Statement for the Record

before the

Senate Select Committee on Intelligence

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27 September 2016

Approved for public release under case number 16-646

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Chairman Burr, Vice Chairwoman Feinstein, and distinguished members of the Committee, on behalf of the women and men of the National Geospatial-Intelligence Agency (NGA) and the National System for Geospatial-Intelligence (NSG), I am pleased to testify before you today. NGA and our geospatial-intelligence (GEOINT) partners help decision makers, military commanders, and first responders understand what's happening at any given place and time, and anticipate what may happen next. I believe our motto says it all, "Know the earth, show the way, and understand the world." Individually and collectively, I can attest that we are fully committed to our Intelligence Community (IC) and Department of Defense (DOD) responsibilities and broader obligation to the nation's security.

NGA and our GEOINT partners across the national security community are critical to the IC's commitment to minimize surprise and enable decision advantage. We are routinely able to respond more dynamically than other traditional intelligence disciplines, as we have worldwide reach, increasingly persistent collection and systematic analytic access. With the explosion in publicly available information and non-traditional sources, the IC no longer has a monopoly on access or insight, but the IC is routinely asked to corroborate what is being reported and to put it into the context of what we know about the evolving issue, to include the motives of the participants and the potential threats to our interests. Another of the ways GEOINT is able to contribute to favorable outcomes is by providing a less sensitive source from which to expose our knowledge and perspective on a situation or threat. Put another way, our customers look to NGA and our profession to create coherence out of chaos. Imagery or other geospatial sources can be a vehicle for sanitizing or articulating the U.S. perspective to partners, the public, international fora, and even adversaries. Let me outline some examples of national security issues, where GEOINT contributes to both our understanding and to our ability to engage and represent our national interests.

NGA and our NSG partners, including the combatant commands and the service agencies, are integral players in operations to degrade and disrupt the ability of terrorist organizations. Every day, our analysts support our government's antiterrorism activities around the world.

The contested regions of Iraq and Syria are host to a web of competing interests, conflicting parties, and complex alliances. GEOINT contributes to our understanding of the actions which players undertake – such as advances of state-actors into neighboring states, the provision of lethal aid and assistance to favored factions, and the underlying terrain, human geography and physical and economic infrastructure. By continuously monitoring these targets, we provide warning, detect and describe operations, and enable policymakers and operators to pursue responses which serve our interests and minimize our exposure to threats. This includes monitoring Syria & ISIL's response to actions by traditional state actors, such as Russia, Iran, and Turkey, as well as non-state actors, such as Hezbollah, Shiite militias, and Kurdish militias.

In recent weeks, NGA has used classified and unclassified GEOINT sources to ensure all parties in Syria adhere to the cessation of hostilities agreement brokered by the United States and Russia. We also initiated and manage a contractor-provided open source program to monitor the cease fire without any classified intelligence input from the Intelligence Community. This gives the United States a program that allows us to share proof of violations with any nation or non-state actor with equities in the process. The program also serves as a testbed for future cease fire monitoring around the world, with a goal towards placing fewer peacekeepers' lives at risk.

In a similar manner, since 2014, GEOINT has contributed to our understanding and responses to Russia's occupation and attempted annexation of Crimea and aggression in eastern Ukraine. We have aggressively applied myriad sources and analytic strategies to track traditional military operations, the flow of supplies and irregular forces, and the ethnic, economic and geographic backdrop to document the flow of the conflict and to characterize the environment and the forces at play. We routinely use open and unclassified sources, such as commercial imagery and crowd-sourced geospatial information to convey appropriately sanitized versions of this knowledge to enable public diplomacy to shape international responses and further US policy and operational strategies.

The administration's Rebalance to Asia and the Pacific included NGA's attention on the South China Sea. NGA is uniquely positioned to help the U.S. Government and

our allies understand developments in the South China Sea because of the interaction between physical and human geographies. By drawing on NGA's various geospatial capabilities as well as years of expertise in the region, we provide a deeper understanding of the dynamics in the region while also supporting Department of Defense civilian and military leaders' requirements to gain and maintain situational awareness of critical developments.

NGA also continues to devote considerable collection, analytic and technical resources to monitoring North Korea's missile and nuclear weapons programs, which continue to undermine regional stability and pose a growing threat to US forces, allies, interests and territories. North Korea conducted an unprecedented number of land and sea-based missile test events this year and a fifth nuclear test earlier this month that have been designed to mature and publicly illustrate development of regional and strategic capabilities. We work closely with allies around the world to share understanding, leverage the insight and sources of all partners and enable collective response to the threat posed by North Korea.

NGA provided intelligence that informed U.S. policymakers during negotiations with the Iranians on the Joint Comprehensive Plan of Action. NGA continues to collaborate with other IC partners to document Tehran's compliance with its initial nuclear obligations. We remain actively engaged in monitoring Iranian compliance.

Throughout the decade, the agency's GEOINT helped reveal the size, scope, and impact of civil wars and regional conflicts, such as in Sudan, and we provide critical support to multiple customers, including policymakers and operators in the field. NGA products demonstrate how destruction in Sudan directly led to hundreds of thousands of deaths, and helped U.S. Government relief organizations better understand how to respond to the humanitarian disaster created by the conflict.

NGA is also proud to have deployed over 3,000 personnel to directly support defense and intelligence operations onsite at command centers, aboard ships and in field bases in support of global operations. Today, more than 100 of our teammates are deployed in or near war zones in Afghanistan, Iraq, Jordan, and the Horn of Africa.

We continue to apply GEOINT to civil missions such as disaster response and

humanitarian operations. When requested, NGA supports federal agencies including the Federal Bureau of Investigation, Federal Emergency Management Agency (FEMA), the U.S. Forest Service, and the Secret Service. Unclassified imagery and geospatial products have supported efforts in humanitarian assistance, disaster recovery, land reclamation and historic preservation, and domestic security special events. A few that I would like to highlight are

- U.S. Forest Service and FEMA for monitoring and management of California wildfires in 2015 and 2016;
- FEMA in response to flooding in South Carolina, Texas, and the Mississippi River in 2015 and 2016; and
- Secret Service and local law enforcement for the 2016 Democratic and Republican National Conventions in Philadelphia and Cleveland, respectively.

NGA also provides electro-optical commercial imagery in support of scientific and academic pursuits. In 2015, NGA developed an unclassified website to deliver NGA-produced, high-resolution digital elevation models, maps, nautical charts, and terrain data focused on the Arctic. Earlier this month, NGA and the National Science Foundation expanded that effort with the release of the first-ever, publicly available, high resolution, satellite-based map of Alaska. This 3-D map will provide data and context for decisions related to climate resilience, land management, sustainable development, safe recreation and scientific research, and was made possible through a public-private partnership that included universities and the White House Office of Science and Technology.

NGA's Maritime Safety office, which traces its lineage to 1869, collects and analyzes information and writes the Notice to Mariners that keep government, civilian, and international mariners informed of vital safety of navigation issues. NGA works openly with nearly every chart-producing nation as well as with the National Oceanographic and Atmospheric Administration's Office of Coast Survey, nine U.S. Coast Guard Districts, and the U.S. Army Corps of Engineers. We also support commercial vessels worldwide with navigation products and warning messages.

In addition to updating worldwide digital nautical charts that ensure Safety of

Navigation to a broad base of users, NGA has expanded beyond maritime to provide important Safety of Navigation information to the aeronautical community. Over the past few years, NGA increased its worldwide, industry-leading aeronautical safety library by 65%, to almost 20,000 flight procedures made available to DOD warfighters. Over the same time period, we also increased our Vertical Obstructions database from 4 million to more than 24 million features. Moreover, we converted from paper to downloadable digital maps, reducing the amount of gear pilots need to carry while helping ensure that they always have the latest information.

NGA is the primary organization responsible to develop, maintain, and enhance the World Geodetic System (WGS) 84 Reference Frame, the foundation for all DOD and IC Positioning, Navigation, and Timing (PNT), including the Global Positioning System (GPS). NGA operates 11 worldwide GPS monitoring stations that collect and use the GPS broadcast to ensure the fidelity of WGS 84, the accuracy of PNT, and the geospatial integrity of GEOINT. In addition, Air Force GPS Command and Control relies upon NGA GPS data for satellite situational awareness and signal integrity. NGA provides 60% of the data necessary to ensure the accuracy of the GPS constellation.

In addition, NGA establishes, maintains, and grows relationships with foreign partners. For over a decade, we've been working with a consortium of international partners called the Multi-National Geospatial Co-Production Program (MGCP) to share the production required to provide relevant mapping data across critical areas of the globe. The MGCP consortium has mapped over 25% of the earth's land surface, emphasizing those areas of high national importance. By partnering with allies, the US gains seven times more coverage than we could have done ourselves.

Meanwhile, our partnership with Germany's Bundeswehr Geoinformation Centre has brought together the TREx Alliance, consisting of more than 30 nations to create a the most comprehensive, pole-to-pole, global Digital Elevation Model from data collected by the German Aerospace Center. This effort will improve ground sample spacing from 30 meters to 12 meters, and in three years, more than a third of the Earth's surface, including the regions we are most concerned about, will be mapped at this higher resolution. Ultimately, this effort will provide higher resolution elevation data

for the entire globe.

Another critical international partnership has been our work with the United Kingdom to integrate their aeronautic safety of navigation content into our data holdings. This success has been replicated across our Five Eyes partners and we intend to expand to other international partners.

Enabling our customers' success compels us and drives us to search for new and better ways to meet our customers' GEOINT needs. Fortunately, advances in automated processing, the GEOINT tradecraft, human-machine collaboration, and the ability to anticipate behaviors has opened up the possibility of a paradigm shift in how we operate. This is a game-changer, and to capitalize on this revolution, NGA must succeed in and with the open.

To be clear, National Technical Means provided by the National Reconnaissance Office (NRO) provide exquisite and peerless capabilities to meet our hardest challenges, but for NGA to provide the best value possible to our customers, we must be able and open to leverage all types of geospatially-enabled content as a component of daily operations.

That's why, over the past decade, NGA partnered with the commercial imagery industry to dramatically improve delivery of commercial GEOINT, not just to NGA, but to the entire NSG. Today, the centerpiece of NGA's commercial imagery program, EnhancedView (EV), provides the majority of commercial imagery for the NSG. With its diverse phenomenology and rapid delivery timelines, EV supports everything from map-making, to disaster relief, to intelligence requirements. In fact, it supports over 90% of our foundation mapping efforts. Its unclassified nature makes commercial imagery a mainstay for U.S. and Allied customers in virtually every mission worldwide, from peace-keeping to combat support to disaster relief.

Succeeding in and with the open also means looking not just at new sources, but also at new forms of data. Most recently, NGA has been using publicly available information such as social media data, together with geospatial information to anticipate hostile actions to U.S. or Allied interests and provide a fully integrated intelligence picture.

In short, we must go wherever the data exist, and apply data wherever the mission demands. While NGA has made great strides in successfully leveraging commercial imagery and other open sources to achieve our mission, NGA's architecture, tradecraft and training, standards, governance, and culture remain optimized for classified GEOINT content. To truly succeed in the open, NGA must lead the IC in overcoming our historic reluctance to allow analysts to engage externally and embrace the ever-expanding private marketplace. Open content will be embraced with the same fervor as classified content, and in many cases, we will use open content first and augment with classified sources to reject, confirm, or increase confidence in analytic judgments.

This new open content paradigm will open the floodgates of information opportunities for us. Instead of just imaging a small percentage of the Earth each day, we will sense all of it every day. To manage that tidal wave of national, commercial, and open sources data, NGA has embraced Activity Based Intelligence (ABI) which will shift our focus from trying to extract insight from a volume of collection – report out what we see and hope it's useful to someone – to looking at the key information needs and priority threats and focusing on what sources and what analytics will detect the activity we need to care about. In other words, we will use big data analytics and methodologies to find adversarial threats inside the noise and volume of disparate data streams.

Key to ABI is NGA's transition to an Object Based Production (OBP) environment. Earlier this year, we started that transition by extracting the important information from the frame of an image to produce intelligence that's more clear, more relevant, and more useful to everyone. Then, we condition, standardize, and migrate that OBP data into a Structured Observation Management (SOM) framework that makes sure that we're feeding ABI with the right kind of information to help analysts make the connections they need.

As the commercial GEOINT industry expands at a revolutionary pace, with new and unique commercial sensors, and as the GEOINT analytic tradecraft becomes more commercialized, NGA faces the challenge of assessing and procuring these

capabilities within current budgetary constraints and in an environment of dynamic mission needs and priorities. Looking to the future, NGA anticipates taking a multi-pronged approach, including purchasing analysis as a service to augment NGA analysis, and purchasing and co-developing alerting services and algorithms for automated object-change detection from commercial data streams which will enable analysts to leverage commercial sources they would not otherwise have time to individually exploit. That's why NGA has expanded outreach and coordination over the last year to the most mature of the "new space" providers such as Planet (formerly Planet Labs), Terra Bella, and BlackSky Global to assess mission utility and access to operational data and services.

Another enabler is our GEOINT Solutions Marketplace (GSM). In recent months, we've worked with the United States Geospatial Intelligence Foundation (USGIF) to integrate the functionality of their Industry Solutions Marketspace with our GSM. The combined result is GSM 2.0, where GEOINT users can submit problems they would like to solve and innovators can submit new ideas and tools to be considered, reviewed and improved upon by the whole of the GEOINT community. This is truly an open partnership, with USGIF running the new platform while NGA manages and adjudicates every submission that's intended for our agency.

The targeting community is benefiting from changes, too. Based on feedback from services and combatant commands, NGA developed new web-based, browser-enabled targeting tools with improved geospatial accuracy and access to streaming imagery. These tools provide greater exposure to community intelligence from multiple domains, reduce research time by consolidating existing information portals, and integrate multiple data sources not previously visible in a single platform. The end result is faster, more accurate targeting tools for our warfighters.

Reforming and improving NGA's acquisition systems are critical to our mission success. Led by NGA's Deputy Director and NGA's Component Acquisition Executive, we are driving changes across agency acquisitions to more effectively meet mission needs. The changes to acquisition policy introduced by Congress in the FY 2016 National Defense Authorization Act (NDAA) coincided with internal NGA reviews to

reduce timelines and eliminate redundancies. NGA's Acquisition Strategy was released in August 2016 and focuses on the rapid evolution of NGA's acquisition systems and processes. NGA is now better positioned to engage with traditional and non-traditional vendors and enhance opportunities for industry interaction and improve procurement transparency. This is particularly important as we move to an IT architecture that allows all data, regardless of its producer, to be interoperable and flow in all directions.

Each day, we work to find ways to make GEOINT more accessible and relevant to time dominant operations, policy decisions, and ultimately, to help partners save lives. Our GEOINT Services initiative is the focal point for this mindset. This effort spans all security domains and, most importantly, it is open-ended. We are shattering the false boundary conditions that have always separated tasking, processing, exploitation and dissemination. GEOINT Services will allow us to find, get, use and contribute in a more fluid and open fashion. Working closely with the Open Geospatial Consortium, our partner for more than two decades, we are using standardized and interoperable strategies to better move valuable data across mission systems faster, sharing it across broader community of users. Our goal is to be "all in" the Cloud by the end of 2017, presenting value on all domains, including the World Wide Web.

One example was how we offered simplified access to our unclassified GEOINT holdings for relief workers in support of 14 different firefighting efforts across six states (Colorado, Utah, Wyoming, South Dakota, Arizona and California). NGA products helped firefighters prioritize resources and better respond to changing conditions. We also supported the Federal Emergency Management Agency (FEMA) with real time damage assessments in response to a number of flooding events this year, including along the Mississippi River in December and January; Houston, Texas in April; and West Virginia in June. NGA's geospatial data helped FEMA identify the hardest hit areas and reroute needed supplies around unnavigable obstructions. And, for cases when the data are not enough, we have embedded NGA analysis into a 24/7 fusion cell to support FEMA response efforts, whenever they have requested support.

We also realize the life-or-death implications to the warfighter of ensuring

common data standards and interoperability between DOD and IC systems. That is why we are working to meet the needs of tactical warfighters at the Joint Task Force level and below who need discovery and retrieval tools as well. The Defense Intelligence Information Enterprise serves as a bridge for combat support agencies between the DOD's Joint Information Enterprise and the Intelligence Community's IT Enterprise (IC ITE).

We're continuing to push GEOINT down to the most tactical levels. Our Shiprider program puts NGA mentors on U.S. Navy ships out in the fleet, to teach them new and innovative ways to access GEOINT while deployed. We have also armed these mentors and their military customers with new capabilities, such as streaming services, which allow, for the first time, access to exploit imagery in a timely enough manner to be used for time critical operations.

To make these sorts of changes happen, NGA developed an Open Content Strategy aligned to our GEOINT 2022 CONOPS and consistent with the National Open Source Committee strategic goals and ODNI strategic plans for IC ITE implementation. Our strategy lays out FY2018-22 goals and specific objectives designed to further NGA's evolution to operate in the open. I am pleased to report that we have already begun to make progress against the strategy in several key areas:

In response to the wave of emerging commercial imagery providers, NGA began engaging with the most mature of these "new space" providers to assess mission utility and possible access to operational data and services. We quickly realized that working with our mission partner, the NRO, would afford both agencies the best opportunity to take full advantage of new and emerging commercial GEOINT capabilities to satisfy mission needs. Together, we stood up the joint Commercial GEOINT Activity (CGA), whereby NGA and NRO are working more closely than ever before to identify and evaluate emerging commercial GEOINT data and services against customer requirements. CGA will serve as the focal point for engagement with our industry partners to understand and assess emerging commercial capabilities for technical feasibility and mission utility.

CGA will help shape the US commercial remote sensing policy regime to

embrace emerging commercial capabilities and the “new space” environment. Together, NGA and NRO will base all future investment and capability development decisions, both commercial and national, on matching user needs to the optimal mix of national and commercial space capabilities. CGA is the conduit that will enable NGA and NRO to fully leverage both national and commercial GEOINT as efficiently and effectively as possible to satisfy a broad spectrum of foundation and intelligence needs, increase resiliency, and improve customer support.

Succeeding in the open also requires an increase in the purchasing and adoption of commercial data, information, and analysis. The Commercial Initiative to Buy Operationally Responsive GEOINT (CIBORG) program, a collaboration between NGA and the General Services Administration (GSA), will use GSA schedules and other government-wide contracts to provide efficient, rapid access to emerging commercially-available supplies of imagery, data, analytical capabilities and services that support the NGA and NSG missions. The goal is to have CIBORG provide the means to procure commercial capabilities that are determined to have the quality and utility to support mission-driven requirements by early 2017.

NGA must also expand to include a robust unclassified production environment interoperable with our classified production environment. In another new initiative, NGA is exploring fulfillment of priority foundation GEOINT content requirements via commercial means by migrating the majority of foundation data production and management to a cloud-enabled IT infrastructure on an unclassified security domain. The unclassified cloud environment, Janus, will enable near-real time access to commercially-created and enriched content (including crowd- and community-sourced data) in a cost-effective manner that improves decision-making timelines.

Another key to operating in the open is ensuring that unclassified content from community, civil, and foreign partners can be readily integrated and disseminated through GEOINT services. The NSG Open Mapping Enclave (NOME) is an open source collaborative mapping environment designed to allow NGA and its partners to work together simultaneously to generate dynamic content in support of missions throughout the world. With semi-automated tools that enable users to quickly conflate

data to the base map and user friendly content management tools, NOME moves the community one step closer toward the concept that “every warfighter is a collector”. In this environment, users do not need to be geospatial experts to provide valuable content to the IC. Any soldier in Afghanistan can add a road they just patrolled to the living database, and populate that road with valuable information that will be immediately available to any users with access to the living map. Even with NOME still in a developmental environment, there are already over 1,000 accounts, including some with our international partners, already making contributions and getting hands-on training, giving us valuable feedback for future development needs.

This level of change integrates people, processes, and technology and drives us toward an integrated and interoperable GEOINT Enterprise. Integration and interoperability implies a change in mindset for NGA and our broader GEOINT Enterprise, the NSG, to adopt a community-first perspective and share stewardship of our Enterprise. I am strengthening my position as the GEOINT Functional Manager to set the vision and execute the changes necessary to bring about that change.

At the GEOINT Symposium in May, I called on the community to accelerate and focus attention in three priority areas: professionalization, interoperability, and unity of effort. These three priorities set the NSG’s course and expand its sphere of influence in an increasingly open and connected world. And we are moving out smartly on execution.

As the GEOINT Functional Manager, I am proud to have mandated that GEOINT personnel at NGA and the services need to be certified – this includes me. Since the program began in 2013, we have awarded more than 6,000 certifications, 20% of those to GEOINT practitioners in the military services. Recently, we received national accreditation for one of our analytic occupations which will enable NGA to systemically train, track, and evaluate analytic personnel against mission priorities. In the last year, we have also completed four new Proficiency Level 2 performance assessments that enable 97% of the Defense GEOINT workforce with opportunities to become certified. At the Symposium, I communicated criteria and timelines for DoD Components to certify their GEOINT-related workforce by 2019, and stood up a Certification Program

Management Office to coordinate the development of the certification assessments, manage certification testing, and maintain enterprise records.

At the same time, industry has been hard at work professionalizing their own workforce. For us to make the best use of the valuable work industry is doing, NGA and USGIF will begin recognizing functional equivalence between our respective professional certifications. This groundbreaking agreement will provide parity and equivalence across certification programs to create portable, transparent knowledge and standards to build a true profession.

To promote interoperability, NSG members and commercial partners are conducting analytical "sprints" to model performance and imagery quality of planned small satellite constellations. Additionally, to promote interoperability and use of SOM techniques, the National GEOINT Committee (GEOCOM) issued a guide to standardize full motion video (FMV) products training and operations encompassing maritime, aeronautical, and land-based scenarios. These standards provide the vocabulary, grammar, and inference rules to ensure that an FMV product is interpreted as the author intended and that end-users interpret the product in the same way.

Demonstrating unity of effort, I invested FY2016 funds to support partners' capability development through the GEOINT Enterprise Investment program. For example, U.S. Special Operations Command will increase the NSG's collective understanding of human geography in priority countries in the Middle East and North and Sub-Saharan Africa. At the same time, the U.S. Department of State's Secondary Cities project will generate data and story maps on the urban food-energy-water nexus in non-primary cities with populations of 100,000-1,000,000, to catalyze geospatial data creation and sharing through regional hubs. I'm also impressed by the partnership and leadership of the Army Geospatial Center on local terrain data, helping the GEOINT enterprise keep up with the rapid pace of urbanization.

I am also taking steps to include more partners in up-stream decision-making. I stood up the Future Needs Working Group, an NSG forum under the GEOCOM to capture and validate future geospatial needs in support of national security. This is a critical effort to ensure that we fully understand and incorporate mission needs to drive

development and acquisition of future capabilities.

Similar efforts are underway with our commonwealth partners, under the auspices of the Allied System for Geospatial-intelligence (ASG). In the past several months we aligned structures, functions and resources; re-imagined Five Eye GEOINT Concepts of Operations; identified efficiencies through mission-sharing and collaboration; produced a blueprint to tackle scientific and technological challenges and speed the transition and adoption of mature and operational capabilities; and shaped the way forward for developing compatible GEOINT analytic standards within a multi-INT construct.

These individual accomplishments are revolutionizing GEOINT and advance the objectives relayed in my NSG Strategy. As a community, we are adding granularity to the plans, programs, investments, and evaluation methods needed to execute the NSG Strategy. But we need to do more, and we need to do it faster.

Three words capture well how I envision NGA operating in the future: lead, broker, and differentiate.

I will lead by fully exercising my authorities as functional manager to leverage the contributions of all NSG members and ensure that the highest mission needs and priorities of the Enterprise drive our resource decisions. I will also exercise my authoritative voice on GEOINT sources and methods.

I am committing NGA to satisfy community members' mission needs by fully understanding and matching requirements to Enterprise capabilities. As a broker for GEOINT data, products and services, we will provide a seal of approval to validate format, accuracy and timely delivery of GEOINT. A seal of approval will increase partner confidence regardless of authorship or source. Each military service endpoint or platform contains the technical specification to which NGA will map products and services, insuring full interoperability.

I will also work across the NSG to identify those missions that each member can do best -- where NGA, as an agency, can and will continue to make a unique contribution to national defense and global security, and where other members of our

GEOINT Enterprise can play a greater or different role. Unity of effort and mission sharing underscore my Functional Management responsibility.

Our partners in the National and Allied Systems for Geospatial-intelligence are making similar explorations. I foresee NGA relying more on its partners to maximize impact to our expanding customer base. Along with this reliance comes the obligation to build the confidence that all members of our Enterprise adhere to appropriate standards and operate in a consistent way. As an Enterprise, we expect to partner differently, work differently, and leverage strengths in ways we have not done before.

Lead, broker, and differentiate compose an activist framework and mindset for community governance. Working together, we are accomplishing more than we have ever accomplished before.

No leader or functional manager can succeed, though, without a dedicated and motivated team behind him. Every day, I am impressed by the innovation and resourcefulness of the men and women who work at NGA and across the NSG. However, the explosion of new commercial geospatial services has created a commercial demand for personnel with the same sort of skills and experience, that I have the pleasure of leading at NGA. In order for NGA to continue to have the best and brightest talent available, NGA must continually relook at the way we hire and manage our workforce.

While there is still more work to do on this front, I am proud of the proactive steps NGA is taking to ensure we have a diverse and qualified applicant pool. NGA actively partners with academic and professional organizations, the Wounded Warrior Program, and persons with disabilities organizations. At the same time, NGA is working to increase the number of people we are hiring with the necessary talent for today and tomorrow to meet the full potential of our agency.

One challenge that the whole IC faces, is how to retain individuals who are waiting for their security clearances to be processed. To combat that, we are exploring new models for hiring. We on-boarded uncleared Aero and Maritime analysts who had completed initial security screenings and put them to work supporting the unclassified portions of the mission while their security clearance reviews were being finalized. We

provided a mission-focused, consequence-enabling space for all new employees to facilitate their on-the-job training and contributions as GEOINT new hires while we adjudicated their clearances. Working in this open environment, they are able to gain new insights and new understanding of how to work with, and in, the open.

We have also modernized how our people train and develop. Our On-Domain, On-Demand training system changes the focus from instructor-centric to learner-centric training, increasing our web-based learning results by almost 300% over the past year. We've even opened our course catalog to our Five Eyes partners, and extended invitations to British, Australian and New Zealand instructors to become adjuncts at our college. In the coming years, we will open up all of our courses to all of our partners.

The foundation of NGA's future is built on its unique ability to articulate its mission and measure and associate talent to those demands. We have designed and are implementing our Mission-Talent Alignment (MTA) initiative to bring a sharper, corporate focus to our mission priorities. MTA also brings unprecedented transparency of assignments to our officers and data analytics to understand trends in our workforce demographics relative to evolving GEOINT requirements. The successful application of the MTA construct brings mission managers and career services together under a common framework to ensure that the growth of our people specifically anticipates both the direction of our discipline and vice versa. This work will significantly enhance and drive our recruitment and attrition strategies.

Another key to enabling our ability to work with and in the open is to make sure that our NGA employees have the right kind of facility and the right kind of equipment to enable them to succeed in performing our GEOINT mission. The new campus in St. Louis, Missouri, will afford us the opportunity to create a place where we can grow our partnerships with industry and academia in a more open and flexible environment to enable our mission through the 21st century.

Our next steps for the program include award of a design contract for the campus and acquisition of the property in FY2017, and start of construction in FY2018. As I weighed my site decision in June, I focused on the best decision and value to support the NGA mission.

Maintaining our schedule, including required funding and project authorization, is critical to the campus development and completion. We continue to work closely with the Army Corps of Engineers and the city of St. Louis to monitor the progress being made to prepare the site for acquisition and follow-on construction.

We have a long road ahead and I remain convinced that we are making the right investment for our agency and the St. Louis community. Your support for the program has been substantial and, on behalf of the men and women of NGA, I extend my deepest thanks and appreciation.

With your support for the growth of our Functional Management responsibilities, our Mission-Talent Alignment and our N2W project, I am confident NGA will continue to be well positioned for whatever changes in the GEOINT enterprise may lay ahead. However, rather than wait for those changes to come, NGA is taking a proactive step to be part of that change.

Earlier this year, we restructured our research and development efforts, moving NGA to leverage all sources of innovation as we conduct our research. NGA Research is connecting with tech talent, ingenuity, and expertise from national labs, universities and businesses to identify fresh ideas, novel research techniques, and path-breaking scientific opportunities. We are then harnessing their abilities to tackle our hardest problems.

Our new focus is helping us attract some of the best and brightest talent out there. For example, earlier this year we brought on board the former director of the Intelligence Advanced Research Project Agency's (IARPA) Office of Incisive Analysis, who at one time held the position of Vice President at In-Q-tel. Another distinguished new researcher was the Advisor to the U.S. National Institute of Standards and Technology (NIST) on International Science and Standards.

Another way that we are tackling our hard problems is through the use of open, unclassified challenges on topics including agile acquisition, crowd sourcing code development, managing disparate data sets, and anticipatory analytics. In compliance with the White House Strategy on American Innovation and the Report of the National Commission for the Review of Research and Development Programs of the Intelligence

Community, NGA is not only benefiting from open challenges driven by industry and academia, but leading them with National Security at the forefront.

Following in the footsteps of the National Security Agency and IARPA, we posted our first challenge.gov submission running from June 6 to July 16. The challenge was spearheaded by our GEOINT Pathfinder initiative and offered a prize award of $10,000 for the development of new tools that would monitor and track changes in living documents. The prize winner was a computer software evaluator from Iowa, who surprised all of us with his unanticipated direction. The code is now integrated into an unclassified mobile NGA geospatial product prototype and greatly reduces the complexity in tracking changes to dynamic documents. Our involvement in challenge.gov was successful and a first of many small challenges focused on achieving short term, practical goals.

NGA is using another one of these challenges to foster innovation in the automation of imagery analytic tasks. One approach involves engaging and participating in SpaceNet, an open data initiative launched recently by In-Q-Tel's lab CosmiQ Works, DigitalGlobe and NVIDIA. SpaceNet brings to the overhead imagery arena the same collaborative approach that has enabled outstanding successes in the machine learning based analysis of photographs taken by ground-based cameras. NGA plans to participate in SpaceNet with data and with challenges. We will adapt what we learn from the unclassified advances and apply them our classified problem sets.

We are also looking to non-traditional partners for ideas about new capabilities to support the warfighter. One example is strengthening industry partnerships through our collaboration with In-Q-Tel. We've doubled our investment to improve our effectiveness in areas such as commercial space, visualization, and cybersecurity.

As NGA is looking for ways to shape how the geospatial enterprise innovates, there is no better way than by going to the geographic heart of American innovation, Silicon Valley. By November, we will have our first staff up and running at NGA Outpost Valley (NOV), which will leverage the capabilities and energy that define the Valley's open, vibrant, geospatial community. In fact, the NOV just completed its first sprint with

Hacking for Defense (H4D). By using H4D's lean methodology framework to address DoD and IC challenges, NOV is better prepared to asses and redefine GEOINT challenges and in turn shape and outfit the solutions. We currently have a team composed of NGA talent across our disciplines who have tackled a high level analytic problem statement, and in the course of six weeks, were able to scope and outline the problem for industry and academia (Stanford University, UC Berkeley) and others to explore technology solutions through a real world scenario challenge. Our hope is that the NOV will help us expand to other innovation centers, such as the Cortex Innovation Community in St. Louis – a growing, new hub of tech development. Ultimately, we will go wherever necessary, if it means we can create the service the world demands and our customers deserve.

We also recently held our first monthly NGA Disrupt event. NGA Disrupt is a forum for non-traditional partners to pitch product ideas in a "shark tank"-like environment. The results are promising – the companies that participated in the first event demonstrated a range of capabilities such as cybersecurity, 3D Visualization, Artificial Intelligence and Machine learning, and advanced search capabilities.

In closing, the agency I am privileged to lead will celebrate its 20th anniversary next week. In 1996, the National Imagery & Mapping Agency was established. Congress, with exceptionally strong support from this committee, was largely responsible for its creation. I sincerely and deeply thank this committee and all of Congress for their continued support.

While we may be the youngest agency in the IC, I can proudly, and confidently, report that the agency and the GEOINT discipline, are more relevant than at any point in our 20-year history. Our future is rich in opportunities, exceptionally bright, and we will build the needed tools to harness the opportunities that arise. We are committed to be the NGA that the mission demands and our nation deserves. In sum, GEOINT is on the rise.

And on that note, I'm pleased to answer any questions that you may have.