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Professionalizing the GEOINT Workforce

USGIF OFFICIALLY LAUNCHES ITS UNIVERSAL GEOINT CERTIFICATION PROGRAM AT GEOINT 2016

By Dr. Darryl Murdock, Vice President of Professional Development, USGIF

Geospatial intelligence has grown far beyond the banks of the Potomac and is now a global phenomenon. In just more than a decade since the term was coined, a large GEOINT Community has sprung up around the world that is significantly impacting commercial business as well as the more traditional defense, intelligence, and homeland security communities.

Workers across the globe and in varied industries are becoming GEOINTers by the very nature and requirements of their jobs. And as the world demands more precision location information, geographical representations, and data visualization, the most challenging issue the community faces is ensuring the professional workforce has the right knowledge, skills, and attitudes (KSAs), as well as a way to demonstrate this domain expertise—or a pathway to achieve such proficiency.

USGIF officially launches its Universal GEOINT Certification Program this week at GEOINT 2016, having just last week completed its pilot exam phase and awarded the first certifications to those who passed pilot exams. This marks an exciting milestone for the GEOINT Community as USGIF broadens its GEOINT pipeline from university accreditation and scholarships to include the professionalization of the GEOINT workforce.

USGIF's certification program includes three exams with corresponding certifications: GIS and Analysis Tools (CGP-G); Remote Sensing and Imagery Analysis (CGP-R); and Geospatial Data Management (CGP-D). A fourth competency—data visualization—is incorporated throughout all of the exams.

Each of the three exams and subsequent professional certifications are valuable as standalone credentials. Many GIS, remote sensing, or data management

➡ see Certification p. 11



Dr. Darryl Murdock, USGIF's vice president of professional development, announced Sunday morning during his GEOINT Foreword welcome address that USGIF's Universal GEOINT Certification Program has completed the pilot testing phase and official program testing will begin in July.

“Workers across the globe and in varied industries are becoming GEOINTers by the very nature and requirements of their jobs.”

—DR. DARRYL MURDOCK, USGIF

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ANALYTICS

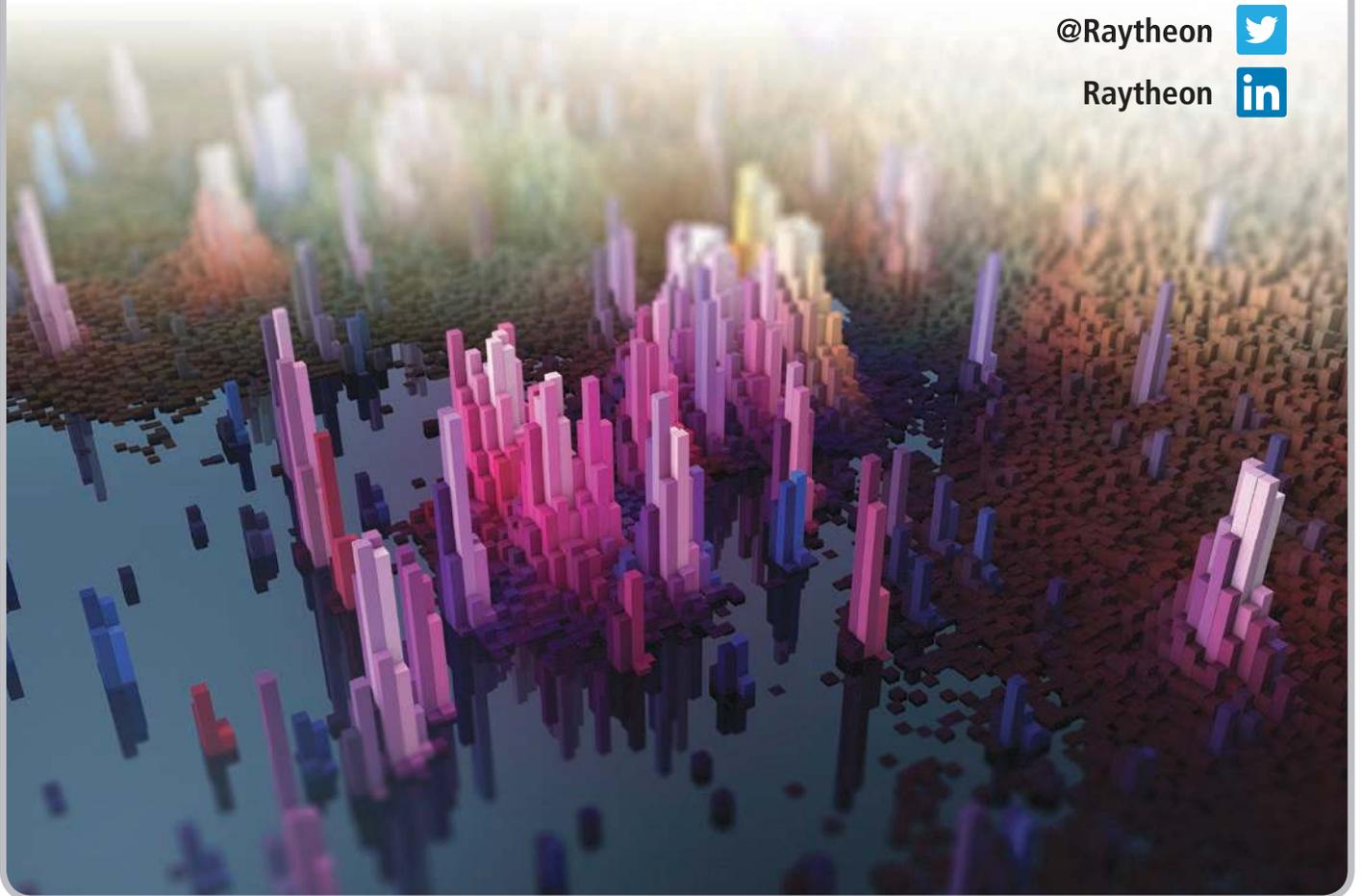
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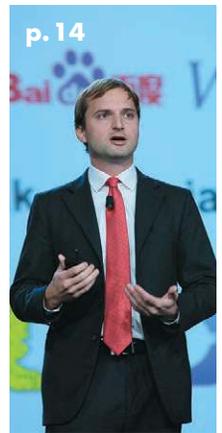
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ARE YOU TAKING FULL ADVANTAGE OF YOUR USGIF MEMBER BENEFITS?

USGIF's affinity program offers a variety of benefits to USGIF organizational and individual members. Westway Development Services (WDS), one of USGIF's affinity program partners, will host information sessions in the **USGIF booth (#901)** from 1 to 1:30 p.m. Monday through Wednesday. WDS provides the defense and intelligence communities with rapid access to accredited, secure facilities and communication infrastructures with all-inclusive support services. Stop by to learn how WDS can help your organization.

FROM THE



The HPE booth features a hands-on "Race to Win the Idea Economy" game.

GET IN THE RACE

HPE BOOTH FEATURES HANDS-ON RACING GAME, INTERACTIVE STORAGE DISPLAY

Hewlett Packard Enterprise (HPE) (Booth 1729) is exhibiting at GEOINT 2016 for the first time since the company spun off from Hewlett Packard Inc. in November 2015.

"We want to make sure both our partners and clients understand we are still one of the world's largest IT companies, and we continue to provide great support and enterprise solutions to national security and defense," said Orlando Figueredo, vice president of HPE's Consulting and Intelligence Segment, Enterprise Services, U.S. Public Sector.

HPE's booth features a hands-on racing game called "the race to win the idea economy," during which visitors can ask and answer questions about current IT challenges. Participants can race with other visitors, and learn not only how HPE can help them with challenges, but also how most challenges are not unique to one company or agency.

The booth also includes an interactive display of HPE's new rack-size converged storage system.

"This gives us the opportunity to talk to customers about our hardware and server product line," Figueredo said. "We will also have experts in the booth available to answer questions."

HARVESTING BIG DATA

KEYW SHOWCASES SOURCERER DATA INTEGRATION AND ANALYSIS TOOL

KEYW Corp. (Booth 1008), a technical solutions firm serving intelligence and law enforcement customers, is demonstrating its new KEYW Sourcerer data harvesting and curation tool at the GEOINT 2016 Symposium.

KEYW Sourcerer is a data integration and analysis tool that ingests large volumes of data from any source, including the internet, to provide solutions tailored to specific customer needs, according to Simone Stanich, KEYW marketing and communications manager. The open-source platform uses automation tools to minimize the tasks analysts must perform, enabling them to spend less time on "housekeeping chores" and more time developing solutions, Stanich added.

"The end result of the application of KEYW Sourcerer in the ingest of data is immediate situational awareness that reduces the cycle time from question, to answer, and back to question again to reveal the unknown unknowns in minutes rather than hours or days," Stanich said.

The system enables machine-to-machine interaction and can be readily accessed via URL.

KEYW also provides synthetic aperture and moving target indicator radars for both manned and unmanned aircraft as well as analytic tools for radar imagery.

PHOTO COURTESY OF HEWLETT PACKARD ENTERPRISE

FLOOR

EXHIBIT HALL HIGHLIGHTS

ENHANCING A LEGACY

TEXTRON SYSTEMS DEMONSTRATES REMOTEVIEW 4.5 AT GEOINT 2016

Textron Systems (Booth 1402) is highlighting updates to its flagship product, the RemoteView electronic light table, at GEOINT 2016. RemoteView has the ability to render high-fidelity, large data sets from different sensor types, bringing in everything from high-resolution satellite imagery to vector encoded data, according to Tony Bruzzese, a solutions engineer and customer engineering liaison within Textron's Geospatial Solutions business unit.

Although RemoteView has been a legacy product for about 15 years, the company is demonstrating the latest version, RemoteView 4.5, in its booth. Version 4.5 includes more capabilities and support for Open Geospatial Consortium standards. Textron is also introducing at the Symposium a Linux commercial version of RemoteView 4.5, which features the same capabilities PC users are accustomed to, Bruzzese said. This is to meet customer demand for the ability to allow third parties to interface with the RemoteView platform.

"We've done extensive work to allow for other people to ... run their custom algorithms through RemoteView," Bruzzese said.

RemoteView 4.5 also includes mensuration enhancements and



This RemoteView comparison shows on the left an abandoned facility in Bulgaria, while the image on the right shows the same facility fitted with an entry control point, shipping containers, and tents for housing Syrian refugees.

unclassified support to better meet the needs of the increasing number of customers using unclassified versions of the light table.

The company is also showcasing its GeoCatalog, an extension to RemoteView that allows customers to create searchable database libraries, as well as a thin client cloud version of RemoteView.

DATA WITHOUT LIMITS

URSA SPACE DEMOS MAPPING PLATFORM AT GEOINT 2016, PLANS TO LAUNCH SATELLITES IN 2018

Ursa Space Systems (Booth 1219) aims to make the powerful data derived from commercial SAR satellites easier to use by delivering results on Ursa Maps, its web-based mapping application.

Founded about a year and a half ago, the company at GEOINT 2016 is demon-



Ursa Space Systems is demonstrating its Ursa Maps web-based mapping application and seeking beta testers at GEOINT 2016.

strating Ursa Maps, which uses data derived from satellite imagery to monitor oil tank fill levels, to identify ships in ports—including those not transmitting AIS, and to count cars in parking lots. The company is also accepting

PAR Government, which allows its data to be available through PAR's GvSA application on the National Geospatial-Intelligence Agency's GEOINT App Store.

"[The GEOINT Symposium] is an opportunity to interact

Ursa Maps beta testers, who will be able to access information over the next several months. The first location Ursa is offering these products for is the port of Singapore.

Ursa plans this week to share details of its partnership with

with the customers and get customer feedback on our product," said Derek Edinger, Ursa co-founder and satellite lead.

Additionally, beyond GEOINT 2016, Ursa is designing its own constellation of SAR satellites, which it plans to begin launching in 2018 to provide users with hourly revisit rates and direct download capabilities. By combining the Ursa Maps data platform with its own SAR constellation, the company's goal is to offer user-friendly, 24/7, all weather, day and night access to space.

GEOINT, M&A, and Capital Markets

As the demand for government and commercial geospatial intelligence continues to grow, some companies will need to access the capital markets to seize the emerging opportunity at its fullest—and fast. Other startups and growth come from mergers and acquisitions.

On Monday from 2:30-3:30 pm in Osceola A, a panel of entrepreneurs will share their experiences of turning dreams into reality by launching their own businesses, as well as how they made the decision to take their businesses to the next level through mergers or acquisitions. Participants will include Josh Hartman, managing partner of Renaissance Strategic Advisors; Omar Balkissoon, CEO and

co-founder, OGSystems; John Fenwick, head, Terra Bella Operations, Google; and Shay Har-Noy, vice president and general manager, platform, DigitalGlobe. USGIF's Young Professionals Working Group will host this panel.

On Tuesday at 4 p.m. in the exhibit hall on the Government Pavilion Stage, USGIF Member Neptune will host a panel titled, "The Intersection of GEOINT and the Capital Markets." This interactive discussion will include representatives from industry, private equity, and investment banking, who will discuss capital markets, the challenges and costs of commercializing geospatial intelligence, and merger and acquisition activity in the space.

GEOINT in Academia

USGIF will host a joint accredited programs meeting Tuesday from 8 to 11 a.m. in Sarasota 2-3 with participants from USGIF-accredited colleges and universities, U.S. Geological Survey-National Geospatial-Intelligence Agency (NGA) designated Centers of Academic Excellence (CAE), and historically black colleges and universities (HBCUs).

The purpose of the meeting, which is open for attendees and exhibitors to observe, is to share lessons learned, explore opportunities for collaboration, and further involve HBCUs with the world of geospatial intelligence.

Dr. Darryl Murdock, vice president of professional development for USGIF, will provide an

update on USGIF educational activities; Dr. Lenora Gant of NGA will update attendees on the agency's CAE program; and Talbot Brooks of Delta State University will outline the school's new 2+2 pilot program.

Additionally, Dr. Robert Hoffman of the Institute for Human and Machine Cognition will lead a panel discussion on how GEOINT analysts learn. Panelists will include:

- Dr. Todd S. Bacastow, Pennsylvania State University
- Dr. Susan Coster, Raytheon
- Dr. Peter A. Hancock, University of Central Florida
- Erin C. Long, Pennsylvania State University
- Dr. Darryl Murdock, USGIF
- Richard Rennolds, NGA

There's an App for That

DOWNLOAD THE GEOINT 2016 MOBILE APP

Do you need to check the GEOINT 2016 agenda or locate a specific booth in the exhibit hall? The GEOINT 2016 mobile app, free for download on iOS, Android, and Blackberry devices, puts everything you need to know about the GEOINT Symposium in the palm of your hand. The app features an up-to-date, detailed agenda, exhibitor and sponsor listings, speaker biographies, social media streams, and much more. Users can also create their own agenda and get notifications when a session they want to attend is about to start. New to the app this year is a wayfinding feature. When in the exhibit hall, users may pull up the exhibit hall map via the app, enter the organization name or the booth number they wish to visit, and the app will then direct them using the most efficient route. Download the official GEOINT 2016 app today!

USGIF Working Group Snapshot

Many USGIF working groups and committees are holding meetings, panels, and networking events at GEOINT 2016. These events, taking place in Osceola A, are open to all Symposium attendees and exhibitors interested in the topic or seeking to learn more about a particular working group or committee.

MONDAY

[NGA Advisory Working Group/ NRO ASP Industry Advisory Working Group Discussion](#)

Evolving to a Sustainable, Government/Industry Business Model in an IC-ITE and Cloud-based Environment

12:30-2 p.m.

The two USGIF industry working groups produced findings and recommendations for consideration. The NRO ASP Industry Advisory Group focused on NRO software licensing approaches, use of open-source software, and requirements evolution. The NGA Advisory Working Group (NAWG) focused on acquisition transparency, RFP clarity

and quality, and how contracting techniques might be used to better deliver innovation. Side-by-side review of the findings revealed common themes that suggest broader applicability of both groups' recommendations and merit further discussion.

TUESDAY

[Small Sat Working Group Panel Filling the Gaps: Nuclear Activity Monitoring and Small Satellites](#)
8-9 a.m.

This panel will deliberate the role small satellites play in answering intelligence questions concerning nuclear power.

- Moderator: Dan Twomey Jr., Solutions Group, NJVC
- Dave Gauthier, Director, Office of Strategic Operations, NGA
- Dr. Andy Hock, Product Manager, Terra Bella Operations, Google
- Serena Kelleher-Vergantini, Research Analyst, Institute for Science and International Security
- Dr. Joe Thurgood, Vice President, Corporate Development and Marketing, Hera Systems

See a better world



**LIVE PRESENTATION SCHEDULE
MONDAY 16 MAY**

- 1:00 pm » The era of Geospatial Big Data
- 1:20 pm » The evolution of the DigitalGlobe Constellation
- 1:40 pm » Olympic security planning enabled by Human Landscape
- 2:00 pm » Leverage the most current high-resolution imagery via Global EGD
- 2:20 pm » Helping mankind understand the Earth at scale
- 2:40 pm » The GEOINT easy button: AnswerFactory
- 3:00 pm » Show me where: The power of automated object detection on the GBDX platform
- 3:20 pm » Enabling terrain analytics in the cloud
- 3:40 pm » How NVIDIA supports GBDX's deep learning capability

See the GEOINT revolution in action at booth #1103



Training Snapshot

GEOINT 2016 offers 30 trainings for 60 hours of dedicated professional development. Attendees can receive .02 Continuing Education Units per session for select trainings, courtesy of Riverside Research, an IACET-authorized provider and USGIF mission partner in STEM education. Each training session is \$25 and you may sign up at the GEOINT 2016 registration desk.

MONDAY AFTERNOON SESSIONS, 2-4 P.M.

Leveraging Critical Thinking in Applying Activity-Based Intelligence Methodology

BAE Systems

Osceola 1

This course will cover the philosophy of activity-based intelligence and how critical thinking can be used to enhance the analytical application of this methodology.

Activity-Based Intelligence In-Action: Nontraditional GEOINT and the Future of Analysis

Learning Tree International

Osceola 2

This course will demonstrate the core concepts of activity-based intelligence as a methodology for technology-enabled problem solving through the use of real-world vignettes.

The Five Habits of the Master Thinker

Pherson Associates

Osceola 3

This educational session will outline the five critical thinking skills all geospatial professionals should master to protect against biased thinking, spur imagination, and collaborate across agencies and disciplines to best protect our national security.

Building Intelligence From The Ground Up: Analyzing Seaport Risk Using Open-Source Data

Textron Systems

Osceola 4

This training session will explore workflow techniques for exploiting and fusing open-source data into foundational GEOINT products used to help port managers address security concerns.

Linking Geospatial Data in Space and Time

IBM

Osceola 5

This class will present the required tools, framework, and steps for big data curation, spatial and temporal alignment, and indexing of data layers.

Open-Source Exploitation Methodologies and Techniques for Targeting Financial Networks, Forecasting Instability, and Tactical Monitoring

Leidos

Osceola 6

This course will focus on managing volume, variety, velocity, and veracity issues with open sources; tailoring data acquisition strategy to be mission relevant; developing unified data models; and configuring analytics to innovate at the speed of mission.

TUESDAY MORNING SESSIONS, 7-9 A.M.

Applying the Concepts of Geospatial Intelligence in Law Enforcement and Policing

Pennsylvania State University

Osceola 1

This course explains the fundamental relevance of spatial concepts and behavioral theories as they apply to law enforcement and policing.

Understanding the Syrian Refugee Crisis through Open-Source Trend Analysis

BAE Systems

Osceola 2

This training will use a recently completed NGA project on the Syrian refugee crisis to demonstrate how to successfully leverage unstructured, open-source data and apply methodologies that support flexible, multi-phase intelligence output options.

From Cyber-Physical Nexus to Cyber-GIS: Techniques for Integrating Cyber into an Organization's Common Operational Picture

Deloitte

Osceola 3

In this training, attendees will learn techniques for using existing GIS technology to build a truly common operational picture and enabling employment of GEOINT techniques against wide-ranging organizational challenges.

Critical Thinking: Within a Scenario-based Construct

General Dynamics Information Technology

Osceola 4

This training teaches the relationship between the practice of geospatial intelligence and its integration into the intelligence cycle, and how it supports the warfighter through critical thinking and the analysis of competing hypotheses.

Building a Better Analyst: From GIS and Imagery Analysis to Web Application Development

Intergraph Government Solutions

Osceola 5

This session will expand the breadth of attendees' geospatial expertise by teaching them when and how to automate workflows through the development of geospatial models.

Anticipatory Intelligence for GEOINT

Camber

Osceola 6

The purpose of this course is to familiarize attendees with the concepts surrounding predictive geospatial simulations.

GEOBowl for a Cause

HIT THE LANES IN THE EXHIBIT HALL TO SUPPORT THREE GREAT ORGANIZATIONS

GEOINT 2016 attendees are invited to bowl in support of charitable organizations while touring the exhibit hall.

You'll find GEOBowl for a Cause in the back left corner of the exhibit hall at **Booth 228** and open during exhibit hall hours.

All proceeds from GEOBowl will go to Boulder Crest Retreat, a privately-funded rural wellness center dedicated to U.S. combat veterans and their families; Freedom Alliance, a 501(c)(3) educational organization sponsoring numerous programmatic activities in support of service members and their families; and USGIF's educational fund that supports scholarships, awards, and other educational activities, such as the National Geographic Giant Traveling Map just outside the exhibit hall.

"Boulder Crest Retreat is honored to be included as a beneficiary of GEOBowl for a Cause at GEOINT 2016 in Orlando," said Ken Falke, chairman and founder of Boulder Crest Retreat. "The interest, visibility, and funds generated through this bowling tournament will go a long way in supporting the combat stress recovery programs and services we offer at the retreat for our military members, veterans, and their families."

Any GEOINT 2016 attendee can participate by purchasing one roll for \$5. Those who bowl a strike will be entered into a raffle for some amazing prizes.

Organizations can sponsor employees to play by purchasing 10 tickets for \$500. Each ticket is valid for one roll of the ball. A strike

enters the bowler for one of the individual raffle prizes and the organization is entered to win a 100-square-foot booth space, a collateral insert in the attendee bag, and a pre-event email for GEOINT 2017.

Contact Jeff Ley (jeff.ley@usgif.org) or Ashley Jones (ashley.jones@usgif.org) if your organization is interested in participating.

"Attendees of the GEOINT Symposium know well the difficult task of defending our country and the sacrifices required to do so. Freedom Alliance is grateful to all in the Geospatial Intelligence Community for your work to identify and neutralize threats to our country," said Tom Kilgannon, president of Freedom Alliance. "With your help, Freedom Alliance provides more than \$1 million annually in college scholarships to the children of fallen and disabled military heroes. We help injured service members and their families overcome the wounds of war so they can be fully independent and self-sufficient as civilians who continue to contribute to our great nation."

The bowling lane is generously provided by Infinity Bol, and the following organizations donated production, materials, and prizes to ensure all proceeds go to the three charitable causes: Actifio, Dell, E-Group, Gaylord Palms Resort and Convention Center, I3ICS, PSAV, and The Expo Group.



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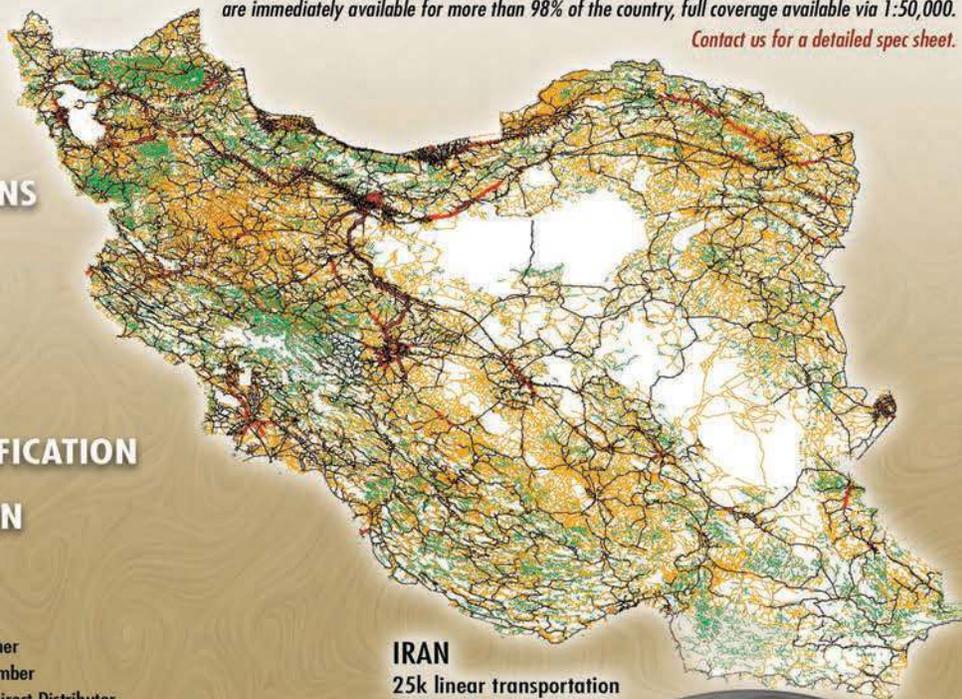
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The Remote Sensing Revolution

GOVERNMENT AND INDUSTRY PANELISTS TO DISCUSS NEW TECHNOLOGIES, POLICY AND REGULATION, AND MORE

By Kristin Quinn

The launch of DigitalGlobe's WorldView-4 satellite later this year will provide new remote sensing capacity to international defense and intelligence customers. A group of panelists, including Dr. Walter Scott of DigitalGlobe, will discuss the ongoing revolution in remote sensing Tuesday morning at GEOINT 2016.



IMAGE COURTESY OF DIGITAL GLOBE

The hyper-availability of remotely sensed information was unimaginable just a handful of years ago, now we can't imagine a world without it readily accessible. Large satellites, small satellites, government-flown UAVs, hobbyist drones, and other platforms all play a part. The GEOINT Revolution is fueled by this next generation of remote sensing, which has made the creation robust new sensing networks much more accessible.

At 11:15 a.m. Tuesday in the general session a panel of government and industry leaders will discuss "The Remote Sensing Revolution."

This discussion on the GEOINT 2016 main stage is important for many reasons, according to Kevin O'Connell, CEO of Innovative Analytics and Training, who will moderate the panel and focus on the following topics:

- The fast and dynamic change in industry and in remote

sensing technology globally as well as the emergence of more and more new companies with interesting ideas.

- What the remote sensing revolution means for intelligence agencies in terms of commercial acquisitions and internal investments.
- The policy and regulatory urgency that is needed to modernize thinking in terms of everything from licensing to security matters.

"There's more recognition that there's a diversity of companies, business models, technologies, and phenomena," O'Connell said. "The Remote Sensing Revolution" panelists are:

- **Winston A. Beauchamp**, Deputy Under Secretary of the Air Force for Space, and Director, Principal DoD Space Advisor Staff

- **Steve Coast**, Space Know; Founder, OpenStreetMap Foundation; Chief Evangelist, what3words
- **Douglas L. Loverro**, Deputy Assistant Secretary of Defense for Space Policy
- **Dr. Lisa Porter**, Executive Vice President and Director, CosmiQ Works
- **Robbie Schingler**, Chief Strategy Officer and Co-Founder, Planet Labs
- **Dr. Walter S. Scott**, Executive Vice President, Chief Technical Officer, and Founder, DigitalGlobe

The Honorable Jeffrey K. Harris, chairman of USGIF's Board of Directors and former director of the National Reconnaissance Office, encouraged GEOINT 2016 participants to attend the panel to gain an understanding of current remote sensing technology and challenges from policy and industry experts.

"Historically, the job of planet data curation was that of nation state governments," Harris said. "Today, the advance of technology is empowering companies and NGOs to provide important new and timely insights. This information can challenge the old world order, and in a good way help foster innovative approaches to improved planet management and understanding. Markets pick winners and losers. Technology for the good can also be misused. Bad actors can develop new threats and individuals can feel threatened as their privacies are redefined and sometimes challenged."

In sum, Harris said, emerging remote sensing advancements are changing our understanding of the planet, its systems, and its inhabitants. 

"There's more recognition that there's a diversity of companies, business models, technologies, and phenomena."

—KEVIN O'CONNELL, CEO OF INNOVATIVE ANALYTICS AND TRAINING

Certification *continued from cover*

professionals within the GEOINT Community may choose to take only one or two of the exams. However, for GEOINT practitioners, passing all three exams offers added value. Those who earn and maintain all three USGIF certifications simultaneously will be eligible to apply for USGIF's overarching Universal GEOINT Professional designation. Universal GEOINT Professionals demonstrate a true understanding of the broad geospatial intelligence discipline.

To learn more about USGIF's Universal GEOINT Certification Program, visit usgif.org/certification.

Leveraging best practices, USGIF created an independent Certification Governance Board (CGB) that directs certification efforts by writing and maintaining the candidate handbook, determining passing scores, and evaluating Universal GEOINT Professional program processes. The CGB has met several times in the lead-up to the official launch of the certification program and will hold its first annual meeting at the Symposium Tuesday.

ALIGNING WITH NGA CERTIFICATION
Parallel with USGIF's efforts, the National Geospatial-Intelligence Agency (NGA) has created a certification program designed specifically for the U.S. Defense Intelligence Enterprise. GEOINT analysts from all branches of the U.S. military, the Defense Intelligence Agency, and NGA participate in the NGA program. While USGIF's

certifications are applicable for all GEOINT practitioners, NGA's certifications are designed specifically for Defense Intelligence Enterprise analysts.

USGIF and NGA have agreed upon a plan for reciprocity. Recognizing differences in intended audiences, USGIF and NGA determined there is close alignment between the three USGIF assessments and four of NGA's assessments. The goal between the programs is to achieve transferability through the concept of functional equivalence. Functional equivalence allows hiring officials to agree that more than one certification meets current organizational needs.

This concept of transportable and transparent professional certification with universal applicability will continue to be paramount to USGIF membership as well as the growing global GEOINT Community.

USGIF's certifications will offer GEOINT professionals the opportunity to advance their careers by differentiating themselves from peers, demonstrating their ability to perform beyond the skill level at which they were hired, and making them more marketable for new positions and eligible for promotions, awards, bonuses, etc.

Universal GEOINT Certification Program testing will begin in July. 

Dr. Darryl Murdock, USGIF's vice president of professional development, will discuss the Universal GEOINT Certification Program at USGIF Booth 901 in the exhibit hall Monday from 2:30 to 3:30 p.m., Tuesday from 1:30 to 2:30 p.m., and Wednesday from 11:30 a.m. to 12:30 p.m. Stop by to learn more!

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Empathy First in Designing for a Digital World

IBM'S PHIL GILBERT KICKS OFF GEOINT FOREWORD BY PRESENTING A FORWARD-THINKING APPROACH TO PRODUCT DEVELOPMENT

By *Melanie D.G. Kaplan*

Rising expectations delivered at a faster pace drive today's world, according to Phil Gilbert, general manager for IBM Design, who gave a keynote address Sunday morning during GEOINT Foreword the pre-conference science and technology day preceding USGIF's GEOINT 2016 Symposium.

The world is being rewritten in code, said Gilbert, wearing his trademark blue jeans and cowboy boots. He added that as human interactions become increasingly digital, organizations must consider how to respond.

"[IBM] had to get old behaviors out of the way and think about solving problems," Gilbert said. "We, like almost everyone in the world, would think the issue was an issue of features and functions. We'd build tools. We thought the tool was the product."

But this thought process was misguided, he said—akin to thinking a bicycle was an experience. "The experience," he said, "is what someone does with the bicycle."

IBM has embraced a concept known as design thinking, which flip-flops the traditional product development cycle. Rather than putting features first, the company wants to put users first. How does a user master his or her craft? Excel at his or her profession?

"The technologies are just a byproduct of what our real job is," said Gilbert, whose startup Lombardi Software was acquired by IBM in 2010. He said the real need and challenge is to develop empathy with users.

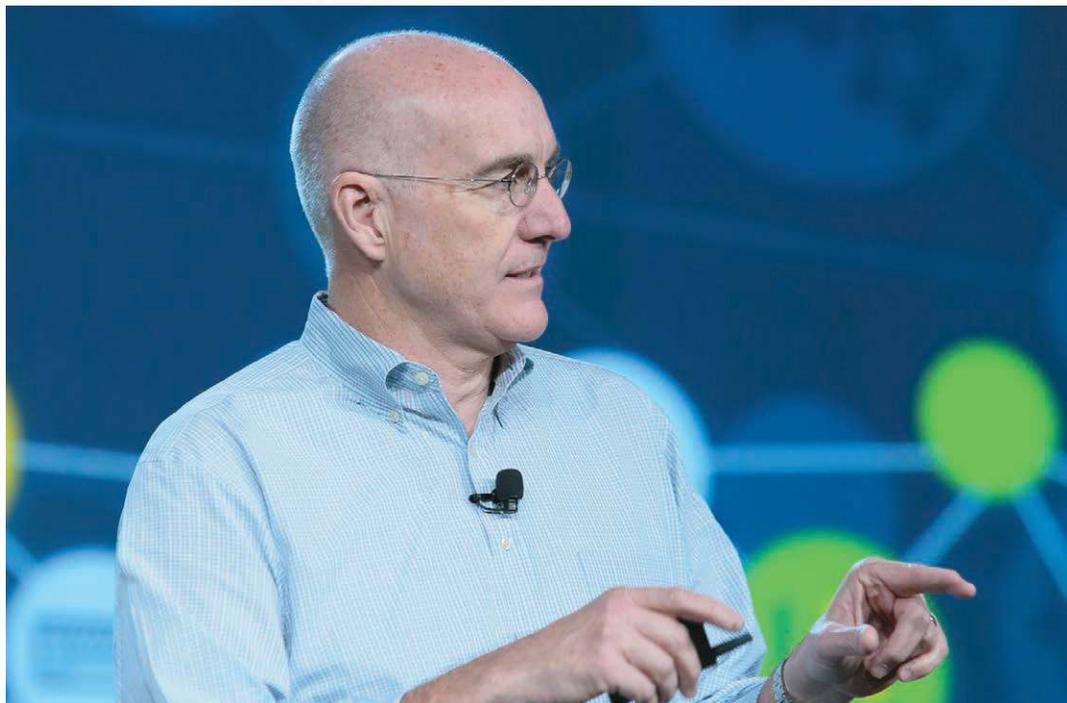
Gilbert believes empathy is the best way to solve the challenges of both speed and user expectations. Should you consider the word "empathy" to represent weakness, Gilbert set the record straight.

"There's no harder word in the English language," he said. "Really understanding the needs, desires, wants, fears, hopes of the person."

In the Intelligence Community, this may mean thoroughly grasping how a warfighter or emergency responder works, for example, in order to make real-time decisions with confidence.

Gilbert showed the audience a graphic illustrating IBM's approach to the world: an infinity symbol accompanied by the words, "Observe," "Reflect" and "Make."

"Observing," he explained, is about immersing oneself in the user's world. He noted that in the field, a user is almost always using the tool differently than the designer had imagined.



Phil Gilbert, general manager for IBM Design, explained how to apply design thinking to meet higher user expectations and the rising pace of information exchange Sunday during his GEOINT Foreword keynote address.

"Reflecting" happens too infrequently, Gilbert said. He uses a design thinking methodology called Playbacks, in which stakeholders take a step back to reflect on a project using everything from low-fidelity sketches to polished demos. It's a safe place for feedback from those at all levels, he said—and an antidote to silos and hierarchies.

"Making" is about giving form to ideas. Gilbert said the process begins with empathy and moves to sketching and prototyping. He encouraged the audience to embrace sketching and stressed the importance of prototyping at all levels. He urged attendees to use design thinking to prioritize their work, adding that inevitably, work based on the real-world understanding of users will be better.

Gilbert also shared the concept of what he calls "a Hill," which is a statement of intent that frames a problem in terms of the intended outcome rather than of how to specifically implement a process. The key, he said, is to use this framework for every aspect of design and to assign teams no more than three Hills.

"Intent, not process," Gilbert said. "This is pervasive. Communicating the intention to teams and letting them figure it out."

Given the complexity of modern problems, the biggest inhibitors aren't the writing of code or the designing of an interface. Rather, it's the speed at which business decisions get made. In that vein, he said, empowered, multi-disciplinary teams are critical.

"Giving [teams] the mindset and permission to develop empathy with our users," he said, "has changed everything." 



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PIONEERING THE FUTURE TOGETHER



Four National Labs Present at GEOINT Foreword

DIGITAL HEALTH BREADCRUMBS, SAR DATA SOLUTIONS, MAPPING POPULATIONS, AND DEEP LEARNING
By Matt Alderton, Kristine Crane, and Warren Ferster



Nicholas Generous, a digital epidemiologist with Los Alamos National Lab, discussed how open-source information could be used to help monitor health trends.

New this year at GEOINT Foreword, the pre-conference science and technology day that precedes the GEOINT 2016 Symposium, were presentations from four U.S. National Laboratories.

TRACKING ILLNESS IN THE INFORMATION AGE

Turning to Google to determine what's ailing you has become a common ritual in the information age. It turns out "Dr. Google," as some physicians refer to the trend, could in the future help authorities track and control the spread of disease.

Scientists at Los Alamos National Laboratory (LANL) are studying how open-source data such as social media can be used

to recognize health-related trends. When people interact through the internet, they often leave clues about their health, said Nicholas Generous, a digital epidemiologist at LANL. That data trail can be combined with traditional disease-tracking methods—including reporting by individual physicians—to better understand health trends.

An uptick in Google searches for flu symptoms is one indicator that can be picked up via big data analytics, Generous said. Another is Facebook and Twitter posts where people mention something health-related. These data points often include location information as well as a time stamp, enabling analysts to place them in a geospatial and temporal context, Generous explained. When analyzed altogether, such information can reveal a lot about the severity and scope of a public health concern.

Smartphones and wearable devices such as Fitbits also have great health-tracking potential. These devices carry sensors such as GPS receivers and accelerometers that can precisely track the movements of those carrying or wearing them. This data can be useful in monitoring the progress of degenerative disorders such as Parkinson's disease or determining whether Alzheimer's patients can still care for themselves, Generous said.

Mental health also has the potential to be tracked via people's online interactions, Generous said. When someone becomes depressed, for example, their social media usage tends to decline. But health-trend

monitoring via the internet is not an exact science, Generous cautioned. For example, the Ebola outbreak of 2014 triggered a huge spike in U.S. searches about the disease, even though the number of confirmed cases in the country was miniscule.

TURNING ADVANCED RADAR INTO REAL-TIME DECISIONS

The Intelligence Community is drowning in data from airborne sensors. Fortunately, Sandia National Laboratories (SNL) is building a life preserver, according to Bert Tise, distinguished member of the SNL technical staff.

"We've got deployed systems out there that are producing tens of millions of images per year," said Tise, whose presentation focused on processing, exploitation, and dissemination of broad-area, high-resolution imagery from synthetic aperture radar (SAR). "When you get a data pile that size, what do you need to do to [analyze] it?"

That question keeps SNL engineers up at night, Tise said, but SNL's answer is a mathematical data analytics approach that turns abstract pixels from SAR imagery into geo-temporal "semantic graphs" that are searchable and node-based.

"These graphs represent the... relationships between the features that are on a map," continued Tise. The relationships shown on the graphs help analysts reduce the size of their data pool in pursuit of better, faster answers to pressing intelligence questions. "It helps with the needle-in-a-haystack problem," Tise said.

» continues on p. 16

Visit Los Alamos National Lab at Booth 1921 and Oak Ridge National Lab at Booth 1915 in the GEOINT 2016 exhibit hall.

Voyager

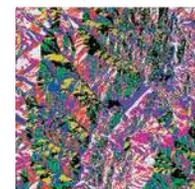
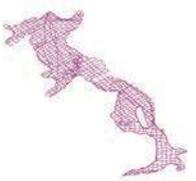
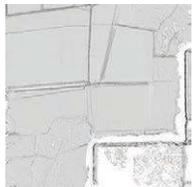
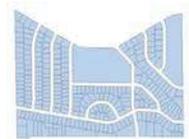
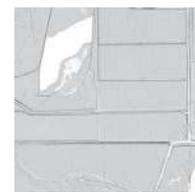
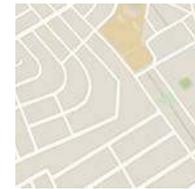
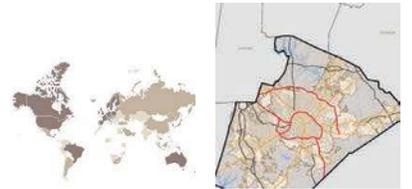
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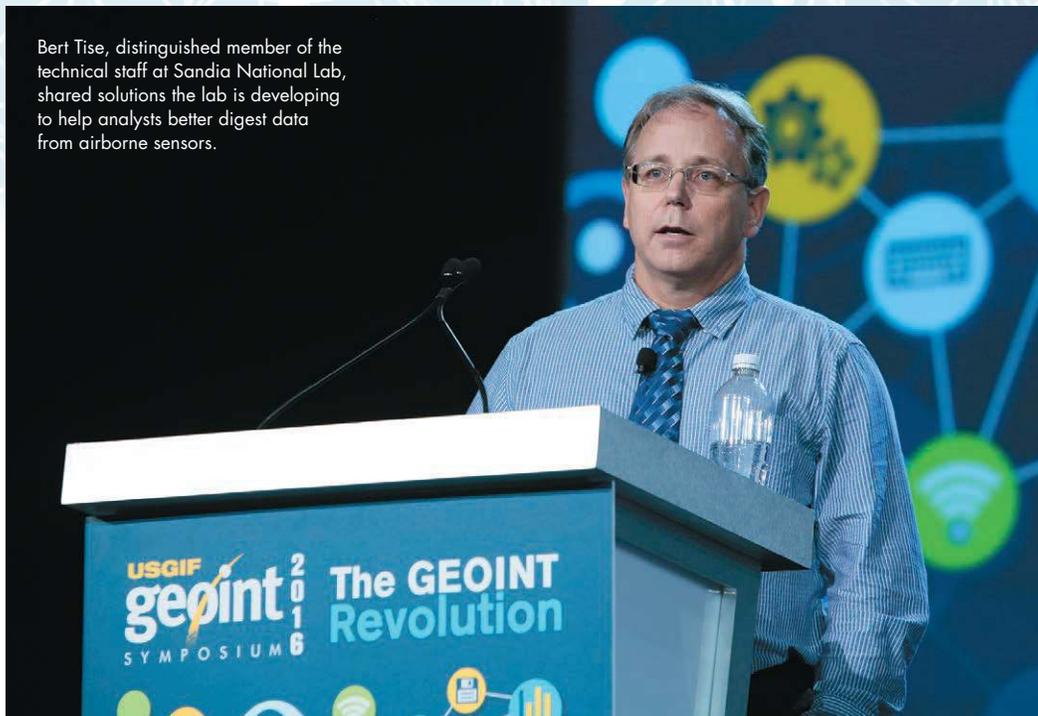
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Bert Tise, distinguished member of the technical staff at Sandia National Lab, shared solutions the lab is developing to help analysts better digest data from airborne sensors.



Tise shared an example from the Federal Aviation Administration (FAA): a national map of all the airplane flights documented by the FAA on a single day in 2014. SNL developed an algorithm based on the geometric features from the map that allowed analysts to identify “odd flights”—outliers that didn’t conform to typical flight patterns.

“With our system ... we can narrow down all that data, based on the definition of ‘odd flights,’ to about 700 out of the total 50,000 flights across the U.S.,” Tise said. “It lets an analyst get in there, ask very nuanced questions, and quickly spot things that don’t belong.”

The result: turning high-quality images into high-quality decisions.

MAPPING HUMAN POPULATION TRENDS

Imagine being able to visualize every hut in Nigeria, every mobile home in Texas, and all the school children in Philadelphia during recess.

Oak Ridge National Laboratory (ORNL) is able to do this

and much more as it ramps up research in three platforms: LandScan Global, LandScan USA, and LandScan HD. All are designed to study the world’s populations with a fine-tooth comb.

Eddie Bright, team leader for the lab’s Population Distribution and Dynamics Team, said ORNL has the ability to stratify urban areas by income levels, types of economic activity, and even occupancy within specific buildings. They can also get information about parts of the country where Census data is scant or unavailable.

“No census worker has ever gone to these areas,” said Robert Stewart, Geographic Data Sciences team leader.

The Lab’s capabilities have been used to gather information on Iraqi refugee movements and assess future population dynamics with respect to trends in climate change and natural disasters.

“If you dump a bucket of people on a terrain, where would they flow?” Budhendra Bhaduri, a corporate research fellow with ORNL, posited. “As a people, we

are all programmed to mitigate risk and look for short cuts. We can understand where people would try to migrate during emergencies.”

Using large data sets, from the World Bank, for example, the team can glean 30 attributes of the whole world, and from these, “generate the most iconic trend lines,” Stewart said.

The lab is also researching population via social media. Its PlanetSense program explores the relationship between Twitter and Facebook activity and population trends.

For example, “Does more Facebook usage mean the population is actually rising?” Stewart pondered.

FUTURE CHALLENGES OF BIG DATA AND DEEP LEARNING

It’s a known fact for anyone in the artificial intelligence world: We are living in an era of exponentially growing data sets and how we mine them is in part a matter of how savvy and how quick our computers are at pattern recognition.

So far, computers have been the mainstay of extracting information from large amounts of data and providing something meaningful to a human analyst.

“The future is going to be a lot more challenging,” said Paul Metzger, of MIT’s Lincoln Laboratory. “With more and more data, a lot of systems are talking to other systems. Manned platforms are interfaced with unmanned platforms. We need to get to a point to have a variety of systems acting as one.”

Metzger, group leader of Intelligence & Decision Technologies at Lincoln Lab, gave an overview of the lab’s beginnings in 1951, when it was already at the forefront of developing autonomous systems to augment humans, up to its present-day research areas.

“We are working more in terms of disaster response,” Metzger said.

This could mean situational awareness about natural disasters such as California wildfires.

The lab is also focusing on cybersecurity using a system called Cloudbreak.

“How do you give a cyber commander an operational picture of what it looks like in a cyber environment?” Metzger said.

The Lab is also training computers to perform first level data triage.

“Every image [is being viewed by] one set of eyeballs,” Metzger said, adding computers could vet images for abnormalities. “What happens when the computer sees something it hasn’t seen previously?”

For example, when a computer “sees” a new aircraft or ship, he elaborated. Having a triage system in place would allow the computer to detect a discrepancy between the number of ships on a given day versus the norm. 📍



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7:00-9:00a

Training and Education Sessions (Osceola Rooms 1-6)

9:00-9:15a

GEOINT 2016 Opening Ceremonies: Presentation of Colors (Osceola Ballroom CD) and National Anthem

9:15-9:30a

Welcome Remarks from The Honorable Jeff Harris, Chairman of the Board, USGIFUSGIF's Arthur C. Lundahl - Thomas C. Finnie Lifetime Achievement Award Presentation

9:30-9:45a

Master of Ceremonies: The Honorable Joan Dempsey, USGIF Board of Directors, and Executive Vice President, Booz Allen Hamilton

9:45-10:15a

Keynote: The Honorable Marcel Lettre, Under Secretary of Defense for Intelligence

10:15-10:45a

Networking Break (Osceola Foyer)

The USGIF Young Professionals Group (YPG) serves to unite junior GEOINT professionals within the Defense, Intelligence, and Homeland Security communities.



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LEARN MORE - STOP BY
YPG Lounge at Booth 901

Join USGIF's YPG for monthly events and programs which provide dynamic learning and networking opportunities.

10:45-11:30a

Keynote: Parag Khanna, Author, Connectography: Mapping the Future of Global Civilization

11:30a-12:30p

Robert Cardillo, Director, National Geospatial-Intelligence Agency

12:30-2:00p

Lunch and Exhibit Hall (Florida Exhibit Hall A-F)

12:30-2:00p

USGIF NGA Advisory Working Group/NRO ASP Industry Advisory Working Group Discussion (Osceola A)

1:30-4:00p

Government Pavilion Stage (Florida Exhibit Hall)

1:30-2:00p – Professional Certification by Tim Hegarty, Chief Learning Officer, Human Development, NGA; and Dr. Darryl Murdock, Vice President of Professional Development, USGIF

2:00-2:30p – NSG Strategic Intent by Robert Cardillo, GEOINT Functional Manager; Dustin Gard-Weiss, GEOCOM Chair; Monique Yates, Co-Chair, Training and Development Subcommittee; Dr. Joseph Fontanella, Co-Chair, GEOINT Analysis and Production Subcommittee; and David Cacner, Co-Chair, Information Systems Architecture

2:30-3:00p – Terry Busch, Chief, Integrated Analysis and Methodologies Division, DIA

3:00-3:30p – Dave Lilley, Deputy Director, Geospatial Management Office, DHS

3:30-4:00p – GEOINT Pathfinder by Erik Makowsky, GEOINT Pathfinder, NGA; and Chris Rasmussen, Source Software Development Lead, NGA Pathfinder, NGA

2:00-4:00p

Training and Education Sessions (Osceola Rooms 1-6)

2:30-3:30p

USGIF YPG Experiencing M&A Panel (Osceola A)

4:00-5:00p

Exhibit Hall Networking Reception (Florida Exhibit Hall A-F)

7:00-9:00p

Chairman’s Reception, by invitation only

» TUESDAY, MAY 17 AT-A-GLANCE

EXHIBIT HALL OPEN 10:00A-5:00P

7:00-9:00a	TRAINING AND EDUCATION SESSIONS (Osceola Rooms 1-6)
8:00-9:00a	USGIF SMALLSAT WORKING GROUP PANEL (Osceola A)
8:00-11:00a	JOINT USGIF ACCREDITED PROGRAMS/USGS-NGA CAE/HBCU MEETING
9:00-9:15a	MASTER OF CEREMONIES: LETITIA A. LONG, BOARD OF DIRECTORS, USGIF; CHAIRMAN OF THE BOARD, INSA
9:15-10:00a	THE HONORABLE JAMES R. CLAPPER, DIRECTOR OF NATIONAL INTELLIGENCE
10:00-10:15a	USGIF AWARDS PROGRAM PRESENTATIONS
10:15-10:45a	NETWORKING BREAK (Osceola Foyer)
10:45-11:15a	THE HONORABLE STEPHEN P. WELBY, ASSISTANT SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING
11:15a-12:30p	PANEL: THE REMOTE SENSING REVOLUTION
12:30-2:00p	LUNCH AND EXHIBIT HALL (Florida Exhibit Hall A-F)
1:00-2:00p	USGIF TRADECRAFT & PROFESSIONAL DEVELOPMENT COMMITTEE ROUNDTABLE DISCUSSION (Osceola A)
1:30-5:00p	GOVERNMENT PAVILION STAGE (Florida Exhibit Hall)
2:00-4:00p	TRAINING AND EDUCATION SESSIONS (Osceola Rooms 1-6)
2:30-3:30p	USGIF SMALL BUSINESS ADVISORY WORKING GROUP PANEL (Osceola A)
3:30-5:00p	USGIF SMALLSAT WORKING GROUP PANEL (Osceola A)
4:00-5:00p	THE INTERSECTION OF GEOINT AND THE CAPITAL MARKETS (Government Pavilion Stage)
4:00-5:00p	EXHIBIT HALL NETWORKING RECEPTION (Florida Exhibit Hall A-F)
5:00-6:30p	USGIF YOUNG PROFESSIONALS WORKING GROUP NETWORKING RECEPTION (Sarasota 2-3)
6:30-10:00p	BUSING TO DISNEY SPRINGS (buses run every 15 minutes)



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