

NGA PATHFINDER

Magazine of the National Geospatial-Intelligence Agency

Vol. 13, No. 1 Winter 2015



**WHEN INNOVATION
MEETS PURPOSE**
DEPUTY DIRECTOR BRINGS
INDUSTRIAL STRENGTH TO
NEW JOB

AGILE ENOUGH?
WHAT NGA IS DOING TO STAY
ON THE CUTTING EDGE

**EXPEDITIONARY
MISSION
SUPPORT TEAM**
DELIVERING MISSION-
CRITICAL GEOINT



The Lens of CONSEQUENCE

A NEW PERSPECTIVE
FOR MISSION SUCCESS

I EDITOR'S MESSAGE I



We all have a story to tell. We tell stories as individuals, as an agency and as a collaborator within the larger intelligence community.

The Pathfinder magazine is one way we convey the National Geospatial-Intelligence Agency's story.

The magazine's primary audience is you, the workforce. As part of Team NGA, you're busy. Those of us who

work on the Pathfinder get that. It's our job to make reading the magazine worth your time. We think we've done that with this issue.

We've changed the layout and added new departments to not only get your attention, but to fill the pages with content that matters to you.

Our guest commentaries in this issue are new. In our Viewpoint department [pg. 8] you'll notice articles written by individuals from outside the agency on matters of GEOINT and national security. Agree with them? Disagree with them? Let's start some conversations. Submit a letter to the editor to Pathfinder@nga.mil and we'll consider it for the next issue. That goes for all of the articles.

Telling Our Story — also new — is written from the trenches. The storytelling is from an employee's perspective. This issue's article is on the congressional budget process [pg. 15]. How does that concern you? If the agency doesn't communicate its "story" well, your project may not be funded. It also concerns you because as part of Team NGA, the work that happens on a different floor from yours — or across the country or overseas — does matter. Stovepipes are so passé. Collaboration begins by taking an interest in another's work.

The back cover is a new look for us, but an idea whose time has come again. Brought to us by NGA's history program, Know the Earth will feature a previously classified NGA product and a challenge. You'll find the answer and explanation in the current issue.

And expect more changes to come. As Deputy Director Sue Gordon said in her interview [NGA's New Firebrand Deputy pg. 4], "In order to be relevant, you have always got to be reinventing."

NGA's story is complex, and by its nature, often times classified. Even so, both President Obama and Director Cardillo have told the public, we will be more transparent. To the extent we can in the Pathfinder, we are.

To be sure, others outside the agency read the magazine. They read it to help them decide if they'd like to work here, to glean information for their own endeavors, or maybe to get a better understanding of what their parent, spouse or friend does at work. We hope they find the information useful and candid.

This issue continues the magazine's tradition of telling the NGA story. Its content and how we've conveyed it will have consequences — good ones we hope. Hey, someone should create a tool to document that [Lens of Consequence pg. 22].

V/r,
Regina Galvin
Editor

The Pathfinder promotes awareness and understanding of geospatial intelligence, and is published by National Geospatial-Intelligence Agency's Office of Corporate Communications.

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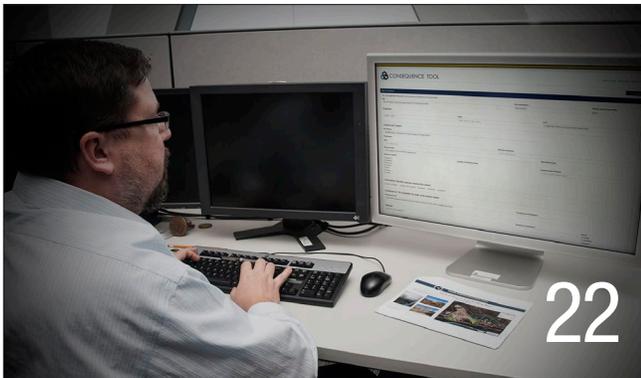
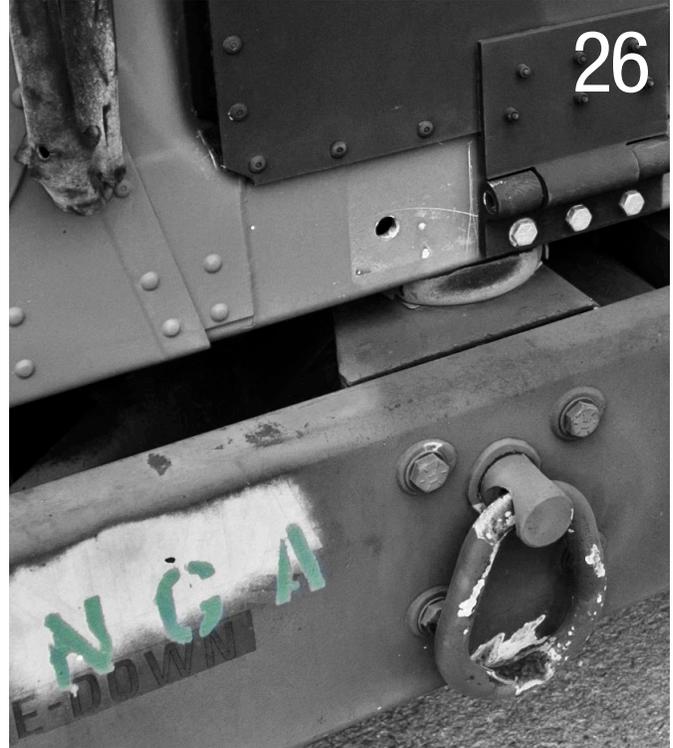
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NGA'S NEW FIREBRAND DEPUTY

SUE GORDON CHALLENGES BUSINESS AS USUAL FOR THE AGENCY AND ITS PARTNERS

By Regina Galvin, Office of Corporate Communications

On a late Friday afternoon, soon after she began her deputy director job, the traffic in and out of Sue Gordon's office was more indicative of an early Monday morning. A self-described firebrand, Gordon found time in her schedule for an interview with the Pathfinder to discuss her role as industry advocate and the opportunities and challenges the agency faces with its industry partners.

WHAT DO YOU UNIQUELY BRING TO THE ROLE OF INDUSTRY ADVOCATE?

SG: Number one, my heritage throughout my career has been one of partnership with industry. I have great experiences with industry that make me see it as an incredible positive force. Secondly, I am not wedded to the past. Others may see me as someone who seeks change. I'm not about change, I'm about relevance. In order to be relevant, you have always got to be reinventing, reimaging. Thirdly, I am so optimistic about our future. If we can just find a way to step into this moment — what NGA, coupled with the state of geospatial capabilities in the commercial sector now, can deliver to this nation and society is absolutely stunning.

So, I bring three things: the benefit of experience, good, fundamental curiosity and a belief that you can do things differently, and an absolute belief that we have a moment that we must step up to.

WHAT IS THE STATE OF INDUSTRY RELATIONS WITH NGA?

SG: It's fundamentally sound because of our shared accomplishments. And, I think relations can be much better if we improve our agility and eliminate barriers to entry. Our partners have so many ideas and they're clamoring to do something with them — for us to do something with them. We are predisposed to want to work with industry. That's our heritage. The number of opportunities is accelerating and they're coming and going. We certainly need to improve on both our accessibility and our adoption. In order to improve, industry needs to continue to work on bringing ideas that matter, not just ideas.

HOW CAN NGA BE A BETTER PARTNER TO INDUSTRY?

SG: Being a better partner has three simple components. Number one is if we can be clearer about where we want to go, that is incredibly useful to our partners. The second is if we can be more open about how to get there, then that will allow the innovation. You can see I put a lot of responsibility on the government side. We can be a better partner by believing that the way we've done it historically, is not necessarily the way it needs to be done going forward. The third component is being more decisive and being a little quicker to act.

HOW CAN NGA FIND BETTER INDUSTRY PARTNERS?

SG: We have great partners, and there are even more out there. We are doing some exciting things to provide access for those who are trying to find their way to us. But I would challenge our potential partners to understand that as intriguing as their ideas are, we are still a system and they bear some responsibility to understand the environment into which we're trying to integrate their solution. The second thing they can do, and I think this is hard and something the director has said before, tell us when we're about to make a mistake. Earlier, I said we can be better partners by having a clearer vision of where we want to go. Industry can help if they will muster their courage and be honest with us about the realities of the world that they see. There are so many great ideas popping — particularly because the world has figured out the incredible reach and power of connecting time and space to events. That [realization] has created this great churning cauldron of ideas that we want to take advantage of. The most effective partners going forward will be the ones who understand how to fit these advances into our system and/or, how we can change our system to take advantage of it.

WHAT DO YOU SEE AS BEING A DISRUPTOR TO INDUSTRY RELATIONS?

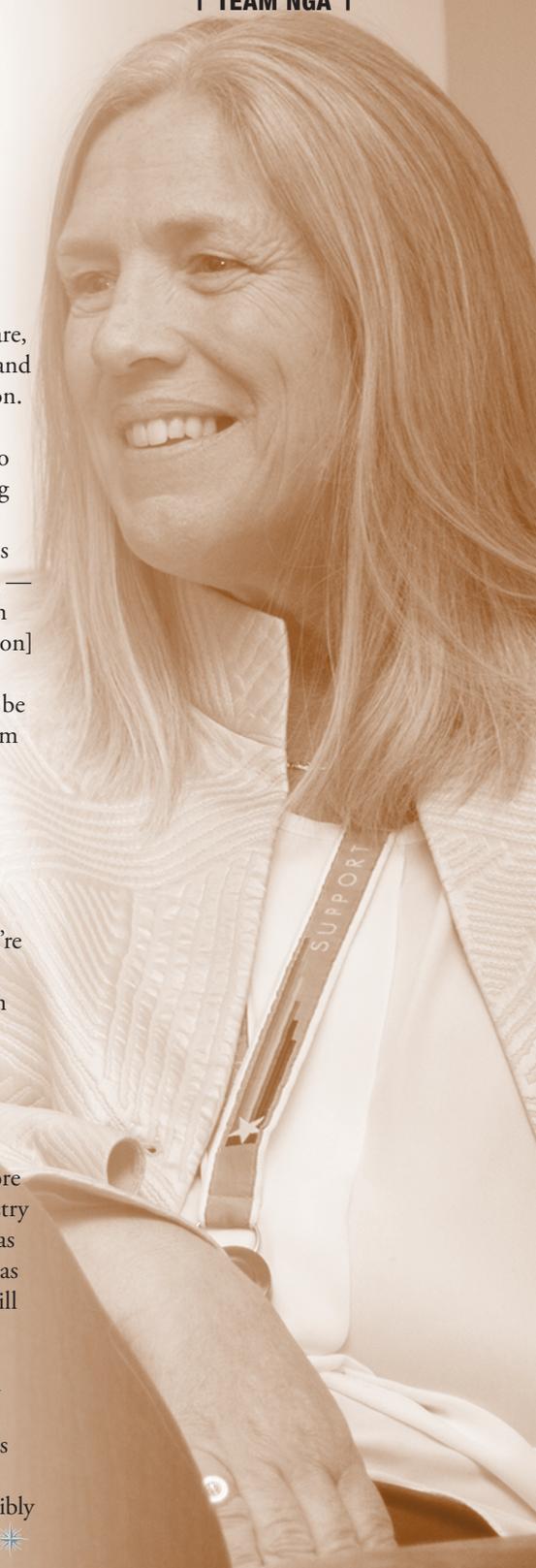
SG: Budget pressure always has the potential to scare us off. I don't think it has to be. I think that's the conventional wisdom and it can happen that way. I've seen some of the best innovation happen during times of fiscal downturn. The second thing that could be a disruptor — again, I put the pressure on us — is if we're not aggressive enough about taking the ideas and imagining how they can advance our work. The world's going to continue to turn and we want to be the partner of choice for the people with the ideas. If we're not aggressive enough and we can't figure out how to get those ideas in, I think we could miss some real openings.

WHAT IS THE ONE CHANGE THAT'S MOST NEEDED FOR NGA'S IMPROVEMENT WITH INDUSTRY RELATIONS?

SG: Well, I've said a much clearer demand signal from us, lower barriers to entry that will bring more players to the table, and more work by our partners on the how not just the what. I think industry can help us with analytics, not just more sources of data. I think as the agency moves to [Robert Cardillo's] idea of consequence and as more foundational data become available, our real value added will be in what we can put together and what insights we can reveal.

YOU SEEM ENCOURAGED BY FUTURE POSSIBILITIES. FROM WHERE DOES THAT OPTIMISM COME?

SG: There is something awesome about the purpose that comes with working in national security. I'm a huge advocate of industry and the innovation engine they bring. But what the government brings is the motivation of enduring challenges and the perseverance to find solutions. I think that the combination of the two energies is incredibly exciting. Now all we have to do is make the magic happen together. ✨



Background: Sue Gordon, a 26-year veteran of the Central Intelligence Agency, brings an intrinsic knowledge of the intelligence community, business acumen and proven innovative technology ideas to her new home at the National Geospatial-Intelligence Agency.

NGA SALUTES

AIR FORCE TECH SERGEANT

CALE BRENNAN

By Kristen Mackey, Office of Corporate Communications

Air Force Tech. Sgt. Cale Brennan has a long history with geospatial intelligence and the National Geospatial-Intelligence Agency. He has served his country since 2003 and has supported NGA for nine years in some capacity, including an NGA deployment to Afghanistan in 2012.

He serves as an example of leadership and a steward of NGA values according to Chris Greene, NGA branch chief of the Asia/Pacific Foundational Geospatial-Intelligence Division.

Brennan supported the Asia/Pacific branch for four years at the Rivanna Station in Charlottesville, Virginia. There he assisted Greene in oversight of daily production requirements and managing military and civilian personnel.

“The branch is large, and it’s large because the Asia/Pacific mission is critical to the Defense Intelligence Agency that we support. That made bridging daily communications between personnel, particularly our military and civilian personnel, a key part of my job,” Brennan said. “Military and civilian employees don’t always approach issues the same way, and managing those healthy differences can lead to better analysis. It’s something I learned years ago and I enjoy doing very much.”

Brennan was part of GEOINT and NGA history in 2010 when he and a group of analysts were transferred from the Defense Intelligence Agency’s Military Forces Analysis operations to the new DIA center in Charlottesville. In conjunction with this move, he was also a part of the

transfer of all DIA-assigned GEOINT analysts from DIA to NGA.

“In 2007, I was on assignment [with] DIA. Then in 2009, I was embedded with NGA in anticipation of NGA ownership of military analysts. We were a test group of analysts owned by DIA but functioning operationally under NGA. There were hiccups, but we managed,” Brennan said.

“Then I was selected to go Charlottesville in 2010 to help guide the DIA analysts who, like me, were now in NGA billets. Having been through the process, I taught them how to operate as an employee under NGA’s operational and administrative instructions versus the military or DIA’s,” said Brennan.

Brennan said that the biggest issue during the pilot and then formal transition from DIA to NGA was breaking down existing walls between military and civilian workforces amidst the administrative challenges of moving to another agency.

Breaking down those barriers is a specialty of Brennan’s, according to those who work with him.

Greene said, “Brennan was hired to validate the accuracy and quality of the branch’s GEOINT, but he became a natural at helping manage the team and bridging natural gaps in experience, training, education and operating in an environment with military from different branches and employees from different agencies.”

Brennan’s duty at NGA ended in December 2014. He now serves as an imagery analyst to CENTCOM where he works alongside NGA analysts.✱

I AM NGA

DWIGHT DEAN

By Kristen Mackey, Office of Corporate Communications

Dwight Dean is highly respected within the National Geospatial-Intelligence Agency and the geospatial community, said his supervisor, Chad Wright.

As the staff lead for integrated operations to the National Geospatial-Intelligence Committee, known as GEOCOM, Dean perpetually looks for ways to optimize the value of NGA and GEOINT in addressing national security issues, said Wright.

**“NGA is the
nexus for all
things GEOINT.”**

– DWIGHT DEAN

With three years at NGA and having worked in various intelligence and analysis capacities for two decades prior to NGA, Wright said that Dean is the right person to serve as the NGA employee representative of the committee, facilitating integration of analytic capabilities and collection across GEOINT platforms.

Dean said that he represents the geospatial community with a high level of confidence because of his long history in the defense and intelligence community, but mainly due to the support he has at NGA.

“NGA is the nexus for all things GEOINT. This is the place to be if you want to be part of cutting-edge geospatial technology, mapping, analysis and national security,” Dean said.

“Dwight brings exuberance and a love of mission to the office each day,” Wright said. “His experience and passion for the maturation of NGA and GEOINT is inspiring to all of us.”

“My work with my leadership and my peers — who I refer to as my ‘work family’ — provides me with all the knowledge and skills that I need to effectively represent NGA as we achieve and upgrade the goals of the GEOINT enterprise,” Dean said.

But, Dean credits most of his success to his family.

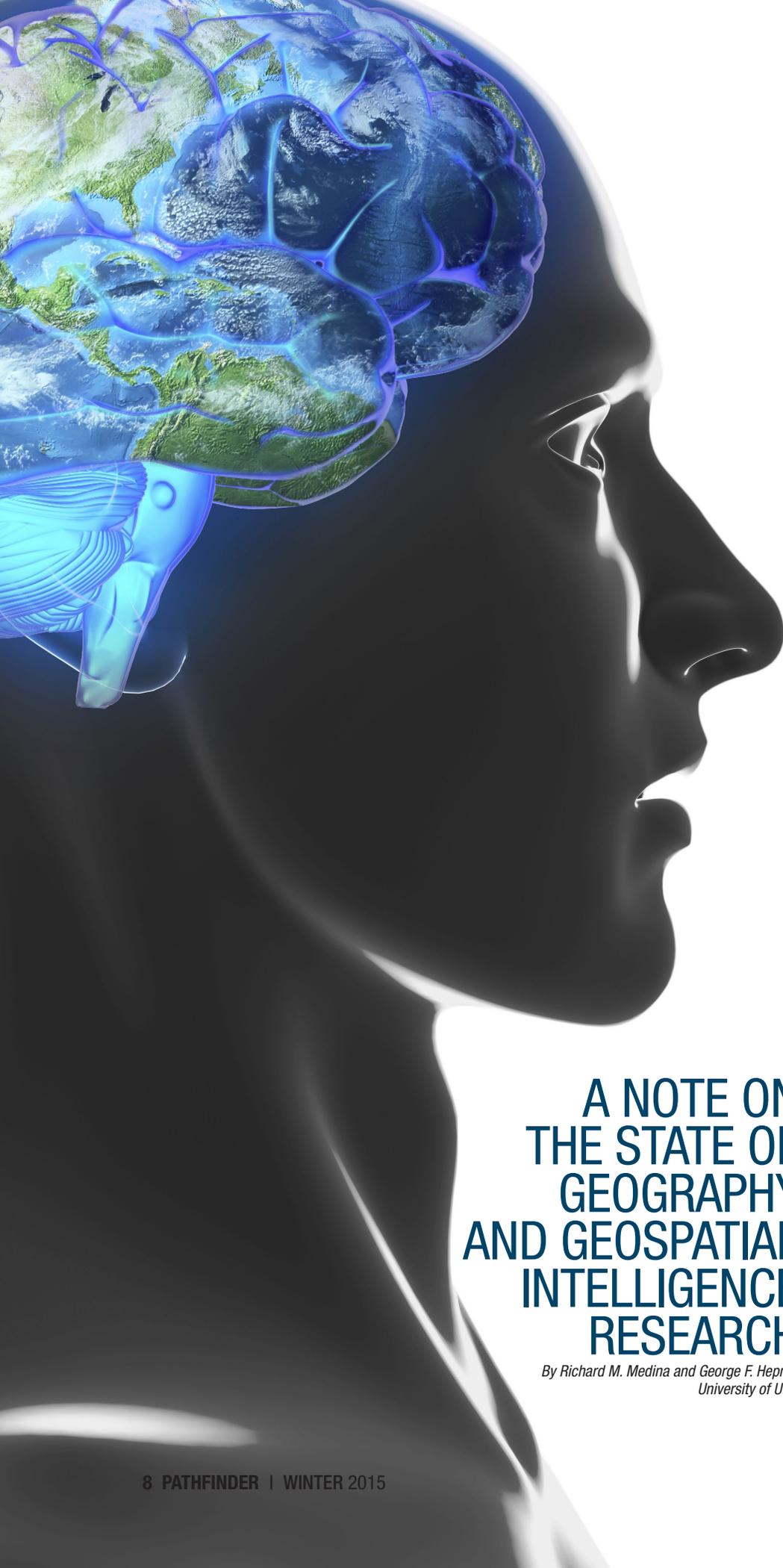
“My parents have been my greatest mentors. They taught me the importance of faith, family, hard work, education, honesty, and community and national service,” said Dean. “My wife and kids remind me of the impact I may have on others, and they improve my understanding of local or world events, and, of course, new technologies. They help me maintain a healthy work-life balance too, keeping me grounded and giving me strength.”

Dean has a bachelor’s degree in engineering, a master’s degree in strategic intelligence, post-graduate degrees in military arts and sciences, joint and combined military operations, and post-graduate certifications for information technology disciplines.

“I have also completed training in multiple GEOINT disciplines over the course of my career,” Dean said. “This education and training, coupled with my operational experience, has been critical to my success supporting NGA and NSG missions.”✦

“My work with my leadership and my peers — who I refer to as my ‘work family’ — provides me with all the knowledge and skills that I need.”

– DWIGHT DEAN



Editor's note: New to Pathfinder—in this issue we introduce Viewpoint commentaries. The articles are written by subject matter experts outside the agency on topical matters of GEOINT and national security.

Today's research environment is one where basic research and understanding are not valued as much as engineering and technology application. With consideration to geospatial intelligence, in many cases there is more interest in capability-driven technologies rather than working to understand fundamental processes to foster long-term pre-emption and mitigation of problems.

The “geo” in geospatial represents, among other concepts, spatial pattern and awareness, places of identity or homeland, scale, connectivity between individuals, groups and places, and activities within geographic space. Within the last 10 years, some have touted the end of these traditional core concepts of geography, reasoning that access to massive amounts of information negates a need for geographic knowledge as our geospatial activities would be replaced by data computation and virtual interaction. These are misguided sentiments leading to the belief that spatial organization is so intuitive to us as humans that anyone can be a geographer without the need for formal education and training. What we have realized is twofold. First, understanding these concepts with consideration to political, social or economic phenomena requires rigorous scientific methodologies founded on spatial thinking and reasoning. And second, the need for geographical knowledge and understanding is greater than ever and ignoring that need will eventually lead to extreme failures in policy.

Spatial and platial understanding is inherent to human existence. These concepts are the base to the individual and collective understanding of our personal and group identity, our connection to the physical environment, and a justification for our existence. While the friction of distance may be decreasing due to cheaper and more available transportation and communications technologies, humans still require physical places, connections to environment, desire for a homeland and a

A NOTE ON THE STATE OF GEOGRAPHY AND GEOSPATIAL INTELLIGENCE RESEARCH

*By Richard M. Medina and George F. Hepner,
University of Utah*

host of other geographic realities that cannot be replicated in the virtual world, at least for the foreseeable future. For example, an October 14, 2014, article in *The Washington Post* highlights Amazon's plans to open a store in New York City. Many would wonder why the most successful virtual shopping company would want to open a physical store. Obviously, the answer is that they see an unmet market, which will yield a profitable outcome. Although an online retailer, Amazon is acutely aware of geographic realities with respect to factors such as warehouse location, shipping routes and population/income distributions.

Another more germane example of the importance of geographical concepts involves global terrorism. Al-Qaida ideologists wrote years ago about crucial geographies, controlling post-conflict regions and capturing resources. The al-Qaida grand plan was focused on control of land as a basis for expansion. And although the media portray the Islamic State as a religion-based political movement, which it is, the more fundamental basis for understanding ISIS is their perceptual and aspirational geographic endgame of a caliphate. Their black flag and narrative of jihadist justification involves historical geographic and culturally relevant regions, including Khorasan, an area spanning parts of Iran, Afghanistan and Turkmenistan. In spite of their tenuous control, ISIS has divided their area of administration in Syria and Iraq into provinces with leadership by regional government to control the people and resources within those provinces. In Syria and Iraq, ISIS has already taken control of oil fields, water and agricultural areas. In spite of their massive virtual recruiting efforts and religious-political characterization, much of the ISIS campaign is centered on human and physical geography.

Given the physical geography of the recent battles in Afghanistan, Iraq and Syria, the use of technology-based geospatial

intelligence has achieved good results. The climate, lack of heavily vegetated landscape and limited topographic relief in most of the areas has made satellite imagery, drone use and tactical communications very effective. However, being overly dependent on these technologies, combined with our failure to anticipate, educate our intelligence and military personnel, and acquire high-resolution human geography information will be a major disadvantage when the focus turns to other areas, such as Africa, Asia and Latin America, as it likely will in the future. Physical space is needed for training, planning and supplying of sustained insurgent and terrorist operations. Understanding the spatial patterns of cultural backgrounds, social connections and capital, routes, and geographic intentions are key to mitigating problems. The geography of cultural or ethnic disagreements can facilitate or agitate a regional conflict into a global one. Most people operate on geographic realities of need, power and control, threat, security, etc. (or perceived realities), not postulated political and sociological theories.

What does this all mean for the future of geospatial intelligence? We must be cautious on our path toward thinking we can gain a full understanding of human behavior and resultant actions through technology and the computation of big data. Trends of open-source intelligence, social media assessment and reliance on hardware technology and other technological capabilities for understanding human behavior are very popular, but we should not be deceived into believing that they can take the place of modern approaches to human geography and other social science disciplines. Geospatial intelligence managers and analysts should be fluent in core concepts of spatial analysis, geostatistics and research methodologies, and they should have small area cultural knowledge and understanding of larger area social and physical systemic processes.

Within the geospatial intelligence profession, the current technological push includes focus on exploration of big data and data mining. Recent studies have shown the bias of making tactical and policy decisions on the basis of social media analysis, which inherently includes sampling biases and primarily reflects the sentiment of certain demographic groups (e.g., young, literate, tech aware), whereas power, especially in traditional societies, resides in individuals and groups outside of the demographic being sampled. Geospatial data uncertainties and biases should be known prior to actions being taken on results from social media mining and other big data applications.

We should not let human geography, a long established discipline, be used as a buzz word. It is difficult to appreciate a discipline like geography when the first time many students see it in its true form is in college, if at all. Many people still believe that geography is the study of maps, or the study of state capital locations, or even worse, the study of rocks. The primary focus of human geography is to understand the spatial patterns of human behavior and interactions. From these patterns, insights into processes of behavior can be gained. In these uncertain times, it is vital to understanding the world and to leverage that understanding to design sound policies to address the global problems we face. Geography is a critical component to this understanding. ✨

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Medina and Hepner co-authored "The Geography of International Terrorism: An Introduction to Spaces and Places of Violent Non-State Groups," ISBN-13: 978-1439886861.

The analysis and opinions represented in this article are strictly the authors' and do not necessarily reflect the positions of NGA, the IC, or DOD.

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2015 SHOULD BE AN EXCITING YEAR

By David M. Finkelstein

Analysts who follow China's People's Liberation Army may be in for an exciting couple of years beginning in 2015. This massive defense establishment of some 2.3 million persons is now a year and a half into what promises to be an extended period of re-energized modernization and reform. The PLA's objective is to enhance their capacity to conduct joint operations with special emphasis on maritime and aerospace domains and other high-tech battle spaces — goals they have been pursuing for many years.

This current round of military modernization was launched as part of the larger, ambitious national reform agenda Chinese President Xi Jinping laid out at the Third Plenum, an annual meeting of the Central Committee, held in November 2013. Section 15 of the Plenum's Decision announced a significant military reform agenda, covering nearly 46 key areas.

We should expect the upcoming reforms, especially organizational changes, to be wide-ranging and touch a lot of rice bowls in the PLA. In addition to myriad articles by PLA leaders suggesting this will be the case, another indicator is the intense political work campaign that has been underway since the Plenum. This campaign is clearly meant to unify thinking and prepare the force for what is to come. The leitmotif is that outmoded thinking and vested institutional interests must be swept away in order to create a PLA

that can fight and win battles. Also noteworthy is the creation of a special leading small group chaired by Xi to oversee and push forward reforms.

None of this is surprising, for even the PLA would be quick to point out that institutional resistance to change has been a problem. It would appear then that the PLA has encountered its own "Goldwater-Nichols" moment. Just as it took an act of Congress in 1986 to force the U.S. military to forge a joint organization, it would seem that the force of Xi and the Central Committee are going to be leveraged to impel the PLA to do what it has long known must be done, but which has proven too bureaucratically difficult without external catalyzing forces.

While strategic indication and warning of impending change has been placed in the public domain, the specifics of what may transpire have been unsurprisingly absent. Still, it is clear from the available information that six major issues will be addressed.

First, command and control for joint operations. The Plenum's Decision was quite clear that creating new and better command and control arrangements for joint operations at the national and theater levels is going to receive attention. The fact that this issue was singled out in the Decision suggests that joint command and control — a fundamental prerequisite of joint operations — has been elusive for the PLA since they started thinking about joint operations almost two decades ago. We should also expect to see adjustments to operational-level, joint warfighting doctrine and new, more rigorous joint training regimens.

Second, we should anticipate organizational changes. This may include rebalancing the force structure among the services, and possible changes within the four general departments and the military regions. As the PLA rebalances its force structure, we should expect the force projection services (the navy

especially, but also the air force and missile forces) to be the beneficiaries of increased emphasis and resources, underscoring the importance of the maritime and aerospace domains. PLA authors also write of the need for the elimination, reduction or consolidation of noncombat organizations and noncombat essential staffs. Another significant reduction of the ground forces may also be in the cards.

Third is the persistent issue of human capital. This means finding ways to increase the quality of officers and noncommissioned officers, and enhancing the professional military education system to serve the joint force the PLA aspires to create. The PLA is still not satisfied with the human talent it is attracting, retaining and training. This is a challenge that goes back as far as Deng Xiaoping's tenure in the late 1970s and 1980s.



Fourth, enhancing defense-related research and development and technology acquisition will be on the agenda. Improving civil-military integration will be given prominence, meaning that the military and civilian R&D sectors must seek greater synergies and be mutually supporting in order to ensure the PLA can field state-of-the-art weapons systems and other battlefield technologies.

Fifth, there is much discussion of the need to develop and better integrate “new type operational forces” — those key assets or units which are characterized by cutting-edge technologies and are deemed essential for prosecuting modern campaigns. Examples include the use of cyberspace, outer space, the electro-magnetic spectrum, ISR assets and precision-guided munitions. The term is sometimes applied to special operations forces, and special aviation

assets such as unmanned aerial vehicles and electronic counter-measures units. These capabilities reside at the heart of what the PLA has been referring to since the early 2000’s as “Local War Under Informitized Conditions”, the current term used to describe a generic high-tech conflict that has served as the capabilities-based driver for Chinese military modernization for over a decade.

Finally, and of potentially great significance, we should expect adjustments to the strategic-level guidance that informs China’s defense posture, force deployments, contingency-planning and plans for modernization (army building). Specifically, the Third Plenum’s Decision stated that the PLA should make adjustments to the “Military Strategic Guidelines for the New Period”, which is the near-equivalent of a national military strategy for China.

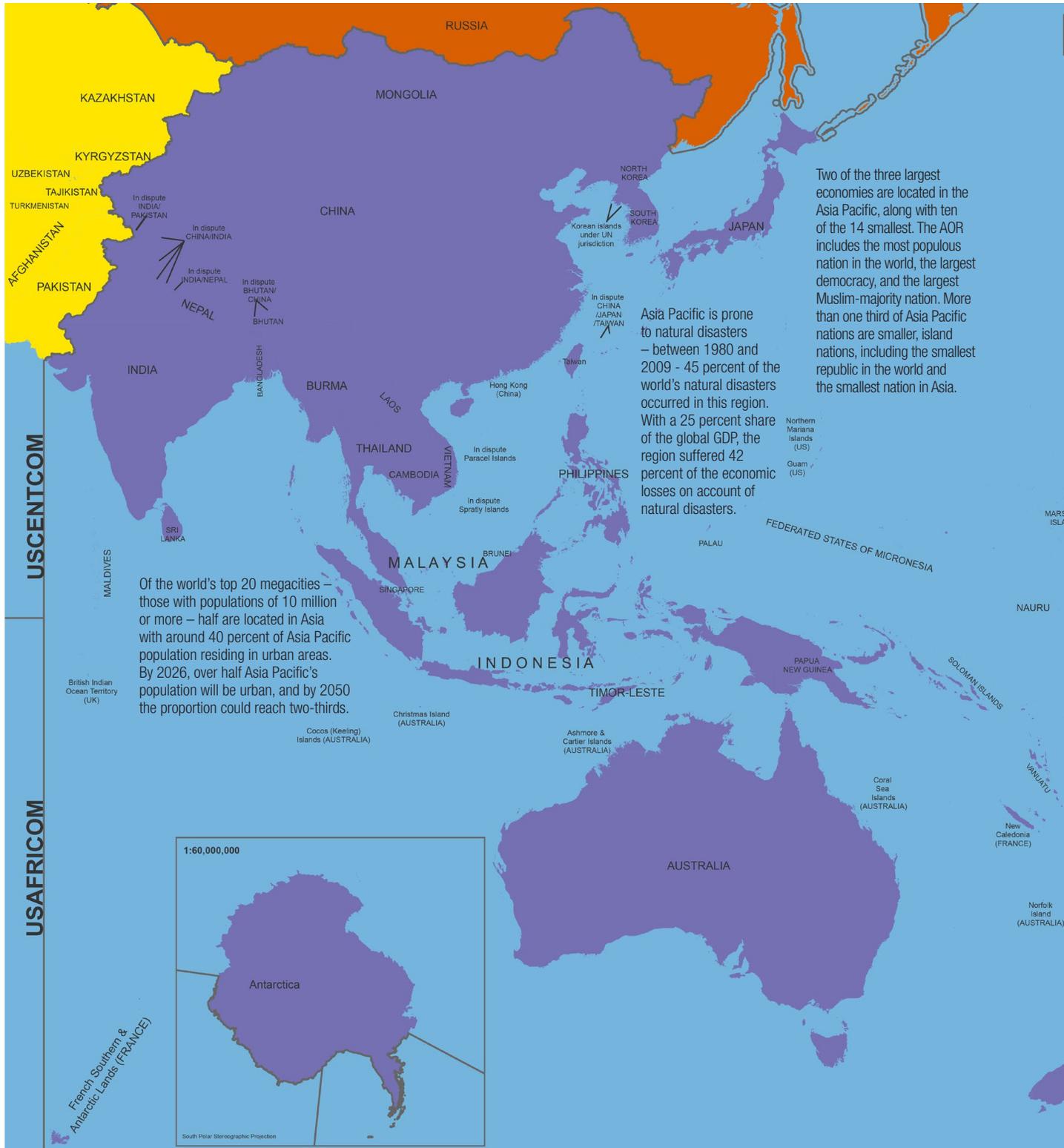
While the time tables for these and

other reforms are unknown, some articles suggest the year 2020 as a target date. If so, decisions will have to be made soon. For example, on December 25, 2014, Xinhuanet (the online news provider of the Xinhua News Agency, China’s official press agency), reported that Xi had approved the Central Military Commission’s Opinion on building new type headquarters. Consequently, 2015 could be the year in which some of these reforms start to roll out, especially the organizational changes. If so, it should make for an exciting time for those who follow the Chinese armed forces. We should not be surprised to find ourselves surprised by what may roll out this year. ✨

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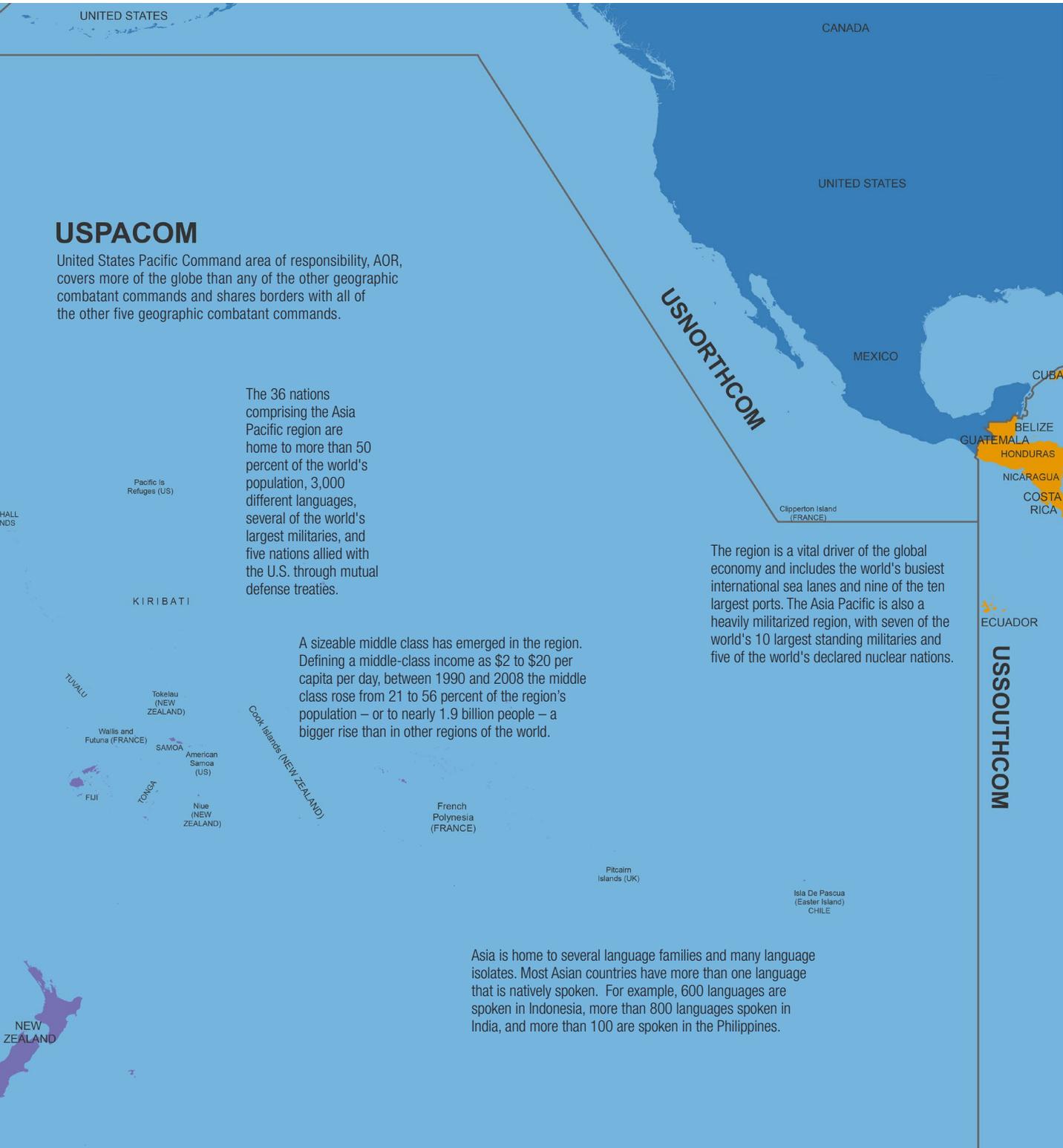


PACOM AREA OF RESPONSIBILITY



“The United States has been and will remain a Pacific power.”

– NATIONAL SECURITY STRATEGY, FEB. 2015



USPACOM

United States Pacific Command area of responsibility, AOR, covers more of the globe than any of the other geographic combatant commands and shares borders with all of the other five geographic combatant commands.

The 36 nations comprising the Asia Pacific region are home to more than 50 percent of the world's population, 3,000 different languages, several of the world's largest militaries, and five nations allied with the U.S. through mutual defense treaties.

A sizeable middle class has emerged in the region. Defining a middle-class income as \$2 to \$20 per capita per day, between 1990 and 2008 the middle class rose from 21 to 56 percent of the region's population – or to nearly 1.9 billion people – a bigger rise than in other regions of the world.

Asia is home to several language families and many language isolates. Most Asian countries have more than one language that is natively spoken. For example, 600 languages are spoken in Indonesia, more than 800 languages spoken in India, and more than 100 are spoken in the Philippines.

The region is a vital driver of the global economy and includes the world's busiest international sea lanes and nine of the ten largest ports. The Asia Pacific is also a heavily militarized region, with seven of the world's 10 largest standing militaries and five of the world's declared nuclear nations.

USSOUTHCOM

AN AGILE APPROACH TO SUSTAINING NGA'S ANALYTIC POWER

By Michaela Mesquite, Analysis Technology Executive Team

When satellite imagery was novel and through the early years of geographic information systems computing, the predecessors to the National Geospatial-Intelligence Agency stood nearly alone in the world of remote sensing and GIS technology.

In 2015, the GEOINT world is commercialized and many previously considered privileged capabilities are now in the hands of every Internet-connected smartphone user, tablet enthusiast and geography aficionado. Mobile device users search the Yelp app for the best nearby restaurants then seamlessly initiate Google Maps to find their way there.

While NGA, and its predecessor agencies, may have helped bring Google Earth to the world, today the creation and utilization of GEOINT is something the general public participates in and private industry shapes.

This open and agile GEOINT environment is filled with fast-paced technology development requiring increased vigilance by NGA technology watchers in order to keep the agency on the cutting edge.

To that end, last fall, the Analysis Technology executive, Todd Johanesen, rolled out the first of a three-part plan to the agency and its mission partners: the Analysis Technology Plan 2020.

The plan's first part, Defining the Analysis Technology Vision for 2020, outlines a future vision that addresses four categories of technologies: Research & Discover, Access & Visualize, Exploit & Analyze, and Expose & Report.

Fulfilling the technical needs in each of these categories should provide NGA's analysts with the much desired time to dive into deep analysis.

"It is fundamentally about

empowering the GEOINT analyst," said Carter Christopher, a former technology executive team member and integral crafter of the plan.

"Analysts' jobs will be increasingly difficult in the coming years. With GEOINT data volumes growing exponentially and rarely being purpose built for GEOINT analysis, we will need to rely on new technologies to help our analysts efficiently triage, integrate, analyze and expose the data and our insights to our customers," said Christopher.

Prior to the plan's release, strategic technology goals were ill-defined and addressed internally with a 'tactical' approach said Johanesen. "The Analysis Technology directorate published a technology plan in order to explain to the workforce, industry, R&D and academia the direction we were headed, our expectations for leveraging new and emerging technology, and to put into context how we want to do GEOINT analysis in the 2020 timeframe," said Johanesen.

Given the rapidly changing landscape of GEOINT technologies, he said the plan wasn't a prescription, but rather a broad vision.

"As technology matures and we leverage it against intel issues, we expect the end results will be slightly different than what we originally proposed," said Johanesen. "This should bring the agility to our technology plan that's similar to the agility expectations of our analysts."

TIMING CONSIDERATIONS

When the plan was released, there were technological, R&D and acquisition initiatives emerging simultaneously that supported internal projects with

substantial technological requirements (such as Map of the World, Structured Observation Management and Activity-based Intelligence). The timing of the roll out of the plan was fortuitous, according to Johanesen, because it informed NGA's R&D partners of the end goals that often are lost in the language of the contract vehicles or in one-on-one internal communications.

Since the plan came out when it did, industry and academia will be able to compete for funding and contracts with a "big picture" idea of what the analysts will be looking for in these initiative-support contracts rather than just a list of technical requirement details.

CONSEQUENCES OF DEVELOPING THE PLAN

"From an internal perspective, the plan should give our R&D teams in InnoVision a common direction for their strategic planning, rather than a long list of things we wish we had that is hard to plan against," said Johanesen. "From an external perspective, academic, industry and R&D partners can form their own strategies for meeting our goals that separated the long-term projects from our day-to-day technology needs."

The next two pieces of the Analysis Technology Plan 2020 will be released later this year.

"This document is an attempt to better define our needs and expectations," Johanesen said. "In turn, this will help NGA arrive in 2020 with a state-of-the-art system that supports GEOINT analysis across the broad spectrum of customers that we support, reinforcing NGA as the premier place for geospatial analysis, as we should be." ✨

NGA AND THE BUDGET PROCESS

By Dan Wessel, Office of Corporate Communications, legislative affairs officer

In Hollywood, the executive branch typically gets one of two treatments: romanticized or demonized. On one hand, you have “The American President,” and “The West Wing,” and on the other, “Scandal” and “House of Cards,” just to name a few. Regardless of the approach, the realities of working the budget process inside a federal agency would not make any script in Hollywood. Why? Because it’s hard work consisting of long hours, ever-shifting requirements and difficult decisions.

At the National Geospatial-Intelligence Agency, the Congressional and Intergovernmental Affairs Division, within the Office of Corporate Communications is responsible for the agency’s engagement with Congress. One of our most important tasks is conveying and seeking congressional support for NGA’s budget.

Each year, the president is required by law to submit a budget to Congress by the first Monday in February. Although this action kicks off the congressional budget process, our work starts almost a year prior as we work across NGA to inform key stakeholders on challenges as we collectively compile the agency’s budget. In an already fiscally strained environment, it’s a challenge that requires a lot of ingenuity, and often compromise, to create a budget that squeezes the greatest value from a limited pool of funds.

As an executive-level agency, we must submit our budget through the Office of the Director of National Intelligence, the Department of Defense, and the Office of Management and Budget.

Leaders in these organizations review each agency’s budget request to ensure consistency with national priorities. Through the submission of his budget, the president issues the dollar and cents implementation of those priorities.

With their “power of the purse,” Congress is responsible for passing annual legislation authorizing and appropriating funds for federal programs. In effect, through the budget process, Congress checks the work of the executive branch and includes its perspective as representatives of the American people.

This is when our office goes into overdrive. We help coordinate hundreds of personnel from across the agency — from senior executives to analysts, staff officers and contractors — and support the flow of information to congressional staff. We must spend as much time on the gritty details of how resources should be allocated as on the broad value of NGA’s contributions to national security.

In 2014, NGA accomplished this by providing over 160 briefings, meetings and visits with members and staff from Capitol Hill, and 300 responses to inquiries.

And during the upcoming budget cycle, the NGA Director, Robert Cardillo, will get his own Hollywood — or C-SPAN — moment: budget hearings. As an important component of congressional oversight, agency heads and administration officials testify before the House and Senate, defending the president’s budget. The director has the responsibility of justifying why the agency’s budget provides the greatest value for taxpayers

at the lowest possible cost. He will be afforded the opportunity to describe his vision for the agency, explain his rationale for resource decisions and present the agency’s successes as the geospatial intelligence provider for warfighters and policymakers. He’ll also field questions on topics ranging from the agency’s assessment of key global conflicts to the status of the agency’s plan to develop a new facility in the St. Louis region.

At the end of this journey, several budget bills that have been passed by both houses in Congress will land on the president’s desk for his signature.

The question that remains is, how well did the agency tell our story and convey the value of NGA? If we did it right, the GEOINT segment of the budget the president asked for appears in the documents he’s about to sign. And NGA gets to perform our critical mission for one more year. Now that’s a sequel worth fighting for. ✨

Dan Wessel is a Legislative Affairs Officer at NGA and he does not develop an annual household budget.

WHAT’S YOUR STORY?

Tell us your personal, unclassified version of the work your office does for NGA for possible inclusion in the next Pathfinder. Send your 600 word or less account to Pathfinder@nga.mil.

NGA AND MERCYHURST UNIVERSITY CREATE UNIQUE EXPERIENCE FOR STUDENTS IN INTELLIGENCE STUDIES

By M. Karen Walker, InnoVision Communications

In the fall semester of 2013, the National Geospatial-Intelligence Agency and Mercyhurst University launched a new partnership that gives students real-world experience in researching and briefing findings to NGA analysts and decision-makers.

Through a Cooperative Research and Development Agreement initiated and managed by NGA's InnoVision Directorate, students enrolled in the Tom Ridge School of Intelligence Studies and Information Science engage with NGA analysts during the capstone course of their undergraduate or graduate program.

Each semester, groups of students form teams to research a question posed

and vetted by NGA for unclassified, open-source research. Near the end of the semester, students brief their findings to NGA decision-makers and members of the analyst corps at the NGA Campus East in Springfield, Virginia.

"The partnership with Mercyhurst gives us the ability to broaden the context for geospatial analysis," said Ann Frelander, the NGA Analysis Directorate's liaison to Mercyhurst.

Frelander said that the questions address issues that represent gaps in NGA analysts' situational awareness and ability to project future trends in their regions of interest. Additionally, students research and develop briefings

on issues that interest the intelligence and defense communities, but that do not require a current allocation of NGA's analytic resources.

Previous student groups have conducted research to understand the geospatial aspects of cyber networks; the nature of global cyber security threats; human geography; factors contributing to state fragility and stability; and the interplay of energy, economy, and critical infrastructures in countries of the Middle East, West and Central Africa, East Asia, and Latin America.

The fall 2014 cohort of students worked on three questions regarding telecommunications infrastructure



Mercyhurst students briefed their findings to NGA decision-makers.
Photo by Kevin Clark

developments in North Africa, the impact of maritime resource issues on regional tensions in the East and South China Seas over the next five to 10 years, and the likelihood that Arctic and non-Arctic nations will meet their economic goals in the region within the next 10 years.

Kris Wheaton, J.D., Mercyhurst professor and capstone course lead, agrees with Freeland that better questions lead to better analysis.

“Our students conduct research for people who are in the business, asking questions the way they are really asked. The questions have the ring of truthfulness, allowing me to create a realistic learning environment, and inspiring our students to think like professionals,” Wheaton said.

STUDENTS DEEPEN THEIR APPRECIATION FOR GEOSPATIAL ANALYSIS

According to Wheaton, Mercyhurst students who earn their degree in intelligence studies obtain positions in a variety of agencies and private sector firms. But wherever they go, they can find ways to use their newly gained and freshly honed geospatial analysis skills.

The signing of the NGA Mercyhurst CRADA was well timed, in Wheaton’s estimation.

“It has become increasingly clear, in the past five years, that students enter our program with an interest in geospatial data and new tools, taking on mapping projects as freshmen,” Wheaton said. “By the end of their four-year program, they understand that they cannot be an IC professional without an appreciation for geospatial analysis; it’s integral to the art and science of modern intelligence.”

Ana Barbic, a former student of Wheaton’s who is now a global threats analyst for Monsanto Company, described her fascination with maps and trying her hand with ArcGIS.

“The NGA assignment fueled that fire even more. I seek every opportunity to provide a geospatial analysis with my assessments because maps are

a great way to make intelligence more accessible and interesting to decision-makers,” Barbic said.

The students also gain appreciation for the myriad ways in which geospatial intelligence can be applied. Current Mercyhurst student Alicia Stoklosa shared her excitement to learn that NGA and other IC agencies support humanitarian missions.

“I was fascinated by the way NGA used imagery analysis to provide timely and appropriate aid to those in need during the 2009 earthquake in Japan,” Stoklosa said.

With this increased awareness, Stoklosa said that she can combine her passion for the environment with her interest in intelligence analysis, widening her career development prospects.

NGA’S QUESTIONS BROADEN STUDENTS’ PERSPECTIVES

Wheaton expressed appreciation for NGA’s effort to provide a wide variety of questions. Mercyhurst students graduate the capstone course with a well-rounded skill set and knowledge base, Wheaton explained.

“We’re investing in a process of critical thinking, teaching students how to conduct and apply their analyses to a working body of knowledge,” Wheaton said.

Barbic likewise commented on the importance of a wider perspective and cross-training. Barbic and her teammates conducted a strategic assessment of the Venezuelan economy. With no prior experience in economic analysis and a portfolio of work concentrated in the Middle East-North Africa and Eastern Europe, Barbic undertook basic research on Latin American economies.

Barbic said that despite the steep learning curve at the beginning, she provided a fresh and alternative perspective to the estimates that her team produced.

“One of my teammates had extensive experience in economics,

and together, all five of us were able to debate effectively on the topic and learn from each other,” Barbic said.

Barbic attributed her growing interest in economics to the capstone course.

“I was made acutely aware of how interconnected, both directly and indirectly, a nation’s economy is with other elements of the country,” she said.

The team tasked with researching resource competition in the South and East China seas found the scope of the question especially challenging.

“We were surprised by the wide range of subject matter that the NGA analysts wanted us to look at, under one overarching question. But after weeks of research and creating our knowledge base, we learned that many factors affect the outcomes of various situations,” said current Mercyhurst student Katelyn Bailey.

The question’s complexity required the team to give more than a simple yes-no answer to whether conflict would occur in the next five to 10 years.

“We have to know how every single indicator affects other indicators, and the many ways that a flag or trigger for conflict could play out,” Bailey said.

GAINING EXPERIENCE AS LEADERS AND TEAM BUILDERS

Maximino Peiz, a current Mercyhurst student who completed the Strategic Intelligence capstone course in the fall 2014 term, said that the most important lessons involved character and leadership.

Peiz described how the partnership with NGA provides an opportunity to display and refine the skills gained through earlier course work.

“This particular capstone course is centered more around managing people and responsibilities than learning more new methodologies,” Peiz said. “The most successful teams learned to work through differences in order to accomplish their assigned task. By helping each other out, we learned how to share roles and responsibilities,” Peiz said. ✨



Open to Possibility

EUCOM NST building
new ways to collaborate

By Jeanne Chircop, Office of Corporate Communications

There is a consistency to National Geospatial-Intelligence Agency Director Robert Cardillo's speeches —whether he is addressing audiences within the intelligence community or those in the public domain: the geospatial intelligence landscape is changing. For proof, he cites the proliferation of commercial satellites, NGA's release of mobile applications via iTunes and Google Play, and crowd-sourcing development through a public software-sharing site called GitHub.

He also talks about NGA's collaboration with worldwide partners to address global events such as the Ebola crisis, the 2013 typhoon in the Philippines, and security at major public gatherings such as the Olympics and World Cup. Through unclassified websites and use of open sources, NGA and its allies are increasingly

integrating and sharing knowledge of the world, even while separated by physical barriers, national policies, security walls, and diverse information technologies and analytic tools.

Open-source intelligence, or OSINT, has been building its place among the other INTs since 1996 when the Aspin-Brown Commission stated that the United States' access to open sources was "severely deficient" and that it should become a priority for congressional funding. It took nearly another decade for the full significance of open sources to be understood; "The 9/11 Commission Report" confirmed that the terrorist attacks on that day were planned almost entirely using open-source information.

Today, an estimated 80-90 percent of finished intelligence products are derived at least in part from open sources

according to the National Intelligence Estimate published by the National Intelligence Council under the Office of the Director of National Intelligence.

Numerous federal committees and program offices across the defense and intelligence communities focus on open-source materials. OSINT, like the other INTs, also has a functional manager. The Central Intelligence Agency operates the DNI Open Source Center to analyze and share open-source intelligence materials through both its headquarters and overseas bureaus.

GEOSPATIAL OPEN SOURCE

At the National Geospatial-Intelligence Agency, analysts review open-source data through a spatial lens. Because of their location and terrain understanding, GEOINT analysts are able to provide

context relevant to key intelligence questions. NGA analysts also use geospatial open-source intelligence, or GOSINT, when supporting unclassified efforts.

“Our open-source software continues to increase first responder efforts and maintain a necessary level of transparency between the federal and local communities,” said Cardillo following a speaking engagement last fall in Huntsville, Alabama, where he discussed numerous ways the agency uses GOSINT to support national security and humanitarian efforts. Among them, NGA’s unclassified GEOINT is contributing to the fight against Ebola in West Africa by helping to identify safe water sources, optimal locations for temporary hospitals and the quickest routes for supply deliveries.

OPEN COLLABORATION

NGA leverages GOSINT in support of its customers and allied partners wherever they are. Crowd-sourced data and social media analysis are regularly used for tipping and cueing. Following social media outlets such as Twitter and Facebook, for instance, provides near real-time situational awareness as public conditions change.

The “NATO Open Source Intelligence Handbook” presents OSINT as “an essential contextual and foundation element for classified intelligence operations” in the 21st century. Additionally, NGA’s Geospatial Open Source Initiative focuses on how the agency supports its allied partners through unclassified open sources.

“At the command level, [Air Force] Gen. Breedlove, the four-star commander of [the United States European Command], has repeatedly commented on the value of open-source intelligence, its shareability and how it can strengthen NATO resolve,” said Ashley Hendrix of the NGA Support Team to EUCOM.

Using OSINT as the basis for collaboration with allied partners has obvious benefits. Beyond those afforded every user, GOSINT offers specific advantages for international

collaboration. It can be leveraged at little cost to either the U.S. government or the allied partner. There are no security barriers and no required agreements.

“Since no formal sharing agreements are required for open-source intelligence, this has oftentimes created a common operating picture for foreign partners with limited GEOINT backgrounds,” said Hendrix.

OSINT TRAINING

NGA has learned from its OSINT engagements over the years and is now taking part in launching a fully releasable open-source curriculum. Its primary aim is to assist military service members who work within an unclassified Internet protocol router domain environment. To date, informal desk-side training has been conducted with more than 200 military personnel. An additional 40 service members attended more structured training in the form of a workshop in Stuttgart, Germany, sponsored by the EUCOM NST. The event was supported by the Geospatial Open Source division within NGA’s Source directorate, along with key linguists and GOS experts.

“Military service members know how to use crowd-sourced data and social media for tipping and cueing. Many of them have grown up using Facebook, Twitter and other platforms, but we also teach how to stay safe from a webmaster while they are conducting those searches,” said Hendrix.

NGA is also working collaboratively with other IC agencies comprising the National Open Source Committee to create and deliver a teachable curriculum to foreign partners.

“Because of our success with the [military] components, we began reaching out to select foreign partners

to teach geospatial open-source concepts and fuse those concepts with commercial imagery, purchased through DigitalGlobe under our NextView License,” said Hendrix.

To date, international training engagements have been arranged with priority EUCOM partners in cooperation with the EUCOM NST’s international affairs liaison.

The growing focus on open sources, including commercial imagery, has sparked EUCOM to establish a formal Open Source Element as a new program in theater, according to Hendrix. NGA and EUCOM will partner in training OSE analysts to look at open-source information and social media through a spatial lens.

“Our previous inability to forecast, understand or counter events foreshadowed in publically available information characterizes both the vastness of public domain information volume within the European theater and the challenge borne by the command to efficiently obtain, scrutinize, utilize and retain open source information with accuracy and timeliness,” said Robert Post, director of the new ECOSE.

“The ECOSE stand-up is the catalyst for change, and the NST’s effort is really the type of program where new energy yields dramatic results,” he said.

Increased use of open sources also begs the question of how NGA will continue to provide services of consequence in the future. Cardillo isn’t worried.

“Geospatial intelligence is by its nature open ... it’s a map. It’s a photo,” he said. “Because of the frame of reference we provide, we can be a place where people can integrate and collaborate.” ✨

WHAT IS OPEN SOURCE?

OPEN SOURCES ARE UNCLASSIFIED, PUBLICLY AVAILABLE SOURCES OF INFORMATION:

- Internet and social media sources (e.g., websites, blogs, webcams, social media)
- Mass media (e.g., television, radio, newspapers, magazines)
- Books, journals and brochures
- Think tank studies, dissertations
- Photos and videos
- Census data
- Commercial imagery
- Subscription databases and services

NGA Defining Security Solutions in the

By Angela French and Mary Kitson, Office of the Chief Information Officer

For the past two years, the Intelligence Community has focused on developing and implementing the Intelligence Community Information Technology Environment initiative, known as IC ITE. IC ITE provides a number of services that support Director of National Intelligence James R. Clapper's vision of true intelligence integration. While many are focused on the mission user improvements that IC ITE will bring, personnel at NGA are working behind the scenes to develop and implement the framework and policies necessary to support this ambitious undertaking.

System security, often an afterthought when designing or using IT resources, is required for the IC to operate on all networks and is a key component to the success of the initiative's success. This includes safeguarding the IT infrastructure against outside malicious actors while ensuring intelligence professionals

have the right authentications and accesses to data within the new integrated environment.

"NGA is leading the community in this area by proactively adopting emerging IT solutions and simplifying security processes," said former NGA Deputy Director Mike Rodrigue. "NGA's work is an example of how the entire IC can better manage and operate securely within the IC Cloud. By executing this security strategy, NGA is able to more rapidly – and transparently – provide online, on-demand GEOINT."

In the summer of 2014, NGA was the first IC agency to deploy an operational capability to the Commercial Cloud Services, or C2S, which offers agile, cost effective cloud computing to the IC. To test the capabilities of the cloud environment and to drive forward one of its key initiatives, NGA chose to first

add the foundational elements for NGA's dynamic Map of the World, an initiative which enables analysts throughout the IC to access data of all intelligence disciplines. Once fully operational, MoW will enable users to visualize and access integrated intelligence content fixed to accurate geographic features on the Earth.

"These initial capabilities are noteworthy, but they are only the first steps in a long process to evolve NGA's role as the provider of a platform for intelligence integration, which will enable all agencies to collaborate in one environment," said David White, NGA's former chief information officer.

NGA's Deputy CIO Shishu Gupta noted that once MoW is fully deployed in the C2S as a common service for the IC, it will provide the opportunity for other agencies to decommission their agency-unique geospatial portals and data programs.

Led by NGA's Office of the Chief Information Officer, staff from multiple key components, the DTE Joint Program Management Office and the Defense Intelligence Agency began working together in the summer of 2013 to develop a method for testing and securing DTE. The environment provides a common suite of collaborative tools such as ".coe" email addresses and the same instant messaging capabilities for the entire IC.

For initial DTE security, the team focused on implementing a new IC security mandate — Intelligence Community Directive 503 — which improves the agency's process of assessing and authorizing information systems for use and establishes the new Risk Management Framework. This state-of-the-art countermeasure is a more intuitive risk management process, according to Lance Dubsy, NGA's chief information security officer.

"The countermeasure better serves program managers' needs throughout the IT system lifecycle and provides leadership a near real-time security posture of NGA's systems," said Dubsy.

All systems used within IC ITE must be accredited using ICD 503 requirements.

"The RMF improves the way we manage risk associated with NGA's information systems," said Dubsy. "Through better safeguarding of our systems and using common services and practices, we can responsibly manage IT security in an increasingly dangerous world while offering substantial savings to program budgets."

After successfully securing the DTE using ICD 503 and RMF, the security testing team used best practices and lessons learned to adapt its security strategy to apply to systems and GEOINT content added to the cloud environment.

Air Force Tech. Sgt. Jason Hess, who serves as NGA's IC Cloud information system security manager, worked with NGA IT Services to develop the first security strategy for adding

content into C2S by leveraging the agility that the RMF provides.

WORKING IN A CLOUD ENVIRONMENT

Cloud-based architectures enable convenient, online and on-demand network access to a shared pool of computing and data storage resources. The IC Cloud allows users to discover, access and store data in a more efficient and secure manner.

"By using the enterprise services of others, we have reduced our typical security process from 90 days to two weeks," said Hess. "The streamlined process enables us to develop more systems in an agile framework while also doing it securely. Program managers need to be able to have enough information about security-related risk to make a decision quickly about launching their IT system in support of the mission."

Security engineers and developers who are working to add programs that will enable MoW supported the risk-based security solution.

The ability to move at mission speed is all about how you approach security according to Allison Roulier, an IT Services engineer.

"Using a streamlined approach to security risk management changes everything," said Roulier. "The best way to adopt the new process successfully is to jump in with both feet."

According to Hess, NGA's security personnel continue to improve how NGA applies ICD 503 requirements and manages risk as it adds more content to C2S.

"The team has held a number of cloud security summits to collaborate with IC partners — including the CIA, DIA, NRO, NSA and FBI — to ensure a community approach to securing all systems that will be used in the IC IT environment," Hess said. ✨

As the first to release capabilities into the C2S, NGA leaders knew they needed to formulate a strategy for securing content and mitigating risk in this environment that could be used by the entire IC. Fortunately, NGA security professionals had an early concept to build upon, one that was used to secure and test one of IC ITE's first services, the Desktop Environment, or DTE.

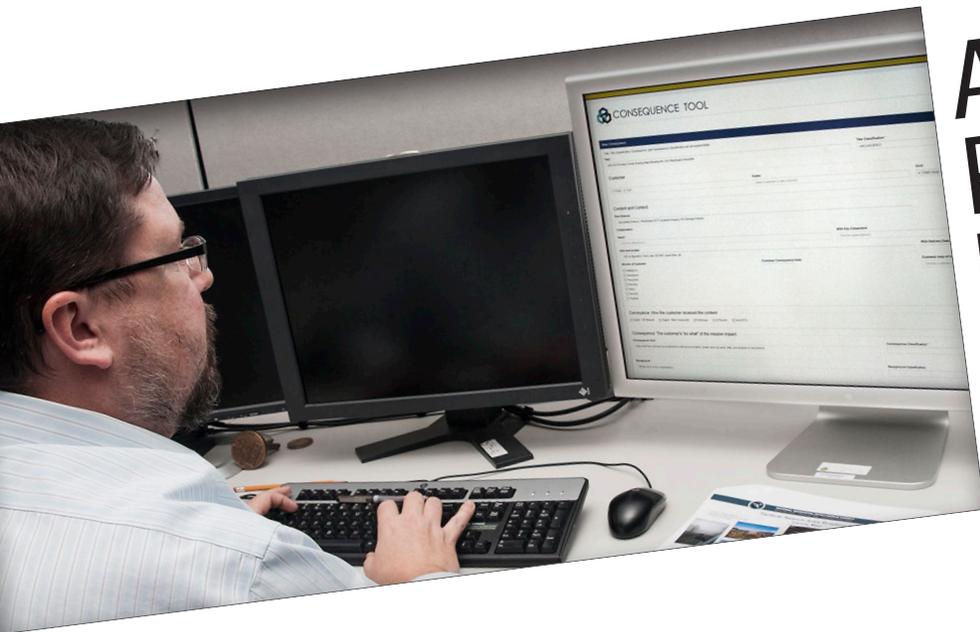
RISK MANAGEMENT FRAMEWORK

The RMF is a flexible, lifecycle-based process for managing cybersecurity risk in highly dynamic environments. It emphasizes the need to protect missions, not just information assets, by encouraging decision makers to consider the economic and operational costs of protective measures weighted against requirements for meeting the mission.

The Lens of Consequence

A NEW
PERSPECTIVE
FOR MISSION
SUCCESS

By Sara Barker, Xperience Communications



Nothing less than a cultural change is underway at the National Geospatial-Intelligence Agency.

The fundamental character that will define NGA under the leadership of Director Robert Cardillo is one with a laser sharp focus on customer consequences. Cardillo's intent is to make sure NGA delivers on its promise to provide world-class GEOINT. The truth of whether NGA is the premier GEOINT provider will play out in the results of this new focus on consequence.

To that end, Cardillo posted

a call to action to the workforce through the agency's internal communications. It was a challenge to think about all they do in terms of what their customers accomplish with their work, whether those customers are external or internal.

"Pursuing consequence together must be the ethos that defines who we are or who we must strive to become," Cardillo wrote. "I want to hear about consequences for our customers within 12 hours, and I don't want there to be more than one level of approval between the employee who

reports the consequence and me."

In response to this challenge, Navy Cmdr. Craig Lawless of NGA's Customer Engagement Initiative is leading an effort that on Feb. 2, unveiled a "consequence tool" to the workforce. While discussing the intent of the tool, Lawless said the agency lacks a single repository to contain customer consequences, even though there are multiple avenues for customers to provide feedback to NGA.

"This tool not only puts a report of a customer consequence on the fast lane to the director, it provides



an opportunity for the workforce to reflect on how their work affects their customers,” Lawless said. “And it’s not just a tool; it’s a process that intends to shift the culture consciousness at NGA.”

That process begins with any member of the agency workforce who notices a consequence that an internal or external customer has realized through the receipt of an NGA product or service. He or she opens up the “consequence tool” from the internal NGA homepage and enters the customer’s consequence,

including details such as its content, context, conveyance, and any collaborators. Once the “submit” button is clicked, the entry goes through only one validator before it arrives at the NGA director’s desk.

Lawless points out that the validation step is essential to the spirit of the process because it can spark a dialogue. For example, the validator may return to the author to discuss whether their submission truly qualifies as a consequence or to encourage them to reach out to the customer for more details regarding their consequence.

“That is the kind of conversation that needs to occur more often to better focus us on what we are doing that really makes a difference for our customers,” said Lawless.

According to Cardillo, the consequence process “will get us in the habit of looking at our work through the lens of customer consequence ... by encouraging dialogue with our customers, it will help NGA be more effective in our response and more anticipatory in our approach. It will also help reveal where we can do better.”✦

CUSTOMER CONSEQUENCE

By Sara Barker, Xperience Communications

What exactly is a “customer consequence” and what does it look like?

According to Robert Cardillo, director, National Geospatial-Intelligence Agency, it is what the customer accomplishes with NGA’s work when data and analysis are so persuasive it can be applied to the customer’s mission at their decision point.

For examples of customer consequence, read on to learn how FEMA’s Urban Search and Rescue Task Force used NGA-created trajectory maps to locate the remains of victims following the 2014 Snohomish mudslides and how satellite images from NGA enabled the U.S. Marines to determine the best location for an urgently needed water purification system after Typhoon Haiyan in 2013.

SNOHOMISH COUNTY MUDSLIDES

When the March 22, 2014, mudslide occurred in Snohomish County, Washington, FEMA’s Incident Support Team knew they needed NGA expertise, specifically NGA’s Integrated Work Group – Readiness, Response and Recovery, or IWG-R3, team. According to IWG-R3 team member Todd Hildreth, the first day they arrived, he and teammate Aaron Davis worked 20 hours straight.

“We got there and had our work cut out for us,” said Hildreth. “First, we had to find the data on the Washington state GIS [geographic information system]. Then we determined what the customer needed and finally, we prepared those products for the next day.”

Among the products the NGA IWG-R3 provided FEMA each day was a trajectory map — in both geo-coded electronic and physical versions — of where the remains of the victims were found in relation to their last known location.

According to Hildreth, the product

helped increase the thoroughness of the searching and tracking efforts.

“We were able to provide sanitized versions of the maps to liaisons to pass on to the victims’ families,” said Hildreth.

Davis acknowledged that creating the maps was a part of the job that was especially meaningful since it allowed the families to have some closure.

“A nice thing about these types of engagements is that the customers are right in front of you, asking their questions, providing feedback,” Davis said.

While representing NGA, Davis and Hildreth were the unexpected benefactors of customer consequence. FEMA’s IST and Urban Search and Rescue teams told them directly how much they helped and the public showed their appreciation by dropping off baked goods daily.

“We feel lucky to have been able to help,” Davis said.

ASSISTANCE DURING TYPHOON HAIYAN

On Nov. 7, 2013, a few months before the Snohomish County disaster, Typhoon Haiyan, the strongest tropical cyclone ever recorded at landfall, hit the Philippines, eventually killing more than 6,300 people and leaving nearly 8 million homeless or displaced. The Philippines asked the United States for help.

When Marine Lt. Col. John Bilas landed at Villamor Air Base in Manila, a wrecked country greeted him, torn apart by Typhoon Haiyan.

“I saw thousands of displaced persons,” he said. “Haiyan ravaged the country and left a massive level of destruction and suffering in its wake.”

Stationed with the 3rd Marine Expeditionary Force at Okinawa, Japan, Bilas, served as an intelligence officer with the Joint Task Force 505 and deployed as part of Operation Damayan, a multinational



Photo by Aaron Davis

effort formed in direct response to the Filipino government’s request for assistance, he said. Bilas in his role with the III MEF supported evacuations and delivery of aid and relief supplies by providing unclassified imagery-derived products to multinational partners and situational awareness to the JTF 505 commander.

“The commercial and [national technical means] imagery provided by NGA was an integral part of this support,” Bilas said.

According to Bilas, it was simple to initiate the support, requiring only a brief email exchange with the U.S. Pacific Command NGA Support Team.

“The PACOM NST then coordinated with the Marine NST and NGA’s Military Support Directorate,” said Bilas. “There were a few hiccups, but once reach-back connections and areas of interest were set, we fell into a battle rhythm, meeting at the same time every day with the same people – the PACOM J2, the NST and my collections manager.”

The JTF downloaded more than 300 full-frame satellite images from NGA and, from these, created original imagery-derived products, including helicopter-landing



zone, beach and route studies.

Bilas said these products were central to the humanitarian assistance and disaster relief that Operation Damayan provided. As an example, Bilas noted how the JTF used imagery-derived products in its planning and construction of a water purification system in one of the hardest hit areas near Tacloban City, a 45-minute helicopter ride south of Manila.

The products helped the staff discern that “getting to the ground would be fine, but roads were blocked, so air was better,” he said.

By the time Operation Damayan concluded Dec. 1, 2013, NGA GEOINT products had supported the transportation of more than 1,300 aid flights to about 450 sites, and helped evacuate more than 21,000 people.

While he considers the operation ultimately successful, Bilas said it was threatened at times by technical challenges.

“Bandwidth still cripples us,” he said. “We had to use NGA’s unclassified network to download the [large data files] due to high-traffic volume delays on the classified network. Doing this risked overwhelming the [unclassified] bandwidth.”

According to Bilas, the root of this problem was a systems issue.

“We need more from NGA on the [unclassified] domain because, by and large, we do not have JWICS access,” he said. “We need to improve our bandwidth. I know Marines who could not download maps, so they went to Google Earth.”

Bilas explained that if customers have bandwidth or network-access constraints, NGA’s advancements in GEOINT are of little use.

“I’ve seen analysts at NGA do great things on JWICS, but where does this go?” Bilas said. “Marines in the operating forces don’t have the access like analysts in DC. Sometimes it’s not as available as we would like. It’s just the nature of how the systems are set up and how we operate in the tactical world. We need more from NGA.”

Bilas said that his experience as an NGA customer during Operation Damayan was positive but he highlighted opportunities for improvement in light of Cardillo’s stated commitment to customer consequence. Recently, the director affirmed that he planned to

focus all agency efforts “on providing our customers with the insights, understanding, foreknowledge and meaningful results that allow them to succeed in their mission.”

For Bilas, fighting bandwidth constraints on the unclassified domain and limited-access to JWICS meant that his NGA-enabled consequence was threatened by its conveyance, according to the director’s new terminology for success.

“These are the types of stories we should be capturing and acting on,” said Cardillo. “Our customers want us to pay attention so that we know what will enable consequences for them before they do. They don’t want to be surprised by anything.”

Cardillo has stated that he hopes he will get to learn of specific opportunities for improvement via the agency’s new consequence tool [see related story, *The Lens of Consequence*]. For an NGA customer like Bilas, this openness could get his accessibility issues in front of Cardillo in a faster and more direct way than ever before.

“I want us to make better use of our mistakes. They are our greatest learning opportunities,” Cardillo said. ✨

NGA DEPLOY
SERVICET
DESK JOCKEY
NEED NOT A

NGA
TIE-DOWN

EMERGENCY TEAM, SUPPLY

By Kevin Clark, Office of Corporate Communications

7:53 p.m. Molly Hatcher's hit song "Flirting with Disaster" blares out of an iPhone as it vibrates on a glass coffee table in the living room of a townhouse outside the Capital Beltway in suburban Northern Virginia. A 34-year-old, medium-built, tattooed Air Force veteran sighs as he pauses the new "Call of Duty" game on his Xbox and leans over to verify the caller.

"Rggghhh, hello?" he grunts into the phone, tired from a long day at work. On the other end of the line is his supervisor.

"Hey brother," the supervisor mumbles.

"We got a situation. I need you here in an hour."

"What's going on?" he asks the supervisor.

"Can't talk about it over the phone, just get here!"

Forty-five minutes and two cups of coffee later, the man pulls up to a warehouse and slams the shifter of his silver Toyota Tacoma into the park position. Now overly caffeinated and eager to find out what the emergency is, he unlocks the door of the warehouse and pushes it open to find 12 of his coworkers scurrying around, aimlessly looking for three missing connectors they need to do an op-test on a new satellite dish.

He turns and sees his supervisor standing there, his eyes fluttering with anxiety.

"Seriously," the man says to his supervisor. "You called me all the way out here to help you find some connectors? This couldn't have waited until morning? Those aren't even the right connectors for that dish anyway!"

"That's exactly why I called you in here, genius," the supervisor yells. "Now find whatever it is you need to get this dish connected! You gotta have it out the door and on the flight line by zero-eight-hundred tomorrow!"

"Tomorrow?" the man said. "Where's it going and who's taking it?"

"If I was a betting man, I'd say that would be you," the supervisor laughed. "We've got a situation going on right now overseas that requires some custom equipment and experienced analytics. A few gentlemen from the Pentagon will be briefing you in a couple of hours. Have your stuff ready to go and have a safe trip!"

MEANWHILE BACK AT THE SHOP...

Whether embedded overseas supporting elite special operations units or in the United States assisting disaster relief efforts, NGA's Expeditionary Operations Office, known as MSD, delivers mission-critical GEOINT capabilities for on-the-spot analysis anywhere in the world, sometimes within hours' notice, according to Hector Montalvo, the logistics branch chief for MSD. Fittingly, the unit's motto is "GEOINT anywhere, anytime."



“Everybody on the team either deploys or has deployed in support of NGA operations,” said Montalvo. “Sometimes it’s necessary to have an analyst there on the spot to help ease decision makers’ uncertainty during times of crisis or on time-sensitive operations. Looking at a brief with some imagery sometimes isn’t enough to answer all the questions and keeping a steady flow of information is essential. That’s where we come in,” he said.

Curtiss L. Miller is a systems technician with the group.

“We have about 13 techs and they are a highly talented group with a lot of responsibility,” said Miller. “You have to really be a jack-of-all-trades to get the job done. It’s one thing to have a great workstation and unlimited resources, but in the expeditionary environment, everything has limits. With limited bandwidth and limited equipment, you still have to make things work.”

Most of the group served in the military before coming to NGA’s deployed services and have extensive backgrounds in information systems, networks, satellite communications and logistics. As NGA employees, they start their training at a warehouse facility located up winding rural roads through dense forests outside the Washington, D.C. area in the mountains of Northern Virginia. There, surrounded by farms and the faint sound of the occasional passing car, technicians have the space and peace of mind to test new equipment, engineer new capabilities and train for their next deployment. Similar training and operational support is conducted at another facility in the St. Louis metro area, as well as two major deployment support locations overseas.

“Most of the technical training is in-house,” said Jason N. Cagle, another technician and the warehouse manager at the facility. “I came to NGA when I got out of the Air Force as an imagery analyst, then

I cross-trained as a geospatial analyst and then into a position as a systems engineer. I’ve done a dozen deployments overseas in support of OIF and OEF [Operation Iraqi Freedom and Operation Enduring Freedom], and now I’m the warehouse manager here. It’s my job to take care of the facility. I love it. My job has kind of evolved with the mission,” he said.

Miller was a former operations specialist in the Navy

“When I got out, I started in NGA’s deployed services as a contractor before being hired on as a government employee. I like it here because we are completely self-sufficient,” said Miller. “I can do everything from setting up the tents to driving the trucks to changing the oil on generators.”

The readiness process for deployment usually takes about six months and varies from person to person, said Cagle.

“Everybody comes from different environments and everybody has a strong suit,” Cagle said. “But when they come here, they need to be familiar with everything because if the equipment goes down, they are the only ones there to fix it.”

The process consists of learning everything from information system operations and maintenance, geospatial applications and data types, all the way to generator maintenance and small-arms training.

“We went through some ‘crash and bang’ courses,” said Joseph A. Valenti, another technician and Air Force veteran. “They taught us everything from evasive driving techniques to weapons handling. There was even a course in hand-to-hand combat where we were had to demonstrate how to get up off the ground in an altercation.”

Valenti said the group didn’t always carry weapons on deployment, but started implementing weapons training when the Afghanistan war kicked off after the terrorist attacks on Sept. 11.

“Me and Cagle were with the second team

of analysts to pull into Afghanistan after 9/11,” Valenti said. “Back then, it was like the Wild West where we were at. The security perimeter of the base we were on consisted of concertina wire and some little cones. People were getting shot all the time and we were always taking a lot of fire from mortars and RPGs [rocket-propelled grenades].”

Cagle said, “When we got there, some bulldozers had just come in and made some six-foot dirt berms and threw some wire on it. That was really all the security there was at the time.”

Since then, the deployed services team has trained on the use of 9mm pistols and M4 carbine rifles, Cagle said.

“Where we carry and what we carry depends on the environment,” said Miller. “If we are on a big base like Bagram, we might only carry a side arm,” he said, referring to the largest U.S. base in Afghanistan. “But if we are going out to some of the [smaller bases] where there is less security, we carry the long guns.”

NOT FOR THE FAINT-HEARTED

Training is important in any workplace, but when your job description may include being fired upon, it is life or death.

“It can get pretty harry out there and the training is really important,” Miller said. “I’ve been shot at more times since I joined the deployed services than I ever did in the military. I spent 90 percent of my time in the Navy on a ship, so that kind of stuff wasn’t really anything to worry about,” he said. “Now, I’ve been on Black Hawks where we have had to make quick drops in altitude so the crew could engage enemy forces because we were taking fire.”

Cagle said with the inherently dangerous responsibility the group takes on and the limited resources available to them in the combat zone, field medical courses are also provided as part of the training.

“Every deployer on our team goes through basic combat first aid that way

they know how to apply a tourniquet and all that stuff,” Cagle said.

Uncertainty is an inherent factor for members of the Deployed Services Team.

“You never really know what’s going to happen,” said Miller. “You never know when one of those one-in-a-million rounds is going to come into your hooch. We took some heavy fire from some large mortar rounds inside the base I was at in Iraq back in ’06. The concussion blew me across my desk and cracked all the windows and blew out some of the tires of our white Chevy truck,” he said. “A lot of guys got hurt in that one.”

“It’s all part of the job, you know,” said Valenti. “I’m not a desk jockey by any means. I like to get out there and get my hands dirty.”

Once their training is completed and the technicians are deployable, they have a wide variety of mission sets to facilitate.

“I’ve done about a dozen overseas deployments since ’02 and at least 30 in the U.S. supporting everything from Super Bowls to hurricane response,” Valenti said. “No two missions are the same.”

“Adaptability is the key,” said Valenti. “We are there primarily as technicians, but there have been plenty of times where I’ve jumped in to help out the analysts too,” he said. “It’s not like we get there and get set up and then say, ‘All right guys, we’re up and running, we’re going to bed now. Have fun.’ We are all one team and we are staying until the mission is done. Actually being there and having that direct relationship with soldiers and airmen who are using the imagery is irreplaceable. You can’t put a value on having someone there on the spot to keep things going.”

Besides supporting NGA’s missions overseas, the MSD also provides NGA assets for disaster relief efforts in the U.S., using resources such as deployable laptops with satellite communications all the way up to the vehicle-based Domestic Mobile Integrated Geospatial Intelligence System (DMIGS) and the Mobile Integrated Geospatial System (MIGS). The

DMIGS was built on a commercial fire truck chassis and engineered by analysts and technicians. It has served as a roving NGA operations center since 2006, containing everything analysts need to deliver critical GEOINT to relief efforts and authorities to help clear roadways and work out emergency routes during natural disasters and special events. The MIGS provides similar capabilities, but is built on a military Humvee platform.

“I’m not a desk jockey by any means. I like to get out there and get my hands dirty.”

– *Joseph Valenti*

“We all have to get our commercial driver’s license to drive the DMIGS,” said Miller. “It’s totally worth the training though. It’s really been a great asset for us. I’ve helped support every hurricane or disaster since 2006 and all we ever need to do our job is fuel and we’re ready to roll.”

In addition to IT and communications equipment, MSD maintains equipment to deploy and sustain analytical and support personnel in austere environments. This includes everything needed to perform their jobs home or abroad, from tents and sleeping bags to weapons and body armor and ready-to-eat meals. The unpredictable nature of the job keeps them on their toes and requires a constant state of readiness for unexpected requirements.

Valenti said, “You never really know what’s coming next. It’s always something new whether you’re in the states or overseas; you’ve got to kind of just roll with what’s going on.”

Miller said he loves his job, but it’s not for everybody.

“I’ve had guys come up to me after our base got attacked and tell me that

they didn’t sign up for this,” Miller said. “The next thing you know, they are on a plane going back home. It’s okay though. I always tell them there are plenty of important things to do back there too.”

Cagle said he likes the job because you don’t do the same thing every day.

“You never know what you’re getting into when you come to work. If you’re watching the news on the weekend and something significant happens, you can get a pretty good feel for what’s coming your way on Monday morning; that is, if they don’t call you in before then,” Cagle said. “The next thing you know, they tell you to go home and get a bag and you’re driving to Fort Bragg the next day to get on a C-17. You can never really be sure.”

MSD maintains relationships and persistent communications with the NGA Support Teams worldwide and other customers for humanitarian and disaster relief support as well as military operations to anticipate requirements. MSD’s constant state of readiness ensures equipment and personnel are prepared as much as possible for deployments prior to an actual event occurring.

The sound of a ringing phone erupts from the corner of a workstation surrounded by a half-full, warm can of Diet Coke, the latest issue of Men’s Health and an old SuperCircuits catalog. A door opens in the back of the room, exposing a meeting room full of technicians and several large video-conferencing screens.

“It’s your turn,” one of the techs says to a new guy, laughing with anticipation.

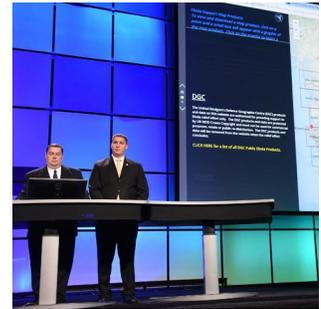
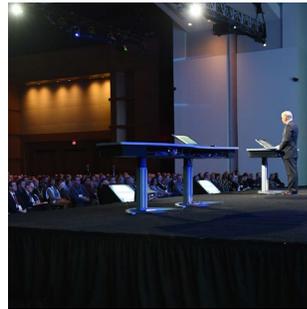
The lone, new technician, still wet behind the ears from training, paces slowly over to the phone and hesitantly reaches his hand to the receiver.

“Military Support,” he squeaks, barely getting the words out as he recalls all the deployment stories his coworkers have told him over the past six months.

On the other end of the line, there is silence followed by a baritone voice.

“It’s time. Are you ready to roll out?” ✨

THE POWER OF TRANSPARENCY



“Partnerships – government, industry, academic and non-governmental – can unleash the power of transparent geospatial information and have enormous positive consequences on serious international crises.”

By Paul Frommelt, Office of Corporate Communications

NGA Director Robert Cardillo spoke about the power of transparency during his remarks at the 2015 Esri Federal GIS Conference at the Washington Convention Center Feb. 10.

In front of an audience of more than 2,000 representing federal departments and agencies, state and local governments, industry, and academia, Cardillo used NGA's support to the fight against the Ebola epidemic to demonstrate the agency's drive toward transparency.

"Since October, NGA has been playing a vital behind-the-scenes role in [the Ebola] crisis in West Africa," Cardillo said. "In this case, our objective is to support medical deployers, helping them save lives by creating a completely open World Wide Web site and posting as much of our data as we can. No passwords – no closed groups."

Cardillo was joined on stage by NGA's Rich Benjamin and Chris Riopelle to give the audience a live demo of NGA's unclassified site.

"This is not a slideshow, we are directly accessing the website," Cardillo said, before inviting members of the audience members to follow along on their own tablet or laptop.

According to Cardillo, at the end of the first week of February, NGA had posted 495 data layers, 202 products – which includes 111 maps of Sierra Leone from the United Kingdom – 68 apps, and 100 percent of the agency's unrestricted elevation data. The unclassified site has seen more than one million views since the end of October 2014.

"We have conveyed the content and context in a way that is unprecedented for NGA," said Cardillo.

During the 30-minute speech, Cardillo also spoke about the proliferation of connected handheld devices, the small satellite revolution, NGA's partnership with Penn State University, the agency's release of mobile applications via iTunes and Google Play, and crowd-sourcing application development via GitHub.

View the full speech, visit:
<http://video.esri.com/watch/4146/keynote-director-robert-cardillo>

Coming next issue — The power of transparency challenges the status quo.

KNOW THE EARTH

ANSWER: The answer to our back cover question is "The Burma Road." Finished in 1938, this rugged 717 mile, overland route provided the final challenging segment of the supply route from Rangoon to Chiang Kai-shek's forces in China. The Japanese overran Burma in 1942, but under British command, British, Chinese, and American forces wrested Burma from Japan in 1944 and the supplies began to flow once again, arriving regularly by January 1945. Look for more on the Burma Road in the next issue.

KNOW THE EARTH

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

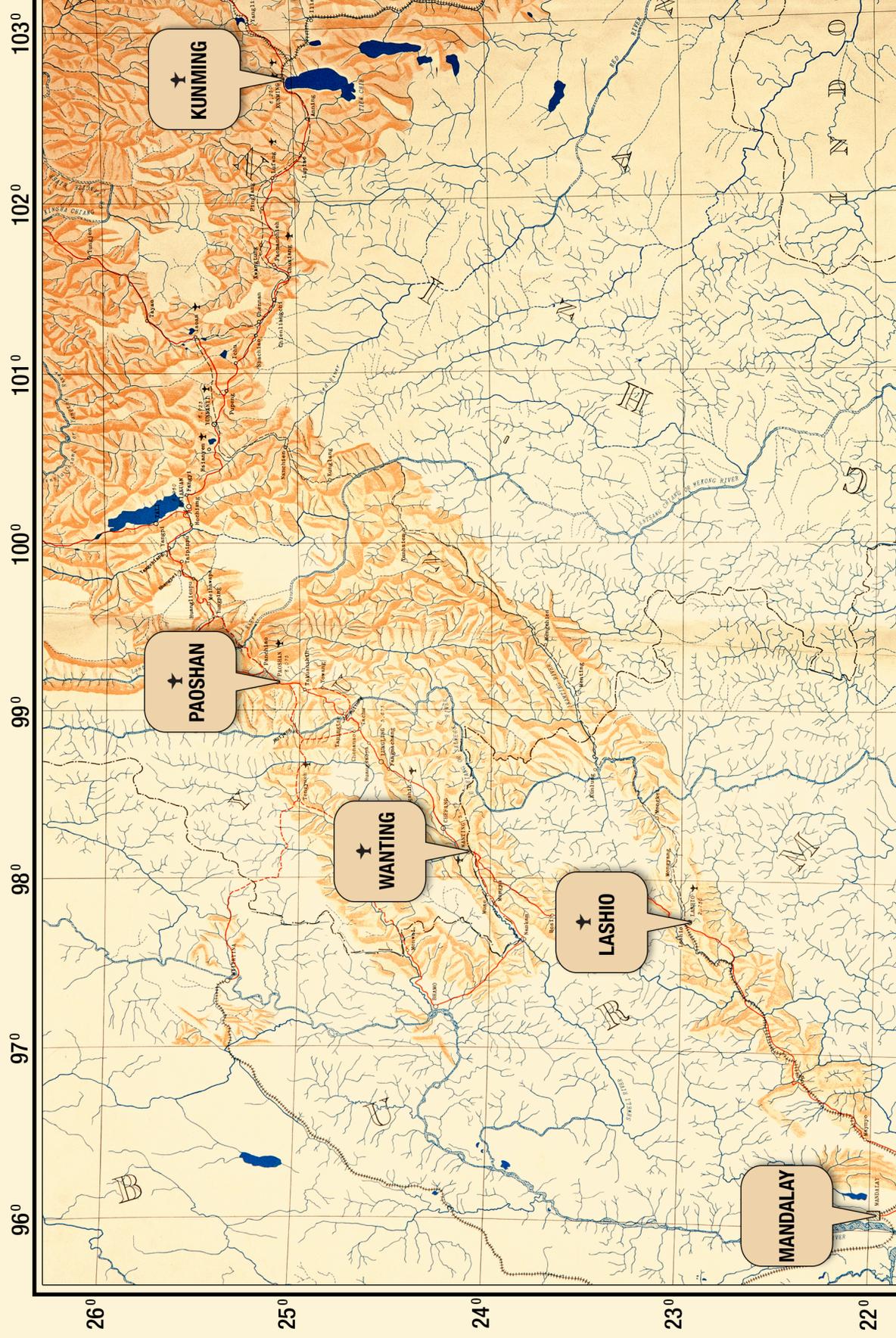
HOW WELL DO YOU KNOW THE EARTH?

Supplies would come by rail from Rangoon via Mandalay to Lashio where it would begin.

It played an essential role in the Far East effort to support China against the Japanese from 1938 through 1942.

WHAT WAS IT?

Answer: pg. 31



LEGEND

- ALL WATER MOTOR ROAD
- OTHER ROADS
- RAILROADS
- PROJECTED RAILROADS
- BRIDGE (PRINCIPAL)
- AIRPLANE LANDING FIELD
- CITIES
- RIVERS AND STREAMS
- RIVERS AND STREAMS (EXACT COURSE UNKNOWN)