GEOINT 2008 Report

Murrett: Quiet Revolution

The NGA's many forward-deployed personnel are returning with new perspectives on effective use of GEOINT.

(Editor's note: Following are edited excerpts of remarks delivered by Vice Admiral Robert Murrett, director of the National Geospatial-Intelligence Agency (NGA), at the U.S. Geospatial Intelligence Foundation's 2008 GEOINT Symposium.)

Our functional management role reflects the instantiation of GEOINT in so many different ways, and the importance of the team efforts that we have with our domestic and international partners, and the responsibilities we have at NGA and across the National System of Geospatial-Intelligence (NSG) to bring together the various elements that we deal with across the intelligence community, DoD and the broader interagency. One of the ways that that is most effectively realized across the NSG is the externally deployed personnel that we have, and the impact that has. Something that is unique to our culture and organization is that more than one quarter, or more than 2,000, of our government personnel are externally assigned, outside of our footprint and embedded in other organizations.

This is continuing to have more and more impact all the time, because of the external focus it represents and the responsibility that all of these people have in making sure that GEOINT is fully provided in ways that are tailored and relevant to the requirements of mission partners, and that it is utilized effectively. The more than 2,000 people that we have externally assigned, whether doing analysis or other functions, are taking an increasing share of responsibility for making sure that GEOINT is effectively utilized by mission partners. That's a part of our tradecraft and culture that's getting more important all the time.

I've had the honor of awarding hundreds of DoD Expeditionary Service Medals to civilian, in addition to military, deployers from NGA, in a variety of places around the world—not just the Middle East, but also the Philippines, Columbia and Africa. There's a change in the work force, mostly among the newer members of our work force, a disproportionate number of whom have served deployments in combat zones, who are fomenting a quiet revolution. The personnel in our organization and others have gone forward, operating in tough environments and contending with some of the most difficult challenges that our nation and allies have to offer.

They come back as different people. When they return to our sites in Washington, St. Louis and elsewhere from forward-deployed assignments in combat zones, they come back with a very different perspective. These individuals are the future leaders of the GEOINT discipline, who are increasingly taking more responsibility for not just providing GEOINT, but also being embedded parts of teams that have a mission focus, and making sure that it is effectively utilized.

A key element of how we come together with the technology we all use has to do with the way that we integrate our architectures collectively across the intelligence community, DoD and the broader interagency. We are getting better and better in our integrated ground architecture. That is realized across the combat support agencies in ways that are getting better all the time, specifically between NSA and NGA programmatically in the past six months.

We're taking different types of platforms and bringing them together in the integrated ground architecture. That has to do not just with the platforms themselves, but also the types of phenomenologies we collect, which are developing rapidly. That's another development that is sneaking up on us—the array of sensors that we have today across the electromagnetic

spectrum are getting more important all the time. Other sensors are taking an increasing market share and level of focus, such as hyperspectral LiDAR and other means. That has important implications for industry, because the competitive advantage for panchromatic and non-panchromatic parts of the electromagnetic spectrum is something that is growing.

Another point about integrated ground architectures is consistent with the theme of transition. We're often asked if we have some trepidation about all the data storage that we have to look at, such as of full-motion video. But the fact is that the technology is outstripping what we've seen in terms of requirements, which we ought to be taking full advantage of.

Another key element is something we take for granted—the aeronautical, nautical and topographical data that we are responsible for. That is part of our mission set that has to do with keeping GEOINT together, which is a true force multiplier, but one that people often take for granted. It gets less attention than some aspects, but it is as important as ever in bringing them together, because the whole is greater than the parts.

Foundation Data

The foundation data domain is another thing that we shouldn't take for granted. It is about the data, and what we have seen develop over time. GEOINT has come to a level that foundation data cannot be taken for granted. It is about the data, the way we put it together and how it is tailored to the requirements of the counterparts that we deal with. Having that data—having it archived and retrievable in ways that are rapidly adaptable to specific operational circumstances—is a key part of our mission set.

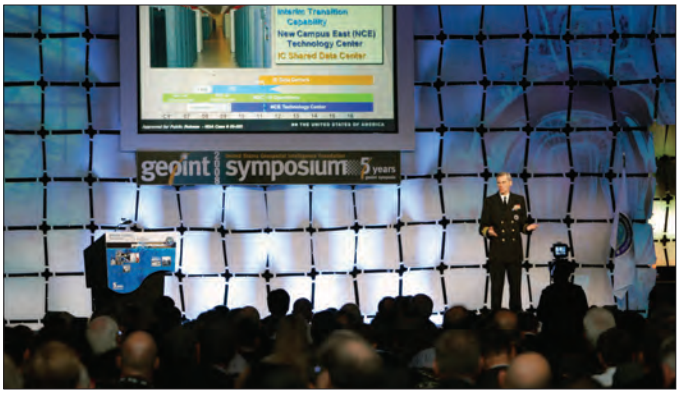
Putting it all together based on the foundational mission that we have is something that we can't take for granted. The foundational part of our business tends to get less attention because it is less glamorous and dynamic. But if you don't have the fundamental data that undergirds the mission set that we have, you're not able to execute the more newsworthy events that we participate in on a day-in-and-day-out basis.

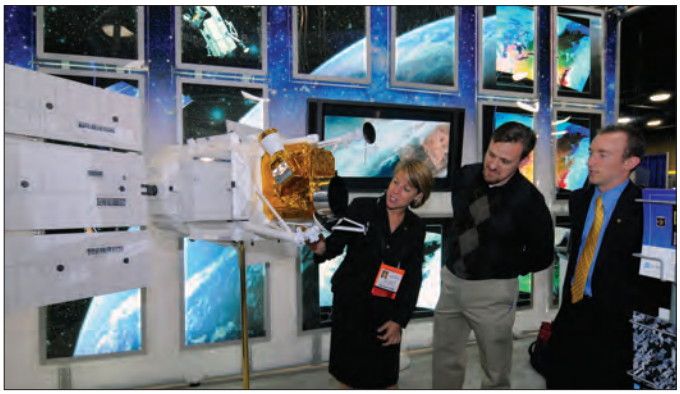
The international component of what we do is absolutely critical—both the intelligence functions we're responsible for, but also a variety of other things we have to do relative to the data. The Multi-National Geospatial Co-production Program [MGCP], which we and our nearly 30 international partners are responsible for, continues to add tremendous benefit to us collectively. Just from a U.S. standpoint, you can measure in the tens or hundreds of millions of dollars the mutual benefit we have from sharing foundation data and having the geospatial co-production program that exists with the 28 nations that are part of the MGCP. The international component of what we do is going to be more important all the time. At some point in the future, there will be more austerity in the

programs we're looking at. As the growth of these programs levels out, these international partnerships are going to be more important. It's a real force multiplier, and a way for us to realize great efficiencies.

It's important to keep our data together and have community data centers. That is where we're going as a nation, but the integration not just of people, but also of data and common access to data, is something that's going to get more emphasis over time. Based on the direction we're getting from DoD and the director of national intelligence, I can't overstate the emphasis that is being placed on integration and collaboration between organizations like NGA and NSA. What that looks like is integrated data and integrated data centers that have cross-cuing of multiple INTs that people can access rapidly. There will be a lot of developments in this area in the next couple of years, as there have been in the past year. Data standards across multiple domains, such as GEOINT and SIGINT, and bringing them together will enable our analysts to operate more effectively.

I'm happy to congratulate both of our U.S. commercial remote sensing partners, based on the success that they have had this year in launching WorldView-1 and GeoEye-1. There is no organization anywhere that provides more support to the commercial remote sensing industry than NGA, and that relationship will continue to grow in the future. The value that we get from this, the flexibility it provides, and the work we do with our international partners based on commercial remote sensing is as important as it has ever been. The sheer capacity that we have that has grown radically this year is something that we want to tip our hats to. ✭





The GEOINT 2008 Symposium, held October 27-30 in Nashville, Tenn., under the sponsorship of the U.S. Geospatial Intelligence Foundation (USGIF), brought together several thousand military, civilian and industry leaders for four days of keynote addresses, issue workshops, exhibits and networking events. The theme of the event, the fifth of its kind, was "Mission Focused, Transitioning to the Future." [Photos courtesy of USGIF]

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McConnell: Conflicts Ahead

Economic shifts and resource pressures are fueling global tensions in the coming decades.

(Editor's note: Following are edited excerpts of remarks delivered by Director of National Intelligence Mike McConnell at the U.S. Geospatial Intelligence Foundation's 2008 GEOINT Symposium.)

The three topics that I want to discuss are the rise of a more globalized, multi-polar system for the entire world; the changing dynamics of population demographics, competition for natural resources, and predictions for climate change; and the increasing potential for conflict over the next 20 to 30 years.

The international system we have known since the 1940s is being fundamentally transformed. It is being transformed by the rise of emerging powers, an increasingly globalized economy, and the historic transfer for relative wealth and economic power from west to east. It's something that we have not experienced in our lifetimes or those of our parents and grandparents. We're also witnessing the growing influence of non-state actors, which can be businesses, "statelets," terrorist groups or criminal organizations.

By 2025, if not before, our futurists believe that there will be a global, multi-polar international system, with emphasis on the multi-polar part. We judge these sweeping changes will not trigger a complete breakdown in the current international system, but the next 20 years of transition to a new system are fraught with many risks and challenges. Strategic rivalries are most likely to evolve around trade, demographics, access to natural resources, and investments in technological innovations. There will be a struggle to acquire technology advantage as the key enabler for dominance.

A 19th-century-like scenario of territorial expansion or military rivalries is not likely, but cannot be ruled out in the next 20 to 30 years. In terms of size, speed and directional flow, the transfer of global economic power from west to east now under way is without precedent in modern history. It derives from two sources. The first is the dramatic increases in the past two years in the oil and commodity prices, which have generated windfall profits for the Gulf states and Russia. It remains to be seen what the impact of the most recent price changes over the past few weeks will be. Secondly, lower costs and government policies have shifted the locus of manufacturing and even some service industries to Asia and to some extent South America.

China is poised to have more impact on the world in the next 20 years than any other country. If current trends persist, by 2025 China will have the world's second largest economy, and be en route to becoming the world's largest. China will also be becoming a major military power in 2025, and likely will be the world's largest importer of natural resources and contributor to global pollution. Despite inflationary pressures, we believe India will continue to enjoy rapid economic growth, and will be en route to becoming the world's second or third largest economy. India will also strive for a more multi-polar world, in which New Delhi is one of the significant poles in this new world. China and India must decide which is capable of playing an increasing global role, and how they will relate to one another.

Russia has the potential to be richer, more powerful and more self-assured in 2025. To do so, however, it will have to invest in human capital, expand and diversify its economy,

and integrate with global markets. It could boast a gross domestic product approaching that of the U.K. or France, but to do so will have to become more integrated into the global economy, open up to the outside world, address their negative demographic trends, health issues and lack of capital investment. If Russia fails to do that, it will condemn them to lesser status, but with nuclear weapons—a loud voice, but overall less relevant.

For the most part, Russia and China are not following the Western, liberal model for self-development. Instead, they're using a very different model, which I'll refer to as state capitalism. What I mean by that is a system of economic management that gives a more prominent role to the state. Other rising powers, such as South Korea, Taiwan and Singapore, have used state capitalism in the early development of their economies. However, the impact of China and Russia following this path is potentially much greater, owing to their size and approach to democracy. We remain optimistic about the long-term prospects for greater democracy, but advances are likely to slow and be impacted by globalization as these countries become subjected to increasing social and economic pressures.

Resource Dynamics

The second topic is the changing dynamics of population demographics, the natural competition for resources, and climate change. Both economic and population growth will put increasing pressure on a number of highly strategic resources, including not only energy, but also food and water. Demand is expected to outstrip the easily available supplies over the next decade. Oil and gas production by many traditional energy producers is already declining. Countries capable of significantly expanding production will see oil supplies dwindle, and oil and gas production will be concentrated in unstable areas.

As a result of growing world population, rising affluence and a shift to Western dietary preferences by a larger middle class, the demand for food will increase by 50 percent by 2030. Over the next 20 years, a lack of access to safe and reliable supplies of water will reach unprecedented proportions. The problem will worsen because of rapid urbanization, and the roughly 1.2 billion people who will be added to the current 6.7 billion on the globe. By 2025, more than 1.4 billion people in 36 countries will likely be faced with a scarcity of water for drinking and agriculture. This could create tensions on the globe, which world bodies and larger states will have to contend with.

Based on many estimates, climate change is expected to exacerbate these resource scarcities. Although the impact of climate change is widely debated and there is not full agreement, if U.N.-sponsored studies on this are correct, the changes will be significant, but will vary by region, impacting many regions much more severely. Agricultural losses are expected to mount over time, with substantial impacts. Decreased agricultural output will be devastating for many countries, because agriculture accounts for a large share of their economies, and many of their citizens live close to the subsistence level.

During the period of this assessment, up to 2025, the probability of conflict between and within nations will be greatly increased. Given the confluence of factors, from the new international system, increasing tension over natural resources and weapons proliferation, we predict an increasing likelihood of conflict. The conditions for conflict between nations, and for large-casualty terrorist attacks, using chemical, biological or—less likely—nuclear materials, will increase between now and 2025.

Terrorism is unlikely to disappear by 2025. Absent economic and political opportunities in the Middle East and other areas, conditions will be ripe for growing radicalism and recruitment of youths into terrorist groups. In 2025, terrorist groups will likely be a combination of descendents of long-established groups, which will inherit the organizational structures, command and control processes and training procedures necessary to conduct sophisticated attacks.

Some of the world's most dangerous capabilities will be in the reach of terrorist organizations.

Types of conflict that we have not seen for a while, such as over resources, could emerge by 2025. Perceptions of energy scarcity will drive countries to ensure their future access to these supplies. In the worst case, this could result in conflicts between or inside states. If government leaders believe ensured access to energy resources is essential to maintaining their internal stability, and even the survival of their regime, they will likely initiate the necessary conflict.

Although Iran's acquisition of nuclear weapons has not been achieved, other countries worrying about a nuclear-armed Iran could lead states in the region to develop new security arrangements with external powers. They would also acquire additional weapons systems, and some will consider pursuing their own nuclear ambitions. If Iran acquires nuclear weapons, it is unlikely that the type of stable deterrence relationship that existed between the great powers of the Cold War would emerge naturally in the Middle East. These concerns are what fuel the intelligence community's worries over the possibility of a nuclear-armed Iran. The risk of use of nuclear arms over the next 20–30 years, although we expect it to be very low, has a greater possibility than today.

Just as it was a mistake to predict the "end of history" at the close of the Cold War, the future world will be full of tensions that could spawn conflict. ✭

Large: Recovering From Reform

NRO DIRECTOR SEEKS CHANGES NOT JUST IN THE ACQUISITION PROCESS, BUT ALSO IN THE WAY THE AGENCY THINKS ABOUT ITS MISSION.

(Editor's note: Following are edited excerpts of remarks delivered by Scott Large, director of the National Reconnaissance Office (NRO), at the U.S. Geospatial Intelligence Foundation's 2008 GEOINT Symposium.)

The changes we're making now are in rebuilding the discipline and process of acquisition that historically made us one of the places to go to for difficult, challenging and leading-edge acquisitions. We need to rebuild that process, and we're taking it very seriously. In 2006, NRO published a strategic framework, with the objective of being the foundation of global situational awareness, as well as providing intelligence on timelines that are defined and responsive to user needs. These goals are the impetus behind our transformation, but that's just a piece of it, because in order for us to achieve that, we had to make some changes internally. It's not changes just to address acquisition, but also in the way we think about our mission.

You've heard a lot about the tools for dissemination and processing, which are a real focus for us. In Vision 2015, which the director of national intelligence just published, he states that he wants to get to decision advantage for the community, as well as providing support for DoD. The agile, highly sensitive platforms that we produce and operate can contribute directly to that. We are a prime contributor of data, along with many other sensors, platforms and venues. But our ability to meet that vision of decision advantage goes beyond decision advantages for our leaders in the nation's capital and at the combatant commands. Decision advantage is situational awareness as well, and driving that down to the lowest possible level, in the field and to first responders. Decision advantage in the hands of the ultimate user is ubiquitous, covering the globe, not just to the warfighter in the field but also to the people here domestically, supporting their mission to protect the United States.

I believe that the community is greatly enhanced by the data produced by NRO, but I will tell you that that data is only as good as the collaboration and teamwork that we have with our mission partners. NRO is tightly coupled to NGA, NSA, CIA and all the other agencies in the intelligence community. Equally important, NRO is tightly coupled to its industrial partners, which are a critical team member in what we do.

We have three priorities at NRO, beginning with operations. Operations is our bread and butter, working around the clock with NGA and NSA in a totally integrated manner. Our job is to continue the flow of critical information to the end-user. The second piece is acquisition. To fine-tune that, it's recovery from acquisition reform. Our focus at NRO is quality acquisition. We're moving past the issues we have had in the recent past, to the point where we've regained the credibility that we once had. The third piece, which is challenging, is doing all of that while still remaining innovative. We're making the case that we and the rest of the intelligence community, as well as DoD, can still be innovative in the types of systems and data that we can push forward.

People often say that NRO innovation means satellites—exquisite new designs and new phenomenologies. That's a piece of it. But innovation also is how we take advantage of the explosion in technology for our ground systems.

For the enterprise—whether the NSG enterprise, the NRO enterprise or the national security space enterprise—agility, swift response and the ability to integrate data and produce information useful to the end-user, are things that we must do collaboratively. There is no one organization, technology or company that is going to solve this problem. It's all of us collectively doing it. Collaboration is the means by which this community is going to meet the needs of users.

Complete Restructuring

The transformation that NRO is going through now has entailed a complete restructuring of our leadership chains, directorates, functional areas and processes. Frankly, a lot of that is focused on recovering from the era of acquisition reform. The era of acquisition reform, which began in the mid-1990s, was a very well-intentioned attempt to produce complex, expensive systems at lower costs and on more rapid timelines, because we all recognized at that time that the pressure was on to do things more quickly and at a lower cost. The philosophy of applying commercial best practices—faster, better, cheaper—was something that everyone bought into, including NRO, Congress, the administration and our industrial partners. We believed that we could do this, and that it was the way to go.

That philosophy had a lot of promise, but unfortunately we found later on that it had led us down a path of weakened oversight, weakened systems and performance and program execution that none of us has been very proud of. The question becomes one of how to recover from that. Acquisition reform is not a phrase that we use any more—quality acquisition excellence is the focus of NRO right now, coupled with mission support and focus.

We work very tightly with NGA and NSA in delivering high-value overhead collection and ground systems, not just to manage satellite data, but also that are deployed to the field to assist end-users directly. That's key to the relationships we have. We need to collect and understand data, and sharing it is absolutely key to meeting the needs of the end-user and the DNI's objective of decision advantage. The architecture of the future, if we do it right, is going to allow comprehensive navigation and access to data. It will allow users to optimize, organize, fuse the content of that information and rapidly disseminate it to end-users so they can take advantage of it and execute their mission.

It's exciting to see how we're going to be using technology to enable users to take advantage of our capabilities. But the threats that we face, coupled with financial constraints, industrial-base issues and work force issues, begin to put a picture together that says there are some very serious issues in national security space. But they're not focused just on NRO, but are issues that DoD and the industrial base face. On top of that, if you look at NRO and add to all those threats and issues the fragility of an aging constellation and the recovery from acquisition reform, we have a heck of a challenge in front of us.

The mission of NRO and overhead systems hasn't changed—the mission has grown. Our systems were developed in the Cold War era with some very specific objectives. It was to go after a few state actors that we knew were a threat to the United States in very strategic ways. Monitoring arms treaties added another facet to support. But in the last 10 years, it's grown even further. We have an extremely diverse and agile target set that's challenging overhead systems because of the nature of the target. The old targets were easy to find but hard to kill. The new targets are hard to find but easy to kill. The target set has expanded, and that's the challenge that NRO is facing right now, along with our mission partners. The global situational awareness required for our troops adds another dimension in terms of timeliness.

But it's not just a matter of a new target set of what satellite systems can do. It's how do we integrate airborne systems, platforms and sensors along with other ground-based systems, and come up with an integrated architecture that takes overhead and airborne collection and ground-based systems and pushes that data to the end-user.

For NRO, the most humbling challenge is to regain the credibility of the organization and the confidence of our overseers that NRO is still a quality acquisition organization. The leading question is whether NRO should be allowed to recover, or is a radical change required in national security space organization and the way it's being managed. That's one that we're all struggling with. But we understand at NRO the changes that are required to make us more effective. Those changes are under way, which are larger than any we've seen in about 15 years. The changes will shake the foundations of NRO, but will enable it to go to the next level. ★