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# Geospatial Intelligence Forum



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# Army GEOINT Perspectives

**KEY SOLDIERS DISCUSS BENEFITS, CHALLENGES OF USING GEOSPATIAL TECHNOLOGY FOR THE SERVICE'S INTELLIGENCE AND ENGINEERING NEEDS.**



CW5 Michael Harper



Lt. Col. David Pendall

*(Editor's Note: The Army GEOINT enterprise is a vast and diverse undertaking that stretches from supporting flood control projects on the Mississippi River to planning operational missions in Afghanistan. As Lieutenant Colonel Jason Strickland, military executive, Army GEOINT Office, observed in an article last year, "The engineering and intelligence communities are together at last. While some are skeptical, many professionals are celebrating the long overdue union of these two disciplines."*

*To give an idea of the unity and diversity of Army GEOINT perspectives, GIF recently reached out to two leaders in the field—CW5 Michael Harper, who serves as the Army's senior geospatial engineer technician at the Army Geospatial Center; and Lieutenant Colonel (P) David Pendall, G2 of the 1st Cavalry Division, who until recently served as the*

*CJ2 for Regional Command-East/CJTF-1 in Afghanistan—for their views on Army GEOINT's key issues and trends. Following are their responses.)*

**What do you see as the most important and beneficial aspects of geospatial technology in your own work? Can you provide some examples of where it has made a difference for you?**

► **Harper:** The ability to rapidly collect, disseminate, visualize and exploit high resolution terrain data and intelligence data from various platforms and sensors provides us with a level of fidelity and situational awareness that soldiers have never had. The ability to ingest open standard data and the ability to pull in and display various sensors feeds in one user-defined common operating environment is an incredibly powerful capability that enables the commander to visualize the battlespace and make informed decisions.

► **Pendall:** The ability to instantly visualize the operational environment (on demand) with 3-D, high resolution, tactically significant tools for additional analysis (slope, distance, dimensions, elevation, terrain masking, etc.), and overlays of additional data elements—social (tribal/ethnic), infrastructure, Ops graphics, threat reporting, radio propagation, etc. Low bandwidth delivery of GEOINT as a service as much as a product. Device agnostic, ingesting literally hundreds of additional data layers into a GEOINT service architecture and application for user defined display and visualization. The ability to ingest and update imagery and masint collection as they hit the enterprise. The ability to integrate ISR feeds [multi-INT] along with sensor locational data and fields of view. This is a significant array of

capability and all deliverable to the tactical user [SQD-CO] as well as the two-star HQ—across common networks.

**What do you see as the most important capabilities for the Army as a whole?**

► **Pendall:** The ability to deliver GEOINT as a service and to interact with the consumer/user to define the output in a mission relevant format. Real-time delivery across a network with tools in a web-enabled architecture. This is a capability for the force—not simply the intel elements—but all operators across all war fighting functions and echelon. The collection side of GEOINT should support user requirements and ingest into an accessible repository—which is what occurs now for the most part. National-tactical integration is a must-have enduring capability as well. The tactical consumer will be a co-producer/content collector/provider to the enterprise as well, from a variety of data streams and mobile devices with georeferenced tagged content.

► **Harper:** Our ability to rapidly collect and exploit terrain and intelligence data from multiple computing environments, including mobile and handheld devices, is our most important capability. This allows us to not only gather information at various stages of the mission, but also to collect various fidelities of data to support all war fighting functions. To fully realize the benefits of this information, we need to improve our ability to receive, seamlessly integrate and manage that soldier-generated data into an ops/intel

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enterprise architecture that enables sharing of information vertically and horizontally and from tactical to national levels.

### What are the chief challenges you face in effective use of geospatial technology?

► **Harper:** Convincing people that the world is not adequately mapped at the scale required for most Army operations, and that we lack the detailed terrain data required for mission planning rehearsal and execution is one challenge. Mapping is something the Army did very well during WWII, Korea and Vietnam, but we divested ourselves of that capability over time and now lack an enduring capability to do it effectively. The technology is there to collect data at a higher fidelity and map more efficiently than ever before. We also struggle with educating people that “geospatial” is more than a map, it is an enabling, cross-cutting capability that provides a consistent framework and organizing principle for operations and intelligence.

► **Pendall:** Getting the broader user community to move from PPT or low-information-density static products to a web-based dynamic content delivery and being comfortable with interaction with applications for on the fly/on demand decision aids. This further pushes the GEOINT capability into a service based orientation for commanders and staffs rather than a static product/email/document based delivery of limited use (but relatively high preparation cost in terms of analysts and staff preparation/layers of bureaucracy).

### If you had a wish list of new geospatial technologies and capabilities, what would be on it?

► **Pendall:** Secure architecture for GEOINT delivery to the device (think 4G smartphones) tied to back-end high capacity smart push/PED processes. Everything from fused space to fused terrestrial collection and user defined additional layered data. Wide area surveillance feeds and mobile/airborne datastream with value added processing to the direct user (tactical) to the same data feeds and layers being used at operational HQ for pattern and “big data” analysis. Add in biometrics and forensic data tied to geography and human network analysis displayed on demand in a geo-vis tool.

► **Harper:** When you look at the National Geospatial-Intelligence Agency’s vision of moving towards an online/on demand environment, there are a couple of things that jump out. Their vision takes them from providing products to providing data, while at the same time reducing some of their data production capabilities to put a greater emphasis on receiving data collected by the National System of GEOINT [NSG] partners. With all the information being collected across the community, on the surface this strategy seems cost-efficient and effective. However, the success of this vision is truly dependent on each NSG partner, including the Army, having complementary service architecture

and structuring their service-generated content in the standards and formats that NGA will be utilizing. To me, the need for a GEOINT content manager to develop a complementary NSG data model for unique features and attributes collected by the services, verification and validation of geospatial-enabled data from disparate service sources, integration into NSG data holdings, and dissemination to NSG and coalition partners is one the most important capabilities required. Essentially, we need a seamless enterprise architecture and a fairly robust system to perform data content management across the NSG.

### How would you rate the effectiveness of cooperation between the people involved in the engineering and the intelligence aspects of the Army geospatial enterprise?

► **Harper:** I think the level of cooperation at the Army and Training and Doctrine Command [TRADOC] levels has probably never been better; the chief of engineers and the Army G-2 co-chair the Army’s Geospatial-Enterprise Governance Board to address geospatial issues at the Army level and along with the Army’s geospatial information officer and staff help move the Army towards an Army geospatial enterprise architecture that will provide a standard and sharable geospatial foundation [SSGF] that supports operations and intelligence convergence in support of mission command. At the TRADOC level, commandants of both the U.S. Army Engineer School and Intelligence School have signed an agreement and are working toward formalizing the GEOINT cell concept that places geospatial engineers and GEOINT analysts under the direction of the G-2/S-2 at each Army echelon.

At the tactical level, many of our formations have already merged these capabilities and routinely work together in the same cell under the direction of the G-2/S-2. At some units, our geospatial engineers work directly for the staff engineer or under operations. I think that regardless of who our geospatial engineers may work for, placing them where they have the best access to the intelligence they need to produce relevant tactical decision aids and analysis better serves all of the war fighting functions on the staff.

► **Pendall:** Our experience with the entire geoint enterprise has been excellent. We had engineer support from the Army Geospatial Center directly supporting us (Terra Explorer) as well as touchable engineering support from NRO. AGC and their Army Geospatial Enterprise really maintained a broader capability set that we tapped and integrated other efforts (our seven-layer analytic structure) to meet our needs across the regional command (Geo Globe Architecture—Terra Explorer, Terra Builder and the Terra Gate Servers). We had NGA and NRO people on site, as well as NGA at our subordinate BCTs. AGC was over for site visits and we stayed tied in as we developed additional capability for the regional command through the Terra Explorer application. I would like to add that the Army DCGS program engineers and FSRs were also very supportive in terms of data access and data layering support

to the GEOINT team. Bottom line: We effectively pushed GEOINT applications and visualization capability throughout the regional command across three networks—to the desktop/workstation at all echelons. Need to work the delivery to the device (secure mobile/4G) next.

### What can be done to improve intelligence/engineering cooperation?

► **Pendall:** Keep embedded support and to the BCT and in some cases below to directly interact with end-users. In the face of declining resources, pressure may exist to cut these support positions first, but that is where the learning and feedback happens first to “stress test” programs and capabilities. Keep organizations flat and integrated.

► **Harper:** I think the full fielding of the Distributed Common Ground System-Army [DCGS-A] will enable our soldiers to use the same systems on the same networks operating in a much more collaborative environment than some of them do today operating on separate systems. Each military occupational specialty brings a unique skill set and when you combine them in an all-source fusion environment it's a tremendous capability.

As we formalize the GEOINT cell, we'll need to look at collective training opportunities both in garrison and in our schools. We're also looking again at our geospatial engineer force structure to ensure that it's aligned to provide the best support to the Army.

### Do you often encounter technological limits on your ability to share needed information? How do those limits compare with the restrictions created by organizational culture, habits, etc.?

► **Harper:** Yes, stovepipe systems or “cylinders of excellence” still impede a common operating picture [COP] and full interoperability due to incompatible or proprietary geospatial data formats, data schema/models, viewers and data management processes.

In addition, we also have a few quick reaction capabilities that were fielded to fill a critical capability gap, without fully vetting their interoperability with existing systems. The Army Geospatial Center is working to help Army Program executive offices and program managers develop their systems with enterprise standards and concepts in mind so that we can ultimately get to a seamless enterprise architecture. I don't think that it's an organizational culture that limits the sharing of information as much as it is the lack of an architecture and tools that enable it.

► **Pendall:** We stressed the need to share and support partners—coalition and Afghan. We had a great Foreign Disclosure Office and impressed the need for quick (responsible) turns and distribution. Another great advantage to the Terra Explorer was the base imagery was unclassified and immediately sharable in many modes. We ran this across the Afghan Mission Network for coalition partners and

made elements of this (static product or for display) to our Afghan partners. We had several specially developed fly-throughs and mission planning products for Afghan Security Forces—either on DVD or hard copy, in addition to screen display in tactical operations centers.

### How would you describe your vision of the Army geospatial enterprise in, say, 10 years?

► **Pendall:** Embedded and part of the command culture as a component of mission command, with less emphasis on static products and more emphasis on immersive visualization and discreet support (user defined) applications (via widgets). With additional sensor technologies and wide area surveillance capabilities, we'll need to rethink PED and what processing (machine based or human analysts in the loop) makes the collection more valuable across the echelons of the joint force. Again, I think adding biometric collection and forensic data into the geoint architecture is a growth area.

► **Harper:** An Army Geospatial Enterprise with a well developed set of common geospatial data standards, models and formats that enable a SSGF that facilitates a COP to the warfighter at all echelons. DCGS-A is providing the net-centric enterprise services for geospatial data management, dissemination and synchronization from tactical to national.

All enabling:

- Uniform pre-deployment configuration of mission command systems with standard data
- Automated dissemination and ingest of updates from tactical, theater and national authoritative data sources
- Horizontal and vertical cross-echelon synchronization of data updates
- Lossless transfer of data from one unit to another during reliefs in place/transfers of authority
- Coalition partner interoperability and seamless data exchange
- Post-deployment retention of collected data.

In 10 years, the AGE will be a well-designed and embedded part of Army mission command systems. Mission command systems will have the ability to discover, download, exploit, create and value-add real-time ‘boots on the ground’ information through a standardized and seamless architecture.

However, it is important to realize that in 10 years the AGE will still be maturing. New technology and standards will emerge that provide even greater fidelity of information that what is available today. We need to stay vigilant in assessing and integrating new technology, standards and strategies into the AGE to ensure our Army remains the world's premier fighting force. ★

For more information, contact *GIF* Editor Harrison Donnelly at [harrisond@kmiimagroup.com](mailto:harrisond@kmiimagroup.com) or search our online archives for related stories at [www.gif-kmi.com](http://www.gif-kmi.com).