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2014 ISSUE 2

trajectory


THE OFFICIAL MAGAZINE

OF THE UNITED STATES GEOSPATIAL INTELLIGENCE FOUNDATION

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BONUS CONTENT

Watch videos of geospatial public safety apps in action.



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View more photos of the coordinated operation to provide security for Super Bowl XLVIII.



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GEOINT AND PUBLIC SAFETY

I realize an image of a police car on the cover of *trajectory* might be perplexing to some of our readers. But, from the USGIF perspective, it's probably overdue. Since the attacks of 9/11, the majority of the Foundation's focus has been on the defense and intelligence communities as they worked together on operations in Afghanistan, Iraq, the Horn of Africa, and Yemen. All of this was managed in the context of other regional challenges such as Egypt, Syria, and Iran as well as strategic issues related to China and, more recently, Russia.



Meanwhile, the Department of Homeland Security was created and has experienced the expected growing pains. Increasingly, the homeland security, emergency management, and first responder communities have found the value of integration, both horizontally and vertically. Horizontally we've seen small steps at the local and state level, such as first responders in the D.C. metro area learning to work more closely together in the aftermath of 9/11 and in the midst of natural disasters such as the summer 2012 derecho.

In parallel, the development of the state and local fusion centers around the country represent a significant step forward in vertical integration, with the idea of facilitating federal, state, and local information sharing and fostering operational coordination.

Not unlike operations overseas, a central organizing principle of this type of engagement is inherently the geospatial intelligence underpinning—the ability to create and sustain shared situational awareness among all agencies whether supporting a national security special event, responding to a natural or man-made crisis, or even for daily operations.

Near-ubiquitous precision location information, prolific geospatial information, powerful computing, intuitive software, capable mobile hardware, and trained, experienced users collectively add up to the most important advance in recent memory for emergency managers and first responders at all levels. Whether policing a municipality, guarding a port, or securing the Super Bowl, GEOINT is indispensable.

Our recent inaugural National Security Workshop at GEOINT 2013*, coupled with the content in this issue of *trajectory*, demonstrates USGIF's commitment to bring our resources to bear, broaden our outreach, and ensure that when we talk of our pillars—Build the Community, Advance the Tradecraft, and Accelerate Innovation—that we keep the entirety of our constituency in mind to include the public safety community alongside defense and intelligence.

As a nation, we've worked diligently to keep the instability of this increasingly dangerous world away from our shores. However, we will continue to see threats to the homeland, both from those who wish us harm and from increasingly severe natural phenomena. A better GEOINT foundation as part of a vertically and horizontally integrated enterprise is essential to prevent attacks and mitigate consequences. USGIF is committed to providing thought leadership and support to foster GEOINT's role in keeping the nation secure.

**Whether policing a municipality,
guarding a port, or securing the
Super Bowl, GEOINT is indispensable.**

KEITH J. MASBACK | CEO, USGIF
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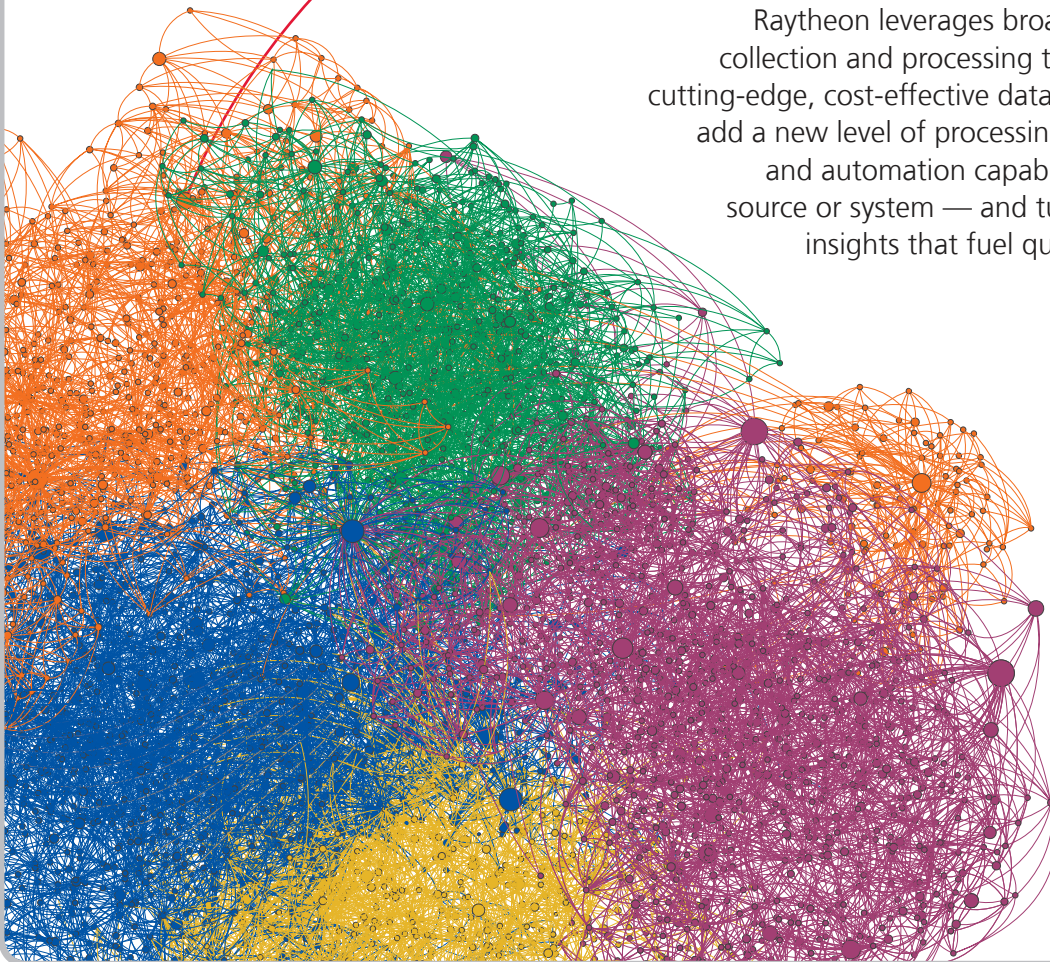


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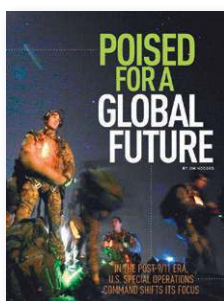
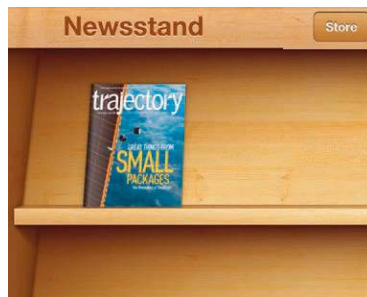
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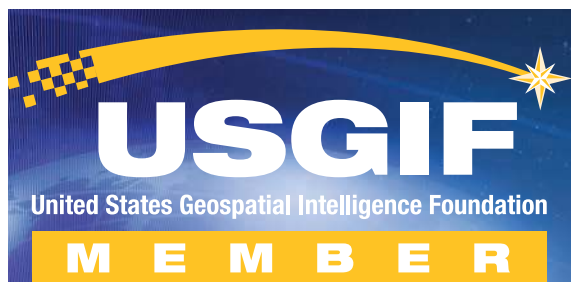
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The *trajectory* team



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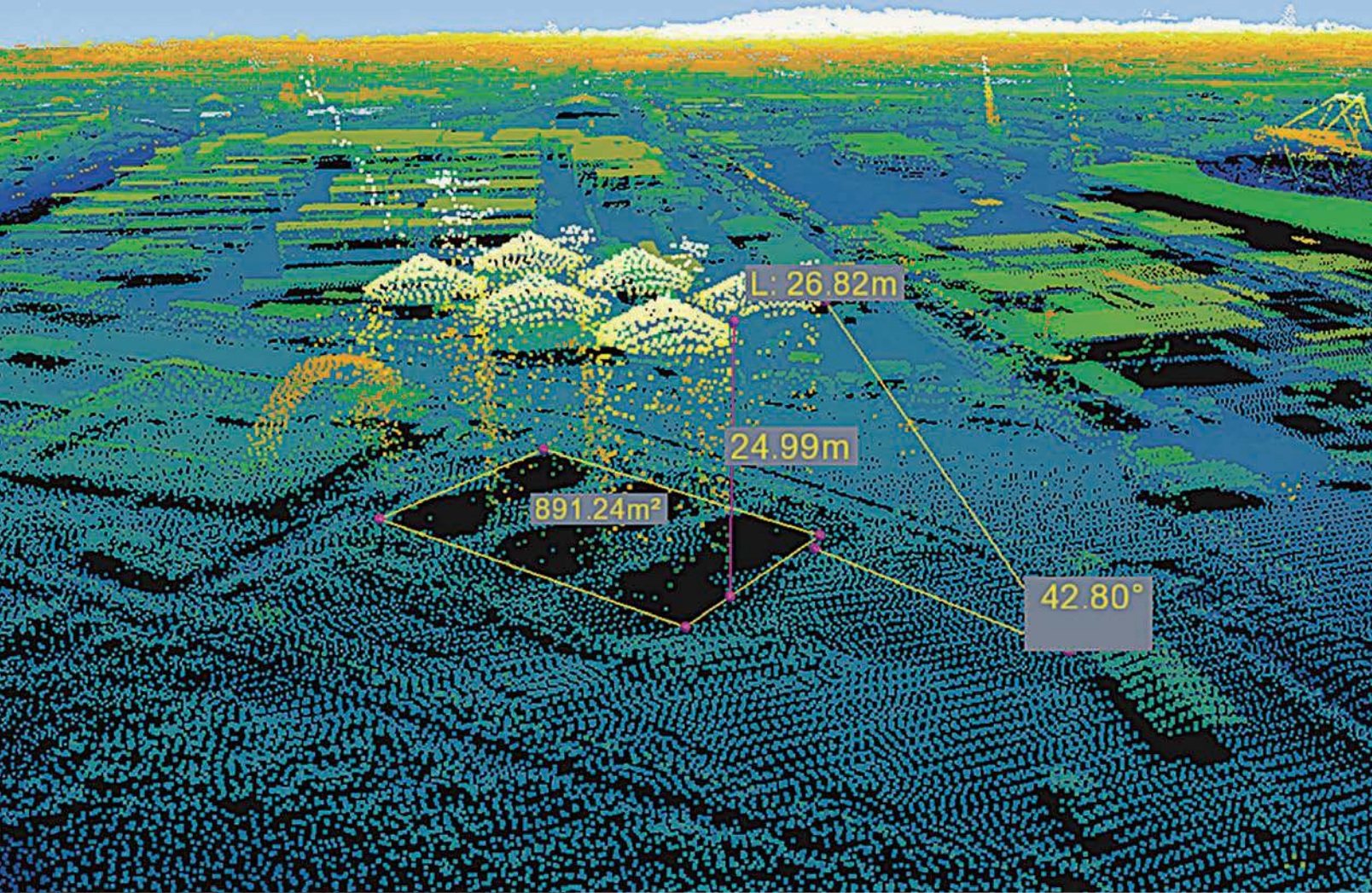
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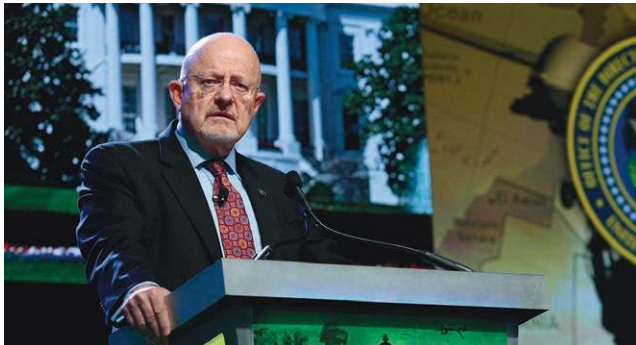


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NEWS UPDATES AND HIGHLIGHTS



DIRECTOR OF NATIONAL INTELLIGENCE James Clapper gave the opening GEOINT 2013* keynote address.

DNI CLAPPER ON WHISTLEBLOWING AND TRUE HEROISM

From the Edward Snowden leaks and the Boston Marathon bombings to the U.S. embassy attack in Benghazi and chemical warfare in Syria, the Intelligence Community has weathered many storms since the GEOINT 2012 Symposium.

"The past 18 months have been one of the toughest stretches for the Intelligence Community I've seen in the 50-plus years I've been in the business," said Director of National Intelligence James Clapper during his keynote address at the April GEOINT 2013* Symposium.

Clapper addressed recent leaks, countering the notion that Snowden is a hero by citing former U.S. Army Reservist Sgt. Joe Darby as a true role model. Darby was stationed at the Abu Ghraib prison in Iraq in 2003 and turned a CD over to the U.S. Army Criminal Investigation Command upon discovering graphic images of guards abusing prisoners.

"Darby makes a great role model ... We need more people with the courage and integrity of Joe Darby in our Intelligence Community," added Clapper.

Clapper said Snowden's leaked documents extend far beyond civil liberties.

"What Snowden has stolen and exposed has gone way beyond professed concerns with the protection of privacy rights," Clapper said. "He stole and leaked secrets about how we protect U.S. businesses from cyber threats and how we support U.S. troops in warzones—putting American lives at risk ... We are beginning to see changes in the communications behavior of adversaries and most disturbingly terrorists, which I anticipate to continue. As a consequence, our nation is less safe and our people less secure."

LETITIA LONG ANNOUNCES RETIREMENT, ROBERT CARDILLO NAMED SUCCESSOR

National Geospatial-Intelligence Agency (NGA) Director Letitia Long announced her plans to retire in a June 2 email to NGA personnel. The Department of Defense announced Robert Cardillo, deputy director for intelligence integration with the Office of the Director of National Intelligence (ODNI), would succeed Long as director of NGA in October.

Long has led the agency for four years, transforming NGA from a provider of static products to

offering a full suite of geospatial intelligence services, including GEOINT apps, the recently-launched "Map of the World," and critical disaster response support.

"I am very pleased that my successor will be Robert Cardillo," Long said in a DOD press release. "Robert is a truly distinguished intelligence professional who knows the Intelligence Community, NGA, and many of our employees well."

Long has a combined 35 years of public service with the U.S. government. Prior to NGA, she served as deputy director of the Defense Intelligence Agency (DIA), as the Defense Department's deputy undersecretary for intelligence, as deputy director of Naval intelligence, and as executive director for Intelligence Community Affairs, the predecessor organization to the ODNI.

"Our nation is fortunate to have selfless civil servants such as Tish Long and Robert Cardillo," said USGIF CEO Keith Masback. "Tish continues to do remarkable work as the director of NGA—I think it's too early to try to sum up her accomplishments because under her leadership a lot will be achieved between now and October."

Prior to joining ODNI, Cardillo served as the deputy director of DIA, the deputy director for analysis at DIA, and the director of analysis and production at NGA.

"I am honored to be asked to lead NGA and humbled by the opportunity to succeed Tish Long," Cardillo said in the DOD announcement. "As someone who began my career as a member of the NGA family, I am excited to have the privilege to build on the progress NGA has made under Tish's leadership. As much as I've enjoyed working with the DNI to help him integrate our IC, I look forward to teaming with the talented men and women of NGA as we continue to improve our analytic service to NGA's wide range of military and civilian customers."

Masback extended congratulations to Cardillo, adding that USGIF looks forward to its continued partnership with NGA throughout the leadership transition.

"Robert knows the agency in detail, having been part of both the formation of NIMA (National Imagery and Mapping Agency) and subsequent transition to NGA," Masback said. "He's led NGA's analysts, collection strategists, and the agency's corporate communications office, among other things. He, like Tish, is a technically competent and caring leader, and is keenly aware of the nation's most vexing intelligence challenges given his current responsibilities at ODNI."



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The number of exhibiting companies and organizations at GEOINT 2013*

CO-AUTHORS DISCUSS WEARABLE TECHNOLOGY, THE NEW DIGITAL DIVIDE, AND WHAT CROSSES THE “FREAKY LINE”

With a dose of humor and sarcasm, co-authors Robert Scoble and Shel Israel took the stage at the GEOINT Symposium to talk about evolving global and technological trends.

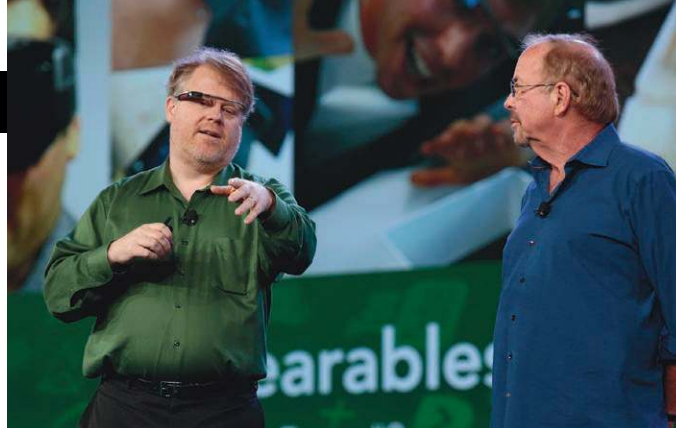
The duo's latest book, *Age of Context: Mobile, Sensors, Data and the Future of Privacy*, explores new technologies that can predict what users want even before they do—and what that means for our lifestyles, businesses, and privacy. After studying innovators around the world, Scoble, startup liaison for open cloud computing company Rackspace, and Israel, CEO of SI Associates and a columnist for *Forbes.com*, gave the audience a peek into the future.

Many location-based technologies are becoming mainstream, Scoble said. Even more so as the number of sensors on and around us increases exponentially, and the cost of the technologies radically decreases.

This means two things: “You’re getting highly personal products ... And businesses are studying their customers in much more detail,” he said. “Any time you see exponential rises in something, you see businesses build up.”

Wearable technology such as Google Glass (which Scoble wore during the presentation) allows the user to see his or her own stock prices and tweets, for instance.

As data becomes more precise, largely driven by the smartphone



CO-AUTHORS ROBERT SCOBLE (left) AND SHEL ISRAEL gave a joint keynote presentation on emerging trends in location-based technology.

industry pressuring developers for constant new technologies and products, businesses are merging personal and location data. Tap-n-Go, for example, is an app invented by a former Israeli surveillance officer and used by students to buy everything from lattes to textbooks.

After about a week, the app will gather enough data and “learn” from it to ask the user whether she wants her 9 a.m. latte.

Scoble said in this “always-surveilled world,” he’s seeing a new digital divide regarding technology: “Those who are all in, or all out”—the latter being those who are paying cash for everything and not using a smartphone.

“I’m an all-in guy,” he said, adding that putting data into his mobile device and giving away his privacy gives him considerable utility and radically improves his life. Israel countered that he is more conservative on this spectrum.

Overall, the duo provided the GEOINT 2013* audience with an entertaining and informative glimpse into the latest in commercial location-based technologies, which often serve as a source of inspiration for defense and intelligence needs.

SPECIAL OPERATIONS, SPECIAL MISSION

Adm. William McRaven outlined a daunting mission for U.S. Special Operations Command (USSOCOM): operate globally while building partnerships that allow nations to defend themselves.

“I guarantee you what happens in Latin America affects what happens in West Africa, which affects what happens in Southern Europe, which affects what happens in Southwest Asia,” said USSOCOM Commander McRaven during his GEOINT 2013* keynote. “It is all connected, and if you don’t look at it in a connected fashion, you’re going to miss something.”

At the same time, Special Operations Forces (SOF) have to retain counterterrorism capabilities. Integral to USSOCOM’s success, in large part, is geospatial intelligence.

“It’s about bandwidth and how we move the products the GEOINT Community provides us,” McRaven said. “Signals intelligence and GEOINT are really the coin of the realm for us to be able to do our mission.”

It’s a mission that continues to evolve as U.S. military presence in Iraq and Afghanistan draws down. SOF is now focused on a global consciousness.

“There’s no such thing as a local problem,” McRaven said. “The world is a very complex place. I’ll tell you, in my 37 years in this business I’m not sure that I’ve ever seen it this complex.”

McRaven outlined some SOF challenges. Among those is sharing information with the command’s partners. He offered an example from Kabul, Afghanistan, in 2009. At the time, U.S. forces were sharing fused intelligence with only five of its then 15 partners.

“I had a very aggressive colonel who was running the fusion cell at the time, and he came to me and said, ‘Sir, the problem is ... we’ve lost that trust factor because we can’t share with them,’” McRaven said.

A solution was found, allowing USSOCOM to share intelligence with up to 22 allies. With the help of the Office of the Director of National Intelligence and the National Geospatial-Intelligence Agency, the Warrior View program facilitated sharing of information.

“That was a sea change to how our allies viewed our efforts to support them,” McRaven said.

He shared a similar message with industry.

“I am working on a number of projects now where I have asked my industry partners to be prepared to share their intellectual property with others in a way they haven’t done before. I think I can show them on the back end that, if you assume that risk, your return in the end will be better.”



USSOCOM COMMANDER ADM. WILLIAM MCRAVEN U.S. Navy, spoke about the importance of building relationships with partner nations and establishing trust.

“A lot of the conferences I’ve been to are very technical, very specific in my area of research, which is remote sensing. Here [at the GEOINT Symposium], you see it all come together.”

—Amanda Ziemann, 4th year Ph.D. student, Rochester Institute of Technology



ADVANCING GEOINT TRADecraft 2013 USGIF AWARD WINNERS ANNOUNCED

The USGIF Awards Program recognizes exceptional work and bright minds from all areas of the GEOINT Community. Award winners are nominated by their colleagues and selected by the USGIF Awards Subcommittee. The 2013 USGIF award winners have demonstrated great achievements in advancing the GEOINT tradecraft.

"We received a record number of nominations for the 2013 USGIF Awards Program and the quality of the

submissions was extraordinary," said Kevin Jackson, USGIF's Awards Subcommittee Chair. "From the curious high school student's first glimpse into the tradecraft to our trail-blazing veterans, the contributions were significant and meaningful. In every single nomination package there is a story of commitment, passion, and unwavering dedication to mission—all intended to make this world a better place."



AND THE WINNERS ARE:

1. TACSAT-3 Exploitation Team: Military Achievement Award
2. Robert L. Arbetter, NGA: Government Achievement Award
3. Pixia Corp.: Industry Achievement Award
4. Richard M. Medina, George Mason University: Academic Research Award
5. Dover Area High School, Geospatial Technology Program: Academic Achievement Award
6. Melissa Martz, NGA: Outstanding Administrative/Support Award

WOMEN IN DEFENSE

Nearly 500 people gathered for a special lunch hosted by the Greater Tampa Bay Chapter of Women in Defense (WID) April 16 in conjunction with GEOINT 2013*. NGA Director Letitia Long gave a keynote address where she stressed the importance of mentoring, taking chances, and empowering women across the defense, intelligence, and homeland security communities. Following Long's speech, the GTB WID chapter surprised USGIF COO Aimee McGranahan with an award honoring her decade at USGIF and her contributions to the defense and intelligence communities.



Pictured from left to right are: USGIF COO Aimee McGranahan; Lisa Monnet, Greater Tampa Bay Chapter of Women in Defense membership chair; and NGA Director Long.

ROBERTA “BOBBI” LENCZOWSKI RECEIVES LIFETIME ACHIEVEMENT AWARD



ROBERTA “BOBBI” LENCZOWSKI received the Arthur C. Lundahl-Thomas C. Finnie Lifetime Achievement Award at the GEOINT 2013* Symposium.

USGIF ANNOUNCED

Roberta “Bobbi” Lenczowski as the recipient of the Foundation’s Arthur C. Lundahl–Thomas C. Finnie Lifetime Achievement Award. Lenczowski is the 10th and first female recipient of the award.

“Any lifetime achievement award evokes reflections, and there are many up-front and background facilitators to thank for their support,” said Lenczowski. “Such an

important award could simply be a memorable way to conclude decades of endeavor. However, for me, this award is a reminder that we must continue to pay it forward as mentors and advocates, following the example of both Art Lundahl and Tom Finnie.”

Lenczowski is an independent geospatial information-intelligence consultant who spent 28 years in the public sector. She retired in 2005 from the National Geospatial-Intelligence Agency (NGA), where she finished her NGA career as executive director of NGA Campus West in St. Louis. During her tenure in Washington, D.C., Lenczowski served three years as NGA’s technical executive, and was also director of operations with the National Imagery and Mapping Agency (NIMA) for more than five years. She also served as president of the American Society for Photogrammetry and Remote Sensing.

During the award presentation, former USGIF Chairman of the Board Stu Shea also announced the award’s renaming to include recognition of Thomas C. Finnie. This distinguished award now recognizes contributions made by both Arthur C. Lundahl and Thomas C. Finnie, and celebrates their accomplishments—in imagery analysis and mapping, respectively—as well as their legacies within the GEOINT Community.

Thomas C. Finnie’s career with the U.S. government began in 1937, practicing engineering and surveying with the Department of Agriculture. In 1962, he assumed the position of technical director for the Aeronautical Chart and Information Center in Washington, D.C., and St. Louis, and was one of the initial eight Department of Defense planners who assisted in organizing the Defense Mapping Agency (DMA) in 1972. Later, Finnie became DMA’s director of management and technology.

Arthur C. Lundahl is known as the “father of modern imagery analysis and imagery intelligence” for his work as the founder and first director of the National Photographic Interpretation Center (NPIC). Under Lundahl’s leadership, NPIC’s role to support the CIA’s deputy director of intelligence transformed the center into a national-level component of the Intelligence Community, and demonstrated image intelligence as a prime strategic and tactical resource worldwide.

NGA ANALYST HONORED WITH LT. MICHAEL P. MURPHY AWARD

BRYAN GOLTRY, an analyst at the National Geospatial-Intelligence Agency (NGA), was presented the 2013 Lt. Michael P. Murphy Award in Geospatial Intelligence at GEOINT 2013*. NGA Director Letitia Long and USGIF CEO Keith Masback presented the award.

Goltry is a geospatial analyst with NGA’s Analysis Directorate, and recently completed Penn State’s master’s degree program in homeland security with a GEOINT focus. Goltry began his GEOINT career with Earth Satellite Corp., where he assisted with NGA’s Geo-Cover project. He then served as an imagery analyst at NGA from 2002 to 2006. In 2006, he worked in the private sector with 3001 Inc. as a program manager providing imagery and geospatial analysis services to customers in the Intelligence and Defense Communities. Goltry received his bachelor’s degree in geographic sciences with concentrations in GIS, global studies, and environmental studies from James Madison University.

“The Murphy award committee felt that Bryan’s independent studies made an exceptional contribution to understanding the principle dimensions of the geospatial intelligence profession,” said Dr. Todd Bacastow, professor of practice for geospatial intelligence at Penn State.

The Murphy Award is named for Navy SEAL Lt. Michael P. Murphy, a distinguished Penn State alumnus. Murphy was killed June 28, 2005, by enemy forces during a reconnaissance mission in Afghanistan. Murphy was posthumously awarded the Medal of Honor, and he and his comrades were recently featured in the film *Lone Survivor*. The generosity of USGIF, the DigitalGlobe Foundation, and faculty, staff, and friends of Penn State fund the Murphy Award.



NGA ANALYST BRYAN GOLTRY received the 2013 Lt. Michael P. Murphy Award in Geospatial Intelligence.

BEYOND THE TRADITIONAL CORE

The importance of shifting geospatial curricula toward application development

DAVID DIBIASE, a member of USGIF's Academic Advisory Committee and former director of the John A. Dutton e-Education Institute at Penn State University, recently shared with *trajectory* his insights on the future of geospatial education. DiBiase is also Esri's director of education.

What are your thoughts on the perceived shortage of STEM graduates in the U.S.?

What I find is a peculiar paradox. Many employers complain there's a shortage of qualified, entry-level workers coming out of higher education. But the paradox is that from a graduate's perspective, there's a shortage of employment opportunities. Workforce research I've seen covering a broad range of industries points out that of employers across the board, particularly in science and technology, only a minority hire recent graduates. They mostly hire people with more experience. But that really puts a squeeze on recent graduates who may not have professional experience. It also points to the single most important thing that educational institutions, businesses, and agencies working together can do, and that is to provide meaningful internship opportunities for every single student in a professional field such as GIS or GEOINT.

What are your suggestions for increasing awareness and encouraging more young people to study geospatial sciences?

One thing that is very effective is [Penn State's] Geospatial Revolution video series that's available for free through YouTube. Esri also supports hosting annual GIS Day activities. In 2013, we had over 1,000 registered GIS Day events held worldwide. Energetic and sustained outreach efforts are really necessary. It's a challenge to unveil this technology area that tends to be invisible to most users—which is ironic given that

so many people now routinely make and use maps with geospatial technologies and don't give it a second thought. Geography has become ordinary but is still a mystery.

What do you think are some of the most essential components of an education in the geospatial sciences?

Even in science and technology fields, employers by and large state that foundational competencies such as communication, the ability to work in teams, and the ability to manage multiple priorities are equally as important as specialized technical skills. But what tends to happen in curricula is an over-emphasis on occupationally specific technologies and tasks, and perhaps a bit of neglect on foundational competencies. It would pay dividends for not only educators, but also students themselves, to consider what are strengths and gaps in curricula and in an individual's knowledge of the field. That gap analysis can help a student create a roadmap for continuing professional development.

How do you feel online coursework is changing the way people study geospatial sciences?

We've long heard that education needs to become a lifelong activity not just a prelude to a career. However, lifelong learning is a difficult thing for adult professionals with full-time jobs and families. High-quality online learning enables education to fit students' schedules rather than the other way around. Fortunately, we're in an era where the public isn't so suspicious of online education. Now, they in fact have high expectations and believe it can be a high-quality experience. The trend toward massive open online courses (MOOCs) in the last couple of years has really spread that sense of trust and high expectations.

What emerging education trends have you noticed recently?

Well, let's talk about an emerging trend that we're not seeing. On the one hand, there is a core of traditional mapping professions that are doing quite well, and the Department of Labor estimates back that up. But beyond that core is an innovative new frontier of geospatial application development that is more consumer and business oriented than what the traditional mapping disciplines have been engaged with. The worrisome lack of a trend is that higher education curricula, with very few exceptions, are still addressing the needs of that traditional core, and very few are focused on that innovative frontier. The notion of students learning to become builders of applications rather than just users is something we don't see very much.

What do you predict for the future of geospatial education?

Geospatial education programs that focus upon the traditional core of mapping disciplines will over time struggle to maintain enrollments and will probably consolidate into fewer and larger programs. Those programs that focus on that innovative frontier of geospatial application development will flourish.

■ BY KRISTIN QUINN

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DAVID DIBIASE speaks at the 2013 Esri Education GIS Conference.





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THE WORLD IN 3D

Digital elevation models and the transformation of the GEOINT landscape

By Thomas Ager



LANDSAT OVERLAY

This view of Antelope Valley, Calif., was generated by draping a Landsat satellite image over a preliminary topographic map from the Shuttle Radar Topography Mission.

IMAGINE A GEOINT ENTERPRISE in which 2D images and GIS data are routinely merged with full 3D models, not just of Earth's surface, but of roads, towers, power lines, trees, and even the exterior and interior of buildings. We are witnessing this transformation now as high-resolution 3D imaging technologies, robust data structures, and commodity applications enable the easy viewing and manipulation of 3D models.

SURFACE MODELS VS. TERRAIN MODELS

Some digital elevation products model the top of Earth surface features such as forest canopies and buildings, while others represent the so-called bare-Earth surface, in which trees and other features have been removed. Though there is no formal scientific agreement regarding terminology, it is generally accepted that Digital Elevation Model (DEM) is a generic term for any digital record of earth's surface. DEM subsets include Digital Surface Models (DSM)—DEMs that model the top of surface features—and Digital Terrain Models (DTM), which represent the bare-earth surface with most features removed from the data.

THE FIRST DIGITAL ELEVATION PRODUCT

More than 30 years ago, the military mapping organizations that preceded today's National Geospatial-Intelligence Agency (NGA) developed Digital Terrain Elevation Data (DTED), the original digital product for terrain modeling. DTED is a discrete matrix of points in which elevations are assigned to a grid of posts set at regular intervals. The smaller the post interval is, the greater the DEM's accuracy. For example, dropping a pole every football field length will likely produce less accurate data than with spacing equal to the length of a basketball court. The Shuttle Radar Topography Mission (SRTM), an 11-day space shuttle mission in February 2000, produced the first DTED on a near-global basis. SRTM used a technique called radar interferometry (INSAR), which employs a pair of antennas and

makes precise radar phase measurements to produce elevation data. DTED 1 posts are approximately 90 meters apart, while DTED 2 posts are roughly 30 meters apart. More recently, the DTED specification has been extended to include smaller, much denser grids that can accommodate more high-resolution techniques.

GRIDS VS. TINs

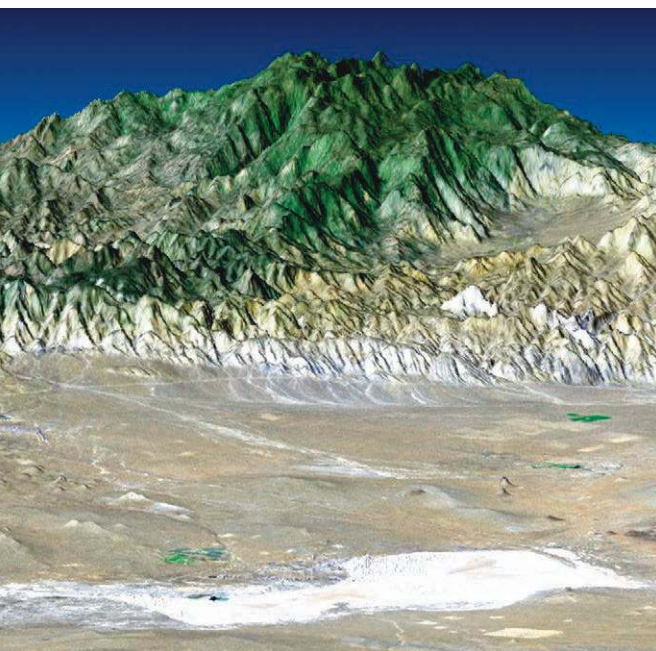
DEMs can be represented as a raster grid, such as the method used for DTED, or by an irregular arrangement of connected triangles with X, Y, Z coordinates at each vertex. Unlike regimented grids, these Triangular Irregular Networks (TINs) vary in density as a function of terrain roughness. The triangles are small when the terrain surface varies and larger when the terrain is smooth. Since the point distribution of TINs is not limited to a fixed grid, they can better model height, such as the peak of a mountain or topographic breaklines and ridges. TINs also allow slope and aspect angles to be more easily derived.

MULTI-SURFACE POINT CLOUDS

The traditional formats for digital elevation data assign one elevation to a particular horizontal location. For this reason, a DEM of a mountainous forest canopy produces a surface model that looks like a sheet draped over the land and trees. A point cloud is an unstructured format of raw X, Y, Z measurements of many surfaces of an object, where multiple elevations can be assigned to one location, and which includes a massive number of points. Point clouds are produced by LiDAR and other sensors, and are used routinely in Computer Automated Design (CAD) applications. They have become valuable for large-scale GEOINT applications to better represent the many levels of land surface structures.

APPLICATIONS AND PROSPECTS

DEMs have numerous applications, including terrain visualization, mapping, landscape fly-throughs, line-of-sight



calculations, and flood and hydrological modeling. However, the emergence of very high-resolution point clouds from LiDAR, radar, and optical sensors; the use of a wide range of platforms such as aircraft, spacecraft, large- and micro-UAVs, ground sensors and hand-held sensors; and commodity

rendering software and hardware spearheaded by the gaming machine industry, enable new capabilities with staggering implications.

At the GEOINT 2013* Symposium in April, Airbus Defence and Space released WorldDEM, which is a global elevation model at 12-meter density, pole to pole. This commercial, open product is billed as far more dense and accurate than any other global DEM. Consider as well that it is now possible to purchase, for a few hundred dollars, a laser scanner that can be clipped to an iPad to create and manipulate 3D models of our local environment. It is even possible to add the fourth dimension of time by using LiDAR or video stereo to capture and reconstruct 3D motion with dynamic point clouds.

Elevation modeling now extends to so many GEOINT applications that they are difficult to enumerate. These include security preparation using 3D models of an event space, historic preservation that models the exterior and interior of buildings and cultural heritage sites, 3D crime scene reconstruction, modeling the interior of mines, and virtual tourism. For example, the Smithsonian uses 3D modeling to record the location and structure of bones and fossils at a paleontology site in the Atacama Desert.

In the past, the world was catalogued in 2D with photos, maps, and blueprints, and first attempts to create 3D earth models, while notable, were quite limited by today's standards. GEOINT is becoming 3D, globally and locally, and not just for DEMs used for traditional applications, but for any application dealing with our world in 3D. ■

**DTED 1
POSTS ARE
APPROXIMATELY**

90

METERS APART.

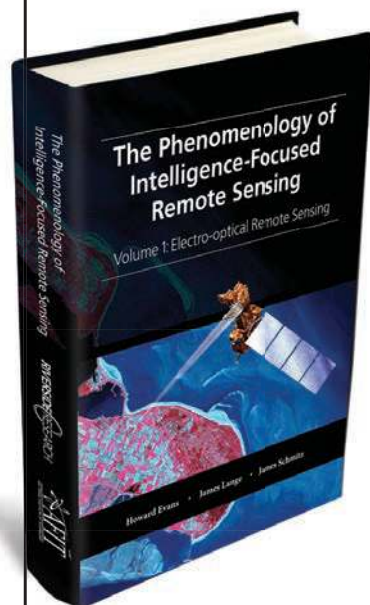
**WORLDDDEM
POSTS ARE
SPACED APART**

12

METERS.

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—Keith Masback, CEO, USGIF



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IN WASHINGTON, D.C., spring is a small miracle. After months of slate-colored skies, frostbitten fingertips, and slushy streets, the nation's capital breathes an exuberant sigh of relief as its denizens exchange parkas for parasols and snow boots for sandals. Cherry blossoms paint the National Mall a bubblegum shade of pink, snow banks give way to sunbeams, and for a moment all seems right with the world.

At last, summer is on its way.

For District residents, it's a blessing. For District police, however, it's a curse, according to Robert Horne, the District of Columbia's program manager for geospatial intelligence. "Crime seems to spike in D.C. during the summer," he said. "Nobody wants to go outside when it's cold and windy, but when it's warm outside, people go out and commit crimes."

SAFE + FO





GEOSPATIAL APPLICATIONS
DO MORE THAN VISUALIZE
DATA. **IN THE HANDS OF FIRST
RESPONDERS, THEY SAVE LIVES.**

+BY MATT ALDERTON

Indeed, numerous studies have shown that when temperatures rise so does the crime rate. There are many reasons why, ranging from social—people congregate more in the summer—to physiological: Heat causes increased heart rate, blood pressure, and testosterone, all of which can make people more aggressive in stressful situations. Regardless of the cause, however, the effect is often violence, which is why the D.C. Metropolitan Police Department has organized a Summer Crime Prevention Initiative every year since 2007. Spanning May through August, the annual program mandates increased law enforcement in neighborhoods with the largest concentration of robberies, carjackings, homicides, and shootings.

To make summer streets safer for citizens, police leverage not only violent-crime detectives, who make more arrests, but also analysts such as Horne, who uses the District's geographic information system to extract location-based insights about crime and criminals.

"The police department uses GIS to determine what areas, based on historical crime as well as current activities, it should focus its efforts in," Horne explained. "We certainly aren't the de-



"Whether you're talking about fire safety, crime, or quality of life in your community, public safety agencies are using GIS to get a better handle on it," said retired chief of police Lew Nelson, director of Global Law Enforcement Solutions and Industry Solutions department manager for Esri.

CHARTS OF THE FUTURE

Geospatial technology and law enforcement are perfectly matched, according to David Roberts, senior program manager in charge of the IACP Technology Center, through which the International Association of Chiefs of Police (IACP) provides technology research and support to state and local law enforcement agencies.

"Everything in policing is location-based," Roberts said. "It stems back to the earliest days of policing, when police had pin maps. Using pins on a map, agencies were constantly trying to interpret the contours of crime and criminality in their jurisdiction so they could determine

how to best deploy resources."

The New York City Police Department (NYPD) is widely credited as the first law enforcement agency to recognize the power of geospatial information. It was 1990 and Manhattan was a scary, lawless place, more gritty than glamorous. Crack pipes littered the ground like cigarette butts, walls wore graffiti-like tattoo sleeves, and Times Square was better suited to criminals than tourists.

Crime was especially rampant in the subway, which fell under the purview of New York City Transit Police Lt. Jack Maple. Rather than focusing on response to subway crimes, Maple strove to stop them before they occurred. To do so, he famously used 55 feet of wall space to map every train and train station in New York City. In crayon, he marked every violent crime, robbery, and grand larceny that took place in the city. Eventually, he made more maps charting more crimes, utilizing a system of colored pins to help Transit Police visualize patterns and strategically deploy patrols to high-risk areas. Maple called the maps his "Charts of the Future," and between 1990 and 1992, they helped reduce felony crime in the subway by 27 percent and robberies by a third.

In 1994, Mayor Rudolph Giuliani named Maple's boss, William Bratton, NYPD commissioner. Immediately, Bratton deployed an electronic version of Maple's charts of the future, called CompStat, which has been credited with reducing homicide, robbery, burglary, and car theft by 80 percent, 83 percent, 86 percent, and 94 percent, respectively, between 1990 and 2011.

"CompStat reporting is becoming very popular in law enforcement," said Cameron Smith, acting vice president for security solutions at Intergraph Government Solutions. "Essentially, it gives police departments the ability to data mine information by location ... so they can not only pinpoint the locations of crimes, but also draw conclusions from those pinpoints to help them address problems."

"Everything in policing is location-based. It stems back to the earliest days of policing, when police had pin maps."

—David Roberts, senior program manager, International Association of Chiefs of Police Technology Center

ciding factor in reducing crime—good police work is the deciding factor—but we help point good police work in the right direction."

In fact, GIS and GEOINT are compasses that point all manner of public safety personnel in the right direction, including police, fire, and emergency medical services (EMS), helping first responders plan and execute missions more effectively, efficiently, and safely.

SERVE, PROTECT, LOCATE

As more police departments implement CompStat tools and methodologies, law enforcement as a discipline is evolving, according to Roberts, who notes a shift toward “place-based policing” — focused on crime “hot spots”—and “predictive policing,” which focuses as much on pre-empting crime as it does on punishing it.

Geospatial technology, including GIS and GEOINT, is facilitating this shift in many ways. One is by helping agencies manage limited resources for maximum effect. “Most police agencies don’t have sufficient manpower,” Nelson said. “GIS acts as a force extender by helping them put the right people in the right place at the right time.”

The Ogden Police Department (OPD) in Ogden, Utah, uses this method, in a slightly different way. Earlier this year, it launched Cyberwatch, a GIS application that utilizes citizens to extend and optimize OPD’s police force. The system sends location-based alerts to registered users on a daily basis notifying them of new crimes and suspected criminals within a given radius of their home. It also allows them to submit geo-tagged anonymous tips to OPD’s Real Time Crime Center.

“It’s basically a neighborhood watch,” said OPD Deputy Director of Support Services John Harvey. “If you think about how cops solve crimes, it’s usually because someone calls in with a tip. So, it makes sense to put this information out there.”

Once the data reveals a developing crime trend in a particular area, OPD rolls out another force extender—a high-visibility remote video surveillance trailer dubbed Archangel. An effective deterrent, Archangel’s deployment reduces crime rates between 24 and 38 percent for areas under its watch.

Law enforcement agencies can also optimize resources by tracking their officers. The Mountain View Police Department (MVPD) in Mountain View, Calif., for example, recently explored “Blue Force Tracking” by piloting Altus, an officer tracking application created by location solutions company Polaris Wireless.

“We’re talking about putting mobile tracking devices on our motorcycles [used for traffic enforcement] and breadcrumbing where they go in the course

of a day, a week, or a month,” said Capt. Chris Hsiung, who leads MVPD’s field operations division. “By overlaying that with traffic accident data, we can determine if we’re writing tickets in the appropriate places, and whether our patrol patterns match up with where our traffic problems are.”

Agencies can use the same Blue Force Tracking devices to enhance officer safety. “When I was in law enforcement, I worked in situations where officers were involved in foot pursuits and ended up dying in an alley with nobody knowing where they were,” Nelson said. “There is no need for that now because you can know where people are at any given time. When you hear a gunshot you can locate your officers to make sure they’re not victims and send help if they are.”

PREDICTIVE POLICING

Resource management is one use case for geospatial tools in law enforcement. Crime fighting—predicting, preventing, and solving crimes—is another.

As IACP’s Roberts indicated, law enforcement can implement place-based policing, basing patrols on geospatially relevant incidents and risk factors.

“[Former Police Chief] Tom Casady ... pioneered this in Lincoln, Neb.,” Roberts said. “He built a location-based policing application ... that’s linked to the Lincoln Police Department’s information management system. Instead of seeing the local Starbucks or Pizza Hut on a map, officers see there’s a registered sex offender at this address, or there was a burglary at that address. They see this on their mobile device, which provides situational awareness to officers in the field.”

Geospatial intelligence can further enhance place-based policing by overlaying on crime maps information related to environment and demographics.

“Many times you can remove today’s criminals and crime continues going on because there are other factors in that community that facilitate crime, like a high number of liquor stores, or socioeconomic factors such as high unemployment,” Nelson said. “We used to work on sending criminals to jail—and we still work on that—but now we also can see if there is some type of modality we can use to change the behavior in a particular area or community.”



PHOTO COURTESY OF OGDEN POLICE DEPT.

OPD’S ARCHANGEL, a high-visibility remote video surveillance trailer, is deployed to various locations determined by analysis of crime data trends.

By plotting everything from streetlights to bars on maps alongside the points where crimes have occurred, law enforcement can take a more holistic approach to crime fighting. Predictive policing evolves this concept further by using location-based analysis of past crimes to prevent future ones.

“Wayne Gretzky said the difference between a good hockey player and a great one is that a good one skates to where the puck is and a great one to where it’s going to be,” Nelson said. “GIS allows us to skate to where the puck is going to be.”

Burglaries are a good example.

“Imagine in front of you a saltshaker,” said Robert Austin, manager of enterprise applications integration for the city of Tampa, Fla. “About 3 inches to the right is another saltshaker, and 3 inches to the right of that another saltshaker. What police have found is that if a criminal goes to the location of the first saltshaker and steals salt from that on Monday, when he goes back on

Tuesday he'll go to the saltshaker next to it, and on Wednesday to the saltshaker next to that ... odds are the criminal will be back Thursday to steal from the next saltshaker."

According to Austin, Tampa police solve 80 percent of all crimes by waiting at that fourth location. "Criminals are not typically the most brilliant of citizens, so they develop patterns," he continued. "Our chief of police estimates that we've achieved 64 percent crime reduction in the last eight years, and she has attributed a large portion of that to the use of GIS."

Law enforcement can similarly use GEOINT and GIS to predict—and therefore pre-empt—carjackings, traffic fatalities, drug crimes, and gang violence. The Los Angeles Police Department (LAPD) combines predictive policing with crowdsourcing by

case is crime investigation. If a child is abducted, law enforcement can use geospatial modeling to determine where the abductor's car could be based on factors such as maximum vehicle speed, time of day, road conditions, and traffic. With a warrant, law enforcement can access cellphone GPS records to locate people who were in the vicinity when a shooting occurred. And with geo-tagged criminal histories, officers can narrow down a list of burglary suspects.

"If we have a burglary pattern in part of the city, we can map out the burglaries and look at offenders in the area who are on probation or parole for burglary," said Darin Lee, a GIS analyst with the Kansas City Police Department in Kansas City, Mo. "Sometimes, they're right on top of each other."

DOD MEETS PD

Of course, GIS isn't the only geospatial tool in law enforcement's toolbox. Police departments increasingly use a wide swath of geospatial intelligence to execute missions.

In Compton, Calif., the Los Angeles County Sheriff's Department recently tested an unmanned aerial vehicle (UAV) that collects high-resolution full-motion video (FMV). During the yearlong test, the UAV—which has a maximum flight time of six hours—allowed police to zoom in on virtually any area within the city for surveillance purposes, enabling them to track individuals and vehicles. When a crime occurred, officers and analysts could direct the UAV to the scene of the crime to gather geospatially relevant information in real time. They could later rewind the video to perform additional analysis.

"What we essentially do is a live version of Google Earth, only with a full TiVo capability," Ross McNutt, president of Persistent Surveillance Systems—the company that provided the technology—told the Center for Investigative Reporting in a video interview. "It allows us to rewind time and go back and see events that we didn't know occurred at the time they occurred."

Although UAVs are still experimental, many police departments already use video surveillance on the ground. The Boston Police Department famously used surveillance video

in 2013 to locate the Boston Marathon bombing suspects. In Washington, D.C., police can readily tap into closed-circuit television (CCTV) maintained by other local agencies.

"The Housing Authority, for example, has CCTV in all of its housing units," Home said. "The Department of Transportation likewise has cameras that monitor intersections for signal timing and whatnot. We can pull video from all of those cameras and display them on maps ... to see any intersection in D.C. that has a camera pointed on it."

In Ogden, OPD has cameras locked on hiking areas, its downtown entertainment district, and public schools. "Right now we have about 230 cameras that the city owns that we can monitor," Harvey said. "We also have access to 1,000 cameras that the Weber County School District has put in schools."

But it doesn't stop at video. Federal authorities have also used helicopters equipped with infrared imaging to identify where marijuana is being grown. And in Montana, law enforcement agencies were part of a recent Montana State University project that tested the use of LiDAR to locate meth labs.

"More and more, you're starting to see the public safety realm [adopt] some of the [GEOINT] tools from the military and intelligence world," Smith said.

RAPID RESPONSE

As powerful as it is for policing, geospatial technology has public safety applications far beyond enforcing laws. In the hands of 911 dispatchers—who locate the response teams nearest an incident, then optimize a route based on traffic, weather, street closures, and other factors—these tools can save lives.

"The value of having a map as part of the dispatching process is self-evident because a major focus of public safety is response time," Smith said. "The quicker you can get to the scene, the better the outcome is."

In Charlotte, N.C., the city uses GIS to manage ambulance response. "There are times of day, days of the month, or months of the year that, for whatever reason, you have more medical emergencies, so you risk running out of ambulances," Nelson said. "Let's say you have 12 ambulances and 10 are

"Our chief of police estimates that we've achieved 64 percent crime reduction in the last eight years, and she has attributed a large portion of that to the use of GIS."

—Robert Austin, manager of enterprise applications integration for the city of Tampa, Fla.

publicizing its predictive policing targets, called "box areas."

"We are deploying as many resources as possible to the box areas," LAPD's Pacific Division said in a March alert that was distributed to citizens. "To further increase the effectiveness of predictive policing we are asking the public to spend any free time you may have in these areas, too. Your presence alone can assist in deterring would-be criminals from committing crime in your neighborhood."

Because not all crimes can be prevented, another compelling use

busy; in Charlotte they use an application to determine where they should place their last one or two ambulances so they have the best chance of getting to the next emergency, based on a historical analysis of emergencies at the same time of day, the same day of the week, at the same time of year. They've found that this is very effective at saving lives without the need for more ambulances."

Response time is so important in Delaware County, Ohio, that the Delaware County Emergency Management Agency (EMA) recently completed a two-year project to map and photograph the county's six public high schools in advance of a potential school shooting. The county's GIS department took 360-degree photos of school interiors; highlighted areas of interest and risk, such as potential hiding places or science labs containing volatile materials; and uploaded them to a secure geospatial application for access by first responders.

"Now, if there's an incident at one of the schools—a protracted standoff scenario, for example, or a building collapse—first responders can get a very good layout of the school before they enter the premises," said EMA Director Sean Miller.

Other cities and counties are executing similar projects with malls and other public areas. "If you have a huge mall, you can have all this information—floor plans, pictures, exits—to assist first responders," Smith said.

WHERE THERE'S SMOKE ...

Fire departments also use GIS to improve response times. In addition to responding faster, however, they can leverage geospatial intelligence to respond better.

"[GIS] allows us to do work before an incident occurs to be more effective when it does," says Dustin Morrow, deputy chief of the Tualatin Valley Fire Department in Tigard, Ore.

The wildfire community has used GIS for decades, according to Sean Triplett, group leader within the U.S. Forest Service's Fire and Aviation IT

Group. When a wildfire starts, he said, the U.S. Forest Service uses GIS to analyze a multitude of geo-tagged data, including:

- The locations of the fire, populations, burned areas, watersheds, structures, wildlife, and safety hazards such as power lines in the flight path of water bombers, which help determine threats;
- Weather, wind, and terrain, which help predict the fire's spread;
- The positions of firefighters, fire lines, dozer lines, and water sources, which help manage resources.

"We also use GIS in prevention," explained Triplett, who said the Forest Service continually maps the presence of volatile vegetation in forests so it can mitigate potential blazes. "Based on our analyses, communities and recreation areas can develop action plans to reduce fuels in their area so that when we do have a wildfire, its severity and impact will be significantly altered and decreased."

A 2013 wildfire in southwestern Colorado shows geospatial intelligence in action. "It was a very hot, fast-moving fire in a large continuous stand of dead spruce trees that were victims of beetle kill," Triplett said. "What we noticed using remote sensing and satellite imagery was that when the fire ran into areas of mixed aspen and deciduous trees—fuels that weren't impacted by bug kill—it would lay over so we could suppress it."

Municipal fire departments are similarly deploying GIS. Instead of vegetation and watersheds, however, their maps include information about fire hydrants, structures, and building occupants. Philadelphia firefighters use a mobile GIS terminal to locate the nearest hydrant, view gas lines and water mains, and access vital building information, including size, building material, whether it's vacant or occupied, and whether it houses any hazardous materials.

Philadelphia Fire Department IT Director Peter Della Porta said firefighters also have access to aerial and oblique imagery.

"Last year, a firefighter died because he was fighting a fire on a row house that had three different levels of roof. He was walking backwards through the smoke and fell. If he had intelligence about what the structure looked like, that might have been avoided."

BIG BROTHER AND BIG DATA

Despite its myriad public safety applications, first responders face a slurry of financial, cultural, and legal obstacles in their quest to utilize geospatial technology to its full potential.

Across the public safety sector, budget is a principal concern.

"We drop \$500,000 on an engine without any problem, but as soon as somebody says, 'I need \$12,000 for an Esri data set,' everybody freaks out,"

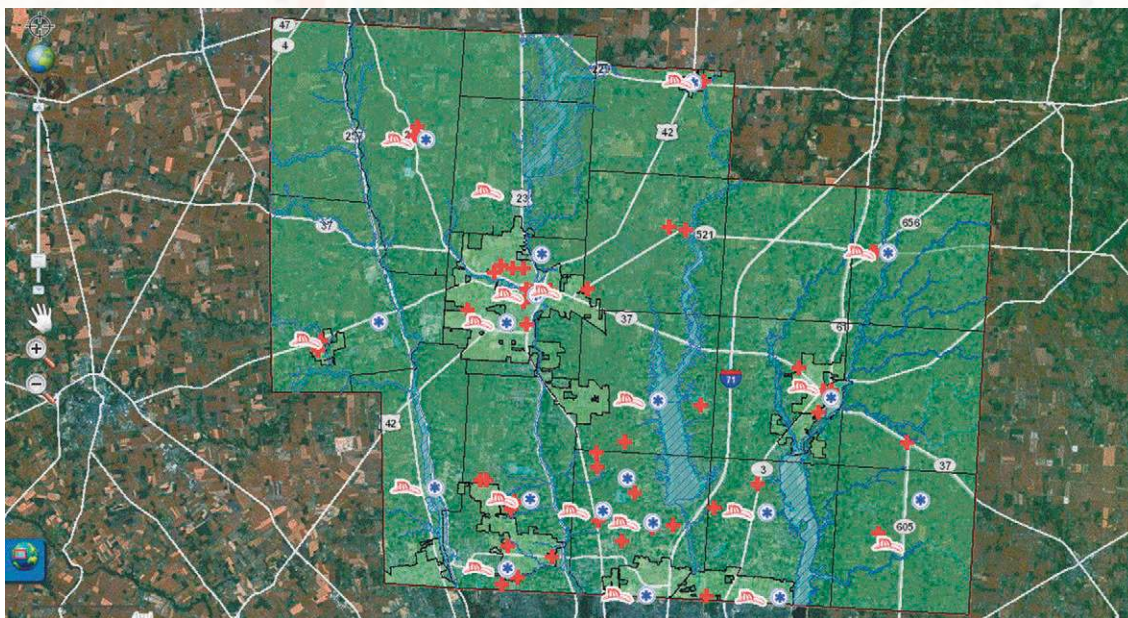


PHOTO COURTESY OF DELAWARE COUNTY, OHIO

DELAWARE COUNTY'S public safety application is extremely helpful as a planning and response tool, displaying critical infrastructure and performing analyses of hazard zones.

THE NEXT GENERATION OF POLICING

In his 1956 short story "Minority Report," adapted for film by Steven Spielberg in 2002, science fiction author Philip K.

Dick describes a dystopian world in which law enforcement is based on the precognition of crime by three persons known as "precogs." By punishing citizens before they commit crimes, not after, authorities reduce felonies by 99.8 percent and homicides by 100 percent.

Despite the rise of "predictive policing," modern-day geospatial tools are far from clairvoyant, but they facilitate police work that's intelligent—not omniscient.

And yet, in a world of location-enabled law enforcement, science fiction is increasingly more science than fiction, according to retired Chief of Police Lew Nelson, director of Global Law Enforcement Solutions and Industry Solutions Department manager at Esri.

"The future has started to arrive," he said. "The Dick Tracy tools I read about when I was a kid? Those exist now."

The following geospatial technologies are coming soon to a police department near you:

+ Mobile GIS: "Where technology is going is more and more mobile," said policing technology expert David Roberts, senior program manager at the International Association of Chiefs of Police. "We're going to see considerable development in equipping and empowering officers [with geospatial tools] in the field."

+ Unmanned aerial vehicles (UAVs): "It's really hard not to [acknowledge] the value of [UAVs]," said Mike King, national law enforcement manager at Esri. "If we can use technology to ... improve law enforcement's ability to really be where the problems are, why would we not embrace that?"

+ Augmented reality: "Within the next five years, I think Google Glass will be standard issue," said John Harvey, deputy director of support services at the Ogden Police Department in Ogden, Utah, who envisions augmented reality applications that officers can use to read license plates, search active warrants, and establish or verify identities.

+ Indoor GPS: "I see GIS moving inside buildings so we can track, for example, firefighters and first responders inside a burning building," said Robert Austin, manager of Enterprise Applications Integration for the city of Tampa, Fla., who also predicts an increase in 3D mapping that incorporates building heights and subsurface materials.

+ ISR sensors: "They're already using sensor devices in the forensics world," said Cameron Smith, acting vice president for security solutions at Intergraph Government Solutions. "In fact, one of [our sister] companies, Leica Geosystems, has the ability to take a laser scanner and create a point cloud of a crime scene; you can actually plot the locations of everything at the crime scene ... to help you determine what happened there."

Morrow said. "Spending that \$500,000 on another analyst, more data sets, and GIS training for our staff would probably do more to mitigate incidents in the community than buying another truck, but it's a big challenge to shift that mindset."

It's a challenge that holds not only small agencies back but also the biggest, according to Daniel O'Donnell, a former GIS analyst in the FBI's Atlanta

field office. Although the potential for GEOINT and GIS in federal law enforcement is enormous, he said, it isn't routine at the FBI and doesn't yet exist at the enterprise level. Instead, passionate individuals engaged in boutique production within local field offices typically utilize it.

"There are amazing and innovative things being done in a variety of pockets throughout the [FBI]," O'Donnell said.

"But it's going to take time, energy, effort, and resources to demonstrate the value of GIS and secure the political will and executive sponsorship to drive demand for it to the point that it becomes a core corporate line of business."

Legal challenges are yet another significant impediment. As agencies adopt new and emerging technologies such as UAVs and augmented reality, citizens, legislators, and judges will have to weigh the benefits of geospatial tools against perceived risks to privacy and civil liberties, according to Kevin Pomfret, executive director of the Centre for Spatial Law and Policy.

"What generally would have been considered sophisticated geospatial analytical tools and technology even four or five years ago is being pushed down into law enforcement at the state and big-city level, and to increasingly smaller law enforcement agencies," he observed. "That's a good thing because of the power of the tools involved, but it also raises some challenges, as those people don't necessarily have geospatial training or understanding, which increases the risk that they'll use the technology in ways that violate civil liberties or even break certain laws. When you add on top of that the lack of a consistent and transparent legal and policy framework with regard to location information and geospatial technology, you increase that risk at the local level all the way up."

Potential solutions exist—requiring warrants to obtain personal data, restricting access to it, and establishing limits on retention of it—but whether citizens and regulators can agree remains to be seen.

"Given the nature and power of geospatial technology, it can be used for good or it can be used in ways that suppress civil liberties," Pomfret continued. "Where that line is drawn for any particular use is going to be a real challenge."

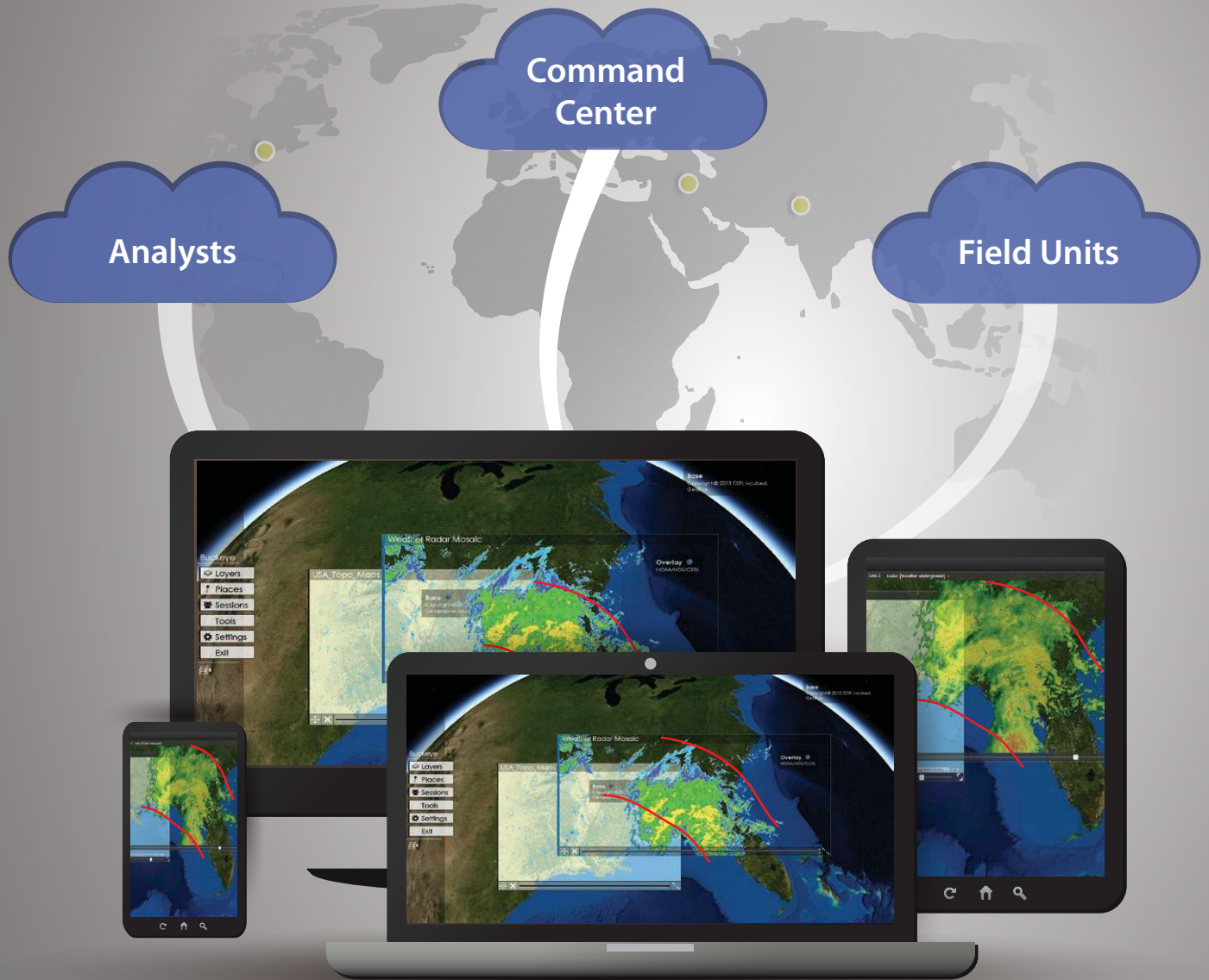
But also a real opportunity.

"There's a lot of policy that needs to be put in place to govern how we're going to use all this data," Roberts said. "But I believe if we enforce those policies effectively, we can achieve a substantial amount of business value and have a huge positive impact on communities." ■



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a more
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by JIM HODGES

utilizing vessels

The ship moved slowly away from its berth and headed for the channel at the Port of Long Beach as dozens of vessels do every day. Suddenly the ship turned hard to port toward an anchored tanker and stopped only after a collision that punctured the outer skin of the double-hulled ship.

THE COAST
GUARD'S
WATCHKEEPER
SOFTWARE IS
ON STATION IN

29

PORTS WITH

6

MORE
EXPECTED BY
THE END OF
FY 14.

Meanwhile on shore, Randy Parsons, security director for the Port of Long Beach, was in a meeting with Mike McMullen, project director of Virtual Port, Long Beach's ambitious attempt to link 20 data sources—12 of them geospatial, including an Automated Identification System (AIS), radar, two types of geospatial fencing, aerial map databases, and more. Virtual Port is expected to launch in late June.

"We decided to trot this thing out and pull it up," said Parsons. "In a short time, we were able to click on the [damaged] vessels. [Virtual Port] gave us the owner, how it's flagged, what the cargo is—in many instances there's a photograph. We were able to pull up the track of the vessel that left its berth."

Virtual Port also told them the location of first responders, whether other water traffic was due nearby, and who had jurisdiction in the area.

"We had the information the Coast Guard needed, the information fire needed, even the information the follow-on investigators needed," Parsons said.

The follow-on indicated the fault lie with an inattentive captain.

While planning for Virtual Port, Parsons kept in his mind's eye the small boat that pulled alongside guided missile destroyer USS Cole in the port of Aden in 2000 and detonated a bomb that killed 17 U.S. sailors. His former job was special agent in charge of the counter-

terrorism program with the FBI's Los Angeles field office.

"We do a lot of petroleum business here, and [terror threats are] pretty scary to us," he said. "Part of the main thrust to a maritime environment close-in is small watercraft. We watch that pretty closely with cameras, radar, sonar."

Other ports are watching Long Beach closely as it ramps up to launch Virtual Port. They seek ideas to leverage existing—if still comparatively sparse—port security measures into a system that can offer a common operational picture largely built of geospatial information, with data layered onto a map and accessible in an instant, and a temporal element to help separate wheat from chaff.

UPGRADING PORTS

"Everyone is coming to understand that one of the major keys in fighting terrorism is sharing information, especially geospatial information," said Paul Zimmermann, director of operations for the Port of New Orleans.

Zimmermann watches approximately 10,000 ships sail past each year, many traveling up the Mississippi River. Are any of those ships carrying threatening cargo? He's adding 300 cameras to the port to help find out.

After a train derailed at the Port of Tampa, Mark Dubina, the facility's vice president of security, was able to pull up

a map and quickly study the pipes of the petroleum tank farms housed underground beneath the trains.

Many of the means used to keep a port secure are adapted from the technology deployed to help fight the wars in Iraq and Afghanistan. State and local authorities are lining up to get Federal Emergency Management Administration (FEMA) grants to purchase these technologies.

"We're doing a lot of technology upgrades here that use [geospatial technology] as a part," Dubina said of the Port of Tampa, which hired geospatial manager Barry Hill to guide the port into a new information world. "Port of Tampa has been here a couple of years and is becoming very robust. We're now just starting to understand its potential for security. There's a lot of emerging port security technology that's just now coming into play."

The U.S. Coast Guard has long understood the value of geospatial information. While stories of daring air-and-sea rescues and drug busts are long on human heroics, they're often short on depicting the geospatial data and technology that guide ships and planes to the scene despite unpredictable weather and conditions.

The Coast Guard tracks ships for security and search-and-rescue efforts, employing radar and monitoring vessel movements through AIS transponders, which transmit signals to and from satellites and other sensors, including satellite imagery, then generate data layered over Google Earth or Google Maps. The Coast Guard's future could well include full-motion video from unmanned aerial vehicles being tested at Wallops Island, Va. The Coast Guard teams with the Navy for this task; although the Navy can track maritime traffic, it has to leave boarding to the Coast Guard.

"One of the major keys in fighting terrorism is sharing information, especially geospatial information."

— Paul Zimmermann, director of operations for the Port of New Orleans

U.S. Customs and Border Protection (CBP) has joined the equation, bringing video and the Vehicle Dismount and Exploitation Radar to its fleet of drones—the largest in the U.S. outside of the Department of Defense.

The Coast Guard's WatchKeeper software for information sharing and management helps fuse all of this available data, and is entering its final phase of deployment. WatchKeeper is on station in 29 ports and is expected in six more by the end of FY 14.

Developed in response to legislation mandating the Department of Homeland Security establish Interagency Operations Centers (IOCs) in key ports, WatchKeeper combines Coast Guard and CBP sensor data with that of local and state law enforcement to provide real-time awareness of the maritime domain.

"There's a democratization of geospatial," said AJ Clark, president of Thermopylae Sciences and Technology, which works with U.S. Immigration and Customs Enforcement (ICE) on its mapping efforts.

"We're starting to get the geospatial world to drive the technology forward," Clark said. "If I'm trying to have situational awareness on a number of different vessels coming into the U.S., and one of my systems is flagging one of the ships for risk ... you have a tool, Google Maps or Google Earth, for example, that allows you to provide that information to a much wider audience."

Further development of these tools is spurred by commerce, which took a handoff from the military and helps to carry the ball during austere times for the federal government.

Getting everyone to use these tools is another issue.

A BEACON IN THE DARK

Port security personnel share readily with each other and are eager to involve federal organizations. However, classified data "is a huge issue," according to Parsons. Long Beach's Virtual Port is web-based and designed to be accessed by local law enforcement agencies as well as officials from the Port of Los Angeles, an economic competitor but a partner in security.

Virtual Port also has dual authentication, which compartmentalizes access to

more sensitive information.

Long Beach partners with Esri for Virtual Port, using the company's ArcGIS platform.

"Long Beach is a lighthouse for this sort of port security," said Russ Johnson, Esri's director for public safety solutions. "Other ports will take their lead from Long Beach."

Although the culture of sharing is improving, some federal agencies have been slow to join in the fusion effort, in part due to cultural differences and the difficulty of establishing protocols.

"I think the handoff between intelligence agencies and Homeland Security is a key component to what we have to solve here," said Brad Ward, vice president

of Geospatial Solutions for Intergraph Government Solutions, which works extensively with the Coast Guard, CBP, and other federal agencies.

"How do you hand off what can be very sensitive intelligence to someone without the proper security clearance?" Ward said. "I think that is on the horizon. It's important to monitor potential threats well before they ever get to a port."

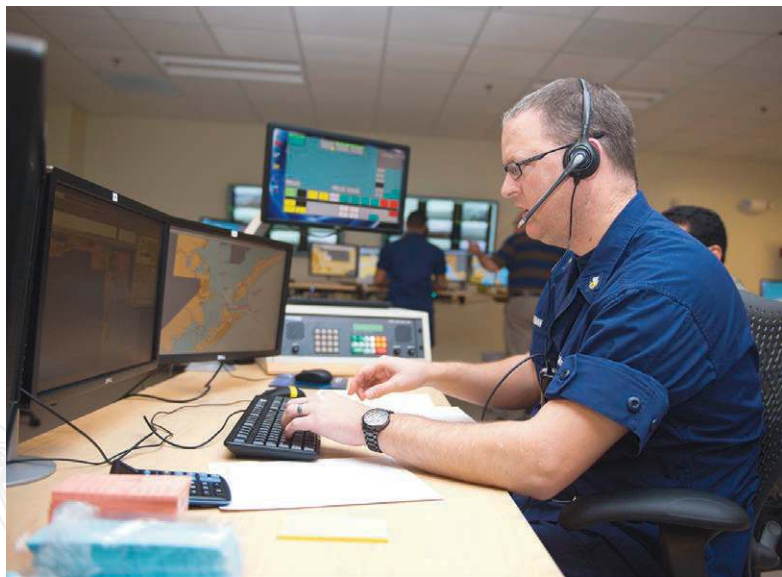
The Coast Guard, ICE, CBP, the FBI, and others have formed teams in ports such as Hampton Roads, Va., to combine resources, information, and jurisdictions. Those teams work with port security, though sometimes the link is tenuous.

Long Beach is a breakthrough in this area. The port and its partner agencies have formed a committee to facilitate information sharing, and work with Esri to establish security protocols.

As automation arrives with the development of Physical Security Information Management (PSIM) systems, such as Long Beach's Virtual Port, some of those walls could be broken down.

"PSIM is still an evolving platform that minimizes the level of human error by taking in all of these devices and making logical sense out of what is a true threat and what is not a true threat," said Allyson Rennie, an account sales representative for Intergraph. "It's all going back to leveraging map data."

Long Beach is still developing



protocols for implementing Virtual Port.

"Sonar, radar—they have algorithms that trigger an alarm if something is out of the ordinary so that an operator can see the alarm, make an assessment, then lay on the additional data sets or additional layers that will help them analyze the situation and pass that information on to a police boat, the Coast Guard, etc.," Parsons said.

Those alarms can come from breaches in a geospatial fence built around a ship or area in a port, not so much to keep people out, but to regulate those allowed access.

In March, Long Beach set up those alarms and protocols for Virtual Port while others, such as security personnel with the new World Trade Center in New York City, took note.

Dubina and other port security personnel are also observing from a distance what they see as a geospatial testing and training ground.

"We know it's a challenge for smaller ports," Parsons said. "If people come in here and find that this is scalable for their situation, that's good. They can determine what they need for their risk threat—weather, tides, cameras, vessel tracking, arrivals, departures, whatever. They can look at this and make it work for them."

All it takes is money and education in a growing geospatial port security field, as well as the technology to grow with it. ■

PETTY OFFICER 1ST CLASS ERIC COLEMAN, an operations specialist at U.S. Coast Guard Sector Houston-Galveston, helps guide inbound and outbound traffic safely into and out of the Houston Ship Channel, Feb. 10, 2014.

LOCATION DATA IS INSTRUMENTAL IN
SECURING AMERICA'S LARGEST SPORTING EVENT

[SECURING] THE SUPER BOWL

BY LINDSAY TILTON

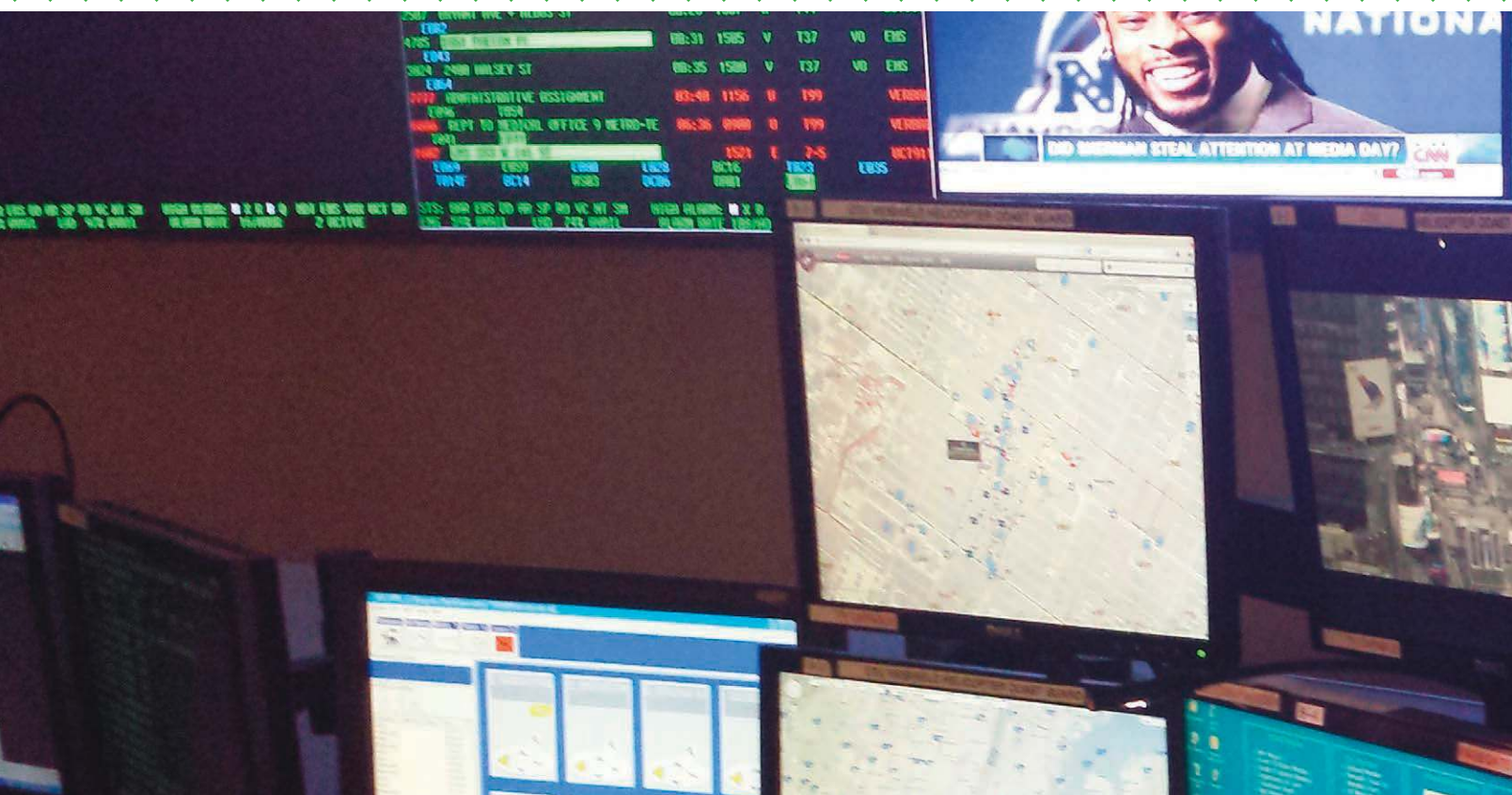




PHOTO COURTESY OF DIGITAL GLOBE

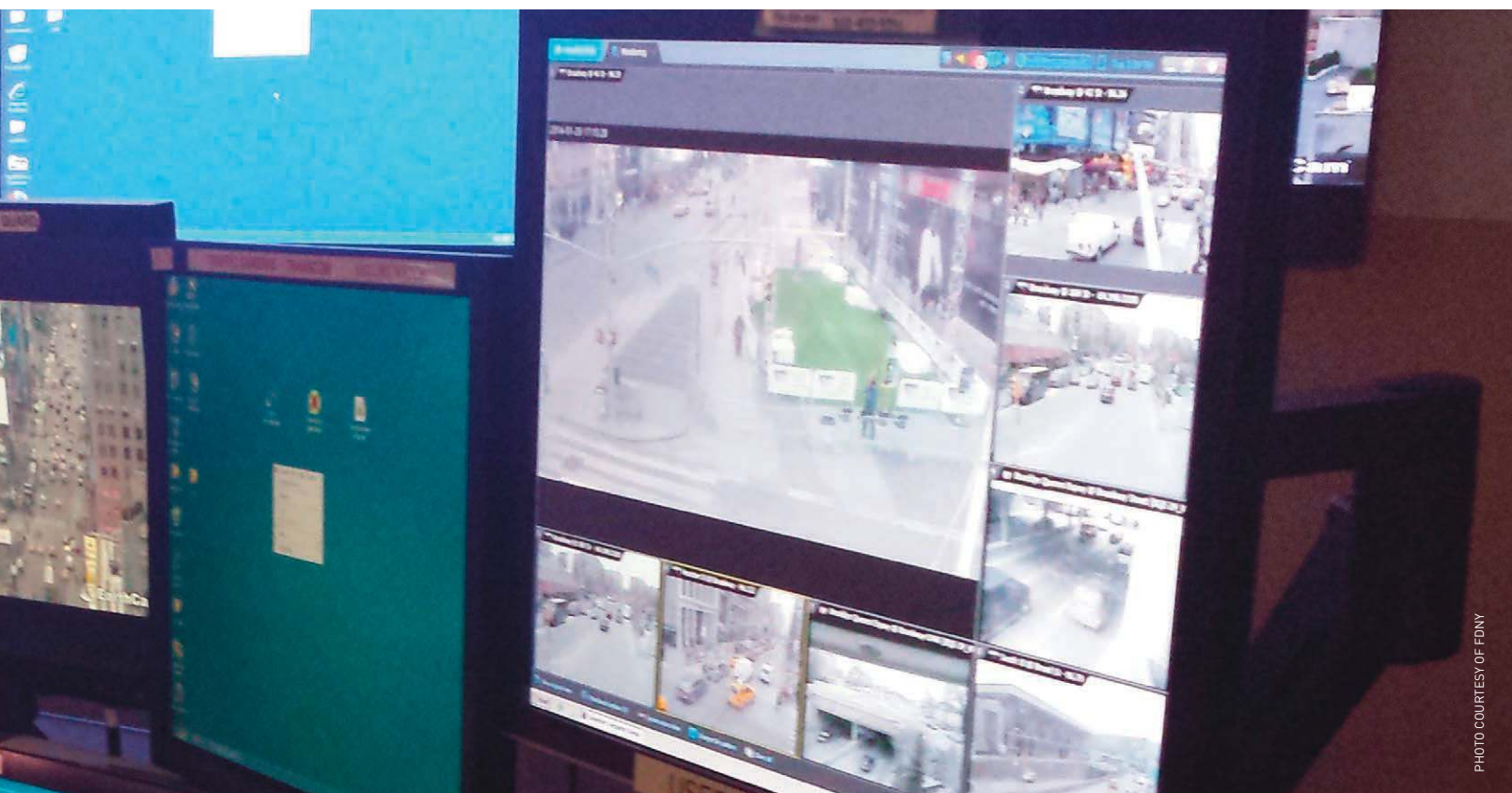


PHOTO COURTESY OF FDNY

ON FEB 2,

millions of viewers watched the Seattle Seahawks dominate the Denver Broncos at MetLife Stadium in East Rutherford, N.J. While football fans cheered on their favored team, laughed at commercials, enjoyed the halftime show, and dined on chili and nachos, most were unaware of the flurry of activity occurring behind the scenes to ensure the security of the event.

“Effective homeland security requires coordinating across the entire spectrum of the nation—federal, state, and local governments, private sector and community organizations, academia, the research and development industry, and citizens,” said David Alexander, director of the Department of Homeland Security’s (DHS) Geospatial Management Office.

To secure Super Bowl XLVIII, the New Jersey State Police (NJSP) led a security operation that encompassed more than 50 local, state, and federal organizations, as well as thousands of first responders. The effort, of which geospatial intelligence was a core element, was intended not only to keep spectators and athletes safe during the

such as these are invaluable to homeland security operations.”

With the uniquely challenging and populous location of Super Bowl XLVIII—with the stadium in New Jersey and pre-game events and mass transit crossing over into New York City—geospatial technology played a critical role in helping NJSP and decision-makers detect and respond to incidents quickly and efficiently.

In addition to concentrating on the football stadium, security was positioned at team hotels and practice fields, buses, subways, ferries, and “Super Bowl Boulevard,” where the 312 pre-Super Bowl events took place on Broadway in Manhattan. With an event of this scale, a strategically planned operation across all levels of public safety stakeholders was critical to protect citizens, and GEOINT was essential in this coordination.

NEEDLES IN A HAYSTACK

The NJSP was introduced to the application of geospatial technology to secure sporting events during the 2012 Super Bowl XLVI in Indianapolis, Ind. Digital Sandbox, a software company that specialized in threat, risk analysis, and monitoring, applied its technology in Indianapolis and was deemed successful.

“We knew we had to have this technology at our game,” DeMaise said.

Safety Cloud has been deployed at events such as the Emmys, Indy 500, America’s Cup, Chicago Marathon, political party conventions, and more.

“Because of the density and how [events were] spread across New Jersey and parts of Manhattan, there was a lot of diversity in the number of agencies, as well as big attention on mass transit,” said Anthony Beverina, president for the public safety and commercial sectors with Haystax Technology.

The NJSP stood up the NJSP Public Safety Compound, positioned directly across from MetLife Stadium, to serve as the nucleus for all intelligence organizations and agencies to collaborate throughout Super Bowl XLVIII. Haystax’s WatchBoard, a geospatial environment where channels of data are monitored then rendered on a map by order of priority, was set up on a large screen at the front and center of the compound to display information from Public Safety Cloud.

Using WatchBoard, more than 600 data feeds—including data from the DHS Geospatial Information Infrastructure and Common Operating Picture application—were monitored by 737 total users, most of which represented the NJSP, DHS, FBI, and New York State Police.

“Integrating and unifying operations ensured decision-makers at all levels were making time-sensitive decisions off a common set of geospatial information, which is absolutely critical with an event like the Super Bowl,” said David Lilley of the DHS Geospatial Management Office.

The large-scale visualization allowed decision-makers to view incidents as they were reported in real time. While multiple agencies inputted infrastructure and mass transit data through the Public Safety Cloud, WatchBoard also displayed feeds that monitored news, social media, video, public safety dispatch, and radiation sensors.

“It’s difficult for commanders to look at paper maps and determine how to allocate resources without having a good image of what’s going on in the ‘battlefield,’” said DeMaise. “Being able to see the map and the data flowing in was a tremendous value, and we had an overwhelmingly, positive reaction to it.”

WATCHBOARD displayed feeds that monitored news, social media, video, public safety dispatch, and radiation sensors.

actual Super Bowl, but also throughout the week leading up to the big game.

“GEOINT played a major role in securing Super Bowl XLVIII by providing the respective incident command elements a dimension of perspective that cannot be achieved through text documents of situational awareness,” said Sgt. 1st Class Chris DeMaise, NJSP special operations. “Geospatial technology provided real-time situational awareness ‘on the map’ while Super Bowl security operations were ongoing, and systems

“It took a long time to procure and there were many hurdles we had to cross, but we were able to complete the process for New Jersey by October 2013.”

The NJSP sought assistance from Haystax Technology, an analytics company that in 2013 had acquired Digital Sandbox along with cloud computing company FlexPoint Technology. Haystax’s core product, the Public Safety Cloud, combines streams of raw data and enables officials to monitor and prevent potential safety threats. Public

Personnel stationed at various locations in New Jersey and New York City were able to download the Mobile Command app on their smartphones and tablets. NJSP in the field used the app to enter incidents, snap geotagged pictures, and upload reports directly to WatchBoard, while their commanders instantaneously viewed the information from the Public Safety Compound.

Federal agencies were able to feed data to WatchBoard using communications interoperability and resource-sharing provider Mutualink, which assisted in bridging data incompatible with WatchBoard.

“There’s a good partnership between federal and local levels,” said Lisa Spuria, director of NSA’s Analysis and Production Directorate. “Geospatial technology has really taken off in the last few years and acts as a good, common reference for everyone ... It helps bring teams together because they are working from the same sheet of music to integrate and help execute the overall mission.”

As a result of such collaboration, security officials using the Public Safety Cloud were able to report and respond to 345 incidents of suspicious persons and packages and social media threats, in addition to 10 major incidents, one of which included suspicious white powder mailed to hotels located near the stadium. These incidents were reported at a much faster rate than previous Super Bowls, according to Beverina.

“Our role is to set the table for [security officials] and then they spring into action to clear the problem—it was a very impressive operation,” Beverina said.

The New York City Fire Department (FDNY) supported roughly 150 special events in 2013, but in 2014 the Super Bowl marked the first such event in which the department made the leap from paper maps to web and mobile apps. The FDNY GIS Unit collaborated with PenBay Solutions, provider of InVision Secure software, to create and roll out a new event management system to support Super Bowl planning and operations.

The FDNY/InVision Secure Super Bowl Web Map utilized Esri’s ArcGIS Online platform and offered planning and operations capabilities in a user-

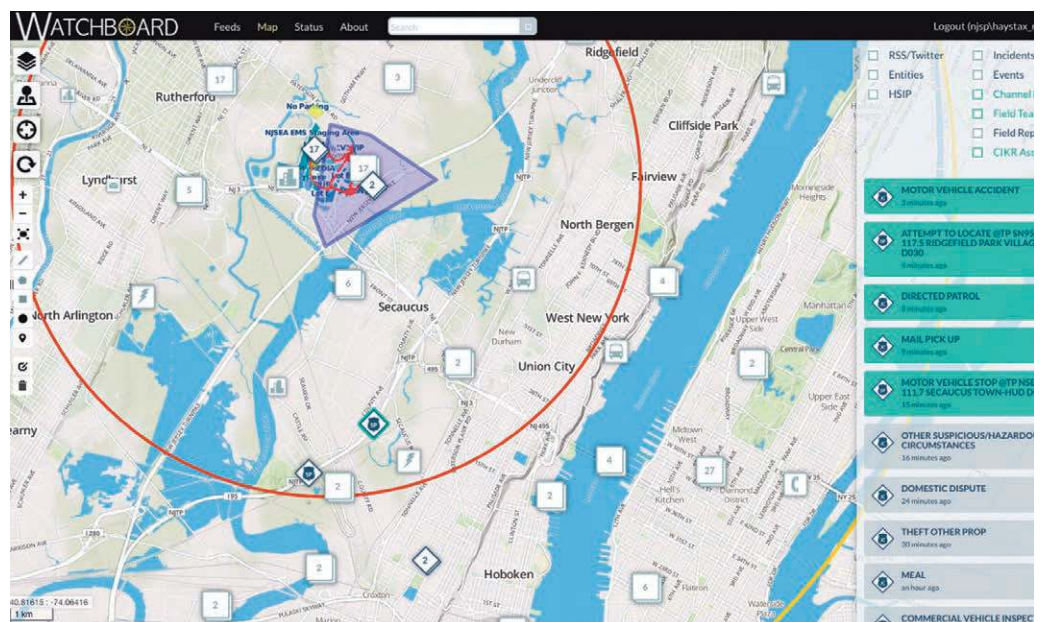


IMAGE COURTESY OF HAYSTAX

friendly manner. The FDNY uploaded building floor plans, pre-incident guidelines, subway and bus stations, video feeds, and boundaries for each event on “Super Bowl Boulevard,” as well as other critical information necessary to secure the overall metro area.

“[Geospatial technology is] a valuable tool in aiding us to provide situational awareness, so we can deploy the right resources to understand what’s going on, when it’s going on, and where it’s going on ... It really opened my eyes to a world of possibilities,” said FDNY Chief Information Officer Joel Golub. “We think there’s value here and we want to explore it more.”

The FDNY web map was also available in the form of a mobile app for field personnel. Similar to WatchBoard, FDNY’s mobile app allowed 154 users to report incidents and take geotagged photos. Fifteen organizations used FDNY’s web map and app, including the FDNY Incident Management Team, the New York City Police Department, DHS, and FBI.

“The web map supported the mission of data sharing with other agencies and made it so everyone was on the same page and combining points on the map,” said FDNY Capt. Steve Pollackov, commanding officer of the department’s GIS unit. “This gave us a nice platform to pull it all together and see the same data.”

DETECTING INTERFERENCE

Another important element in keeping athletes and attendees safe was the prevention of GPS jamming. While jamming is commonly used for stealing cars or shipping containers tagged with GPS locators, it could also be used to interfere with technology used by public safety officials, according to Carl Slutsky, Exelis Signal Sentry product manager. For this reason, Exelis deployed its new Signal Sentry product at Super Bowl XLVIII to report any disruption of GPS signals.

Exelis’ Signal Sentry 1000 detects, geolocates, and characterizes sources of intentional and unintentional interference to U.S. GPS signals. Exelis collaborated with the Super Bowl Communications Committee in conjunction with DHS to strategically place eight sensors around the football stadium to capture any interference and report back to Exelis’ cloud computing environment.

“From the time a jammer is turned on and we geolocate the source, it only takes three seconds,” said Slutsky. “It gives us time to deploy resources to address the jamming.”

Though Exelis could not disclose the number of reported jamming incidents at the Super Bowl, Slutsky said its first run with Signal Sentry was a success and the company plans to deploy it for future national security events.

WATCHBOARD was used by 737 public safety representatives, including those from the New Jersey State Police, New York State Police, DHS, and FBI, to secure Super Bowl XLVIII.

LT. COL. EDWARD CETNAR, Super Bowl XLVIII incident commander, briefs the unified command at the New Jersey State Police Public Safety Compound.

PHOTO COURTESY OF THE NEW JERSEY STATE POLICE



THE FUTURE FOR LAW ENFORCEMENT

The success of geospatial applications at Super Bowl XLVIII demonstrated even more ways GEOINT and GIS can help law enforcement act more quickly and efficiently when responding to emergencies.

level events and for those on the horizon, the mission of protecting citizens continues to remain unchanged, reiterated Golub.

"In the end, [the FDNY] mission is to save lives and protect the safety of our members, and technology is supporting

"The operation and information sharing went well and the data was easily useable," Spuria said. "Geospatial technology has matured and evolved over the years, and NGA had a lot of practice with domestic events to get the data organized and know what people want and what their challenges are to help them plan."

Despite the mass advancement of technology used at national security-

that mission," Golub said. "Down the road we are hoping [geospatial] technology can help aid us further in search and rescue operations, large-scale response, and enhance that life-saving mission—that's our goal moving forward."

But with the increasing amount of technology and Big Data comes the need for heightened levels of information security.

"Security is a major concern these days," said Joe Mazzearella, senior vice president and chief legal counsel of Mutualink. "Communications have to be protected and encrypted because you don't want that sensitive information in the wrong hands."

Having evolved from paper maps to location-based apps, geospatial technology has transformed daily activities to be more simple and efficient. Coordinating thousands of security personnel and first responders at the Super Bowl is far from a simple task, but was carried out efficiently and successfully due to the power of collaboration, information sharing, and geospatial intelligence. ■

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OPENING THE DOOR TO ABI

USGIF's ABI Working Group develops unclassified data set

USGIF'S ACTIVITY-BASED INTELLIGENCE WORKING GROUP

(ABIWG) is using GEOINT 2013* Symposium activity to develop an unclassified ABI data set that will be available to USGIF members for tool development and demonstrations.

Since launching in late 2012, the ABIWG has grown considerably to include representatives from 64 companies and organizations. The group also hosts at-capacity flash talks and forums. The next classified ABI forum is scheduled for July 24-25 at Heritage Conference Center in Chantilly, Va.

The main objective of the data set is to make the ABI market more attainable for small companies without access to the type of data necessary to develop ABI solutions, most of which is classified.

"The whole point of the working group is to be a connections tool between industry and government, and unfortunately the government—out of habit and a lot of other related restrictions—tends to talk to the people that they're currently talking to," said Jeff DeTroye, co-chair of the ABIWG and vice president of special programs for Analytical Graphics Inc. "They don't hear as much from the smaller companies or the companies that don't have much in the way of security clearances. Those companies have great ideas, but they don't have anything to bounce their ideas off of. The larger companies with access to classified data already have data sets to work with."

In addition to USGIF members, the data set may also prove useful for academic institutions.

"Those companies have great ideas, but they don't have anything to bounce their ideas off of. The larger companies with access to classified data already have data sets to work with."

—Jeff DeTroye, co-chair of the ABIWG and vice president of special programs for Analytical Graphics Inc.

"USGIF is a great vehicle to collect and provide research data," said Erf Porter, ABIWG co-chair and special programs manager with MITRE Corp.

The ABIWG invited attendees to opt in for anonymous RFID tag tracking while in the GEOINT 2013* exhibit hall,



PHOTO COURTESY OF USGIF

and also gathered data via three cameras positioned throughout the hall. More than 600 people elected to wear an RFID tag, while both the professional event photographers and the ABIWG cameras gathered more than 30,000 photographs of exhibit hall activity. The ABIWG also collected social media data associated with GEOINT 2013*, and the Naval Post-graduate School shared with the working group LiDAR data it collected in the exhibit hall.

Some examples of information that could be derived from the data include: Who is an exhibitor vs. an attendee? How many populations were present at the event and who is a member of which? What sort of traffic anomalies occurred in the hall? Such scenarios are analogous to red force vs. blue force tracking and other ABI problem sets.

Although originally intended for smaller companies, larger companies have already expressed interest in the unclassified data set, according to DeTroye.

"It's going to be a very interesting data set to explore," DeTroye said. "It will be able to address a lot of issues that are in the ABI hard problems list in a way that's much less constraining than any classified data set you may have acquired."

The ABIWG anticipates the data set will be available in June to any USGIF member

organization along with guidelines to ensure individual identities and personal information is protected. ■

To learn more about the ABIWG or the unclassified data set, email ABI@usgif.org.

MORE THAN 4,300 attendees gathered in Tampa for the GEOINT 2013* Symposium.

MORE THAN 600 PEOPLE ELECTED TO WEAR AN RFID TAG, WHILE EVENT PHOTOGRAPHERS AND MOUNTED CAMERAS GATHERED AROUND 30,000 PHOTOGRAPHS OF EXHIBIT HALL ACTIVITY.



SECURE SOLUTIONS LEAD TO SUCCESS

DELL FEDERAL'S FOUR FOCUSES: OPEN, SCALABLE, AFFORDABLE, AND SECURE

Dell Federal not only serves the National Geospatial-Intelligence Agency (NGA), but the entire Intelligence Community at large.

"If you Google 'Intelligence Community' and see all 17 entities listed, we support all of them in some form or fashion," said Jennifer Kauffman, regional sales director for the Intelligence Community with Dell Federal. "We run the gamut of all things federal government." Internationally, Dell Federal also serves every G-20 nation in some capacity.

Dell Federal leverages its breadth and depth across the Intelligence Community to create open, scalable, and affordable solutions such as Dell Cloud Client Computing and SecureView. In addition to developing scalable, open products, the company takes an entrepreneurial approach to dealing with customers and works with leading industry organizations to stay involved in the larger conversations surrounding GEOINT and Intelligence Community needs.

< **DELL SYSTEMS** allow intelligence and military personnel access to the information they need, whenever and wherever they need it.



DELL'S RUGGED TECHNOLOGY provides users with reliable service, no matter how extreme or remote the environment.

TACKLING CYBERSECURITY

In the GEOINT Community, Dell Federal found the need to add another item to its list of core solution design tenants: secure.

“When you look at our solution design tenants of open, scalable, and affordable, today we have also added the secure tenant to our focus,” said Steve Harris, vice president and general manager for Dell Federal.

Keeping pace with industry trends and concerns, Dell Federal has leveraged its legacy and recent acquisitions (including Make Technologies and Clerity Solutions) to create cutting-edge cybersecurity offerings. From creating new solutions to supporting already existing implementations, everything the company does “revolves around the foundation of a cybersecurity strategy,” Harris said.

Kauffman echoed this sentiment, suggesting that from the DoD to NGA to even the Social Security Administration, cybersecurity is of Dell Federal's utmost concern.

A CHANGING LANDSCAPE

Dell Federal has used this changing, uncertain era of budget austerity to its advantage.

“When customers face budget constraints, it is often the time that Dell Federal is most advantaged,” Harris said. Because Dell Federal products are based on open standards and commodity technology, Harris believes his company can often steer customers away from costly, proprietary solutions to more reasonably priced, open ones.

In addition, interoperability has been a critical component of Dell Federal's latest initiatives. The company's CEO, Michael Dell, has been outspoken in promoting the federal government's adoption of cloud-based solutions, as well as the benefits of moving from proprietary to open architectures.

“Where the government has the most advantage when they're doing procurements is when their IT strategy works around open systems,” said Harris.

NGA and Dell Federal previously held a software procurement agreement. Currently, there are various avenues by which NGA customers can purchase Dell's entire suite of solutions and services.

A DYNAMIC FUTURE

Kauffman finds particular interest in the

fact that the Intelligence Community Information Technology Enterprise (IC ITE) calls for a common desktop environment across the Intelligence Community. She believes the initiative brings together all industry concerns (including budget constraints) to ensure desktops look the same and systems are structured similarly across all intelligence agencies.

In addition, Dell Federal places a large emphasis on its membership with USGIF. Kauffman said both being a USGIF member and participating in the GEOINT Symposium, among other Foundation events, is paramount to the company's success, as it affords them “the opportunity to be a part of the larger [GEOINT] conversation.”

Despite changing architectures and budgetary concerns, Kaufmann sees the shifting geospatial intelligence landscape as thrilling.

“It is a very exciting time, a very dynamic time, and a changing time,” she said. “As a highly private entity and no longer a publicly held company, we have the ability to be agile and develop technologies and solutions that will help that ever-changing market.”

■ BY JAMIE FRIEDLANDER



“When you look at our solution design tenants of open, scalable, and affordable, today we have also added the secure tenant to our focus.”

—Steve Harris, vice president and general manager for Dell Federal

WHERE HAVE ALL THE YOUNG PROFESSIONALS GONE?

More senior leaders should encourage their younger workforce to build a professional network



THE YPG LOUNGE
in the GEOINT 2013*
Symposium exhibit hall
hosted a number of guest
speakers and events
throughout the week,
including Jeff Jonas of
IBM (standing).

TAKE RISKS. Network outside of your field. Spend time doing something that has no connection to your job.

Lindy Bersack, quality management team lead with Blue Canopy, is big on note-taking, so when she attends USGIF events, she jots down these snippets of advice, which aid in her professional and personal growth. Bersack even added a new acronym to her lexicon: PIC. That's Professionalism, Integrity, and Character. She first heard PIC in a talk given by retired Air Force Brig. Gen. Michael Lee, national security partner at Blue Canopy, who initially encouraged Bersack's involvement with USGIF's Young Professionals Group (YPG).

"I can't begin to tell you how much I've learned," Bersack said. Through various YPG events, she's attended training sessions for Esri and OpenStreetMap, networking happy hours, speed mentoring sessions, and service projects such as the International Spy Museum's SpyFest, where the YPG helped children build model satellites out of household items.

From Lee's perspective, Bersack is gaining confidence, thanks largely to her YPG participation.

"Lindy was almost a little timid," said Lee, a member of the USGIF Board of Directors. "YPG has forced her to the next level. She's poised, professional, and she is a much more valued asset for us."

Lee added that Bersack's increased involvement gives her visibility within the company—and among Intelligence Community seniors—that otherwise might have been unattainable.

Lee, a skilled networker who actively mentors about a half-dozen people at any given time, said he teaches young professionals communication skills and stresses the importance of "knowing how to walk up, look someone in the eye, and make small talk as you get to know them." He's set a personal goal to get at least one junior intelligence professional involved with YPG each year.

However, not enough senior leaders follow Lee's example: YPG has around 400 individuals on its listserv, even though USGIF has more than 240 member companies and organizations, employing hundreds of thousands of highly skilled workers. So, where are all the young GEOINT professionals?

"Companies have to understand the value of having young people involved in an organization [such as YPG]," Lee said. "It's good for professional growth, but personal growth as well."

Often, young professionals aren't sure where to find networking opportunities.

"I wanted to be involved with the Community, but I had no idea where to look," said Mike Campanelli, a senior systems engineer with RadiantBlue Technologies, and a member of the USGIF Board of Directors. "I would have had no idea to Google 'USGIF YPG.'"

Fortunately, Campanelli's supervisor, Todd Ham, told him about USGIF and encouraged him to develop a strong network—recognizing that his own mentors have been tremendous assets throughout his career, and wanting to do the same for the next generation.

Sam Unger is the National Geospatial-Intelligence Agency account program performance manager at TASC, and also serves on the YPG Working Group (YPGWG), which plans YPG initiatives and events.

"If I'm giving my time, I want to know what it's going toward," Unger said. He added that the YPGWG is discussing longer-term projects with definitive goals that appeal to the next generation, but getting the word out and helping managers and executives recognize the value of YPG participation is equally important, he said.

"It's a bonus for management, because they are always trying to figure out, 'How do I keep my Millennials engaged?'" Unger said. "YPG is a great channel for opportunity and innovation. It's a feedback mechanism for management, because the young professionals come back to the office talking about new ideas."

Shay Har-Noy, founder of TomNod, which was acquired last year by DigitalGlobe, is active with YPG and says networking needs to be a higher priority for his peers. He likes to say that people at all career levels should have mentors, and everybody should print their own business cards—without a company logo—and market themselves with an eye on their future.

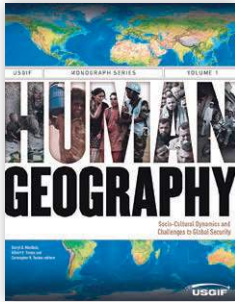
And that future means the time when today's GEOINT Community leaders will retire. Bersack understands that she and her contemporaries will eventually take charge, relying on the relationships they are forging today.

"The more mentoring and exposure we get now," she said, "the better off we'll be when we have to step into those positions." ■ BY MELANIE D.G. KAPLAN

To learn more about the YPG, contact Carrie Drake at carrie.drake@usgif.org.

YPG has
400
individuals on
its listserv, even
though USGIF
has more than
240
member
companies and
organizations

READING LIST

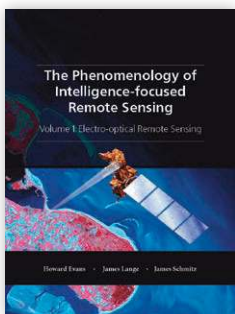


HUMAN GEOGRAPHY: SOCIO-CULTURAL DYNAMICS AND CHALLENGES TO GLOBAL SECURITY

Edited by Dr. Darryl Murdock, Dr. Robert Tomes, and Dr. Chris Tucker

USGIF recently released its first publication of the USGIF Monograph Series. This 232-page monograph features a collection of articles from thought leaders and leading human geography practitioners around the globe. In addition to being a valuable resource for intelligence professionals, the monograph is also targeted toward human geography academic programs as either a primary or secondary textbook.

Copies can be ordered online via USGIF.org and Amazon.



THE PHENOMENOLOGY OF INTELLIGENCE-FOCUSED REMOTE SENSING

By Dr. Howard Evans, Dr. James Lange, and Dr. James Schmitz

Riverside Research partnered with the Air Force Institute of Technology under a Cooperative Research and Development Agreement to publish this graduate-level textbook. It is the first textbook of its kind to include phenomenology, sensors, and intelligence applications under one cover. Riverside Research will donate a portion of the proceeds to the USGIF Scholarship Program.

Visit riversideresearch.org/textbook to learn more.

PEER INTEL

Boundless announced the addition of **Joshua Campbell** as the vice president, product management, where he will lead Boundless' effort to build products for data collaboration, crowdsourcing, and editing. Campbell was previously a geographer and GIS architect with the Human Information Unit in the Office of the Geographer and Global Issues at the U.S. Department of State.

TASC named **Mark A. Forman** vice president for IT services and cloud initiatives. In this role, he will help shape TASC's solutions in cyber, cloud and mobile computing, and data analytics.

The U.S. Air Force selected **Col. Leah Lauderback** as the next commander of the National Air and Space Intelligence Center at Wright Patterson Air Force Base. Lauderback was previously the commander of the 67th Cyberspace Operations Group at Joint Base San Antonio—Lackland, Texas.

IN MEMORIAM

Carolyn Merry, professor emeritus and former chair of the Department of Civil, Environmental and Geodetic Engineering at Ohio State University (OSU), died in a car accident June 3. She was 63 years old. Merry retired in 2013 after 25 years of distinguished service at OSU. She began her career with the College of Engineering in the fall of 1988 as an assistant professor teaching surveying and remote sensing, and became department chair in 2004. OSU described her relationships with students, faculty, alumni, and donors as "remarkable and sincere."

Doug Nebert, senior advisor for geospatial technology with the USGS Federal Geographic Data Committee Secretariat died in a plane crash in Oregon May 31. Nebert's career spanned more than 30 years of service with the U.S. Geological Survey. Nebert was known internationally for his expertise, technical ability, and dedication to building cooperative relationships, integrated technical solutions, and spatial data infrastructures.

USGIF EVENTS CALENDAR

JULY
8

GEOINTeraction Tuesday
Maggiano's, Tysons, Va.

24-25

ABI Forum
TASC Heritage Conference Center
Chantilly, Va.

30

USGIF Workshop Series: "Analytics
2014: Insights for Mission Impact"
Hyatt Regency Reston
Reston, Va.

SEPTEMBER
9

NGA Tech Showcase East
NGA Campus East,
Springfield, Va.

9

GEOINTeraction Tuesday
Springfield, Va.

16-17

NASIC Technical Workshop
NASIC, WPAFB, Ohio

OCTOBER
23

NGA Tech Showcase West
NGA Campus West,
St. Louis, Mo.

NOVEMBER
11

GEOINTeraction Tuesday
Maggiano's, Tysons, Va.



Fair Winds and Following Seas

During the GEOINT 2013* Symposium, USGIF's first chairman of the board, Stu Shea, announced he was stepping down from the Foundation. One of the founders of USGIF, Shea was also the Foundation's first president and CEO.

The vision shared by Shea and others in the Community helped create USGIF and steer its direction during the organization's first decade. Shea poured his personal energy and dedication into the Foundation during its formative years, and his leadership has brought together a wide variety of Intelligence Community experts on USGIF's volunteer Board of Directors. In May, Shea was recognized by the *Washington*

Business Journal with a 2014 Outstanding Director Award for his decade of dedication to the GEOINT Community.

The Honorable Jeffrey K. Harris was elected Shea's successor by the USGIF Board of Directors and assumed duties April 15. Former director of the National Reconnaissance Office (NRO) and undersecretary of the Air Force, Harris has contributed to U.S. national security in both government and industry for 35 years.

In 2014, the Foundation celebrates its 10th anniversary and recently marked its 10th GEOINT Symposium. The organization is going strong into its next decade with new initiatives, while not losing sight of the original trajectory set by Shea.

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