NGA
PATHFINDER
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ON THE ROAD TO TRANSPARENCY

OPEN FOR BUSINESS
How transparency is challenging the business-as-usual status quo

MERGING TRAFFIC
Planning where and how federal GEOINT lanes will converge

FAST TRACK TO TRANSPARENCY
Quickly getting the news of Nepal out to the public

Here in the National Geospatial-Intelligence Agency's Office of Corporate Communications, we often discuss what it means for the defense and intelligence communities to be transparent.

The Department of Defense principles of information under which we operate mandate a free flow of information. They instruct us that information will not be classified or otherwise withheld to protect the government from criticism or embarrassment. And information should only be withheld when its release would adversely affect national security, threaten the safety or privacy of U.S. government personnel or their families, violate the privacy of U.S.citizens, or be contrary to law.

Sharing what we do with the public to the extent that we can is ultimately in our best interest. But historically, we haven't openly shared our successes. Often in the past, our products were released by third parties, without our seal or other identifying information. Some would say we have been modest to a fault. We have shined our light in the proverbial opaque bushel.

While that practice for the intelligence community is business as usual, it is counterintuitive for communicators. Sharing information at times seems at odds with our environment.

Early in 2015, Director of National Intelligence James Clapper released a set of principles of transparency and called on everyone in the IC — not just the communicators — to "... provide appropriate transparency to enhance public understanding about the IC's mission and what the IC does to accomplish it."

That's the ideal. The reality is that as a community, we've just begun the journey and candidly, it's going to be a long trip. If all roads end at a place called transparency, there undoubtedly will be detours, traffic jams and road closures along the way. NGA's part is to find the most efficient and expedient means to get there, despite the obstacles.

At the wheel is Director Cardillo. He's driving Team NGA towards transparency and getting us there in a new faster, smarter convertible with less capacity for old cultural baggage.

Earlier this year in a speech at an AFCEA/NGA Industry Day Cardillo said, "In the past, we have excelled in our closed system. We enjoyed a monopoly on sources and methods. That monopoly has long since ended. Today and in the future, we must thrive and excel in the open."

Of course there will always be private drives down restricted lanes. But on this trip we're heading to new destinations with the top down in the open air and not everyone along for the ride likes the exposure. The familiar old SUV with the darkened widows was comfortable. It felt safe. But it wasn't energy efficient, maintaining it was expensive and it was beginning to slow us down.

In this issue's cover story, we consider some of the opportunities and challenges the agency will encounter on the road to transparency. NGA — buckle up and read on.

V/r,
Regina Galvin
Editor

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NGA Leadership
Director: Robert Cardillo
Deputy Director: Sue Gordon

OCC Leadership
Director: William M. Caniano
News & Information Chief: Tim Taylor
Editor: Regina Galvin
Designer: Carmella Bender
Contributing Editor: Kelly Graveline
Photography: Anthony Boone

Contact us
Send letters to the editor to
Pathfinder@nga.mil
Telephone: 571-557-5400
DSN 547-5400

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NatlGEOINTAgency

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pathfinder@nga.mil

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NGA SALUTE: SENIOR AIRMAN HARDIAN WICAKSONO

By Scot Cregan, Office of Corporate Communications
Photo by Tony Boone

Upon his arrival to the U.S. as a 7-year-old from Jakarta, Indonesia, he spoke only a few words of English. Now this Pittsburgh-raised airman is a motivational speaker and example to his fellow service members. Where did he find his drive to succeed? From the power to kick over his head.

"How did I get here? I owe it all to taekwondo, my past instructors, my current military leadership and my team — including the government civilians and contractors I work with," said Air Force Senior Airman Hardian Wicaksono, an imagery analyst in the National Geospatial-Intelligence Agency's Analytic Integration directorate, Office of the Middle East and Southwest Asia. "Without the help of these people, I would not have enjoyed the successes I have. To say they have helped mold me into who I am would be an understatement."

Consequences of Developing the Plan

Wicaksono started taekwondo, the martial art that combines self-defense and combat techniques with sport and exercise, when he was nine years old. He hasn't stopped.

"Taekwondo is not just about throwing a kick — it's about improving every aspect of yourself. My early focus on goal setting, being positive, earning respect and self-confidence has helped me get to where I am today," said Wicaksono. "But it's not just about helping yourself — it's about helping others. That's my passion."

Wicaksono walks the talk not only through his primary duties at NGA as a subject matter expert on Middle East strategic issues, but also as a volunteer for the agency and greater military community. He's the president of the Airmen of Distinction, an organization that serves 1,500 junior enlisted throughout the national capital region; the NGA Junior Enlisted Council's public affairs officer where he promotes community service and morale events; a certified Air Force resiliency trainer; an Air Force physical training leader; and an active member in NGA's joint service color guard.

On top of his aforementioned service, he's also on call day and night as a certified sexual assault victim advocate. Wicaksono spent 412 hours in training and on call, which contributed to his receipt of the Military Outstanding Volunteer Service Medal in 2014. He recently co-organized a teddy bear

donation event that collected over $1,000 in stuffed animals for Joint Base Anacostia–Bolling and Prince George's Hospital Center to serve as a comfort items for those in crisis.

"We're also in the process of setting up a self-defense course at NGA," Wicaksono said. "My taekwondo background will definitely come into play."

The focus of taekwondo on personal development and leadership skills complement Wicaksono's military professional development and Air Force career aspirations, as exemplified by his selection for a below-the-zone promotion to senior airman, an honor that allowed him to be promoted six months early.

"He's a hard charging airman that leads amongst his peers, said his supervisor, Air Force Staff Sgt. Thomas Small. "In fact, he won both the 2014 junior enlisted Air Force Intelligence, Surveillance, and Reconnaissance Award at the major command level and the 2014 junior enlisted NGA Annual Award. These awards recognize his work ethic at NGA and within the military and civilian communities."

Know a service member worthy of an NGA Salute? Send your suggestion to Pathfinder@nga.mil.

I AM NGA
A.J. FRYE

By Kristen L. Mackey, Office of Corporate Communications

> “I stay engaged and challenge myself, but when I see others learning and teaching and pushing the boundaries together, that’s the sweet spot.”

Wearing lederhosen and sporting a smile, A.J. Frye’s picture captures his easy-going, playful demeanor. Frye enjoys his job, his colleagues and life in general. And according to those who work with him at the National Geospatial-Intelligence Agency Support Team in Germany, in addition to being a nice guy, he’s well regarded.

“A.J. Frye embodies NGA’s core values, exceptionalism in his work and always goes above and beyond his duties with the U.S. Army Europe and U.S. European Command NST,” said NST Deputy Chief, Tari Steele.

Frye is assigned to a Geospatial Planning Cell at EUCOM, home of the EUCOM Theater Geospatial Database, which Frye helps manage as a data steward.

According to John Hoffman, branch chief to the EUCOM NST’s Direct Mission Support division, this database program was created to fill the gap between NGA planned vector production and other critical vector data required by commanders, analysts, planners and systems.

“The [unit] is designated as the primary provider of GEOINT to EUCOM, making Frye’s technical expertise critical to NGA’s success here,” Hoffman said.

Steele and Hoffman said that Frye has developed such exceptional skill in his job as data steward that it allows him time to take on various other projects that impact the NST partners.

“He works hard to apply technology in ways that make access to data easier, increasing the innate quality of our work. This is even more important in the resource constrained environment that we now inhabit,” Steele said.

“Perhaps most exceptional is Frye’s ability to be honest and authentic,” Hoffman said. “He maintains a positive outlook, but he does not sugar coat reality. He is pragmatic about the present but idealistic about the future.”

Frye’s personality and realism stood out in Pathfinder’s interview with him.

“Work is fun,” Frye said. “I’d like to know who isn’t having the time of their life while toiling away in ArcGIS for hours at a time. In all seriousness, my job is important and I treat it that way.”

Frye said the hard work and challenges that his team takes on inspires him.

“I stay engaged and challenge myself, but when I see others learning and teaching and pushing the boundaries together, that’s the sweet spot,” Frye said. “Perhaps that sounds a bit cheesy, but I’d take the challenge of this job any day over a predictable mission with loafers and cynics.”

According to Hoffman, Frye’s character brings added value to the NST and beyond.

“Frye embodies unselfishness,” Hoffman said. “He works extremely hard to support his [unit] teammates, but he puts in just as much effort for his NST colleagues throughout Europe. He doesn’t say “no” to any project. He follows through on every promise due, in large part, to his remarkable work ethic,” Hoffman said.

Frye attributed his work ethic to his parents.

“They were both team players and hard workers. They dig ditches and string cable between telephone poles for US West, the phone company in Seattle. They even built our house themselves,” he said. “Watching [them] at a young age inspired me, even though I turned out to be a desk jockey. I think I pounded some nails into the wall with a Playskool hammer, so I like to think I did contribute to their hard labor.”

Leaving the plastic tools to his childhood, Frye went on to study geography and environmental resource management at the University of Washington in Seattle, graduating in 2009.

“I fell into the geography program after taking a cartography class as an elective and thought it was pretty nifty. Now, a few years later, I make maps for a living, Frye said. “I just wish I wasn’t constantly being asked by people who don’t understand GEOINT, ‘Hasn’t the world been mapped already, like, Magellan and Cortés?’” ✦

The Role of GEOINT in a Period of Rapid CLIMATE CHANGE

By Chris Crosiar, Office of Basic and Applied Research

Editor's note: *The analysis and opinions represented in this article are strictly the author's and do not necessarily reflect the positions of the National Geospatial-Intelligence Agency, the intelligence community or the Department of Defense.*

In my experience as a research and development scientist at the National Geospatial-Intelligence Agency, I recall a time when the mention of climate change was so taboo, analysts could only reference "an environmental anomaly." Times have changed.

Over the past six years, climate change has become a regular topic in the world's daily news, renewable energy is a growing economy and the Department of Defense calls climate change "a threat multiplier."

In 2014, the Military Advisory Board wrote, "In many areas, the projected impacts of climate change will be more than threat multipliers; they will serve as catalysts for instability and conflict." Even earlier, in 2008, findings from the National Intelligence Council's National Intelligence Estimate — the highest level intelligence product created in collaboration with 16 U.S. intelligence agencies — stated "climate change will aggravate existing problems that threaten domestic stability in a number of African, Asian, and Pacific Island states."

Climate change is the inevitable result of living on a planet that rotates daily on its axis and makes one revolution around the sun annually. What is problematic and of national security import are the severe consequences of the "environmental anomalies" that occur on our planet.

"After the 10,000 years of relative [climate] stability scientists call the Holocene, civilization is entering a period of massive climatic upheaval with tremendous consequences for our stability," replied Bill McKibben, a noted environmentalist and founder of 350.org, an international climate change movement, via e-mail. "How bad those consequences are depends mostly on how quickly we eliminate the use of fossil fuel."

Regardless of the rhetoric, for scientists in the intelligence community, our job is to focus on the security threat of climate change. And the threat is significant.

The 21st century has seen the warmest global average temperature since record keeping began in 1880 — last year the average was 1.24°F (0.69°C) above the long-term average for the 20th century.

The environmental impacts of climate change have been documented based on this

increasing rise of the global average temperature. The rise in temperature leads to sea ice melt and glacier retreat. Increased global temperature also produces increased evaporation of water. More water vapor into the atmosphere is the energy source that results in more intense weather events and storms. Additionally, the increases in the volume of the world's oceans make coastal areas more likely to flood after storms. On the flip side, the increase in global average temperature makes dry areas drier, resulting in multi-year, multi-decadal droughts.

Crop yields and water sources are intricately woven to sustain our global population. China and India have 1.4 and 1.3 billion people respectively, according to Worldometers.info. The Tibetan Plateau and their existing glaciers provide water to those two countries through five major rivers but, the Tibetan glaciers are retreating.

In 2012, Lester Brown, president of the Earth Policy Institute, authored "Full Planet, Empty Plates." He wrote, "Not only are there no substitutes for water, but the world needs vast amounts of it to produce food." He went on to state that adults drink four liters of water a day but it takes 2,000 liters of water, 500 times as much as we drink, to produce the food we consume each day.

The impact of climate change to national security is clear. When a country loses the ability to govern due to a shortage of basic life needs — food and drink — citizens are likely to rebel, or other factions will step in and try to take control. These actions are destabilizing to countries and a threat to our national security when U.S. interests or investments are high.

As intelligence analysts, the question we need to be asking is, how can national security be more proactive in dealing with these challenges? I recommend a multistep approach.

One of the primary steps is to have access to multidisciplinary data, including physical and social science data. Second, the data needs to be integrated and assimilated on a time scale that supports a rapid response. Third, a paradigm shift must occur for policy and decision makers so they are equipped to make the proper notifications for an event that is anticipated, rather than reacting to one that has already occurred.

Finally, the intelligence analyst needs to embrace the new tradecraft, one in which multiple analysts from different disciplines prepare coordinated, anticipatory analyses for decision makers. Efforts to increase our knowledge by incorporating social science data, often referred to as human geography, with physical science data will produce more in-depth GEOINT analytic results.

These steps are vital before national security can be more proactive.

At NGA, research into anticipatory outcomes has begun in order to assist decision and policymakers to understand "what's next."

The nexus approach to looking at many complex systems to understand how they are interdependent had its debut in 2011 at the Bonn Nexus International Conference, "The Water Energy and Food Security Nexus—Solutions for the Green Economy." Applying a systems-thinking approach to understanding the spatial and temporal linkages and interdependencies of complex systems, such as water, food and energy, is a challenging new opportunity for the GEOINT analytic tradecraft.

"These complex systems have spatial extent and exhibit 'patterns of life' over time, which can be modeled, visualized and exploited," said Edward Cope, director of Basic and Applied Research at NGA. "By leveraging big data, pervasive compute power, transdisciplinary science expertise and systems thinking, GEOINT analysts will be able to expose nonlinear relationships between systems, and provide anticipatory insights to nonobvious system behaviors, resulting from second and third order network affects."

A successful result from the integration of physical and social science data would be the ability to project multiple outcomes or futures from that assimilated information.

In order to make this shift, our GEOINT education programs and existing analytic tradecraft will have to evolve. This will bring the integrative power of spatial temporal reasoning in the context of dynamic systems thinking, delivering anticipatory analysis.

The significant consequence of this type of analysis to the policy and decision makers is a proactive stance when facing the national security problems posed by a rapidly changing global climate.

Chris Crosiar holds a Ph.D. in Atmospheric Science from the University of Missouri-Columbia. She currently is a research and development scientist in the Office of Basic and Applied Research at the National Geospatial-Intelligence Agency.

Have an idea for a GEOINT or National Security Viewpoint contribution? Send your query to Pathfinder@nga.mil.

ENABLING CONSEQUENCE

By James B. Longley

Editor's note: *The analysis and opinions represented in this article are strictly the author's and do not necessarily reflect the positions of the National Geospatial-Intelligence Agency, the intelligence community or the Department of Defense.*

> **We scan the electromagnetic spectrum for high-resolution color imagery, radar, infrared, laser, hyperspectral, and full motion video to collect vital data.**
>
> **With all of our advanced expertise and capabilities, NGA exists for only one reason — to enable consequence for those we serve.**
>
> – NGA Director Robert Cardillo
> Space Foundation Symposium
> April 14, 2015

A simple concept — enabling consequence — conveys an enormous responsibility. The National Geospatial-Intelligence Agency's very existence hinges on the value of the insight it provides and the results it achieves.

On the one hand, NGA represents the near-highest standard of state-of-the-art modern technology. The agency has set the pace for the collection and utilization of geospatial information from around the globe. Yet, despite this success, once exquisite capabilities unique to NGA have now become relatively commonplace.

As Director Cardillo has stated, geospatial information and services have become largely commoditized. Capabilities that once required large organizations and expensive budgets are now readily available from a highly competitive commercial market at a significantly lower price even as we now have previously incomprehensible quantities of data available at speeds never before realized.

The implications of information that can be obtained or used instantly are profound. Our adversaries have become quite skilled at using these new technologies and we have no choice but to adapt our processes accordingly.

We can no longer take the risk of a single-point failure as the people and skills in one part of a complex process are forced to wait for the information that may or may not be delivered by another part of a complex process. Access inside and across the system must be opened to allow the seamless sharing of information.

Systems must adapt to the threat, and if the process isn't responsive, we must change the process. Our smart managers must place the bulk of their attention on the management of the mission not the management of the office.

Director Cardillo shrewdly connects the need to adapt NGA's culture, organization and processes to the vast explosion of imagery and sensory data that now strain an organization built around slower, more predictable challenges. As he stated in a recent speech, "If we continue to think linearly, we lose ... We must think asymmetrically to understand and out maneuver our adversaries."

He also correctly assesses that it will be the people of NGA who will determine its future.

Only time, and minds better than mine, will determine the specific changes needed. But it's worth recalling a comment by President Lincoln: "Man is not the only animal who labors; but he is the only one who improves his workmanship."

There's a lesson here for the people of NGA: In order to provide value, you must adapt from old systems to new modalities.

There are more parallels with President Lincoln, who was truly our first geospatial president. He sponsored the first transmission of an electronic message from an aerial platform — a hydrogen balloon in June 1862 — and he soon thereafter established the Union Army Balloon Corps. Moreover, he was also our first technology president and used the telegraph to establish the first civilian-controlled, national command authority in history. His mastery of electronic messaging and sponsorship of these changes helped the nation to outmaneuver the Confederacy.

Lincoln especially understood that when free to think, it is a paramount human ability to, in his own words, "observe, experiment and reflect," and, ultimately, adapt that would promote our success and our future as a nation.

Director Cardillo has that same level of respect for the people of NGA. He needs everyone to "observe, experiment and reflect" as the professionals that you are. He's now calling on that belief to transform the agency and continue to deliver, and even increase, NGA's value — enabling consequence — in the service of our nation.

James B. Longley is a former member of the U.S. House of Representatives from Maine's 1st District. He is also a retired Marine, a lawyer and former senior advisor to the director of the Missile Defense Agency. Longley was a member of the Armed Services Committee and co-founder of the House Task Force on Terrorism and Unconventional Warfare. He currently serves as the executive director of the Advanced Technical Intelligence Association.

RUSSIA'S "NEW GENERATION WARFARE"

By Phillip A. Karber, Ph.D.

Editor's note: *Over the last year Phillip Karber has made 14 trips to the frontline assessing the military situation. His most recent trip was in May 2015. The analysis and opinions represented in this article are strictly the author's and do not necessarily reflect the positions of the National Geospatial-Intelligence Agency, the intelligence community or the Department of Defense.*

For the third time in a hundred years, storm clouds are darkening over Eastern Europe. Once again, a major power is sponsoring attacks against a sovereign country as well as making threatening statements and military demonstrations against American allies. Month-by-month since Russia's 2014 invasion and occupation of Crimea, Moscow has doubled down on its aggressive actions against Ukraine and escalated its hostile posturing versus NATO. What seemed unimaginable 18 months ago is now a reality — a contingency few saw coming, but a challenge with which we now have to cope.

In retrospect, 1999 is likely to be viewed as a pivotal turning point in European security. That is the year when former KGB agent Vladimir Putin came to power believing "the collapse of the Soviet Union was the greatest geopolitical catastrophe of the century." He since seems committed to reestablishing Russian hegemony in Eastern Europe and restoring Moscow's coercive leverage as far west as the Vistula. It is also when the Russian Army began a decade-long restructuring of its forces and successfully introduced new tactics in the second Chechen War.

Recognizing that Russia faced three very different types of military opponents — high tech in the West, mass armies in the East and unconventional threats from the South — the General Staff designed the Russian Army for highly decentralized and dispersed operations covering the spectrum from unconventional, conventional and tactical nuclear battlefield environments. This new approach was employed against Georgia in 2008 and practiced against NATO in the Zapad ("West") large-scale field exercises of 1999, 2009 and 2013.

It was also in 2013 that Russian military writers began writing about "new generation warfare" and the Chief of the General Staff, General Valery Gerasimov, called for "rethinking on the forms and methods of warfare." Russia's proxy war with Ukraine over the last year has moved its evolving operational concepts out of the realm of theory into a brutal practice.

As practiced in Ukraine, Russia's new generation warfare is manifested in five component elements: political subversion, proxy sanctuary, intervention, coercive deterrence and negotiated manipulation [see sidebar].

Russia's new generation warfare differs from Western views of hybrid warfare — a blend of conventional, irregular and cyber warfare — in that it combines both low-end hidden state involvement with high-end direct, even braggadocio, superpower involvement. Contrary to Western politicians, the Russian leadership understands military options and plays them like a Stradivarius.

Aspects of this Russian strategy were evident earlier, but its implementation in Ukraine is where the veil has been lifted on this toxic brew. In Crimea, we saw subversive agents organizing internal opposition and fake elections. By spring, the Donbas was converted into a web of chaos, humanitarian catastrophe and artificially generated civil war — with Moscow fueling the proxy insurrectionists.

Against every expectation, the Ukrainian Army conducted the largest mobilization and redeployment of any Western or East European country since World War II and has fought admirably given its two decades of military neglect and inventory of 30-year-old equipment. The surprise is neither that they resisted, nor that they have lost a string of recent battles but that, after nine months of near continuous combat, the Ukrainian Army is still standing.

When Ukraine attempted to restore order over its territory, Russian artillery launched massive and lethal cross-border fire strikes in July, and in late August unleashed a direct armored invasion. The first Minsk "ceasefire" was repeatedly broken by violent attacks that its Western-promoted monitors from the Organization for Security and Co-operation in Europe were impotent to stop and in turn led directly to the recent Winter Offensive where, without modern antitank weapons, Ukraine lost hundreds of its best armor and artillery in high-intensity combat.

As of this date, Russia has introduced into the Donbas several thousand pieces of heavy equipment — late model tanks (including T-90s), long-range artillery and rocket systems armed with thermobaric warheads, and a variety of sub-munitions, modern air defense and electronic warfare systems (many of which are unique only to Russian forces). Now Ukrainian forces are running low on ammunition, their air force has been driven from their own skies, forward units are down to half strength, and there is no reserve left. They are alone and the fate of people who just wanted to be part of the West is now in the "lap of the gods" — or worse, Putin's whim.

The Donbas is currently in its third ceasefire but suffering daily violations while opposing battalions are reinforced and reorganized into Russian-led brigade and corps formations capable of much deeper operations. Meanwhile, proxy leaders talk of future "fourth and fifth Minsk ceasefires" after they have seized even more territory.

Western sanctions, coupled with the fall of oil prices and endemic oligarchic corruption, have hurt the Russian economy, but Putin seems determined to make an example out of Ukraine — possibly seizing a land bridge to Crimea, or even extending Moscow's control of Novorossiya all the way to Transnistria. The decision of the West not to provide replacements for Ukraine's attrited weaponry or even meet their request to purchase modest numbers of modern antitank guided missiles (like Javelin or TOW II) serves as a virtual military embargo. Ironically, the most successful Western sanction has been in preventing a friendly country from defending itself.

Accompanying this aggression on the ground, Russia made direct nuclear threats against the Ukraine — a state that had given up possession of thousands of nuclear weapons under the 1994 Budapest Agreement in exchange for an explicit guarantee by Moscow of its sovereignty. Operating in proximity to NATO countries, Russian air, naval and strategic forces have conducted increasingly dangerous and provocative over-flights, nuclear force demonstrations and hostile exercises.

From the Arctic Circle to the Caucasus, frontline NATO members are expressing anxiety. Norway, Denmark, Estonia, Latvia, Lithuania, Poland and Romania all feel threatened. Neutrals and NATO partners like Sweden, Finland, Moldavia and Georgia look for help.

Last September, U.S. Air Force Gen. Philip Breedlove NATO's SACEUR and EUCOM's Commander, was one of the first in Europe to call attention to Russia's new style of hybrid warfare and to point out that its potential for malevolence and instability was not limited to Ukraine, but could threaten the rest of Europe. Whether Western politicians like it or not, the Russians are pursuing military options made viable less by their inherent strength than the victim's isolation and weakness.

5 Elements of Russia's New Generation Warfare

POLITICAL SUBVERSION: Insertion of agents; classic "agi-prop" information operations employing modern mass media to exploit ethnic-linguistic-class differences; corruption, compromise and intimidation of local officials; backed up with kidnapping, assassination and terrorism; recruiting discontented elements into a cellular cadre enforced with murderous discipline.

PROXY SANCTUARY: Seizing local governmental centers, police stations, airports and military depots; arming and training insurgents; creating checkpoints and destroying ingress transportation infrastructure; cyberattacks compromising victim communications; phony referendum with single party representation; establishment of a "People's Republic" under Russian tutelage.

INTERVENTION: Deploying of the Russian forces to the border with sudden large-scale exercises involving ground, naval, air and airborne troops; surreptitious introduction of heavy weapons to insurgents; creation of training and logistics camps adjacent to the border; commitment of so-called "volunteer" combined-arms Battalion Tactical Groups; integrating proxy troops into Russian equipped, supported and led higher-level formations.

COERCIVE DETERRENCE: Secret strategic force alerts and snap checks – forward deployment of tactical nuclear delivery systems; theater and intercontinental "in your face" maneuvers; aggressive air patrolling of neighboring areas to inhibit their involvement.

NEGOTIATED MANIPULATION: The use and abuse of Western negotiated ceasefires to rearm their proxies; using violations to bleed the opponent's Army while inhibiting other states from helping under the fear of escalation — divide the Western alliance by playing economic incentives, selective and repetitive phone negotiations infatuating a favorite security partner.

Phillip A. Karber, Ph.D., is president of The Potomac Foundation and adjunct professor at Georgetown University. In the early 1980s he served as Strategy Advisor to the Secretary of Defense and Chairman, Joint Chiefs of Staff.

EUCOM AREA OF RESPONSIBILITY

Information and map provided by NGA Office of Geography.

> The United States maintains a profound commitment to a Europe that is free, whole, and at peace.
> – *National Security Strategy, 2015*

Human Geography Facts about the U.S. European Command

1. There are 51 countries and territories that are within EUCOM, constituting more than 21 million square miles or 54 million square kilometers.
2. The European Union is a political-economic union of 28 European countries that aims to ensure the free movement of people, goods, services and capital, enact legislation in justice and home affairs, and maintain common policies on trade, agriculture, fisheries and regional development. The common legal tender among the countries is the euro. The EU accounts for approximately 7 percent of the world's population (third after China and India), but is the global leader in trade, accounting for approximately 23 percent of global imports and exports.
3. The Eurasian Economic Union created by Russia, Belarus and Kazakhstan on May 29, 2014, was formally established on January 1, 2015, with Armenia as the newest member state and Kyrgyzstan as an acceding state. This alliance enables free trade and movement, coordinates financial systems and seeks to create collaborative industrial, energy, transportation and agricultural policies among members.
4. Europe is a densely populated region, with the exception of the northern third of the continent. Ten cities have populations exceeding five million inhabitants. Istanbul, Moscow, London, Rhine-Ruhr and Paris are all megacities (cities with population in excess of 10 million people).
5. There are over 400 different languages spoken throughout Europe. Indo-European languages dominate the region. Other languages include Basque, Maltese, Finno-Ugric, Samoyedic, Bulgaric and Turkic.
6. Europe is an ethnically diverse region with more than 100 different ethnic groups. While some ethnic groups form the majority population of a country (such as Russians, French or Turks), there are numerous ethnic minorities that play important roles within certain countries, such as the Gagauz of Moldova, the Mordvinians of Russia, and the Tatars of Eastern Europe and the Balkans. Each ethnic group has a distinct cultural identity that strongly influences its relations and interactions with other neighboring groups.
7. Europe has a tumultuous past of frequent wars and changing country boundaries. Boundaries have remained relatively stable since the dissolution of the Union of Soviet Socialist Republics in 1991. Additional changes occurred in the southern part of Central Europe and in Eastern Europe after the Yugoslav Wars in the 1990s, to include newly created states in the Balkans. More recent changes include the partially-recognized Georgian breakaway regions of Abkhazia and South Ossetia after the 2008 Russian-Georgian War, and Russia's annexation of Ukraine's Autonomous Republic of Crimea.

OFF THE CHART UPDATES

Human geography adds value to evasion charts

By Jessica Daues, Office of Corporate Communications

Instead of information about leopards, tigers and other large carnivorous animals, the National Geospatial-Intelligence Agency has added human geography content — languages, ethnic groups, population densities and cultural customs — to evasion charts, known as EVCs.

Evasion charts are unclassified, limited-distribution charts produced by NGA for the military that provide information service members can use to survive and find rescue if stranded during their missions in hostile or unknown areas.

Human geography, or HG, is the study of people, how they organize themselves, and how they shape and are shaped by their environment said Kent Christen, a human geographer at NGA.

NGA produced its first evasion chart with human geography content in November 2014 for Operation United Assistance, the U.S. Department of Defense support to West Africa during the Ebola crisis.

The introduction of human geography into evasion charts was welcomed by the Joint Personnel Recovery Agency in Fort Belvoir, Virginia. The JPRA is the Defense Department's office of primary responsibility for DOD-wide personnel recovery matters.

"Including HG in EVCs could be an enormous benefit to an evading service member and can help him or her create evasion plans of action, based on people-centric information," said John Stotz, chief of the Evasion Aids Branch at the JPRA.

Human geography is a relatively new emphasis for NGA, and the agency is working to incorporate HG to its products and services. The new charts are simply one example of how NGA is using HG information to improve its tradecraft.

Evasion charts trace their history back to World War II. Traditional EVCs contain maps, medical information and information about local plants and animals.

The charts are much larger than typical maps — 42 by 60 inches — and are printed on both sides of Tyvek, a waterproof, extremely tear-resistant material. This material allows the charts to serve as more than just maps. They can collect water; protect against sun, wind or precipitation; splint a broken bone; cover a wound and more.

NGA produces evasion charts at the request of U.S. combatant commands and military services based on their strategic annual requirements. NGA also produces charts for emerging conflicts and crises, such as the Ebola crisis. The charts are then provided to individual military personnel in advance of their missions.

The evasion chart team brought the idea of adding human geography information to the charts to JPRA this past fall. The team already was working on a chart for West Africa to support the Ebola crisis, so they made some modifications to include human geography elements and put together a prototype.

With a finite amount of space on an evasion chart, the team had to make hard decisions about which information to include and which existing information to remove.

"The standard we set for adding new information was that it had to be generalized, useful and accurate in the long-term," said Christen.

Some information about local animals was dropped to make room for human geography content.

"EVCs used to show images of leopards or tigers or animals of that sort, to advise people to avoid them," said Sean Noll, branch chief for the NGA team of cartographers, designers and human geographers that produces the charts. "Well, we thought that was pretty obvious."

Because those who might use evasion charts would already have received military survival training, basic survivability information also was removed from the charts, according to Kimberly Rennegarbe, cartographer with the team.

JPRA reviewed the West Africa prototype evasion chart and took it to the user community, where it received overwhelmingly positive feedback, said Noll.

With the support of the JPRA, all new evasion charts now contain human geography information, and NGA is adding it to new editions of charts as they are replaced.

'CAN YOU GIVE ME WATER?'

NGA has added four elements of human geography to EVCs:

1. **Native language information** – Basic local language survival phrases, such as "Hello", "Can you give me water?" and "Where is the nearest hospital?"
2. **Ethnic distribution** – This could help isolated personnel understand the religious, economic and cultural background of the people they encounter.
3. **Population density information** – This could help isolated personnel know where they can likely avoid local people or seek assistance.
4. **Cultural dos and don'ts** – For example, in areas of West Africa, one should approach a dwelling by clapping one's hands, rather than knocking.

CAN WE TALK?

NGA hopes to improve business with engaging discussions

By Sara Barker, Xperience Communications Team

Who knew fruit could be so meaningful?

"You'll never look at a banana the same way," said Xperience directorate's deputy director, Christy Monaco, after hearing the story about Bob Stone at a recent session of the National Geospatial-Intelligence Agency's "Lead with your Customer" conversation series.

Stone, a former senior leader at the Pentagon, wanted to recognize and reward employees for excellence in customer service. After being blocked time and again by the numerous guidelines that existed in the traditional bureaucratic channels, he decided on a less cumbersome approach: a banana.

Instead of a formal award, anytime he heard about an employee going above and beyond for a customer, he personally delivered a banana to them. He explained to each recipient that this was his way of recognizing them for their excellent customer service and contributing towards the mission. Instead of being delayed by a process, Stone found a more personal way to express genuine appreciation to employees.

The story captures the spirit of NGA's "Lead with your Customer" conversation series, sponsored by the Xperience directorate's Customer Engagement Office. The series is being led by a team that includes MT&H, and Mark David Jones and J. Jeff Kober, founders of World Class Benchmarking and former leaders of the Disney Institute.

The four-part series, which started in April and will run through September, aims to connect the dots that lead from leadership excellence to employee engagement and from employee engagement to customer centricity and customer consequence — a process that the most renowned public and private sector organizations consider their secret to long-term success.

The catalyst for the series is the pressure on the agency — due to fiscal realities — to ensure it is providing its customers the biggest bang for their buck. This means not only improving the efficiency of how the agency serves its customers, but also carrying out proven customer-centric approaches to delivering real value to customers — what NGA Director Robert Cardillo calls "customer consequence."

"Agency leaders are starting to ask employees how their work is relevant to their ultimate customer's mission. It's very much a new direction for some employees who were, in the past, only focused on delivery of their 'widget,'" said Jim Griffith, deputy director of operations at NGA.

The new focus requires motivated, engaged employees, which is what the "Lead with your Customer" conversation series intends to deliver. If employees are not truly engaged in their work it will be nearly impossible for them to provide a customer experience that consistently enables positive customer consequences. The 2014 NGA employee climate survey reports that only 29% of the workforce feels engaged, for context that is close to the national level of only 30% according to Gallup's 2013 State of the American Workplace report.

Xperience Customer Engagement office deputy director Sherry Crumpler views the series as an opportunity for NGA employees to learn insights into customer centricity from organizations that do it best.

"This training will enable NGA to deliver more impactful consequences for our customers," said Crumpler.

As a precursor to the conversation series, in March 2015, a group of senior leaders from NGA visited world-class organizations in the Washington, D.C. metropolitan area to learn about their customer-centric successes.

"[I]… learned, or relearned, important lessons from the leaders of each of the businesses we met," said NGA's Chief of Staff Ed Mornston. "It was a great opportunity to think about our business through the lens of other businesses, and then to project what they have learned to NGA."

Human Development directorate's Vietta Williams said that she was impressed by how REI, the outdoor gear retailer, encourages their employees to literally "walk in their customers' shoes" by offering them complimentary days to go out hiking, camping or traveling, which affords them first-hand experiences of the value of REI's products.

"REI encourages consultations rather than simple transactional interactions with customers," said Williams, explaining how the retailer's staff members take the time to understand a customer's needs and guide them toward the right purchase.

According to the company's management, their customer-centric focus is what prompts customers to choose REI in the future over other competitors.

"Managing a customer interaction — not by the clock — but with the intent of building a relationship may seem simple, but it's extremely effective," said Williams. "It's a habit that we at NGA, and all government agencies, should strive to adopt. While expediency is critical, not taking the right amount of time up front to understand customers could waste everyone's time later."

HD: THE CHALLENGE OF CHANGE

By Amelia Cohen-Levy, Human Development directorate

We're all familiar with the saying, "Change is the only constant in life." This couldn't be truer than what is currently happening in our geospatial intelligence profession. In an April speech at the Space Symposium in Colorado Springs, Colorado, National Geospatial-Intelligence Agency Director Robert Cardillo talked about these changes, something he calls a "seismic shift," and emphasized that developing the workforce and our approach to cultivating talent is one way NGA can address the changes happening in our industry.

Cardillo told the audience of government and industry professionals, "People are our real power — our discriminate value proposition in an indiscriminate world. To leverage the power of our people, we must transform outdated government processes, embrace diversity, adopt new workforce strategies, and encourage them to master the new methods and tradecraft. And we need a better flow-through of talent and experience."

Ellen Ardrey, the director of the Human Development directorate, couldn't agree more.

"NGA faces many challenges. What I see as our greatest challenge isn't each individual issue, rather, it's the sum of its parts — the challenge of change. Facing that change head-on requires our dedicated, unflinching commitment to the mission," Ardrey said. "For HD, that mission begins with people, so we are concentrating our efforts to evolve a more agile workforce."

As our customers' requirements change and the agency's needs evolve, new work roles emerge, often requiring skillsets that are underrepresented in the current workforce. That's where the HD Strategy Office comes in.

Part tacticians, part policymakers, part prognosticators, they conduct the workforce and talent analysis that creates understanding of how the workforce's contributions align to mission requirements. This analysis allows HD to figure out where the gaps are between the role, the workforce and the work that needs to be done.

To find the right people externally, NGA is not relying on traditional recruiting methods or sources and has reimagined its strategy. Looking for innovative approaches to multimedia visualization? Try the Savannah College of Art and Design. How about aeronautical intelligence analysts? Visit the International Women in Aviation Conference.

"We have had to question everything we know about recruiting based on NGA's strategy," said Alex Berger, director of the Human Development Talent Management Office. "In order to recruit a diverse workforce that is capable of driving us to the future, we have had to start operating more like a Fortune 500 company than a federal government agency."

Recruiting is only one piece of the puzzle. The development of the skills and talents of the current NGA workforce is just as important. This is why the Strategic Workforce Planning Team is building comprehensive competency assessments.

"Employees are going to have a voice," said Jason Franz, the career services program manager. "For the first time, really, they'll be able to go in and document what they want to do with their careers."

The goal is to empower employees to look at themselves and their careers in a new way, perhaps even inspire them to take on a role or training opportunity that they might not have considered before.

While many of these changes at NGA seem daunting, Cardillo has a different perspective, as he stated in the closing of his speech in Colorado, "Yes, the pace of change is accelerating — but it is also exhilarating. Within every momentous change, we will find equally momentous opportunity."

CLIFF DIVING:

The National Intelligence Fellowship at the Council on Foreign Relations

By Deborah McDonald

One of my favorite magnets reads, "Life begins outside your comfort zone." I like to tweak it for work: True growth begins outside your comfort zone. My friends have termed my apparent love of leaping into the unknown at work as "career cliff diving," which explains in part why I could not resist applying for the Office of the Director of National Intelligence National Intelligence Fellowship at the Council on Foreign Relations. While one of the preeminent foreign policy think tanks may at first appear quite different from the National Geospatial-Intelligence Agency's mission, I can assure you there are more similarities than differences.

The most common denominator, which first drew me to CFR, was its commitment to objectivity. CFR is an independent, nonpartisan membership organization, think tank and publisher of Foreign Affairs magazine. Its mission — to inform the public debate on foreign affairs — parallels NGA and the intelligence community's driving mission to objectively inform the same policymakers and military leaders, albeit through classified channels.

CFR, headquartered in New York City, was formed in 1921, following the 1919 Paris Peace Conference, "to afford a continuous conference on international questions affecting the United States, by bringing together experts on statecraft, finance, industry, education and science." Its membership of 4,900 reads as a "Who's Who" in the international arena.

The rigorous NGA and intelligence community fellowship application process that began in fall 2013 concluded with my appointment for the 2014 academic year. My duties include a mix of liaison and representative functions, facilitating greater communication between the IC, CFR and, where appropriate, the public. In addition, the fellowship is considered a development opportunity. Development takes many forms, from working on an approved study, attending educational meetings, as well as interacting with CFR members and staff who are experts in their respective fields. As an IC representative, I am called on to provide my perspective based on my expertise. The greatest adjustment for me as an intelligence officer is the CFR's operation in the public space, which while challenging, is also the most rewarding.

I greatly enjoy interacting with CFR members because as an IC member, it's a rare opportunity for me to hear about concerns directly from the public we serve. In addition, the members' insights provide an added dimension and depth to my previous IC worldview. I believe we all share one of CFR's founding principles — a desire to "help America ... find its place in the world."

My time at CFR was a continuation of this very unexpected journey that began when I joined NGA's legacy organization, the National Imagery and Mapping Agency. I believe I will feel the effects of my fellowship for many years to come. I won't forget the interest and excitement I encounter when meeting fellow geospatial and intelligence kindred spirits.

I can only hope I've left a few soft ripples behind in the fellowship waters.

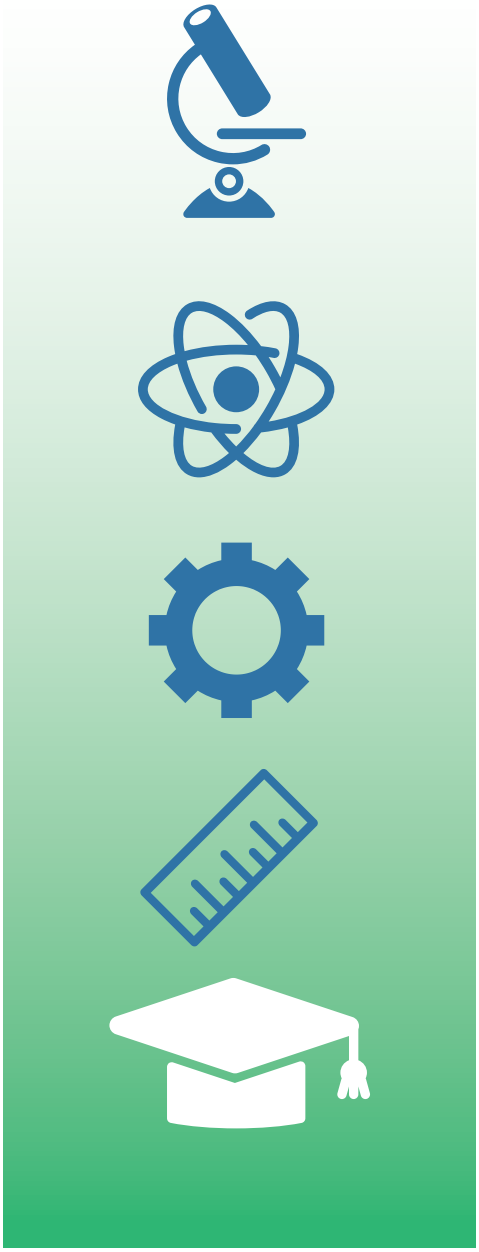
Deborah McDonald is the 2014 CFR Fellow. She will return to NGA at the conclusion of her New York-based fellowship. After a year of introductions, she can now say National Geospatial-Intelligence Agency in one rapid breath.

WHAT'S YOUR STORY?

Tell us your personal, unclassified version of the work you or your office does for NGA for possible inclusion in the next Pathfinder. Send your 600 word or less account to Pathfinder@nga.mil. Submissions may be edited for clarity and length.

THE FUTURE STEMS ON IT

By Lisa Williams, Office of Corporate Communications



According to the U.S. Department of Education, only 16 percent of American high school seniors are interested in pursuing a college degree or related career in STEM fields.

That's not good news for an agency whose mission is built on expertise in science, technology, engineering and math, or STEM.

For more than 25 years, volunteers from the National Geospatial-Intelligence Agency and its legacy organizations have built relationships with schools across the Washington, D.C., and St. Louis regions, as well as a growing number of NGA Support Team locations, to promote STEM-related concepts in the classroom as part of the agency's Partners in Education outreach program.

The PIE program matches subject matter experts to kids of all backgrounds and skill levels, exposing them to potential career fields and hopefully inspiring them in STEM subjects.

These connections to community, and youth in particular, have never been more vital.

"It's a program that thinks very long term by connecting NGA to a community that could help bring a new group of people to work for us in the future," said Bill Florich, an NGA employee in St. Louis who joined PIE 11 years ago.

PIE volunteers share their GEOINT knowledge with students through initiatives, including guest speaker programs, mentor and tutoring opportunities, pen pals, and science fair judging.

For many PIE volunteers, representing NGA to diverse groups of inquisitive and technologically-savvy students inevitably challenges them to see beyond the daily grind.

"No organization or entity should isolate itself from the community at large," said Florich. "PIE forces me to step out of my daily working life and explain the value of what I do to others. I actually understand my mission better through PIE."

NGA has recognized that STEM education among the youth in the local community not only creates a bond to the region, but also serves as a method for anticipating and developing talent investment needs for the future.

"When I was in school, I learned math but didn't know why I was learning it or how it would apply to real-world issues," said first-time PIE volunteer Adam B.* "The PIE program with its emphasis on STEM education helps students see how their coursework [could prepare] them for future NGA employment."

PIE volunteers are spearheading efforts to expand the scope of the program's outreach to include St. Louis City and the outlying neighborhoods of the Ferguson-Florissant School District.

In St. Louis, representatives from InnoVision and the Office of Aeronautical Navigation have led efforts to partner the PIE program with Gateway STEM High School in St. Louis City. Volunteers offer support for aviation and robotics, as well as building school presentations.

"Having a tutor to help support our teaching staff ensures we can reach more students," said Renée Racette, assistant principal at Gateway STEM High School. "Connecting students with [PIE] tutors is a fantastic way for them to see how the broader subjects they are learning connect to the real world."

**Last name withheld at request.*

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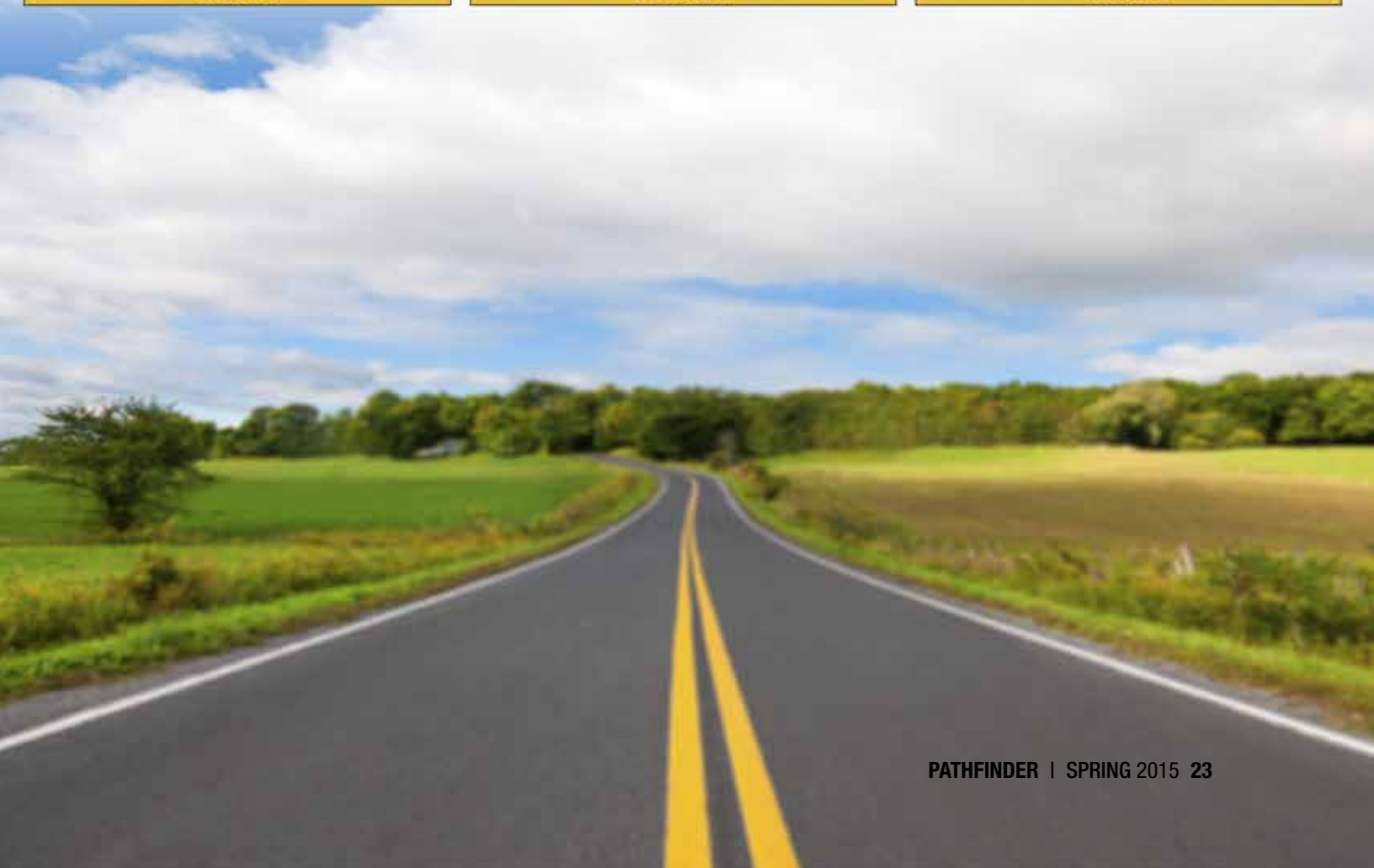


NGA OPEN FOR BUSINESS

HOW TRANSPARENCY IS CHALLENGING THE BUSINESS-AS-USUAL STATUS QUO

By Regina Galvin, Office of Corporate Communications

In the early spring of 2015, Maryland commuters returning home from the National Geospatial-Intelligence Agency's Springfield, Virginia, headquarters might have noticed a new state sign along the road, "Welcome to Maryland! We're Open for Business!" The new greeting is a distinct departure from the former, "Enjoy Your Visit!"

Around that same time, NGA announced its GEOINT Pathfinder initiative and metaphorically posted an "open for business" sign to the public. The initiative, according to Director Robert Cardillo, is an effort to reduce the barriers between the agency's bureaucratic system and the commercial market — a distinct departure from business as usual.

The intent of the initiative is to answer key intelligence questions using only unclassified data through a network of in-house labs and off-site locations interconnected through a secure collaborative service.

"The GEOINT Pathfinder is an experiment to transform NGA into a mostly open-source agency," said Chris Rasmussen, program manager of GEOINT Pathfinder and NGA's lead for public open-source software development.

The GEOINT Pathfinder was not the first initiative to "go public." In April 2014, NGA launched its GeoQ application on GitHub, an online open-source version control system. GeoQ is an open-source workflow tool used to assist with humanitarian assistance and disaster recovery by crowdsourcing analysis of traditional and nontraditional data on a Web browser, allowing the crowd to contribute to a common damage analysis, including source data such as location-tagged photos and video of disaster-affected areas.

"GitHub is a nerdy software thing. But sitting down with [Cardillo] and showing it to him, his assessment of it was that it's a new way of doing business," said Rasmussen. "It's part of the transparency efforts. Just because we have the word intelligence in our title, [it] doesn't mean secret."

Not quite opaque

Like other government agencies, NGA is moving towards a more transparent public presence.

Transparency in government allows the public to "see through" the restrictive barriers to understand how an agency does business. Working in the open-source environment allows citizens to participate in the tradecraft and business of NGA — a challenging culture change for an organization borne of secrecy.

However, because initiatives like GeoQ and GEOINT Pathfinder are open that doesn't necessary mean public in the sense that anyone has access to it. Within that distinction lies a root source of resistance from some in the intelligence community. IC analysts resistant to a more transparent status quo often cite security vulnerabilities as the reason not to do something, according to Rasmussen.

"Posting on GitHub is putting source code to interact with the public. When I was selling that to the organization, a lot of my time was spent myth-busting," Rasmussen said. "Because it exists on the Internet, people would compare it to the [access on the] Yahoo comment section — one has nothing to do with the other."

GitHub works on a trusted repository model — to gain access to code you must be a developer. Changes are made to the code only after the suggested coding has been scrutinized and approved.

"Just because we have the word intelligence [it] doesn't

"Open means open to interact," said Rasmussen. "You can have open data and still have restrictions, like FOUO [for official use only]. It's more restrictive but it's still going to the broadest base first," said Rasmussen.

"If someone sees a description of the content we've produced from GEOINT Pathfinder in Data.gov that is FOUO — that's much better than locking everything down within an FOUO system wholesale. You leave a descriptive breadcrumb at the lowest possible level for discovery and then you link up to the more restrictive set," said Rasmussen. "But the fact is it's discoverable at the lowest level first."

Accessibility to tradecraft and business

Ray Bauer, an NGA innovation lead and GitHub Governance Board co-lead with Rasmussen, is someone Cardillo called "disruptive," according to Bauer.

"So, what I take he meant by that — which is good — is that I'm disruptive from the standpoint of what I am working on and trying to accomplish with GeoQ on GitHub is not status quo," said Bauer.

Bauer champions adopting open source as much as possible and proposes that proprietary standards impinge on transparency because they limit accessibility.

"We should use open and common standards like an OGC [Open Geospatial Consortium] and stop falling victim to proprietary data formats," Bauer said. "Some of our vendors don't want us to do this … because it doesn't bring money back in for software updates and upgrades, but I believe the future business model will revolve around data and analytic services, not software."

Much of what Bauer advocates requires a culture change.

"For example, a lot of people are comfortable with their very expensive tool suites. And they are needed for certain missions, but they're not the only tools that could be used for what many of our analysts do today."

When analysts use open-source techniques like GeoQ, it allows real-time collaboration. Bauer claims it enables them to do their work faster, smarter and more efficiently while taking advantage of the exponential growth of data sources.

"If you do traditional work, you're going to get traditional results," Bauer said. "If you really want to do something different, you're going to have to change things."

Industry leaders who do business with NGA couldn't agree more.

Trust in transparency

Open-source code is to a developer what open communication and trust is to an NGA business partner. And for several industry partners or would-be partners, the status quo is stacked in NGA's favor and just slightly less than opaque.

Ultimately, the intended consequence of transparency is to create a level playing field and build trust. To get there with its business relations, NGA has some work to do, according to some in industry.

"The first step is real communications, collaboration and dialog with the understanding that communications need to be two way," said Keith Barber, an associate partner with OGSystems. "Simply hearing the same message about transparency with no details seems to articulate that the agency has not 'figured it out.'"

According to Barber, NGA needs to provide insight into how decisions are made, provide clearer evaluation criteria up front and provide better visibility about the way things are actually procured versus developed.

NGA created an online collaborative site to connect with industry and academia called the GEOINT Solutions Marketplace. Its purpose is to bridge the gap between NGA and solution providers by sharing interest areas.

Barber's company worked with the United States Geospatial Intelligence Foundation to stand up the Industry Solutions Marketplace. He said he feels that the linkage between GSM and ISM facilitates collaboration among users to gain insight into capabilities already built and used in other environments that could be adapted to operations.

"This [linkage] can enable transparency and increase collaboration between capability providers and users," he said.

NGA gets high marks from Steve Ryan, a senior mission engineer with Northrop Grumman's Intelligence, Surveillance

in our title,

mean secret.”

– Chris Rasmussen

and Reconnaissance division, on efforts towards transparency.

“NGA’s senior leadership has engaged well with industry through venues like GEOINTeraction Tuesdays, held by the U.S. Geospatial Intelligence Foundation. This has exposed industry leaders to NGA’s leadership and thinking with very positive results,” said Ryan.

But Ryan thinks the gatherings could be better.

“To make these kinds of events even more useful, NGA could consider including rising leaders from more of its operational workforce — across analysis, collection, acquisition, policy and many other disciplines,” Ryan said.

“This will facilitate the building of lasting relationships and mutual trust within the next generation of NGA leaders,” said Ryan. “[Doing so] will place industry and NGA on a path to better collaboration, which is a must-do in order to achieve NGA’s goals of context and consequence for its customers.”

Kathy Pherson, chief executive officer of Pherson Associates LLC, a woman-owned small business, said first and foremost to get to transparency [NGA must have] clarity of thought and communication.

“To say, give us your good ideas and we’ll decide what to do with them — that’s not transparent,” said Pherson. “Being transparent is being able to articulate the problem.”

Fairness and honesty are foundational stones in an agency’s path to transparency, and Rasmussen said that GSM allows for more of both.

“GSM lowers the bar of entry for people to interact with us, with our ideas or with our open data,” said Rasmussen. “Let’s say there’s a problem we’re working on. It goes out on GSM with a link to source code and documentation within GitHub. Source code with good documentation is a clear communication of how to help rather than esoteric insider language within BAAs [broad agency announcements], which are not recognizable to most outside the beltway.

“You start with the biggest pool of talent first, which let’s say is GitHub, which is open to everybody. Then, you go into the more restrictive territory and move up to the FOUO site,” Rasmussen said. “You click the link, you get a log in and you move up [to the next restrictive level]. But you don’t default upfront and make the door way too high to knock on.”

What will true transparency look like for NGA?

For Gene Keselman, cofounder and executive director at The Foundation for Innovation and Discovery, or FINND, it comes down to giving everyone who can help make the mission more successful the chance to do so.

“I have worked with some incredibly forward leaning leaders inside NGA who are willing to push the envelope as far as they can to get to “openness”— to allow new and innovative companies, technologies or people to get their foot in the door,” said Keselman. “When I ask them what’s stopping them from going even farther, their consistent answer is the established contract process.”

Karyn Hayes-Ryan, NGA’s component acquisition executive, is aware of the challenges and opportunities the current monolithic system of contracts and acquisition pose.

But she said GSM is more than contracts.

“It’s also allowing us to share openly what we need and providing that mechanism for some of those solutions to be industry partnerships,” said Hayes-Ryan. “If a company has part of a solution, they can talk to others who are interested in that activity. We’ve got the collaboration tools within GSM for someone to say, ‘Hey, I’ve got part A of what [we] need. Does anyone out there have part B?”

Hayes-Ryan acknowledges there is room for improvement in the acquisitions area. But despite remaining bureaucratic conundrums, she said getting research and development into the operational baseline in months — rather than years — is progress.

“This is the way we have to be doing business to stay competitive in the future,” said Hayes-Ryan.

More industry and academia collaboration, easier points of entry for a wider audience to interact in the agency’s tradecraft and business practices, and initiatives creating a larger public conversation — all signs welcoming outsiders to a state of greater transparency at NGA.

By Jeanne Chircop, Office of Corporate Communications

Just as "information superhighway" was becoming a popular buzz term, President Clinton issued Executive Order No. 12906 to coordinate federal geospatial activities. His administration tasked the Government Accountability Office with reviewing how federal agencies use geospatial data to perform their missions and how much they spend to obtain it.

This activity led to the creation of the Federal Geographic Data Committee, assignment of a functional manager for federal geospatial data and the development of the National Spatial Data Infrastructure to establish data and metadata-tagging standards for geospatial data. It provided the bedrock for a defined lane for geospatial intelligence on the information superhighway.

This activity did not involve the National Geospatial-Intelligence Agency. It happened in 1994, two years before NGA's founding. More importantly, it did not apply to geospatial data collected for intelligence or defense purposes.

Even today, NGA is only one of a pack of drivers – and not in the lead. As the agency and its customers venture deeper into the open territory of big data, NGA is mapping out exactly where and how its unclassified lane will converge with the public lane that has been under construction for the past two decades.

Why it matters now

Ensuring that NGA's customers can successfully merge the unclassified and public domains when necessary will require careful attention to information technology infrastructure, standards and quality assurance. It will entail unprecedented transparency and collaboration with public GEOINT providers. Most significantly, it will influence how NGA designs and rolls out what it is currently calling GEOINT Services, a new strategic initiative defined by NGA Deputy Director Sue Gordon as simply "how we expose our content in a way that allows it to be used."

Gordon, a champion of the GS effort, has been quick to clarify that there is nothing simple about the task; it will involve solving cross-domain and security challenges as well as establishing effective policies and procedures for the entire intelligence community working together on the same geospatial data. Building an open architecture and adopting standards that enable content to be integrated and shared across the GEOINT community is a challenge, especially for a government agency used to operating predominantly behind closed doors. Add that GS will have additional lanes to enable classified data users to use and share data and services behind the security barrier, and it becomes especially complicated.

It is a challenge NGA is prepared to conquer, according to Gordon.

"We have an obligation and imperative to provide GEOINT and 'GEOINT-able' content in a way that's easy to use," she told an NGA workforce assembly at the end of April.

She defines GEOINT-able content — a term she made up because no other words fit what she needed to convey — as information that can be used to help people make sense of their world. For NGA, that means providing customers with access to useful, relevant and timely location-based data from within the classified, unclassified and open (i.e., public) domains.

The public platform

How geospatial information is shared in the public domain is becoming increasingly relevant to NGA customers because of the proliferation of unclassified, publicly accessible GEOINT. The

main avenue for GEOINT in this domain is GeoPlatform.gov, a federal repository comprising some 80,000 metadata-tagged records. GeoPlatform, which was launched by the FGDC in 2011, is an Internet-based capability that was developed to allow unclassified federal GEOINT data to be easily shared and accessed by federal agencies, state, local and tribal governments, the private sector, academia, non-governmental organizations, and the general public. GeoPlatform is hosted by the Department of Interior, the functional manager of GEOINT in the public domain, just as NGA is the functional manager of GEOINT in the classified domain.

According to the GAO, more than 30 federal agencies post and use GEOINT on GeoPlatform. Among them are several NGA partners in the agency's unclassified humanitarian assistance and disaster response, or HADR, mission, including the Federal Emergency Management Agency, National Oceanic and Atmospheric Administration and the U.S. Geological Survey. Mapping of wildfires, evacuation routes and natural disasters such as floods, hurricanes and earthquakes are examples of services shared on GeoPlatform. NGA has supported FEMA and other federal partners with GEOINT services during notable HADR events such as Hurricane Sandy in 2012 and the Washington state wildfires in 2014.

GeoPlatform is also at the center of efforts in Congress to eliminate duplication of effort and spending among federal agencies on GEOINT. While these activities do not apply to GEOINT gathered and used for national intelligence, they illustrate the potential for NGA's unclassified services to either collide or converge with the public activity (see sidebar).

> "Ensuring that NGA's customers can successfully merge between the unclassified and public domains will require careful attention to IT infrastructure, standards and quality assurance."

NGA's platform

NGA will develop its GS platform to reside on the Intelligence Community Information Technology Enterprise, according to Gordon, so that users throughout the defense and intelligence communities will have shared access. In 2014, the director of national intelligence designated NGA as the agency responsible for developing a geospatial platform for the IC.

Carter Christopher, Ph.D., one of the authors of the GS business plan, calls the platform, "An IC geospatial-data 'ecosystem' where content value is defined by the user, not the originator."

Christopher uses the term ecosystem to describe the new platform because it is intended to form a community where data and services — much like organisms in a true ecosystem — interact and create recognizable patterns of interacting, regardless of their type. Once created, the GS platform will be the place where customers can integrate data and services from all types of providers — traditional classified and unclassified sources, open source, commercial and other government sources — in a matter of seconds, rather than today's norm of hours or days. It will be both open and secure, based on Open Geospatial Consortium standards, and will support open-source big data as well as traditional IC geospatial data and imagery. It will also provide processing services, and over time, the ability to create cross-intelligence analytic models to provide spatiotemporal context for current and future national security-related events.

"It will be a modular, component-based architecture, leveraging community best-practice components — including the Globe and Map of the World — to provide interoperability, key functionality, best value, ease of deployment, management and flexibility," said Justin Poole, director of the Xperience directorate and NGA's portfolio manager for customer service.

Whenever discussing the GS initiative, Gordon stresses that one of the main criterion is that its architecture enables content to remain where it resides, rather than requiring it to be imported to and managed in duplicative databases. Easy and smart integration with other Web-based providers of GEOINT, such as GeoPlatform, will be a consideration for the agency's GS platform in the unclassified domain.

"If we build a platform in IC ITE with a common data-services architecture, standard APIs [application program interfaces], data services and security, then NGA and its customers can centrally organize, integrate and curate GEOINT with guaranteed levels of service, regardless of where the content actually resides," said Brian Valletta, one of NGA's lead enterprise architects for GEOINT Services.

Valletta and other NGA IT experts are already partnering with DOI representatives to ensure compatibility between NGA's future platform and GeoPlatform. The relationship is proving mutually beneficial.

"NGA's teaming with DOI forms a synergistic relationship that will greatly enhance the impact of GeoPlatform.gov in the unclassified environment," said Jerry Johnston, Ph.D., a geospatial information officer at DOI.

Johnston acknowledged that a chief struggle has been to get agencies to integrate on GeoPlatform. Despite the executive order to integrate, many agencies have their own competing platforms. FEMA and the Department of Homeland Security are among them.

A major key to enabling successful integration of existing forums such as GeoPlatform with the GS architecture will be consistent use of standards, said Kevin Hope, NGA's chief data officer.

"Proper implementation of standards is imperative for NGA to deliver critical data and services to our partners on the unclassified domain," said Hope. "Consistent use and application [of standards] will allow us to leverage already-built platforms like Interior's, but also construct interoperable environments as needed for unique requirements or missions."

With all the necessary focus on standards, architecture, and other technical and governance issues, Poole said, "It's important to remember that the bottom line is to provide better customer service to GEOINT users."

Money & Management – GEOINT in the Public Domain

By Jeanne Chircop, Office of Corporate Communications

GeoPlatform is at the center of several federal initiatives to eliminate duplication of effort and spending among federal agencies.

Sens. Orrin Hatch, R-Utah, and Mark Warner, D-Va., introduced Senate Bill 740 last March "to improve the coordination and use of geospatial data." The legislation addresses the collection, production, sharing and use of geospatial information among federal agencies and their international and private-sector partners. It requires geospatially referenced data to be tagged according to standards established by a National Geospatial Advisory Committee, which also oversees the development of the National Spatial Data Infrastructure. The tasks outlined in this bill fall under the Secretary of the Interior, who is responsible for GEOINT in the public domain.

The bill further states that, within four years of enactment, federal funds will not be made available for any data that does not comply with the NGAC standards.

"There is currently no corresponding bill on the House side, and the bill has not yet moved forward on the Senate side. However we are keeping it on our radar because of its potential implications on federal funding, GEOINT standards and availability of GEOINT data," said Ryan Vaart, an NGA legislative affairs officer.

S.740 does not pertain to GEOINT collected and used for intelligence purposes, which NGA is responsible for, "as determined by the Director of National Intelligence," or to classified national security-related GEOINT "unless declassified under Executive Order 12951, as determined by the Secretary of Defense;" however, its language is less clear regarding unclassified GEOINT used to support the Department of Defense.

Two days after introduction of the Senate bill, GAO issued a new report on how well federal agencies are implementing the 1994 Clinton Executive Order. The last report was issued in 2012.

Like the Senate bill, the new GAO report makes it clear that the government is getting serious about eliminating duplicative efforts and investments on geospatial data used by federal and state agencies. Of note, the Federal Geographic Data Committee — formed by President Clinton in 1994 and still active today — has joined with the Office of Management and Budget to start an initiative to require agencies to report on the status of their geospatial-related investments beginning with the fiscal year 2017 budget process. OMB began requiring agencies to identify geospatial investments in its 2013 budget formulation guidance and established the Geospatial Line of Business for budgeting purposes even further back, in March 2006.

The GAO report notes that the agencies covered by Clinton's executive order still have a long way to go to eliminate duplication. Previous reports disclosed that the federal government invests billions of dollars each year in geospatial data, and research for the 2015 report found that federal efforts are still largely uncoordinated and duplicative, and that agencies tend to understate the real cost of their geospatial investments. Adherence to data standards and uniform metadata tagging is sporadic, according to the report, and incorrect data may risk lives during emergency events such as hurricanes and massive wildfires.

FAST TRACK TO TRANSPARENCY

QUICKLY GETTING THE NEWS OF NEPAL OUT TO THE PUBLIC

By Paul Frommelt, Office of Corporate Communications

With a forecast of warm spring weather, the weekend agenda for Terry Wilcox included cutting the grass, a BBQ and watching a baseball game. Those plans quickly changed when a devastating 7.9-magnitude earthquake struck Nepal in the early morning hours of April 25.

Within hours, the National Geospatial-Intelligence Agency's Integrated Working Group - Readiness, Response and Recovery, or IWG-R3, was hard at work collecting data to support disaster relief for the region, said Wilcox, acting GEOINT mission manager for IWG-R3.

This data included damage assessments, operating status of airfields, estimates on internally displaced persons and studies of transportation routes, said Stephen Gibson, NGA national geospatial intelligence officer for South Asia and Nepal earthquake mission manager.

By the evening of April 25, NGA ensured that the 69-member Fairfax County Urban Search and Rescue team, based out of Fairfax, Virginia, was able to download the agency's search and rescue atlas for Kathmandu to its standalone mobile devices prior to their deployment to Nepal to assist with rescue operations.

The next day, NGA opened a public website to host unclassified geospatial intelligence data, products and services in support of the U.S. and international relief efforts and was using its social media channels, particularly Twitter and Facebook, to disseminate topical products to the general public and drive additional traffic to the site.

While supporting humanitarian assistance and disaster relief, or HADR, is nothing new for NGA, the speed and sophistication in which NGA began getting meaningful data into the hands of first responders for this crisis was unprecedented for the agency.

"We learned a lot from the Ebola crisis about how to establish our unclassified presence, and how to leverage the skills and capabilities of GEOINT components from all parts of NGA and the U.S. government," said Gibson. "Our successes in clearing administrative hurdles and changing data and imagery sharing [practices] that we learned during the Ebola crisis have helped us hit the ground running during the Nepal earthquake crisis."

The NGA team's focus on providing their data in a timely manner and at an unclassified level comes from the top, Director Robert Cardillo, who has concentrated much of his first year at the helm of NGA on a renewed commitment to transparency.

"Successful partnerships depend on integrity and transparency," said Cardillo, in a speech at the Esri Federal GIS Conference last February. "And we at NGA are determined to uphold the highest standards and be as transparent as we can be. Of our many missions, NGA's disaster relief efforts allow us to be transparent in ways our sister agencies cannot."

Another aspect of that transparency involves raising the profile of NGA and the agency's mission.

"We used to be able to disseminate information but we had to do it without attribution to NGA. NGA was not able to get credit for our support," said Wilcox.

In coverage following the earthquake, BBC attributed an NGA produced map in its reporting — thought to be a first for the agency.

Wilcox said that this focus on transparency and attribution has increased the number of customers who now use NGA for its GEOINT.

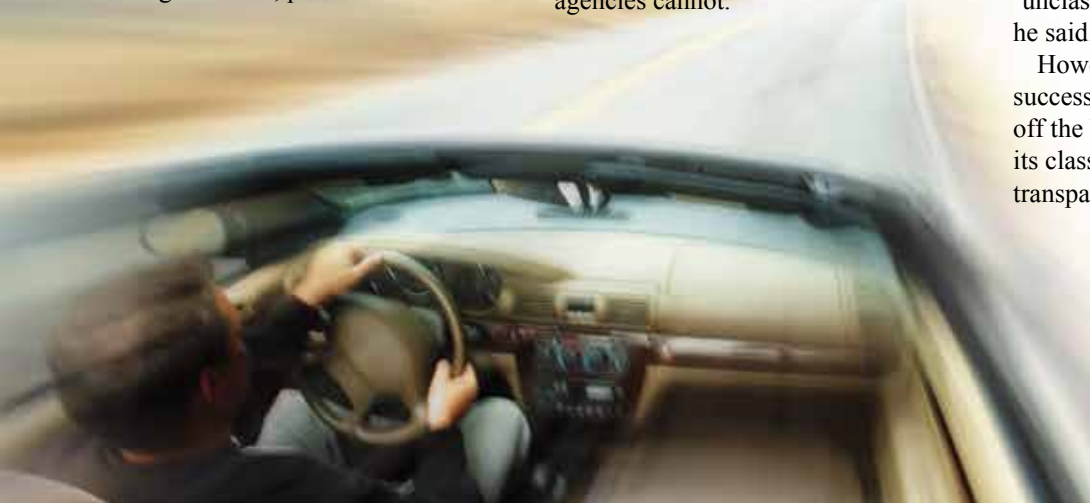
"They go online and they see that NGA is supporting this event and it just opens up a lot more avenues to come to NGA," he said. "We are getting a lot more folks asking for additional support because of it."

As with support to the Ebola crisis, which was the first time that NGA set up a publicly available website for disaster support, the Nepal earthquake team is already compiling a list of lessons learned to continue to improve the speed and breadth of data dissemination in the future. This includes continuing to minimize the red tape of administrative hurdles, data and imagery sharing policies, and licensing restrictions with commercial providers, said Wilcox.

The team is also still fighting the deep-seeded desire to keep information close to the vest that comes with years of working in the secret environment of an intel agency, said Gibson.

"We have faced challenges adjusting our mindset from the classified, 'need to know' mindset that comes from decades as an intelligence agency, to an 'unclassified, need to share' mindset," he said.

However, Wilcox said that with each successive crisis, NGA is sloughing off the barriers and hindrances from its classified legacy and revealing its transparent future.



NGA PRODUCTS HELP SHOW THE WAY …

Photos courtesy of SSV Corwith Cramer.

Dear NGA,

This is where I work — sailing aboard the SSV Corwith Cramer with SEA Semester college students, most recently in the Caribbean Sea. We use many NGA products to help us navigate, both traditional and electronic. We have a GPS and an electronic chart program on a computer to do most of the navigation but back it up with plots on paper charts using our GPS position or a radar fix or a visual fix from a celestial body (sun, stars and planets).

We teach the students to use all methods available and not trust one source for all information on our location. Our paper and electronic charts are kept up to date by corrections posted on msi.nga.mil and we use various publications (H.O. 229 and 249) to reduce stars, as well as Bowditch tables when needed, which are all NGA products. Just another day at the office...

Thanks from a satisfied customer!

Allison, 2nd mate,
NavComSafety Officer
SSV Corwith Cramer
Somewhere in the Caribbean Sea

NGA Pathfinder Magazine
7500 GEOINT Drive
Springfield, VA 22150

CHINA'S LIFELINE: The Burma Road

By Nathan Thompson, NGA History Program intern

***KNOW THE EARTH:** The last issue's back cover featured the Army Map Service product seen below. Read on to learn the historical context of the map's use.*

The Japanese chose to invade China in 1937, well before the United States and Great Britain entered the conflict that would become World War II. As Japan's advances effectively cut off sea and rail routes to the Chinese forces by 1940, this Army Map Service product clearly demonstrated to contemporary planners that the rugged geography of the Burma Road had suddenly become China's primary logistical lifeline.

This important map and other cartographic tools like it also defined the geospatial challenges posed by this route to both transit and defense. Supplies shipped to the southern Burmese port of Rangoon moved north by rail to the central city of Lashio, where the road started. From there, its 717-mile track crossed the Burma-China border and traveled through cities such as Wanting and Paoshan, winding over peaks rising thousands of feet and river gorges descending nearly as deep. It ended in Yunnan province at Kunming, a strategic linchpin in the fight against Japan.

The road's importance did not go unnoticed by the Japanese. After taking Indochina in 1941 and Malaya at the start of 1942, they set their sights on Burma. A swift invasion took Rangoon in March and much of the road later that spring. Japan eventually pushed Allied forces out of all but far northern Burma, and a blockade of the land route left air transport as the Allies' only option. Sorties from India over "the Hump," a wall of towering eastern Himalayan peaks, delivered some supplies, but aircraft and personnel shortages meant they could not keep up with China's needs for food, fuel and weapons.

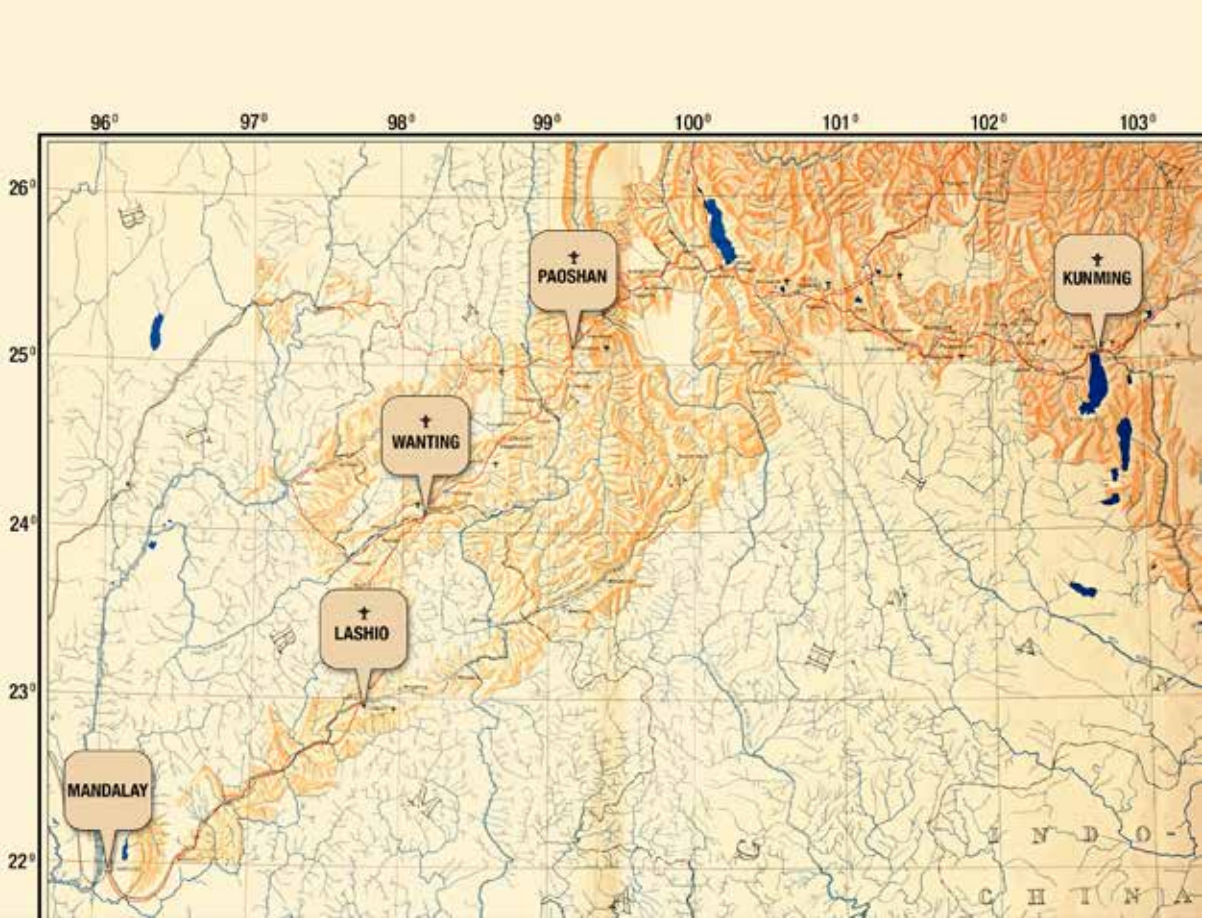
Working under British Admiral Lord Louis Mountbatten, the Supreme Allied Commander in the theater, U.S. Army Maj. Gen. Joseph Stilwell spearheaded efforts to reopen the land route to China. With Japan firmly in control of the Burma Road, focus shifted to the Ledo Road, an alternative route proposed to enter Burma from the north and reconnect with the old road near Wanting. This route avoided most of the Japanese-held territory, but still required the Allies to retake land in the northeast.

Stilwell's 1944 campaigns did just that, recapturing the critical transport hub of Myitkyina while the British beat back a Japanese counteroffensive in the west. Meanwhile, a majority African-American contingent of engineers worked furiously to build the

road itself. By January 1945, successful American-Chinese attacks on Bhamo and Namhkam linked the Ledo construction with the original road, and on January 27, the Allies restored the land link with China.

Some of NGA's earliest predecessors contributed to the campaign. Aerial reconnaissance and the service branches' photo interpreters gave Allied forces an edge in the difficult terrain, especially after they gained complete air superiority in mid-1944. On the mapping side, the Engineer Reproduction Plant operated an office in northern India, helping to print maps for in-theater use. In the final year of fighting, the Map Division of the Office of Strategic Services set up shop in Kunming, providing support at the terminus of the road.

Logistical challenges like those the Allies overcame in Burma persist today. New technology has helped matters, but supplying campaigns in contested theaters around the world remains no less difficult and no less important. In Burma and China, it took well-trained, battle-tested soldiers to put supplies to good use, but geospatial solutions to daunting logistical obstacles proved critical to the Allies' defeat of Japan.



KNOW THE EARTH

ANSWER: The answers to our back cover questions are: The War College Division of the U.S. Army General Staff prepared this map about one month after the June 28, 1914, assassination of Archduke Franz Ferdinand, heir to the Austro-Hungarian throne, which set Europe on the road to World War I. This map emerged as part of the American desire for a more thorough understanding of the conflict unfolding in Europe. It contains some preliminary estimates of the general military capabilities of the opposing alliances as well as estimates of the warship tonnage available to each power.

KNOW THE EARTH

BY GARY WEIR, PH.D.,
NGA HISTORY PROGRAM

HOW WELL DO YOU KNOW THE EARTH?

This view of Europe is very different from today. Political and ethnic entities appear here that no longer exist. This map also includes data on populations and those "trained" for some purpose. It played a very important role in forming U.S. military perspective on the developing European conflict.

WHO MADE THIS MAP AND WHY?

Answer: pg. 35