

SHOWDAILY

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The Power of Real-Time Data for Firefighting

TO TAME WILDFIRE, CLOSE THE GAP BETWEEN DATA IN THE CLOUD AND KNOWLEDGE ON THE GROUND

By Rob Pegoraro

Paper maps versus an out-of-control wildfire is nobody's idea of a fair fight. But firefighters still too often resort to printed cartography when battling blazes like those that have repeatedly devastated parts of the American West.

A panel Tuesday morning at GEOINT 2019 outlined ways to change that, from collecting more comprehensive data about the risk and extent of wildfires to building ways to transit that data to individual firefighters in as close to real-time as possible.

The past two years of California fire history have provided ample evidence of the need to attack this problem. Jeff Johnson, CEO of the Western Fire Chiefs Association, reminded the audience of the stunning spread of the fall 2018 Camp Fire.

"From the minute this fire started, around 6:30 in the morning, this fire traveled 6.3 miles in less than an hour and a half," Johnson said.

High winds swept flaming embers ahead of the existing conflagration—"embercast"—and in one situation, generated a "firenado," an unsettling sight shown to the audience via video clip.

"From my perspective as a fire chief and a firefighter and a technologist in the public safety space, this is the time where we bring our ability to analyze data and understand scientifically what's going on in the environment, and find the technological tools that will bring those to the incident commanders," Johnson continued.

But on the ground, he said, we're not there yet: "The incident commanders in a wildfire setting are still in many cases throwing paper maps across the hood of their vehicle."

Kate Dargan, co-founder and chief strategist of the firefighting-analytics firm Intterra Group, noted the weight of tradition.

"Legacy wildfire strategies are built on a 100-year-old methodology," said Dargan, who served as California's first female state fire marshal. "We invented this mechanism, this methodology of firefighting, back in the days of mules and shovels."

But the growing danger and damage of wildfires demands changes to what she called "a culture of tactical," or the instinct to solve the

► see *Wildfires* p. 16



Panelists (left to right): Kate Dargan, Intterra Group; The Honorable James Reilly, United States Geological Survey; Jeff Johnson, Western Fire Chiefs Association; Rachael Brady, California Department of Forestry and Fire Protection; and Jaclyn Guz, Clark University.

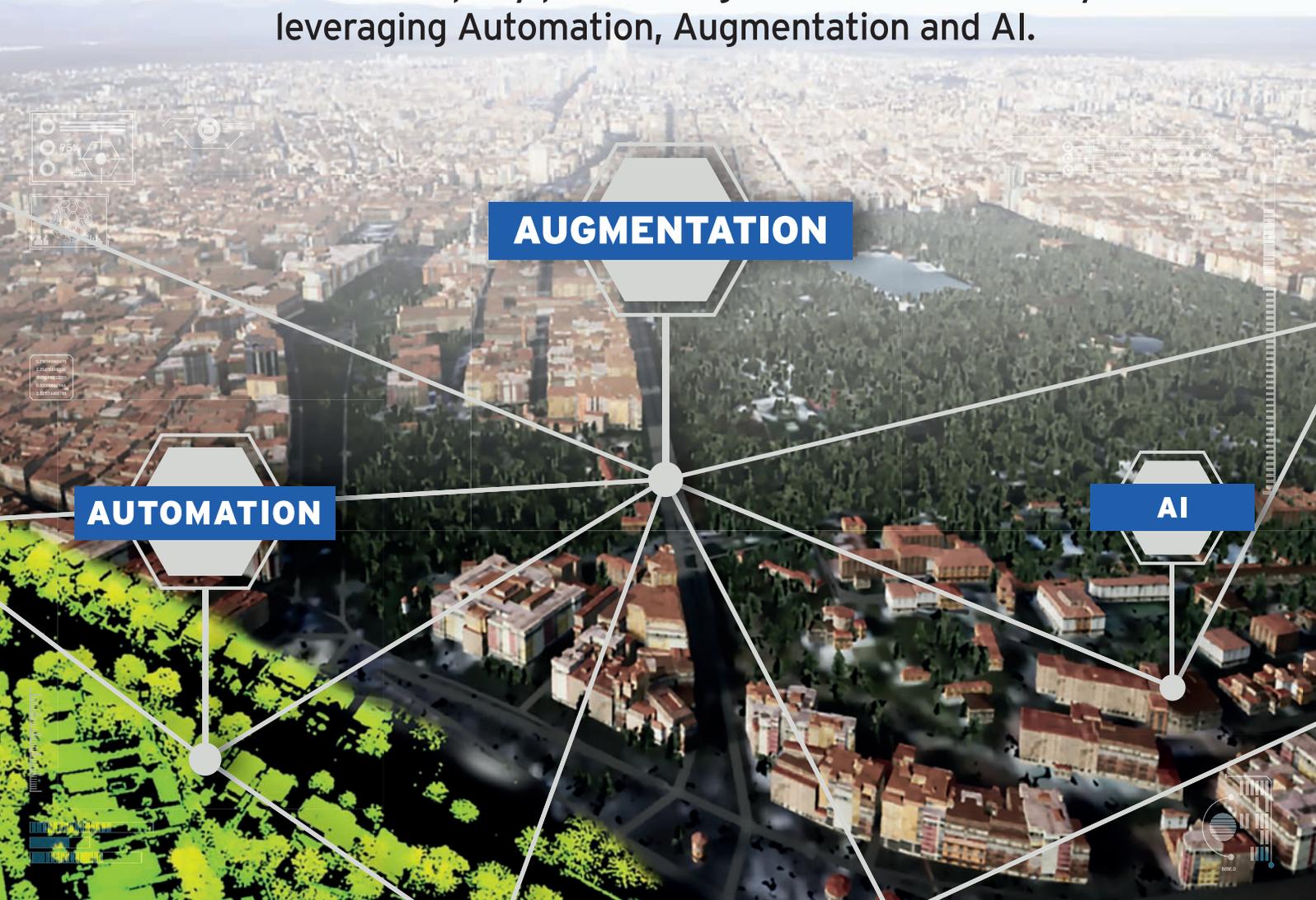
"From the minute this fire started, around 6:30 in the morning, this fire traveled 6.3 miles in less than an hour and a half."

—JEFF JOHNSON, WESTERN FIRE CHIEFS ASSOCIATION

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EXHIBIT HALL NETWORKING RECEPTION

Join us Wednesday from 2 to 3 p.m. for the final exhibit hall networking reception of the Symposium. Visit with colleagues and enjoy refreshments while exploring 210 exhibitors showcasing cutting-edge GEOINT services, solutions, and technologies. Thanks to our sponsor, Visit Tampa Bay!

FROM THE



IMAGE COURTESY OF SAIC

In acquiring Engility, SAIC now leads the Innovative GEOINT Application Provider Program.

FUELING THE GEOINT APP STORE

SAIC SHOWCASES NEW AND ENHANCED OFFERINGS FOLLOWING ENGILITY ACQUISITION

By Jim Hodges

When the company acquired Engility in January, the Innovative GEOINT Application Provider Program (IGAPP), which feeds into the National Geospatial-Intelligence Agency's (NGA) GEOINT App Store, became part of the SAIC (Booth 401) portfolio.

"This is a big year for us at GEOINT because it's a great way for us to promote that program," said SAIC spokesperson Jake Weyant. "We can say, 'Hey, you don't have to be a multimillion-dollar government contractor to do government work. Here's a way to access and do apps in your own shop.'"

The NGA App Store currently has 90 applications in its inventory that have been downloaded 60,000 times and have generated more than \$7 million for developers.

One of IGAPP's best promotions is its Grand Challenge award, which SAIC presented Monday afternoon on the Government Pavilion Stage at GEOINT 2019. A total of \$50,000 was awarded to JED Services, CACI, and Orbit Logic.

SAIC's Engility acquisition also brought analytical tools that complement those the company already offered to speed up workflows between intelligence analysts and warfighters at the tactical edge. A demonstration of those workflows is being offered in the SAIC booth.

The booth also features information on SAIC's "micro-training" offerings, which break education into smaller segments for easier assimilation, and a virtual reality training. SAIC will also showcase its suite of digital engineering tools, including those that allow a project to adapt quickly to mission requirements.

SAIC has long supported the GEOINT Symposium.

"GEOINT offers us a great chance to see a lot of decision-makers as well as those in industry whom we talk with on a regular basis," Weyant said. "It's also a chance to see what our customers are looking for."

FROM SENSORS TO ANSWERS

KITWARE DEMOS OPEN-SOURCE IMAGE AND VIDEO ANALYSIS TOOLS

By Rob Pegoraro

The problem **Kitware (Booth 1430)** aims to solve can be described as "Too Much Information." The ever-expanding array of location-aware cameras and sensors around the world generates more geographically-tagged data than people can parse and process in a reasonable timeframe.

At GEOINT 2019, Kitware is demonstrating its open-source tools for automatic image and video recognition and analysis, showing how they can aid in tasks such as identifying disinformation campaigns via digital forensics, creating 3D models from 2D source material, tracking people and vehicles in video



Kitware's open-source software uses deep learning for object detection and classification in satellite imagery.

FLOOR

EXHIBIT HALL HIGHLIGHTS

of varying quality, and identifying and indexing potentially millions of images and videos shared on social media.

"We work from source (sensors) to solution (answers), successfully creating advances to drive technology development in areas such as image recognition, object detection and tracking, scene understanding and recognition," business development representative Libby Rose wrote via e-mail. "Our strengths include learning from small training sets through unsupervised learning, transfer/domain adaptation, incorporating synthetic data, and leveraging user feedback for interactive learning."

Founded in 1988 and based in Clifton Park, N.Y., Kitware focuses on the public sector and counts the Defense Advanced Research Project Agency, the Intelligence Advanced Research Projects Activity, the Air Force Research Laboratory, and the Office of Naval Research among its customers.



IMAGE COURTESY OF KITWARE

PRIME TIME FOR LOWE ENGINEERS

NGA'S JANUS GEOGRAPHY INITIATIVE MARKS A TURNING POINT FOR THE AIRFIELD MAPPING AND SURVEYING FIRM

By Jim Hodges

Just over a year ago, Bill Daniel received a phone message from a friend congratulating him and **Lowe Engineers (Booth 1431)** for winning a piece of the National Geospatial-Intelligence Agency's (NGA) Janus Geography Initiative—the Janus Aeronautical Features Program.

The call was a pivotal moment for the company, said Daniel, co-managing partner of the

60-year-old Atlanta firm as well as an adjunct professor in geomatics at Georgia Tech.

Lowe Engineers had worked on airfield mapping and surveying contracts for NGA and its predecessors for almost 25 years, but always as a subcontractor, usually for Harris Corporation or SAIC.

"Janus is a big deal for us," Daniel said. "We are a prime contractor, along with two other small companies (T-Kartor and Continental Mapping)."

How big? The 10-year contract has a maximum value of \$320M for the three companies to survey and map airfields, including a Lowe specialty: charting vertical obstructions that can be hazardous during takeoff and landing.

Following the Janus award, Lowe Engineers joined USGIF and reserved a booth at GEOINT 2019 to display the work of its

PHOTO COURTESY OF LOWE ENGINEERS



While Lowe Engineers often uses satellite images in its mapping work, sometimes surveyors have to use handheld instruments and get boots on the ground, as with this project in the Everglades.

Geospatial Services team.

"We have mapped more airfields than any other small business in the world," Daniel said, adding that he looks forward to networking with the company's partners, including NGA.

BRINGING SPEED TO GEODATA ANALYSIS

OMNISCI'S GPU SYSTEM YIELDS RAPID INSIGHTS FROM VAST DATASETS

By Jim Hodges

Around the time of the 2011 Arab Spring, **OmniSci (Booth 1526)** CEO Todd Mostak learned what many others were beginning to grasp, that social media had intelligence value. But how much value was difficult to ascertain given the sheer volume of the open-source data.

Mostak had just returned to the U.S. after two years of teaching English and learning Arabic in

Egypt and Syria. While taking computer science courses at MIT, he tweeted questions to assess activity in the region where he had lived. Tweets flowed back in astounding numbers, some in answer to his queries, others just offering time-stamped and geo-located reports to the world from the region. But clarity among the massive numbers was elusive "because of the lack of speed of the hardware and software," Mostak said.

He found a computational solution in video game cards he incorporated in graphics processing units (GPUs) to replace traditional, slower central processing units (CPUs). From that Mostak created San Francisco-based MapD in 2013.

MapD rebranded as OmniSci in 2018, when Mostak realized the company's GPU system had sent it well beyond mapping capabilities. He claims the GPU system is 75 to 3,500 times faster than a CPU database and has many useful applications in addition to social media analysis.

At GEOINT 2019, OmniSci is showing an aeronautical display that meshes telemetry data points with real-time radar to determine how planes navigate.

As a young entrepreneur, Mostak first attended GEOINT 2014 to learn. Now, he's attending GEOINT 2019 as a new USGIF member and plans to teach as well as learn.

USGIF Announces New Scholarship in Partnership with Dun & Bradstreet

\$15,000 SCHOLARSHIP TO BENEFIT A GRADUATE STUDENT PURSUING LARGE-SCALE, DATA-INTENSIVE GEOINT PROBLEMS



The newly created Dun & Bradstreet Geospatial Data Science Scholarship will award \$15,000 to a graduate student pursuing a Master of Science or Ph.D. in data science.

USGIF announced Tuesday during its Board of Directors meeting at GEOINT 2019 Symposium that it has partnered with Dun & Bradstreet to offer a new academic scholarship to advance geospatial data science understanding and capabilities.

The Dun & Bradstreet Geospatial Data Science Scholarship will award \$15,000 to a graduate student pursuing a Master of Science

or Ph.D. in data science who is focused on solving data-intensive, large-scale, location-based problems using engineering, computer science, math, and/or spatial science.

“Dun & Bradstreet is pleased to work with USGIF to support emerging talent in a field that is crucial in the data science landscape,” said Tim Solms, Dun & Bradstreet’s General Manager,

Government Services. “This scholarship will help the geospatial industry grow as it works to address and solve important national security challenges.”

The recipient of the Dun & Bradstreet Geospatial Data Science Scholarship must be enrolled in any full-time graduate program and be in good academic standing. His or her expertise should include geospatial data accessibility, spatial decision support systems, and geospatial problem-solving. The student’s academic pursuits should demonstrate understanding of how artificial intelligence, machine learning, and data mining can be used to augment geographic information science workflows to mine data and provide solutions.

“Today’s data scientists are expected to have a diverse skill set that includes mathematics, statistics, computer programming, and analysis as well as knowledge of social science,” said USGIF VP of Academic Affairs Dr. Camelia Kantor. “The geospatial component in this new data science scholarship highlights the important dimensions of location and time. Given that huge volumes of data have a location and time component, society needs people who can understand, use, and apply geospatial principles and tools. USGIF is thrilled to partner with Dun & Bradstreet in this effort.”

The winner of the scholarship, which will be administered by USGIF, will be announced in July.

“Today’s data scientists are expected to have a diverse skill set that includes mathematics, statistics, computer programming, and analysis as well as knowledge of social science.”

— DR. CAMELIA KANTOR, USGIF

For more information on the USGIF Scholarship Program, please visit usgif.org/education/scholarships.

USGIF to Open Trajectory Events Center

THE FOUNDATION'S NEW HERNDON, VA., EVENT SPACE TO OFFER AFFORDABILITY AND FLEXIBLE DESIGN OPTIONS

By Kristin Quinn



USGIF announced this week at GEOINT 2019 that it will soon open a state-of-the-art event space, to be known as the Trajectory Event Center (TEC), in Herndon, Va. Scheduled to open in July, the TEC will be a year-round resource for the GEOINT Community and beyond.

Featuring flexible meeting spaces for up to 300 people, cutting-edge audio-visual technology, and live streaming capabilities, the TEC will be an ideal location to host corporate events, training sessions, sales meetings, product launches, receptions, tabletop exhibits, hack-a-thons, and much more.

“Whether it is our Young Professionals Group looking to combine networking and professional education, or providing a flexible space to accommodate the cadences of USGIF working groups, we recognized the potential for the TEC to help USGIF advance our community,” said The Honorable Jeffrey K. Harris, chairman of USGIF’s Board of Directors. “Extending our ability to leverage diverse opinions in a collaborative

environment is a best practice where we can intensify the cycle of learning and adapting to help GEOINT organizations evolve.”

The TEC will be in proximity to Dulles International Airport and a four-minute walk from the planned Herndon Metro stop on the silver line. Ample complimentary parking will also be available.

“The TEC is unlike anything I’ve seen in the Northern Virginia area,” said USGIF COO Karin Fitzgerald. “This world-class facility is not only an ideal venue to host future USGIF events, but it is a terrific alternative to the typical hotel ballroom. We look forward to offering this resource for all members of the GEOINT Community.”

Visit tecdulles.com to learn more about the Trajectory Event Center. Book a 2019 event and receive a 25% discount. Contact info@dullestech.com for pricing and availability.

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 #816	 #817	 #916	 #917	 #1016	 #1017	
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GEOINT is the Vehicle, National Security is the Outcome

PDDNI SUE GORDON'S VISION TO MOVE THE INTELLIGENCE COMMUNITY FORWARD

By Lisbeth Perez



The Honorable Sue Gordon, Principal Deputy Director of National Intelligence, spoke Tuesday morning.

The Honorable Sue Gordon, the fifth Principal Deputy Director of National Intelligence (PDDNI) began her GEOINT 2019 keynote address Tuesday morning by sharing with the audience wise words she imparted to her newborn granddaughter, Harper, whom she had just met the day before.

“The world is doing what it periodically does. It is changing.

“Each of these problems I posed has a GEOINT component but none can be solved by GEOINT.”

— THE HONORABLE SUE GORDON, PDDNI

And the change that we are experiencing right now is a big one,” Gordon began. “You will need to develop a craft, something that you are good at, and something that you could offer for the cause. And just when you get good at it you are going to have to develop it again. You see, the craft is not the point of your endeavor. Your craft is merely the vehicle for your outcome.”

Gordon said she feels this is an important message to share, not just as the matriarch of her family, but also of the U.S. Intelligence Community (IC). GEOINT is often an important component

to a solution, but not the entire solution.

The PDDNI described this changing world as one of “ubiquitous technology, digital connectives, and data abundance.” As an innovator, Gordon said even she has had to “let go of some fixed points, things that you always believed to be true, because you cannot keep everything fixed and still get somewhere else.”

To explain GEOINT’s role in this “brave new world,” Gordon shared a question posed to her by a student from North Dakota. The student asked how 38 North—a program from the Stimson Center at Johns Hopkins University dedicated to providing the best possible analysis of North Korea, including through the use of

commercial satellite imagery—influences the U.S. approach to denuclearization.

Gordon explained, “If we stay in the place where we think our whole craft is about knowledge and not about the use, we’ll miss the joy of the moment we have. You are not in the GEOINT business, you are in the national security business. Your ‘what’ is GEOINT, but your ‘why’ is national security.”

She implored attendees to think about the following IC focus areas:

- Understanding risk in a 5G World
- The security of future communications
- Understanding the threat of human-imposed disaster
- Exposing the modalities of new terrorist threats

“Each of these problems I posed has a GEOINT component but none can be solved by GEOINT,” she said. “It can’t be somebody else’s responsibility; it has to be all of our responsibilities in our craft to get us there.”

Gordon pointed out that even leading experts can become more comfortable identifying problems than solutions. She challenged attendees with what she believed should be some next steps for the IC.

One example she pointed to is the Intelligence Community Information Technology Environment (IC ITE).

“IC ITE is what the IC has decided on as its vehicle for integration,” Gordon said. “If your solution doesn’t work with it, you are not on team national security. And if we’re doing it wrong, then you need to tell us what we need to do to make it right.” 🌐

Activating AI

DOD'S DR. LISA PORTER DRAWS A RESEARCH ROADMAP FOR OPERATIONALIZING AI

By Matt Alderton

Although airlines stopped putting it in seatback pockets in 2015, long-time travelers might remember SkyMall, the offbeat in-flight catalog that peddled oddball wares such as chaise lounges for dogs, glow-in-the-dark toilet seats, and life-sized Stormtrooper suits. Thanks to SkyMall, the length of one's flight could be measured just as easily in "oohs" and "ahs" as in miles or minutes.

During a keynote speech Tuesday at GEOINT 2019, The Honorable Dr. Lisa Porter gave the impression that artificial intelligence (AI) is a lot like the products in a SkyMall catalog: Because they sound so neat, you can't help but want them. But do you really, actually need them? The truth is, not everyone does.

"AI is a bit of a shiny object ... so sometimes we fall into that hammer-looking-for-a-nail problem," said Porter, who is deputy under secretary of defense for research and engineering with the U.S. Department of Defense (DoD). "We have to be careful and recognize that not every problem is well suited to AI."

Porter described how the research community both inside and outside DoD can advance AI in ways that maximize benefit over buzz. Step one, she said, is problem identification.

"Sometimes we're not very good about describing problems," explained Porter, who said succeeding with new technology requires "really digging into understanding the problem that you're trying to solve [by] spending quality time with the end users who are currently addressing that problem."

Along with a clear problem, AI demands good data.

"If you've decided that AI is really the appropriate approach to solving the problem, you also have to ask yourself ... is it really possible to generate the type of AI data I'm going to need for the algorithms I want to deploy?"

Assuming it is, the next item on every AI shopping list should be explicit metrics, according to Porter. She offered as an example a search algorithm trained to identify cats versus one trained to identify missile launches. For the former, precision is paramount; you may not care if the algorithm returns every image of a cat, as long as every image it does return is, in fact, a cat. For the latter, recall is more important than precision; you may be willing to tolerate false positives in exchange for confidence that the algorithm will capture every image with a missile launch in it.

"These are the kinds of things you have to think about ahead of time when you're defining metrics by which you're going to improve and optimize your algorithms," said Porter, adding that metrics are as important for making business cases as they are for improving algorithms. "At the end of the day, [users] have to be able to justify the cost of implementing your technology ... and the only way they're going to be able to do that is to show a quantitative measurement that exceeds the cost."

Therein lies the shortcoming of most contemporary AI efforts, according to Porter: Their architects are so fixated on demonstrating new technology that they've yet to engineer systems to actually integrate it.

"A pilot is not adoption," emphasized Porter. "The

The Honorable Dr. Lisa Porter, Deputy Under Secretary of Defense for Research and Engineering.



“These are the kinds of things you have to think about ahead of time when you’re defining metrics by which you’re going to improve and optimize your algorithms.”

— THE HONORABLE DR. LISA PORTER, DOD

community must adhere to transparency so that we can get to reproducibility, so that we can get to trust. Because if we don't understand these results are validated and reproducible, we at the DoD and in the national security community cannot use them."

Along with explainable AI, Porter said the scientific community should be laser-focused on: developing solutions to adversarial AI; reducing reliance on large datasets; and diversifying GEOINT

algorithms in areas beyond image processing.

Porter put her priorities into two main categories, the first being AI systems engineering, and the second being research.

"We've got to continue to focus on research—challenge ourselves to move beyond our comfort level," she said. "Otherwise, we're never going to get to a point where we're going to truly rely on these algorithms in mission-critical applications." 🌐

Government Pavilion Stage Highlights

PRESENTERS DISCUSS GEOINT-RELATED IARPA PROGRAMS, NRO COMMERCIAL PARTNERSHIPS, AND NGA'S TECHNICAL WORKFORCE



Dr. Catherine M. Cotell, Deputy Director, Research, IARPA, provided the activity's GEOINT perspective Monday afternoon.

Government leaders shared insights and business opportunities Monday afternoon at the **Government Pavilion Stage (Booth 466)** in the GEOINT 2019 exhibit hall, sponsored by AT&T.

IARPA GOES AFTER THE TOUGH PROBLEMS

BY JIM HODGES

The Intelligence Advanced Research Projects Activity (IARPA) doesn't exist solely on geospatial business. It serves the entire Intelligence Community, but there is plenty of GEOINT work under way, according to Deputy Director Dr. Catherine M. Cotell.

Founded on the Defense Advanced Research Projects

Agency (DARPA) model, IARPA works on long-term, complex, multidisciplinary issues to grow programs to a point at which they can be transitioned to U.S. intelligence agencies.

Ideas for IARPA programs can come from anywhere. "Finder," for example, grew from Intelligence Community frustration at seeing pictures of Osama bin Laden in news reports and not being able to locate him.

"Finder was initiated to tell analysts without metadata where a photograph was taken anywhere in the world," Cotell said.

Leveraging machine learning and image processing with geospatial fusion, data fusion, and other technology, Finder takes advantage of every aspect of a photo to determine its place of origin.

IARPA has also undertaken programs to learn the geospatial origin of radio signals, to create 3D models from remote sensor data, and to determine identity and activity from security cameras, among other GEOINT-related activities.

IARPA is also working on programs such as TrojAI to test security among AI activities.

"There is a focus these days on using AI to solve our analytical problems," Cotell said. "[TrojAI] challenges people to come up with different Trojan attacks on different kinds of AI systems."

Another program, Secure, Assured, Intelligent Learning Systems (SAILS), is being designed to test the privacy of AI. In it, algorithms will be reverse engineered to determine the data used on a problem.

"When you're dealing with classified information, that's a big concern," Cotell said.

NRO OPENS UP TO MORE COMMERCIAL POSSIBILITIES

BY ROB PEGORARO

The National Reconnaissance Office (NRO) is making more deals with private industry and talking about them—a considerable shift for a government agency whose existence was classified until 1992.

"It's a little bit new for us," said Troy Meink, who leads NRO's GEOINT Directorate.

Also Monday, NRO announced the signings of "study contracts" with three providers of commercial satellite imagery—Planet, BlackSky and Maxar. Meink said NRO has begun to explore how the private sector can augment its in-house capabilities.

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"There is a focus these days on using AI to solve our analytical problems. [TrojAI] challenges people to come up with different Trojan attacks on different kinds of AI systems."

— DR. CATHERINE M. COTELL, IARPA

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One reason, he explained, is the growing volume of work NRO conducts in civilian areas.

“We do a lot of support for disaster relief, whether that’s hurricanes or tracking plumes of volcanoes,” he said, adding that his agency also provides a substantial amount of imagery for environmental and law enforcement purposes.

These new contracts will allow NRO to assess how commercial space imagery and analytical services might help it meet the demands of those as well as its military and Intelligence Community customers.

Meink said NRO has also begun leaning more on private launch services—he name-checked small satellite firm Rocket Lab, while Elon Musk’s SpaceX delivered its first NRO payload in April 2017—with launch costs under \$100 million, about a third of what it typically costs to launch an NRO satellite.

Meink told attendees to expect further NRO interest in cooperation with private industry, noting that in May, the agency posted via its social media accounts a Request for Information for improving its imagery capabilities. Then, he added, “I was not even aware that the NRO had a Facebook or Twitter account.”

NGA LEARNS WHAT’S POSSIBLE FROM TECHNICAL WORKFORCE

BY JIM HODGES

National Geospatial-Intelligence Agency (NGA) Chief Technology Officer Mark Munsell was succinct when he described one of NGA’s strategic assets.

“This is something that we value as an organization, something we’ve invested in, something that, if we don’t take care of it, will lead to a failure of the organization,” he said. “That’s how we see our technical workforce.”

Colleagues Dr. Andrew Brooks, Deepak Kundal, and Jeanne Stacey joined Munsell in the discussion.

“Success started with the people who are doing that work,” said Brooks, who joined NGA just over a year ago as chief data scientist.

Stacey, who leads the NGA Data Corps, has been instrumental in enabling the agency to hire 50 data scientists in the past year.

“Keeping them is a challenge,” she acknowledged. “They are looking for interesting problems.”

She added there is a need at NGA to advance data literacy across the workforce so all



Dr. Troy Meink, who leads NRO’s GEOINT Directorate, spoke about the evolving NRO GEOINT mission Monday afternoon.

personnel can better understand what the scientists are divining and appreciate the value and potential of data.

Kundal, in his eighth week at NGA as chief data officer, considers part of his charge to help lead “a fundamental paradigm shift in the way we actually think about data from the agency perspective.”

Technology combines both products and people, according to Brooks, adding that NGA has about 50 software developers.

“They bring the prospect of what’s possible,” he said. ☺



NGA panelists discussed people, data, and technology as strategic assets Monday afternoon. From left to right: Dr. Andrew L. Brooks, Chief Data Scientist; Jeanne Stacey, NGA Data Corps; Deepak Kundal, Chief Data Officer; and Mark Munsell, Chief Technology Officer.

2019 USGIF Award Winners Announced

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

At GEOINT 2019, USGIF announced this year’s recipients of its annual Awards Program. The USGIF Awards Program recognizes the exceptional work of the geospatial intelligence tradecraft’s brightest minds and organizations pushing the community forward. Award winners are nominated by their colleagues and selected by the USGIF Awards Subcommittee.

“GEOINT is about how we see the world and how we predict, plan, respond, and react to the world’s greatest challenges and opportunities,” said Kevin Jackson, chair of the USGIF Awards Subcommittee. “This year brought us some very exciting and unique nominations and tradecraft applications that truly demonstrate how GEOINT has expanded into new domains. We are excited about the 2019 award winners and what’s in store for the future of GEOINT.”

THE 2019 USGIF AWARD WINNERS ARE:

1. Academic Achievement Award

Aaron Gerace and Matthew Montanaro, Rochester Institute of Technology

2. Community Support Achievement Award

Taking Autism To The Sky, Inc.

3. Government Achievement Award

Rachael Brady, CAL FIRE

4. Industry Achievement Award

Jeffrey D. Clark, Ph.D., Riverside Research

5. Military Achievement Award

GUARDIAN Team, National Guard Bureau



USGIF Volunteer Spotlight: Kevin Jackson

Kevin Jackson has served as chair of the USGIF Awards Subcommittee since 2005, the first year the Foundation presented its USGIF Awards. He describes his role as "the most rewarding, humbling committee assignment there is."

"The award winners are the ones making this tradecraft happen," Jackson said. "They're the innovators, the thought leaders pushing the envelope."

Jackson is responsible for guiding the entire award process, from the call for committee volunteers and award nominations to presenting the awards on stage each year at the GEOINT Symposium. The hardest process is selecting the winners, said Jackson, though added he doesn't vote unless there is a tie.

"The diversity of the applications of the GEOINT tradecraft will just blow you away," he said.

When asked why he has dedicated nearly 15 years to this committee, Jackson said, "This is the community we all work in. How do you show appreciation any better way than helping to grow the community that probably puts food on your table and also does some pretty cool things to help the world become a better place?"



USGIF Chairman of the Board The Honorable Jeffrey K. Harris presented Kevin Jackson with an award for his many years of service as a dedicated volunteer Tuesday at GEOINT 2019.

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Dr. Annette J. Krygiel Receives USGIF's 2019 Lundahl-Finnie Lifetime Achievement Award

KRYGIEL HONORED FOR DECADES OF INFLUENTIAL SERVICE TO THE GEOINT COMMUNITY



Dr. Annette J. Krygiel received USGIF's 2019 Arthur C. Lundahl-Thomas C. Finnie Lifetime Achievement Award Tuesday morning.

USGIF announced Dr. Annette J. Krygiel as the 2019 recipient of the Foundation's Arthur C. Lundahl-Thomas C. Finnie Lifetime Achievement Award Tuesday morning at GEOINT 2019. Krygiel is the 15th individual to win this prestigious award.

Krygiel is a native of St. Louis, Mo., having earned her bachelor's degree in mathematics from Saint Louis University and a Ph.D. in computer science from Washington University. She served 38 years with the Department of Defense (DoD) in positions at the Aeronautical Chart and

Information Center, the Defense Mapping Agency (DMA), the Central Imagery Office (CIO), and the National Geospatial-Intelligence Agency (NGA). She was DMA's chief scientist until her appointment as director of CIO in 1994.

Krygiel has been an independent consultant since retiring from federal civil service in 1999 and has also participated in many advisory roles, including serving on the Naval Studies Board for the National Academies.

"I am surprised, stunned, and deeply honored to receive the Lundahl-Finnie award," Krygiel said. "I am also very humbled at this connection to two great visionaries who

enabled geospatial intelligence capabilities critical to our nation. My own career has been framed by their organizations, by people they mentored, and to some extent by strategies they employed. I am immensely grateful to the USGIF Board for this recognition and for including me among such distinguished awardees."

In collaboration with the National Defense University

and the DoD's Command and Control Research Program, Krygiel authored the book, "Behind the Wizard's Curtain: An Integration Environment for a System of Systems." Additionally, she has received a number of awards, including the Defense Distinguished Civilian Service Award and the National Intelligence Distinguished Service medal. She was also inducted into NGA's Hall of Fame in 2001.

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

Lundahl is known as the father of modern imagery intelligence and analysis and was the founding director of the National Photographic Interpretation Center. Finnie served as DMA's director of management and technology and was one of the primary architects of the agency's evolution into the digital era. 🌐



To learn more about the Lifetime Award and its past recipients, visit usgif.org/community/LifetimeAward.

New Army Weapons and Tactics Will Require AI-enabled GEOINT

ARMY AI TASK FORCE DIRECTOR DESCRIBES THE FAST-PACED FUTURE OF WARFARE

By Jim Hodges

Brig. Gen. Mark Easley described how the future of war will demand speed with new weapons, capabilities, demands, and tactics.

Speaking Tuesday at GEOINT 2019, Easley discussed standoff warfare and the nature of different battlefields where “there are no rear areas.”

“In my career, there has been an incredible revolution in military affairs,” he said. “Precision-guided weapons, GPS, stealth technology, and a small thing called the internet. And these will be accelerating in the 21st century.”

He looked out at the audience.

“We need your help,” he said.

“We need to modernize, but our challenge is, specifically, how?”

“There are no easy answers,” said Easley, who is director of the Army Artificial Intelligence Task Force under Army Futures Command, charged with envisioning the effects of AI on future warfare.

“With artificial intelligence, not only will the speed of battle be extremely fast, but AI-enabled ISR systems also will make it difficult to hide military formations for very long,” Easley said.

He then quoted Army Chief of Staff Gen. Mark Milley: “If you stay in place for more than two hours to three hours, you will be dead.”

Battle survival and success will involve amass, disperse, amass, disperse.

“Underpinning conflict at its very core is GEOINT,” Easley said.

The speed of battle will require knowledge of threats and obstacles along one’s path, and support systems to be established and reestablished quickly.

Longer-range and faster weapons will require more intelligence to be produced, faster.

Two operative terms are “speed of relevance” and “speed of decision,” Easley said, adding, “the speed of decision-making with the volume of raw data available now would overwhelm our equipment.”

This is why he’s asking for help. And why he frequently travels between Washington, D.C., and the task force’s hub at Carnegie Mellon University in Pittsburgh, Pa. The Task Force is also collaborating extensively with the Department of Defense’s Joint Artificial Intelligence Center and the Army Research Lab.

Easley said his group is examining a system of rapid prototyping for potential AI equipment.

“We want to build, fail, learn, build again,” he said.

AI is also necessary for the Army to operate under “The U.S. Army in Multi-Domain Operations 2028,” a strategy that envisions the necessity of multi-domain (space, cyberspace, air, land, and sea) operations against adversaries using anti-access/area denial tactics.

Those tactics include “standoff,” according to an Army video Easley showed during his remarks. In standoff, an adversary remains at a distance, in effect trying to deny U.S. multi-domain capabilities.

With advanced weaponry, multi-domain operations, and



standoff tactics, the scope of information necessary for the service to succeed means GEOINT is going to be paramount, Easley said. It also means AI enablement will be crucial in dealing with the plethora of data generated.

In standoff, for example, U.S. joint forces will seek to exploit available opportunities—attacking, prevailing, and then fighting in a position of increased advantage. Finding those opportunities will rely upon intelligence, and geospatial intelligence in particular.

“GEOINT will take a more direct and fundamental role than it ever has before,” Easley said. “Focused operations will be predicated on knowing the [capability] of the enemy.” 🌐

Brig. Gen. Matt Easley, Director, Army Artificial Intelligence Task Force, Army Futures Command, spoke Tuesday morning.

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 “Underpinning conflict at its very core is GEOINT.”

— BRIG. GEN. MARK EASLEY, U.S. ARMY

Wildfires *continued from cover*

James Reilly, USGS

problem first and figure the rest out later.

“We have spent \$40 billion of money in the last two years, dealing with the insurance, recovery, and firefighting costs,” Dargan said. “That is unacceptable.”

Firefighters without accurate, real-time data can suffer far worse outcomes. United States Geological Survey (USGS) director James Reilly explained to the audience how shifting winds led the 2013 Yarnell Hill Fire to overrun 19

Prescott, Ariz., firefighters who didn’t know of that changing threat.

“They never saw it coming,” Reilly said.

He and Dargan outlined several initiatives to collect and analyze data and then deliver the information to firefighters on the ground.

The Colorado Division of Fire Prevention and Control, for instance, now operates two multi-mission Pilatus PC-12 aircraft that can be scrambled to collect color and infrared imagery of wildfires and can send data down to firefighters’ mobile devices within 10 minutes, Dargan said.

Earlier this week, she added, the California National Guard turned on the capability to shapefile updates

of fires to firefighters every 15 minutes, and the Colorado National Guard will soon have the same ability.

The National Center for Atmospheric Research, meanwhile, has begun modeling weather around fires in 3D to give a more accurate view of where winds might spread their embers next.

Reilly pointed to LandFire, a project created by the U.S. Departments of Interior and Agriculture to map wildlife vegetation,

meaning potential fire fuel, and said firefighters use this as a tool to assess evacuation routes and decide where to preposition equipment before fire season.

USGS’s GeoMAC (Multi-Agency Coordination) map offers a nationwide view of fires to lend strategic situational awareness for incident commanders.

Government agencies are now augmenting these mapping efforts by using LiDAR data from both airborne and spaceborne vehicles to gauge the fuel potential of forest canopy.

Human intervention also plays a role. Panelist Rachael Brady, a research data specialist with the California Department of Forestry and Fire Protection, employs statistical models and geospatial analysis to track wilderness arson and identify perpetrators. In a brief ceremony after the panel, Brady received a 2019 Achievement Award from USGIF for her contributions.

Reilly and Johnson also noted the role of development patterns, urging action to make buildings in wildfire-prone settings more resistant.

Getting the types of aforementioned information to firefighters in nearly real time will require major advances in artificial intelligence and machine learning. Dargan noted that Intterra is working with Amazon’s Rekognition image-identification software to detect fires early on.

Reilly began his remarks with a blunt recommendation for AI-driven alerts: “To be able to get to that very low latency of information, we’re going to have to get the humans out of the loop.”

Dargan set out an ambitious metric: fire-perimeter data with a resolution down to 1 square meter, updated at least every two minutes. That would be a complex endeavor with a simple rationale—as she said, “I need to know where the fire is at all times.” 🌍

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“We have spent \$40 billion of money in the last two years, dealing with the insurance, recovery, and firefighting costs. That is unacceptable.”

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— KATE DARGAN, INTTERRA

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2019 IGAPP Award Winners Announced

JED SERVICES, CACI, AND ORBIT LOGIC RECOGNIZED AT GEOINT 2019

SAIC (Booth 401) announced the 2019 Innovative GEOINT Application Provider Program's (IGAPP) award winners this week at GEOINT 2019. National Geospatial-Intelligence Agency (NGA) Director Vice Adm. Robert Sharp and Lew Messing, SAIC's customer account executive, presented the awards.

JED Services was selected as the \$20,000 Grand Challenge Winner for its Paul Revere military recall app. The application allows commanders to import an Excel roster for use during recall events. Once the roster is created or imported it can be organized into groups and the user can issue a recall to one or more groups via a push notification. The recipient can acknowledge notifications, message with their commander, and share their location and ETA.

CACI was selected as the \$5,000 Grand Challenge Runner-up for its Kuato app, which addresses the same military recall need. Kuato allows leaders to create a roster of team members and recall them to a location with text and voice instructions. When a leader initiates a recall, team members will receive a notification on their device and can respond with their current status in the app. Team leads can

monitor team member responses and locations via the app in real-time.

A third award in the amount of \$25,000 was presented to Orbit Logic as the winner of the Prototype Grand Challenge. The winning submission, called Order Logic, presented an enterprise-wide marketplace solution for users and suppliers of GEOINT information, products, and services.

Order Logic is an application for satellite imagery collection order management. The app provides the capability to browse, view, create, and edit imagery orders; to monitor imagery collection and processing status; and to estimate collection feasibility for single and multi-use satellites with user-specified collection constraints and configurable satellite parameters.

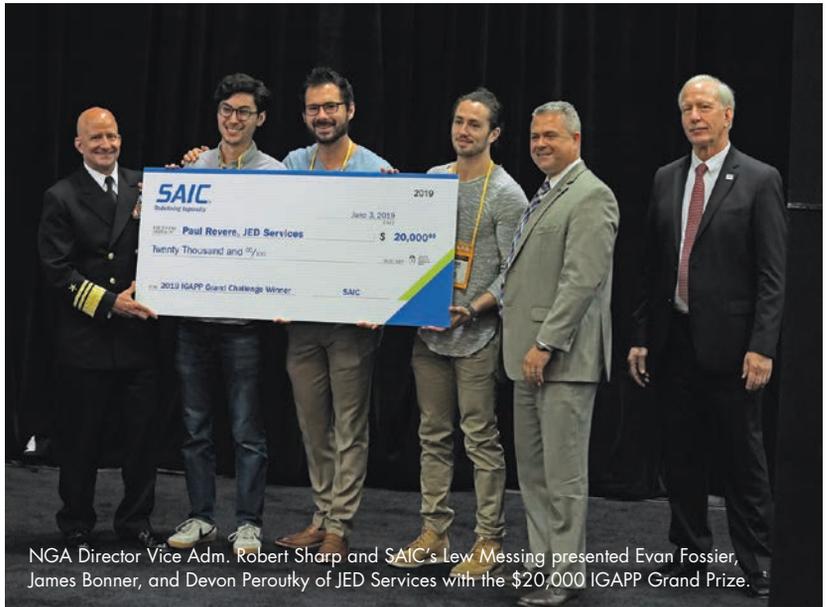
Applications built by Alambda, Aviation Mobile Apps, Central Contacts, and Tech Maven Geospatial received Honorable

Mentions for their contributions.

The IGAPP Grand Challenge is an annual contest in which IGAPP-approved app vendors participate in a three-month "hackathon," building and delivering mobile apps that address a variety of Department of Defense mission needs.

"This program has been a tremendous proof of concept for quickly delivering innovation to the geospatial intelligence user community," said Michael LaRouche, executive vice president and general manager of SAIC's National Security Customer Group. "Witnessing how relevant and timely apps are provided to end users across all mission areas shows how new thinking around acquisition can benefit our government and industry."

NGA's IGAPP contract vehicle was first conceptualized and provisioned by SAIC. IGAPP continues to bridge the gap between NGA and private sector app developers. SAIC acts as the "trusted broker" for mobile app procurement, and by delivering



NGA Director Vice Adm. Robert Sharp and SAIC's Lew Messing presented Evan Fossier, James Bonner, and Devon Peroutky of JED Services with the \$20,000 IGAPP Grand Prize.

JED Services was selected as the \$20,000 Grand Challenge Winner for its Paul Revere military recall app.



CACI received the Grand Challenge Runner-up award of \$5,000.

specific user needs of a demographic typically unavailable to private developers, removes barriers to entry without incurring any up front development costs. Compared to a formal acquisitions model, meaningful apps can be delivered in months instead of years. 🌐

Learn more about IGAPP by visiting SAIC at Booth 401.



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)

- Matt Roper, Chief of Joint Intelligence, Surveillance Reconnaissance Services, NATO Communications and Information Agency
- Rosanne M. LeVitre, RADM Retired, USN, Assistant Director of National Intelligence for IC-DOD Coordination/Integration, ODNI

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)

10:00a–3:00p

Exhibit Hall Open (Halls 2–3)

Sponsored by General Dynamics IT

12:00–2:00p

Lunch (Exhibit Hall)

12:00–2:30p

Government Pavilion Stage (Exhibit Hall, Booth 466)

Sponsored by AT&T

Master of Ceremonies: Ronda Schrenk, Vice President of Programs, USGIF

- **12:00–12:30p**—Harnessing Innovation through Industry Partnerships
- David Gauthier, Director, Commercial GEOINT Solutions, NGA
- Christy Monaco, Chief Ventures Officer, Office of Ventures and Innovation, NGA
- **12:30–1:15p**—St. Louis: An Emerging Geospatial Center of Excellence
- *Moderator:* Tara Mott, Chair USGIF St. Louis Area Working Group
- Otis Williams, P.E., Executive Director, St. Louis Development Corporation
- Brett Markham, West Executive & Deputy Associate Director for Operations
- Christine Woodard, Co-chair, St. Louis Area Geospatial Ecosystem (SAGE) Steering Committee, NGA
- Dr. Kenneth Olliff, Saint Louis University, Vice President of Research
- **1:15–2:30p**—Acquisition Agility
- *Keynote:* Kevin Meiners, Deputy Director of National Intelligence for Enterprise Capacity, ODNI
- *Moderator:* Dr. Fred Turman, Co-Chair, USGIF’s NGA Advisory Working Group
- Kelly Pickering, Director, OCS, NGA
- Mark Andress, Director, CIO-T, NGA
- Matt Conner, Chief Information Security Officer, NGA
- Shenice Stephens, Office of Ventures and Innovation, NGA

2:00–3:00p

Networking Reception (Exhibit Hall)

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