Monday morning at GEOINT 2019.

Roche led off by noting the one thing technology hasn't given analysts more of: hours in the day.

"Although we have more data and more capability, the amount of time that we have as storytellers to get that story together and tell it has been dramatically compressed and will keep being compressed," he said.

Surace agreed and said, "We are getting inundated with two or three or four times more data, but with essentially the same staff."

Edwards then led a presentation on how his firm uses tools such as 3D rendering software and augmented reality interfaces to take an idea for a scene from a director's sketch—sometimes on an actual napkin—to a rough version with the resolution of a video game to the finished product on a movie or TV screen.

The same capabilities, Edwards emphasized, can serve to visualize and explore complicated national security scenarios.

"I can only imagine the military and government applications of this in the future," he said.

"We're all trying to acquire and interpret a diverse range of data, we're integrating the data into simulations that can optimize the results, and then we're presenting that in an easy-to-digest fashion, so that many different groups can feed off of that information," Edwards mused.


Chris Edwards


Kevin Surace

Surace warned that the contrary reflex in many government offices is to stick with what worked before.

"Avoid risk, hang in there, I'll get to retirement," he described the mindset. "The problem is, if you want to advance, you need to take the risk."

Surace and Roche also noted multiple times that shying away from new tools won't stop adversaries from adopting them. This led to a discussion on "deepfake" videos, a threat all three speakers agreed needs more attention.

"In one minute, you can make the Nancy Pelosi video of a week or two ago," Surace said in reference to a video doctored to make Rep. Pelosi (D.-Calif.) appear incoherent. "It was the cheapest, easiest stunt that any of us could do in Final Cut Pro in five minutes."

The Pelosi video slandering the Speaker of the House was easy enough to flag as fake, but Surace and Edwards both warned that we may need to rely on AI applications to catch better-executed deepfakes.

And that, too, will require getting over the instinctive fear many people—elected officials included—have of AI.

"When you say AI, the first thing they think of is 'Ex Machina,' and 'Her,' and Hollywood's vision of us interfacing with robots," Surace said of dystopian big screen depictions. AI in reality, he continued, isn't like that.

"It's a new version of math," he said. "It's math that can run extremely well in a large cloud. But it's just math."

Combining AI & GEOINT for Disaster Planning & Relief

PANELISTS AT GEOINT FOREWORD DISCUSS DATA ANALYSIS FOR FIRST RESPONDERS

By Lisbeth Perez

GEOINT Foreword panelists discussed how AI can be leveraged to use GEOINT as a forecasting tool ahead of natural disasters.

During Sunday's GEOINT Foreword, a diverse panel of subject matter experts spoke about how the combination of artificial intelligence (AI) and geospatial data could aid in pre-disaster evacuations, disaster relief, and more.

Brian Collins, CEO of Intterra, began the conversation by speaking about the need for rapid analysis of the vast quantities of data fed to first responders, specifically firefighters.

"We need to assess the large amounts of data that come in and we need to start looking at it before we hand it off to [first responders]," Collins said. "We need rapid analysis of that data instead of a trigger of alerts."

Jessica Hulsey

He further explained how repurposing this information would allow evacuation pre-planning, rapid predictions regarding where the fire is expected to spread, and assessments of the social and economic impacts.

Eli Ibanga, a student at the University of Southern California's Spatial Sciences Institute, discussed how AI helps with evacuation preparedness ahead of a disaster.

"We wanted to focus on the preparation as opposed to response and recovery, which we often spend a lot of our time and resources in," Ibanga said.

Applying AI for evacuation reduces recovery costs, loss of life and injury, and community recovery time. One example Ibanga gave was health information exchange and the digitization of medical records.

"By leveraging machine learning and artificial intelligence the data can be processed and coded to come up with solutions for potential barriers to recovery or [to identify] people who could be at risk," Ibanga said.

William Porter, senior manager of operations support at nonprofit Team Rubicon, spoke about his team's response following several disaster scenarios such as Hurricane Florence in September 2018.

Team Rubicon members traveled to North Carolina to collect and map data. The information included flood zones, functioning gas stations, distribution points, open roads, etc.

"It impacted the traditional response and informed decisions," Porter said.

Jessica Hulsey, a product development manager at BAE Systems, spoke about understanding AI and machine learning in the context of disaster response.

"What we are trying to understand in disaster response and geospatial intelligence is how we can apply these capabilities to improve how we approach problems," she said. " ... What are the questions we need to ask? What are the answers we are looking to get in order impact response in a meaningful way?"

She showed imagery captured during Hurricane Florence. AI used at the time detected various items on the road, such as fallen trees and standing water.

"But what are we trying to understand in this scene? The human in this can say the tree is not blocking the entrance to the property, the standing water is not approaching the residence, which is important to know," Hulsey explained. "We are seeing some computer vision techniques but then we want to link that where we can get to decision-making."

Ultimately, according to Hulsey, it comes down to observation and classification. While AI and geospatial data are complex it's important to ask the right questions and to identify the data, resources, and techniques that lead to timely answers.

The Search for Exoplanets

ONE NASA DATA SCIENTIST'S TAKE ON HUMAN-MACHINE TEAMING

By Rob Pegoraro

Some tasks are too tough for either humans or machines to handle on their own. Jeffrey R. Smith, a data scientist with the SETI Institute at NASA's Ames Research Center in Moffett Field, Calif., brought a particularly complex task to the attention of GEOINT Foreword attendees Sunday afternoon.

"It has to do with this tiny problem we have of finding planets 600 trillion miles away from the Earth. It's actually more difficult than it sounds," Smith joked.

After centuries of Earthbound struggle to locate exoplanets, a series of orbiting observatories have discovered thousands over the last decade or so. These include not just gas giants that probably can't support life but also approximately Earth-sized worlds at distances from their stars that could allow water to exist—a key precursor to life.

"There are Earthlike planets everywhere," Smith said. "There are millions in the galaxy."

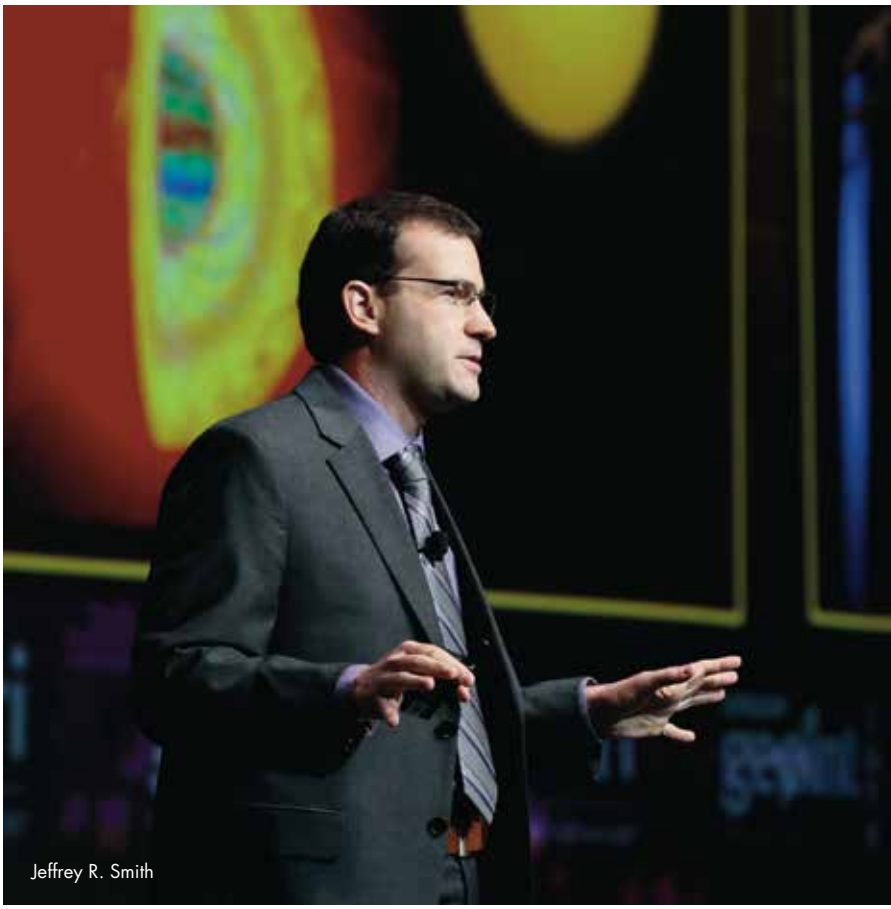
Smith focused on one of these specialized satellites: TESS, the Transiting Exoplanet Survey Satellite, launched in April 2018. Like NASA's earlier Kepler probe, it locates exoplanets by searching for the fluctuations they cause in the light of their stars as they pass in front of them.

Identifying legitimate signals of planetary transits from all the possible errata makes for some tricky work.

"We're searching for really small signals here," Smith said.

Everything from the spacecraft wiggling in orbit to distant stars that oscillate and pulsate on their own can introduce noise into images captured by these orbiting observatories.

"All of this adds up to systematic issues that are sometimes thousand of times larger than the actual signals," Smith said.



Jeffrey R. Smith

To surface the real signals, researchers have built a variety of deep-learning models—Smith refrained from describing them, instead offering variations of, "I'll just say it's magic"—to yield a smaller set of potential planetary finds for human evaluation.

As he put it: "The pipeline doesn't spit out planets, it spits out things that might possibly be planets, these planet candidates, and a human has to look at these and figure out or guess, is this really a planet or not?"

To demonstrate the degree of difficulty, Smith showed a series of TESS imagery and asked the audience if each represented the signature of a planet's transit. After a couple of reasonably obvious examples—one a large planet, another an imaging artifact—the examples became more ambiguous.

"This is just chance correlations of random noise," Smith said after showing an image that looked to the uneducated eye as if it could have been yet another sign of an Earthlike world. "We're searching out signals that are just above the noise floor."

He closed his presentation by emphasizing the importance of finding the right role for machine learning versus human insight—as in, one that "frees the humans to concentrate on the interesting things."

In the case of exoplanet sleuthing, that role came down to culling out the clutter, so humans don't spend as much time on image triage.

"Whatever you can do to eliminate false positives early on in your pipeline, the more efficient you're doing to be," Smith said.

But he suggested that a purely biological or completely digital approach will never work for complex problems such as this.

"It really takes the human to decide where do you put the machine, how do you wire up the machine, and to what degree do you trust the machine," he concluded. "And for that matter, what degree do you trust the human—because humans have biases and intuitions."

> "Whatever you can do to eliminate false positives early on in your pipeline, the more efficient you're doing to be." — JEFFREY R. SMITH, NASA

In the Age of AI, Humans Will Still Be in Charge

GEOINT EDUCATORS DISCUSS THE EDUCATIONAL NEEDS OF THE FUTURE

By Jim Hodges

From left to right: moderator Ben Conklin of Esri; Col. Steven D. Fleming, Ph.D., of USC; Dr. Todd S. Bacastow of Penn State; and Dr. Camelia Kantor of USGIF.

Geospatial intelligence in an AI-enabled world is about adaptation and trust. But it's not about accepting that the human element is being moved to the rear of the bus by a machine.

"It's about combining machines with human processes," said Dr. Todd S. Bacastow, a panelist in Sunday's "Education vs. Training: GEOINT in an AI-enabled World" session as part of GEOINT Foreword.

Bacastow, a professor of practice for geospatial intelligence at Penn State University, added: "Unless we're going to have machines direct machines, humans are going to have to be involved and we're going to have to have humans direct machines to augment what we do."

Bacastow and fellow panelists offered their perspectives on technological advances that have some geospatial practitioners concerned.

Increasingly, the discipline is likely to involve "life-long learning," said Dr. Camelia Kantor, Vice President of Academic Affairs for USGIF. It will also include the necessary ability to adapt to change.

"How do we react to innovation and change every time we have a new revolutionary technology?" Kantor continued. "How can we react when we know there's a change coming?"

Before universities establish curricula to teach evolving geospatial technology, including AI and machine learning, academia needs to accept that change is occurring quickly and will continue to do so.

"It is a little hard to keep up," said U.S. Army Col. (Ret.) Steven D. Fleming, Ph.D., professor of practice in the Spatial Sciences Institute and the Institute for Creative Technologies at the University of Southern California. "Sometimes, one step behind is the best you can do. In many cases, we are doing all that we can do to stay up with the educational and training requirement."

One method educators can use flies in the face of traditional higher education, which requires lengthy approval timelines for new courses and curricula. Flexibility is paramount to incorporate evolving technology.

"I encourage academics that are in the business of doing any kind of education [to be flexible]," Fleming said. "They should say, 'I'm going to accept the fact that this discipline is dynamic, and I'm going to address change through the unknown, looking over the horizon, and you folks are going to have to trust me.'"

Trust them to do what, exactly? To answer the question, "What are the competencies that people who do geospatial intelligence should have in the AI environment?" Bacastow elaborated.

"One thing we can predict is that we're going to need to train the AI systems," Bacastow said. "We need to teach people to be experts at training them."

People also are necessary to interpret AI results, to apply critical thinking to the human-machine team, and to apply prescriptive analytics to amplify anomalies. They will also be needed to cope with ongoing technological developments.

Those people will be best taught in modern settings. The era of PowerPoint in support of a lecture does not fit the dynamic nature of the geospatial intelligence profession.

"We're going to have to move into a much more realistic training environment, or education

To learn more about USGIF's Academic Planning Committee and educational initiatives, contact USGIF's Dr. Camelia Kantor at camelia.kantor@usgif.org.

USGIF Volunteer Spotlight: Todd S. Bacastow, Ph.D.

By Kristin Quinn

Todd S. Bacastow, Ph.D., is a longtime supporter of USGIF and the GEOINT profession at large, and currently leads the Foundation's Academic Planning Committee.

Bacastow was teaching at Penn State shortly after 9/11 and around the same time the term geospatial intelligence (GEOINT) was coined, when his then colleague, David DiBiase, attended the first GEOINT Symposium.

"He came back and said, you've got to see this," Bacastow recalled. "It was a natural fit in away. In a larger context, [getting involved with USGIF] was my way of continuing to serve after I retired from the Army."

As a result, Penn State became one of the first universities to earn USGIF Collegiate Accreditation and to grant academic GEOINT Certificates.

Current priorities for the Academic Planning Committee are looking ahead to understand the academic needs of the GEOINT discipline, how USGIF can support those needs, and how to move the discipline into the next decade. This includes the planning of a new academic GEOINT summit USGIF plans to host in September 2020.

Bacastow's overarching goal for the committee is to "take the intellectual lead on the discipline." To do so will require diversity, he continued, urging academics who are just learning about GEOINT to get involved.

"This is a way they can learn the discipline, and we value their participation because they will broaden the perspective," Bacastow said, adding he hopes to reach other markets such as business and public safety.

As the discipline matures it is starting to see a second generation of professionals with a stronger grasp on AI, machine learning, and deep learning, according to Bacastow.

"That's in a real sense where the future lies—it's in the new people, it's in that new generation coming up," he concluded.

environment," Bacastow said. "We're going to have to put the student in very difficult situations. That means a large variety of real-world training scenarios. That's where the human will interact with the machine and gain confidence in the ability to use it."

Teaching will change, but so will learning, according to Fleming.

"Alvin Toffler said, 'The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn,'" Fleming quoted. "Something that was right when you learned it, then wrong today, can become right tomorrow. You have to be a dynamic learner."

CIO *continued from cover*

"Epoch 2 is looking at: Yes, we have that foundation, but how can we actually use that?"

— LA'NAIA JONES, ODNI

but now the role of the CIO really encompasses everything that the agencies or organizations are providing," said Jones, adding CIOs now oversee not only technology, but also disciplines as diverse as security, procurement, and human resources. "The role has morphed from what was more of a stovepipe to now being foundational and integrated into everything that we do."

Part of what makes the modern CIO so foundational, Gallina proposed, is that they have become soothsayers. "There's the keep-the-lights-on part of the CIO job, and then there's the [part of the job that's focused on] future investment in the portfolio," she said. "This is the new issue for CIOs in our role: We need to be thinking ahead of our own agency about how will technology trends in industry disrupt the agency's operations in the future."

Juliane Gallina

Personnel constitute a big part of the answer, panelists agreed. "A CIO today has to have an incredible wealth of talent working for them to ensure that they're meeting [their objectives]," asserted Redmond, who said the State Department, for its part, has a number of programs designed to help it recruit and develop the IT talent necessary to address future challenges and opportunities.

One successful example is the IT Skills Incentive Program, which encourages employees to acquire new skills and education by giving them financial rewards in exchange for completing eligible training courses and certifications. The department also has an expansive IT internship program and is investing "aggressively" in hiring low-level IT employees—"digital natives" who will help the agency achieve and maintain a technological edge as they advance through its ranks.

Though attracting qualified IT talent can be difficult even in the private sector, the challenge is even more pronounced in the IC due to the security clearance process, according to Jones, who said a major focus at ODNI is its Right, Trusted, Agile Workforce initiative, for which the objective is partnering with industry to establish a trusted workforce that can easily flow between the IC and the private sector. "We're looking at how we can leverage relationships and partnerships ... to be able to bring people in more easily in order to help with innovation," she said.

"Relationships and partnerships" were also a dominant theme when panelists turned their attention to the Intelligence Community Information Technology Enterprise (IC ITE), which is now in the midst of its "second epoch." While IC ITE's first epoch was about establishing an IT foundation—a common IT architecture and a shared IT environment—its second epoch, panelists indicated, is about establishing functional partnerships through which to actually leverage it.

Continued Jones, "Epoch 2 is looking at: Yes, we have that foundation, but how can we actually use that? How can we partner with industry, academia, among ourselves to be able to leverage what we do well and to learn from each other?"

Though it's not yet clear what they'll look like or how they'll function, the need for knowledge sharing via constructive and collaborative IT partnerships is undeniable in the face of emerging technologies, including 5G wireless networks for mobile intelligence, blockchains for supply chain security, and even Sci-Fi-sounding innovations like augmented reality goggles one can control with eye movements.

"It truly blew my mind," Gallina said of the latter innovation, which she recently experienced firsthand at a technology summit.

Her sentiment—wonder, excitement, curiosity—perfectly captures the driving force behind the transition among IC CIOs: With the prospect of new technology, public and private enterprises need skilled IT departments to make strategic sense of it.

USGIF Announces 2019 Stu Shea Endowed Scholarship Recipient

CLARK UNIVERSITY'S JACLYN GUZ BECOMES SECOND RECIPIENT OF $15,000 SCHOLARSHIP

Monday morning at GEOINT 2019, Jaclyn Guz was recognized as the recipient of USGIF's Stu Shea USGIF Endowed Scholarship. Guz is a student at Clark University in Worcester, Mass., pursuing her Ph.D. in geography.

The scholarship honors K. Stuart Shea, one of the founders of USGIF and the first chief executive and chairman of the organization. The $15,000 scholarship is awarded annually to one Ph.D. student studying cartography, geography, or imaging science.

"I am very happy to be the recipient of the Stu Shea Endowed Scholarship," Guz said. "This scholarship enables me to better conduct my research by allowing flexibility and freedom to explore questions and methods that were not previously feasible. Additionally, it opens networking opportunities and the ability to interact and collaborate with experts in my field. I hope the connections I make will allow me to expand my skill sets and help me to advance geospatial technology."

Guz earned her bachelor's degree in environmental science from Texas A&M University in 2016. In the first year of her Ph.D. program, she completed a research project in Colorado and Wyoming that quantified how post-fire regeneration density has decreased throughout the past century. The project was partially funded by a USGIF Scholarship she was awarded in 2018.

Two internships at Esri helped Guz develop skills in machine learning and big data that she applied during her Ph.D. research. Outside of school, Guz volunteers with the Worcester chapter of Girls Inc., a nationwide nonprofit that helps young girls gain life skills, specifically through their Eureka! STEM and Leadership Program.

As part of her volunteer efforts, Guz helped acquire a grant from the National Network of Libraries of Medicine. The grant funded a healthy community mapping project for the Worcester chapter, which Guz hopes will be implemented at other Girls Inc. chapters across the nation.

The Honorable Jeffrey K. Harris (left), chairman of the USGIF Board of Directors, and Stu Shea (right) present the $15,000 Stu Shea scholarship to Clark University Ph.D. student Jaclyn Guz along with the USGIF Board of Directors.

> "I hope the connections I make will allow me to expand my skill sets and help me to advance geospatial technology."
>
> — JACLYN GUZ, CLARK UNIVERSITY

Learn more about the USGIF Scholarship Program at usgif.org/education/scholarships.

NGA Director Vice Adm. Robert Sharp (third from left) and Esri president and founder Jack Dangermond (far right) pose with young GEOINT professionals in the GEOINT 2019 Speaker Ready Room.

7:00–9:00a
Training & Education Sessions (Third Level, 301A–302C)

8:30–8:45a
Master of Ceremonies: Keith Masback, USGIF Board of Directors (Hall 1)

8:45–9:45a
Keynote: The Honorable Sue Gordon, Principal Deputy Director of National Intelligence (Hall 1)

09:45–10:15a
Keynote: The Honorable Lisa Porter, Deputy Under Secretary of Defense for Research and Engineering (Hall 1)

10:00a–5:00p
Exhibit Hall Open (Halls 2–3)
Sponsored by General Dynamics IT

10:00–11:00a
USGIF Workforce & Certification Development Initiative Information Session (Exhibit Hall, USGIF Booth 1511)

10:00–11:00a
USGIF Machine Learning & Artificial Intelligence Working Group Session (Third Level, Room 303AB)

10:15–10:45a
Morning Coffee and Networking Break (Exhibit Hall)

10:45–11:30a
Panel: Wildfires — Science and Technology — Changing the Wildfire Paradigm (Hall 1)

- Kate Dargan, Co-Founder, Chief Strategist, Intterra Group
- The Honorable James Reilly, Director, United States Geological Survey
- Jeff Johnson, CEO, Western Fire Chiefs Association
- Rachael Brady, Research Data Specialist, California Department of Forestry and Fire Protection * 2019 USGIF Government Award Winner
- Jaclyn Guz, Ph.D. program at Clark University * 2019 Stu Shea Scholarship Winner

11:00a–12:00p
NGA and USGIF Small Business Advisory Working Group Session (Third Level, Room 302A)

11:30a–12:15p Keynote: BG Matt Easley, Director, Army Artificial Intelligence Task Force, Army Futures Command (Hall 1)

12:30–2:00p Lunch (Exhibit Hall)

1:00–2:00p
Accredited School Information Session (Exhibit Hall, USGIF Booth 1511)

1:00–2:00p
USGIF NGA Advisory Working Group Session (Room 303AB)

1:00–2:00p
USGIF Professional Certification Information Session (Exhibit Hall, USGIF Booth 1511)

1:00–4:00p
Government Pavilion Stage (Exhibit Hall, Booth 466) Sponsored by AT&T

- Master of Ceremonies: Lewis Shepherd, Vice Chair, AFCEA Intelligence Committee

1:00–1:30p — AIMing for Success

- Moderator: Lewis Shepherd, Vice Chair, AFCEA Intelligence Committee
- Dean Souleles, Chief Technology Advisor, ODNI
- Dr. Anthony Scriffignano, Chief Data Scientist, Dun & Bradstreet

1:30–2:15p — Collaboration in Space for International Global Maritime Awareness

- Moderator: Nicole Pilkus, Deputy Director of Maritime, NGA
- Guy Thomas, Science Advisor to the Multinational Maritime Security Center of Excellence
- Piotr Malinowski, Head of Information Fusion Centre European Border and Coast Guard Agency

2:15–2:50p — GIS Solutions in Support of Army Modernization

- Gary W. Blohm, U.S. Army Geospatial Information Officer, Army Geospatial Center

2:50–3:20p NRO and Commercial Systems for GEOINT

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

3:20–4:00p Operations and Interoperability: Fueling the Global GEOINT Enterprise

- MG Charlie Cleveland, Associate Director for Operations
- Jennifer Daniel, Associate Director for Enterprise

1:30–4:10p
Lightning Talks (Exhibit Hall, Innovation Corner, Booth 1943)

2:00–2:30p
Afternoon Coffee Break (Exhibit Hall) Sponsored by HERE Technologies

2:00–2:45p
Young Professionals Mentoring Discussion (Exhibit Hall, YPG Lounge, Booth 2005)

2:00–4:00p
Training & Education Sessions (Third Level, 301A–302C)

4:00–5:00p Networking Reception (Exhibit Hall)

4:00–5:00p
Accredited School Information Session (Exhibit Hall, USGIF Booth 1511)

4:00–5:00p
Young Professionals Mentoring Discussion (Exhibit Hall, YPG Lounge, Booth 2005)

5:00–7:00p
Young Professionals Networking Reception (Broken Crust Cafe) Co-hosted by Esri's Young Professionals Network

» WEDNESDAY, JUNE 5, AT-A-GLANCE

EXHIBIT HALL OPEN 10:00A-3:00P

7:00–9:00a	**TRAINING & EDUCATION SESSIONS** (Third Level, 301A-302C)
8:30–10:00a	**USGIF ST. LOUIS AREA WORKING GROUP SESSION** (Third Level, Room 303AB)
9:00–9:15a	**MASTER OF CEREMONIES: DR. L. ROGER MASON, JR., USGIF BOARD OF DIRECTORS** (Hall 1)
9:15–9:45a	**KEYNOTE: THE HONORABLE KARI BINGEN, DEPUTY UNDER SECRETARY OF DEFENSE FOR INTELLIGENCE** (Hall 1)
9:45–10:15a	**DISCUSSION: NATO AND COALITION SUPPORT TO THE WARFIGHTER** (Hall 1)
10:15–10:45a	**MORNING COFFEE AND NETWORKING BREAK**
10:45–11:00a	**KEYNOTE: LYDA KREWSON, MAYOR OF ST. LOUIS, MISSOURI**
11:00–11:30a	**KEYNOTE: DAVID LUBER, EXECUTIVE DIRECTOR, UNITED STATES CYBER COMMAND** (Hall 1)
11:30–11:45a	**CLOSING REMARKS: KARIN SOYSTER FITZGERALD, COO, USGIF** (Hall 1)
12:00–2:00p	**LUNCH** (Exhibit Hall)
12:00–2:30p	**GOVERNMENT PAVILION STAGE** (Exhibit Hall, Booth 466) *Sponsored by AT&T*
2:00–3:00p	**NETWORKING RECEPTION** (Exhibit Hall) *Sponsored by Visit Tampa Bay*

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