



NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY

Office of Corporate Communications

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**Remarks as prepared for
Robert Cardillo
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On this day, 73 years ago – June 5th, 1944 – General Eisenhower drafted two letters. Each was written in anticipation of the operation he would initiate the very next day – D-Day. Operation Overlord relied upon some of the most important maps, charts and imagery intelligence in history. Annotated defensive positions for targeting, terrain models for cliff-side assaults, and landing zones for gliders and paratroopers. With such intelligence insight, Eisenhower maximized his understanding of the adversary and minimized the adversary's understanding of his capabilities and intentions. Max your awareness, counter theirs, that's always been the equation.

Now, back to those letters. This is from the one he didn't use:

"My decision to attack, at this time and place, was based upon the best information available. "The troops did all that bravery and devotion to duty could do. "If any blame or fault attaches to the attempt, it is mine alone."

This reflection on D-Day, and the day before, D-Minus One, is a poignant reminder of who we are as intelligence professionals and as a combat support agency. We exist but for one reason, to advantage our decision-makers and the warfighters they deploy. And when the deployment transitions from defend to defeat, we must ensure that that fight is not fair, and that we have the advantage.

So this morning, I'd like to talk about the GEOINT revolution that we've sparked in our time and how I believe it will drive – and how it must drive – the next generation of intelligence. Our team is ready and our profession is poised to elevate our effect and our relevance. For Team GEOINT – this is our time.

We are standing where the SIGINT community stood when the internet became the digital fabric of the planet. And whether our new persistent view of the world comes from space, air, sea, or ground – in five years, there may be a million times more than the amount of geospatial data that we have today. Yes, a million times more.

So we're at our own version of D-Minus One in a world that has moved from data scarcity to data abundance, from hunting for that one perfect image to creating coherence from a flood of images and the services that follow.

We'll either sink, or we'll swim, or we'll ride the rising tide. I say we ride!



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So just how big is this rising tide? If we were to attempt to manually exploit the commercial satellite imagery we expect to have over the next 20 years, we would need eight million imagery analysts. Even now, every day in just one combat theater with a single sensor, we collect the data equivalent of three NFL seasons – every game. In high definition!

Imagine a coach trying to understand the strategy of his opponents by watching every play made by every team in every game for three seasons – all in one single day. Because three more seasons will be coming tomorrow. That's what we ask our analysts to do – when we don't augment them with automation. But with all this data – and dramatic improvements in computing power – we have a phenomenal opportunity to do and achieve even more.

We know more about our planet – and any given emerging threat – than at any time in history. And we'll be able to anticipate opportunities and threats as we provide true decision advantage over our adversaries. And it's important that we thrive in this new reality, because our adversaries are racing us there. So this is a competition we must win.

As we do so, we will steal space and time from those who seek to harm our security and provide it to those charged with protecting our freedoms. This data deluge is not something to be afraid of – the data itself isn't the threat. Managed smartly and efficiently, it's the solution – but it's going to require us to change.

First and foremost, we know we cannot deal with the wave of data on our own. We need partners. I am the Director of NGA and I am also the Functional Manager of the U.S. GEOINT community.

By the way, if you'd like to hear more about the particulars of our U.S. National System for GEOINT, the NSG, I'll be back up here tomorrow at 9:15 a.m., on a panel moderated by Keith Masback. And, you're always welcome to check out the NSG booth, where NGA is a proud member.

But our U.S. community also partners with the Allied System for GEOINT – as well as with other international partners – with academia and, of course, with industry. All of these partnerships truly go the distance – many of them literally circumnavigate the globe. And, each one of them matters. Because together, we can build a far more effective, unified, professional and interoperable GEOINT Enterprise, by implementing a set of shared principles:

- Create an environment that fosters trust and accountability,
- Use common definitions and a common framework to develop needs,
- And, partner strategically to advance the enterprise.



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So if we think “community first,” we’re far more likely to achieve success for ourselves and our mission partners. To better reflect a “Team GEOINT first” ideal, I made an important change last year by elevating the Director of the GEOINT Enterprise Office at NGA to also serve as my Associate Director for Functional Management. Dustin Gard-Weiss – appropriately on a Joint Duty Assignment from the Navy – wears those hats. I’ve given him the mission and the clout to act on GEOINT matters from a community-first perspective.

Why is operating as a community so important? Consider NGA’s longstanding partnership with the Oak Ridge National Laboratory in Tennessee. I’m proud to say that NGA invested in R&D at Oak Ridge about ten years ago. And it’s paid off.

With help from the Gates Foundation, Oak Ridge created a map of Nigeria based on satellite imagery and more than 2,000 on-the-ground neighborhood surveys. Through this partnership, they identified settlements that didn’t exist just a few years ago. So, when Nigeria distributes the measles vaccine next year, they’ll save a billion dollars and countless lives because they won’t use flawed, 10-year-old census data. And it’s all thanks to the unique combination of imagery, automation, human geography and mapping technologies – and most importantly – strong partnerships.

One great example of a multi-national partnership, borne out of Germany’s leadership, is the T-REX Alliance of nearly 30 nations – and growing. It’s created the most comprehensive pole-to-pole global Digital Elevation Model – or DEM – in history. Quite literally, this will redefine the ground.

Just three days ago, we released our Arctic DEM, in conjunction with the University of Minnesota’s Polar Geospatial Center, under the leadership of our colleague, Paul Moran. We all now have a much greater understanding of terrain in this last frontier.

As always, we’re close partners with NRO, and nine months ago Betty Sapp and I stood up the CGA to evaluate commercial GEOINT capabilities and services for the community. Please visit the Government Pavilion tomorrow at 3:15 p.m. to hear from CGA’s leadership, Mike Foster from NGA and Pete Muend from NRO, and see the unveiling of their “Leaderboard.”

As commercial capabilities and services become available, we intend to make it easier for our government partners to acquire GEOINT data and services through the CIBORG initiative. It’s about the rapid and easy acquisition of commercial imagery, data, analytic capabilities and services – and CIBORG is off to a great start. It enables organizations to access and purchase commoditized commercial data, products and services directly through GSA to satisfy their unique mission demands. GSA has added 10 vendor contracts to CIBORG with another 20 in the process of being added. And, so far in this fiscal year, NGA has committed \$40 million via CIBORG. This initiative supports our role to become the GEOINT broker of choice.

Along with other activities like JANUS, which will take our data partners into the realm of content services, CIBORG will provide a gateway for our GEOINT suppliers. The broker will match user needs to suppliers and convey the content and services to our customers. For more, I hope you can join Justin Poole, when he leads a panel in the Government Pavilion this afternoon at 1:30 p.m.



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To make it even easier to partner, we've developed NOME, which allows all our partners to crowd-source and create foundation data in areas with no existing coverage. Right now, there are more than 600 web users from 15 contributing member nations on our World Wide Web presence and more than a thousand users on our top secret domain. Later this summer, we'll expand NOME to our secret domain, so many more military users can access it.

Here's a recent example from the city of Yei, in South Sudan. In seven weeks, Team NOME added more than 700 kilometers of new roads and more than 70,000 new features. While you might be nervous that you're looking at one of the 600 editors, please be assured that all of my work is QC'd by real experts!

We're pressing ahead with outposts not only in Silicon Valley, but also in New York, St. Louis, Boston, right here in San Antonio, and Ybor City, near Tampa. Those teams are creating innovative solutions with non-traditional partners and networks.

I say again: We'll go wherever the talent exists and apply it wherever the mission demands. The bottom line is that partnerships benefit us all. Together, Lewis and Clark blazed trails for American trade routes and security. Wilbur and Orville created manned flight. Sergey and Larry's collaboration now allows us to find routine knowledge in seconds. And Ben and Jerry – well, they make summer just a little sweeter.

Partnerships are obviously a prime necessity for Team GEOINT to deal with the rising wave of data. But, we also need to develop innovative new tools and training. When we talk about the future and analytic modernization we often focus on discrete data and tools – Activity Based Intelligence, Structured Observation Management and Object-Based Production.

But, it's also about putting the right pieces in place to automate the workflow. It's about driving effective collection and analysis. Remember those analysts watching every frame of every game? Our goal is to automate 75% of their tasks, so they have more time to analyze that last play and more accurately anticipate the next one. So they can look much harder at our toughest problems – the 25% that require the most attention. So they know what to do on fourth down.

Fortunately, we're already seeing that potential. We've had several resounding successes over the last year – here's one of just many. Since I opened with Normandy, let's look at a new GEOINT Service we call Beachfront. Beachfront automates the creation of new coastline using commercial satellite imagery sources. This is the immense river delta system on the border of India and Bangladesh. It would have taken one analyst five hours to produce these vectors manually – it took Beachfront less than six minutes. 300 minutes to 6. That's a lot of time freed up by computers to perform analytic work that today only humans can do.

NGA's Safety of Navigation mission is one of our oldest and one of our most critical missions. Keeping navigation safe in the maritime, aeronautical and topographic areas – including the precision work being done by our geomatics experts – is at the core of NGA's support to our nation and its allies.



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We've seen a shift from manual to digital and now we're moving into the augmented and automated arena with our ongoing foundation modernization efforts. While geodesy remains the lifeblood of NGA, the heart of our profession is Analysis and it's always been both an art and a family of sciences.

So now, it's time to add that extra spark – from the electricity of a circuit board or the flash of a great idea – the thing that takes us beyond where we thought we could go.

The movement from pictures to pixels to data and the shift away from some of the highly manual work I've described is a significant change not only to our processes, but also to our workforce. So we've started the process of retooling and reskilling our most valuable asset – our people. And as we shift from pixels to data, it's important that every teammate has the necessary data literacy and computational skills. That includes not only the analysts who derive insight from data to create coherence from chaos, but the supervisors who manage them and the leaders who make strategic decisions about that data.

Of course, we'll still need creativity, intuition, critical thinking and intellectual diversity. So our vibrant recruiting pipeline is open. Because we'll need people who can solve problems we haven't even thought of yet. The smart money is on creating user-driven and user-developed solutions.

At last year's symposium, I discussed GEOINT Services as our flagship effort to deliver content and services to our customers, utilizing the Cloud. Well, I'm happy to report that GEOINT Services is now well underway and we've transitioned implementation to our development side of the house.

One highlight of GEOINT Services is a multi-disciplined team of analysts, technologists and data scientists called the Rapid Feedback Team. They deconstruct customer workflows to better understand their pain points, which helps us and our customers evaluate how GEOINT Services would tie into the workflows, but in a low-risk way.

Now, adding more programming skills to our workforce will allow us to open the floodgates of information opportunities. To use open content first and then augment it with classified sources – to reject, confirm or increase confidence in analytic judgments – that makes the most sense to me.

Now, I tried to do this myself when I took a Python class. I'll never be a real coder, but my goal is to be able to communicate a little better with the workforce and ask them better questions, and to think differently about data.

It's a lot to learn. And when I see initiatives like #WECODE , Women Enriching Coding, that find creative ways to help users at every level build and improve their skills, I see them fitting right into this moment, where we ride the wave to new heights.

When it comes to GEOINT Professional Certification, we're definitely having an excellent ride. NSG personnel now have the opportunity to get eight operational certifications with three more programs due online this year. We've administered nearly 14,000 tests and awarded more than 9,000 certifications to GEOINT professionals worldwide. We have the largest intelligence certification program in the Department of Defense. And the National Commission for Certifying Agencies has accredited three different programs: GEOINT Fundamentals, Imagery Analysis and Aeronautical Analysis.



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This will all lead to shared standards, shared terminology, shared tradecraft, shared everything – more accessible data for all of Team GEOINT. It will also enable more confidence in our profession across the board. So, as I hope you can tell, I'm bullish about this GEOINT Revolution and the future of our profession.

But there are two areas we're moving into where I'd appreciate your feedback when we get to Q&A. One is what we've started referring to as GEOINT Assurance.

The reality is that any digital connection includes both benefits and risks, because there are nefarious actors out there who – even though they may not have direct links with us – can and do affect our security. It's not that different from how you must protect your personal data at home, on your laptop or your phone.

Because when so much of what we now do is in the open, we've got to safeguard the integrity of the pixels, the data, the commercial providers, the artificial intelligence and the algorithms, to ensure that they haven't been interrupted or corrupted. In other words, GEOINT pedigree.

While it's well known in our profession that we can't completely trust anyone, what we can do is differentiate between bad data and data worth further examination. And that's what professional GEOINT analysts do, apply their expertise to make these important distinctions. We could button up and play it safe, we could go back to the classified world. But to not work in the open, where so many of our answers and our customers now reside would be negligent.

The second challenge I'd appreciate some feedback on is the area of augmentation and automation. How do we best take action here? Because if it's done right, augmentation will enable our analysts to find meaning above, beneath and beyond the data. Finding the meaning is really our bread and butter. It's where we have the skills, the historic knowledge and the expertise to do it well – so that's where we should focus our efforts.

The goal is to let the commercial providers scoop the data, let the algorithms and industry partners give it the first few passes. Then have our analysts do what they do best – understand the world.

Where we truly need augmentation most right now is Full Motion Video. Because FMV, as currently practiced, is a critical challenge to NGA and our entire profession. It's time-consuming, manually intensive, redundantly exploited, poorly integrated and it leaves a great deal of useful data unexploited and undiscovered. In other words, while it remains essential to national security, it's both extremely costly and extremely inefficient. We must change this, so I just named Buzz Roberts as our new Director of Artificial Intelligence, Automation and Augmentation, and his first challenge will be to address FMV automation.

Of course, FMV is just one area in which augmentation and automation are key. As we identify which jobs have tasks and elements that are repetitive and follow rule-determined patterns and processes, we need industry and academia to help us identify those specific activities that can be automated.



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How can we best analyze the cost/benefit ratio? How can we streamline these processes and maximize the data? We're going to invest here and your thoughts on this would be very welcome.

So, that leads to an idea I'd like to share with you. It's an emphasis on how we need to change Team GEOINT – a new entity we can create together – a Public-Private Partnership. That term has been used in different ways over the years, but in this case, I'm talking about an innovative and interdependent relationship between NGA and industry that supports and grows both our capabilities.

NGA sits on an amazing and broadly untapped resource. We have labeled imagery, data and analysis going back decades. In a world of deep learning, historic data and ground truth are immensely valuable. Some have even called data "the new oil."

At the same time, we know that industry has valuable data, as well as the talent, creativity and ability to make something out of nothing to create new algorithms and whole concepts. We must tap into that. So, we propose the creation of a data investment brokerage. NGA would invest our data, our analysis and maybe even our data exhaust – the byproducts – into promising startups, companies and ideas.

The goal would be to obtain a return on that data in the form of new or transformed data, new algorithms, trained machine vision approaches or an application of linked software. Our approach to this initiative is now in formation, and we look forward to developing this type of data-centric synergy with any and all interested partners.

It's a bold idea with many challenges – from authorities to declassification to licensing – and it definitely falls into the category of taking a risk. So, I've assigned Dr. Anthony Vinci to address these challenges and bring about this new Public-Private Partnership.

This is part of the larger goal of putting NGA on the right foot for innovation. To help do that, we're creating a new Office of Ventures and Innovation under Anthony, which I'll task with driving innovation – both internally and with our commercial partners.

I'm pleased to announce we've recruited Dr. David Bray to come over to NGA to run that office – next month. David is a true change agent, who's currently serving as the CIO at the FCC and I expect big things from him.

Again, we can't – and won't – do it alone. We want your thoughts, feedback and ideas. We want to know how we can work together. What data do you want? Do some of you want to invest your data alongside ours? What can we create together? It's the start of a conversation that we look forward to having with you. Please come by the Government Pavilion today at 3:30 p.m., to hear more from Anthony.

In the spirit of this new partnership, let me tell you about the data challenge we've come up with. Illegal trafficking of all types – whether it's in people, wildlife, drugs, money or weapons – is a global problem. Our challenge, simply stated, is this: Using your knowledge, skills, resources and only open source material, how would you help NGA and our partners model, track and deter trafficking?



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Your proposal might be to create analytic algorithms, visualize data or develop unique ways to leverage open source information. We'll run this in the same manner as our hackathons, with a team of experts assembled to judge the submissions, but over a period of several months. And, let's consider this challenge a preview of the Public-Private Partnership, because for the prize, here's the twist: We're not simply giving away money.

As long as you're a U.S. citizen, you'll also be able to participate in a cooperative project with NGA. We'll work together to test and implement your ideas from the challenge. We'll negotiate the release of unique NGA data. And you'll be able to share the outcome of the cooperative project. Now I hope that sounds appealing. Big data is clearly the new coin of the realm and we all need to invest it wisely. So look for a press release to come out about our Trafficking Data Challenge, in the very near future, with all the details.

As the current stewards of our profession we look to the future, but it's important to remember the past. We stand on the shoulders of giants. Today, on the eve of D-Day's anniversary, it's worth a couple of minutes to acknowledge our World War II predecessors. One such group was the U.S. Army Map Service Civilian Women Cartographers.

I was privileged to induct all 224 of them into the Geospatial Intelligence Hall of Fame last October. Well, when we held that ceremony at our Virginia headquarters, we wanted to honor them and all the other inductees, without them feeling as if they had to do, or say, anything. But one of them, Bea McPherson, had other ideas, so we went off script a bit. She represented her fellow cartographers and she did it with panache. I'll let Bea take it from here.

[McPherson video]

Now, recall the two letters General Eisenhower drafted, here is the one he read ...

"Soldiers, Sailors, and Airmen of the Allied Expeditionary Force ... The eyes of the world are upon you. The hopes and prayers of liberty-loving people everywhere march with you ... You will bring about ... security for ourselves in a free world."

In a world where so many things divide us, our mission brings us together. It reminds us just how closely connected we are. And, if we can do more than see these connections, if we can honor them, then that unity of purpose will inspire us. It will develop and deliver the next generation of intelligence that the world demands and our customers deserve.

Because that unity isn't only for the big moments – like preparing for a D-Day. It's for all of us, every day. It's also what connects us to this moment – and this gathering place – at this GEOINT Symposium.

What's different now is that operations today don't have such defined, clear-cut timelines as Operation Overlord. So we have to be ready to help our customers hit the beach and clear that beach, around the clock, every single day. And we need to start riding that wave now.



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My intent today was to underscore the connections between my agency and the rest of Team GEOINT, between the U.S. and our allies, between our proud history and our vibrant future. Please allow me to share one final, personal connection. When I think of who inspires me, what connects me to this moment, I think of this picture. It was taken 11 years after D-Day.

In it, President Eisenhower is handing a diploma to a newly minted Second Lieutenant, Richard Cardillo, my father, and passing on the responsibility to represent our ideals and to defend our freedom. I think of that diploma as a baton and it's our turn to run as fast as we can and to win.

I am proud to stand here as the GEOINT Functional Manager and carry that responsibility, with you, for all who depend upon us. Because, just as we keep our eyes on the world, the world is also looking to us, counting on us to use every asset at our disposal – every pixel, every neuron, every bit of data – to make the difference, to win the race. We do that for our leaders, our citizens and our first responders. And of course, we do it for our Soldiers, Sailors, Airmen, Marines and Coast Guardsmen to ensure they succeed in their missions.

Now it's our turn to play our own critical role in protecting the world. And if you'll permit me to mix my metaphors: To ride this new wave, as part of this GEOINT revolution we've sparked. And to lead and train the next generation in our field, as they prepare to carry the baton – for the race continues. They'll need to ride that next wave, so our legacy continues onward.

Truly onward.

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