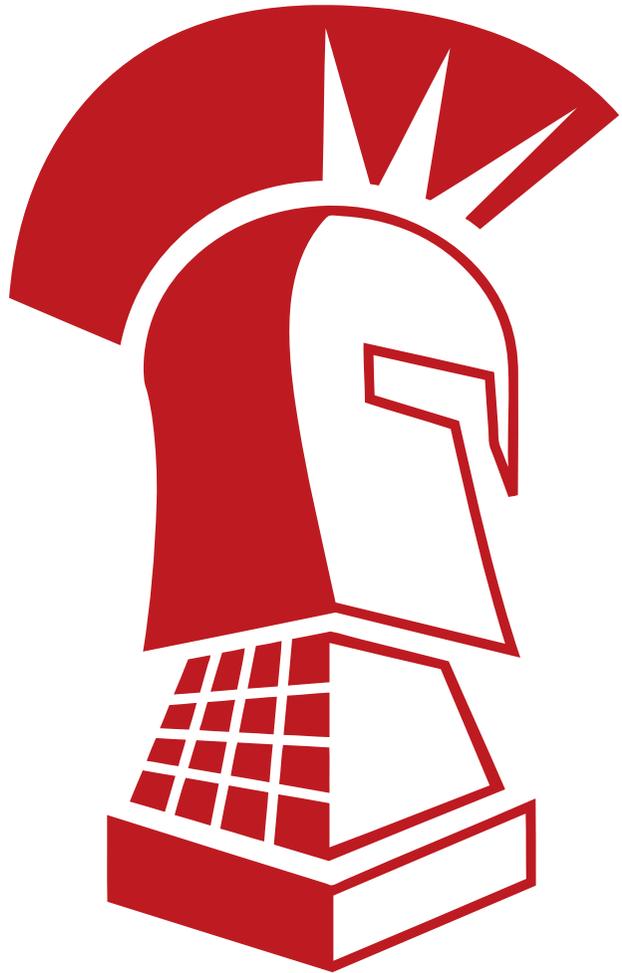




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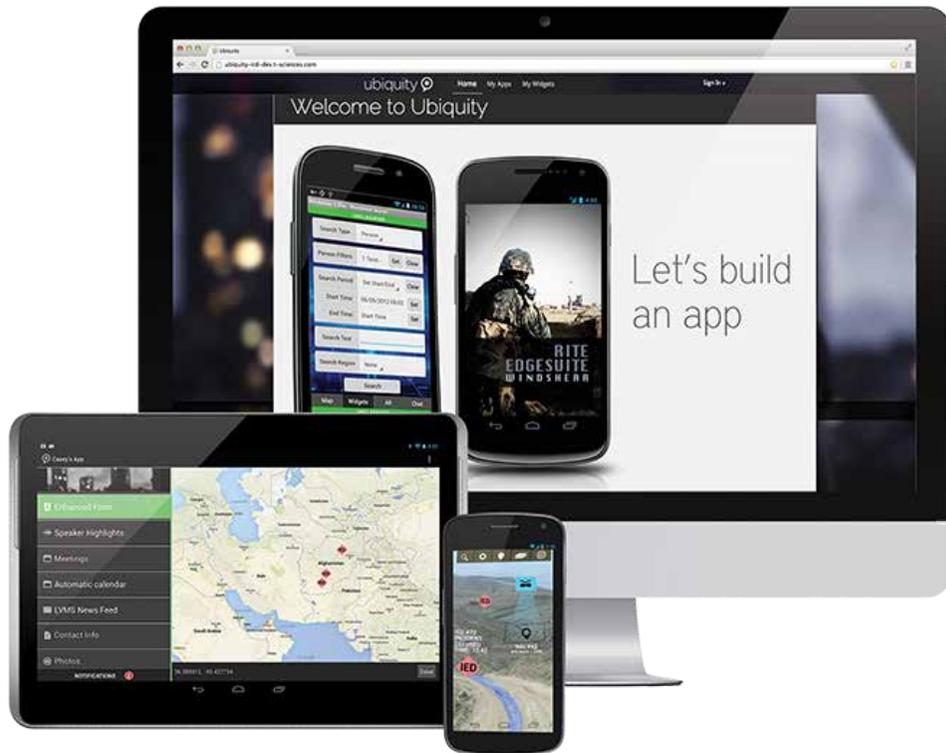
2013

**PRESS BOOK**



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GEOSPATIAL INTELLIGENCE FORUM



# Cloud Warriors: U.S. Army Intelligence to Arm Field Ops with Hardened Network and Smartphones

By Larry Greenemeier

A big step up from wireless radios, modified smartphones could help operatives identify the enemy and disseminate allegiance shifts, and even provide a drone's-eye-view of the battlefield.

The U.S. Army's Military Intelligence Corps wants to equip its field operatives with a pocket-size tool they can use to locate and identify adversaries, and then disseminate that information to nearby troop commanders as quickly as possible. Their tool of choice—a modified Google Android smartphone with specialized apps, a setup none too different from the ones so many civilians use for multitasking in their daily lives.

Military Intelligence, which has issued basic Android smartphones to a small number of its operatives in the past two years, is testing new Samsung Galaxy Note 2 Android sets loaded with software—known collectively as Windshear—that could send and receive biometric, GPS and other data via a secure mobile “cloud” network. Another key feature under consideration as part of Windshear would give operatives access to streaming video taken by drones overhead, something not available today to troops on the ground.

Smartphones and a secure, real-time connection to data are necessities if the U.S. military is to stay a step ahead of its adversaries, says Col. Jasey Briley, a retired Army intelligence officer acting as a consultant on the Windshear project.\* Whereas the Army has for at least the past decade used mobile devices to perform biometric identification, those instruments were only as effective as the data they contained. “The photos and fingerprints in the databases are not updated in real-time,” he adds. “This is where Windshear could provide an advantage—it’s always being updated.”

A squad or company entering a village in Afghanistan, for example, needs the latest information regarding that location before they arrive, including whether it is friendly to U.S. troops or has recently switched allegiance, says Briley, who last served as a senior intelligence officer with the 18th Airborne Corps before retiring in May 2012 and becoming CEO of JBB Group, an intelligence and security services firm.



Troops have long had access to real-time communications via wireless radios, but a smartphone could send and receive digital photos of enemy combatants known to be operating in a particular location. “In the past that basic information might have been copied over the radio or the squad wouldn’t get it at all,” Briley says. The Army has also used satellite phones, but that technology has not trickled down to the squadron level, much less to individual soldiers. “It’s an expensive piece of equipment and it’s expensive to get the satellite signal,” he adds.

As anyone who has lost cell phone coverage during an emergency knows, a mobile phone is only as reliable as its network. Keeping smartphones operational in remote areas without much of a telecommunications infrastructure is not easy. There are many locations—such as the tribal zone straddling the Afghan–Pakistani border—where a cell signal cannot reach, Briley says. In many field operations soldiers communicate via vehicle-mounted cell towers, although sometimes those soldiers must venture into rugged terrain and leave their vehicles behind. In such cases, he adds, the soldiers can download maps and other useful information before venturing too far from the mobile cell tower.

Windshear would not solve connectivity problems in such cases, but it will enable broader data sharing when soldiers can sync up with the cloud. Windshear operates on a smartphone just like an app from a user’s perspective, says AJ Clark, president of Thermopylae Sciences+Technology, the Arlington, Va., provider of Web-based geospatial software used to build Windshear. Yet the software is actually an “app container”—tapping on the Windshear screen icon brings up a new screen filled with more specialized apps that change automatically based on a soldier’s location, mission and specific military specialty.

Military Intelligence first evaluated Windshear’s ability to deliver cloud-based biometrics, facial recognition, reporting and ID scanning capabilities as part of the May 2011 U.S. Joint Forces Command’s Empire Challenge, a showcase for emerging military technologies. The Army might further scrutinize the software and smartphones as part of a Network Integration Evaluation (NIE) in 2014, one of a series of semiannual, soldier-led tests of commercial and custom-designed technology that could be used to improve the Army’s tactical network. This would be different from previous field testing because the NIE is a formal event where many different Army systems come together to see how a new system holds up in a replicated field environment, Clark says, adding that “systems nominated for NIE testing can be fast-tracked to the field if they are positively received by the soldiers.”

“The soldiers can download maps and other useful information before venturing too far from the mobile cell tower.”

Windshear also plays into the U.S. Department of Defense’s larger “mobile device strategy,” which they outlined in May 2012. (pdf) This plan lays out a number of scenarios in which smartphones, tablets and other modified mobile consumer electronics might assist the military. Field units could maneuver in unfamiliar environments with help from real-time maps that soldiers annotate and share with other troops via their handheld devices. Engineers would be able to take digital pictures of mechanical parts, using those images to order replacements via the cloud. Another possibility: Military health care providers could diagnose injuries as well as remotely access lab results from the field.

Getting soldiers to embrace new mobile gadgets will not be a problem. “Our young soldiers grew up with smartphones—they’re the ones really pushing the technology onto the battlefield.” Briley says. “When you introduce something like this, they’re like, What took you so long?”



## Exploring the Google Space

By Bill Flook

Thermopylae Sciences and Technology, at its founding six years ago, “didn’t want to be a defense contractor,” recalls President AJ Clark. “We wanted to be a technology startup.”

And that attitude is still probably a healthy one. Even though Rosslyn-based Thermopylae built a business off of government and military customers, the feds aren’t exactly the safest bet these days.

Fortunately, the geospatial software company has a better plan. Thermopylae’s future is commercial. This is where the company is investing, both in its Dallas and Miami offices.

As a longtime reseller for search giant Google Inc., Thermopylae builds customized applications on top of Google Maps and Google Earth. For much of its history, that’s meant providing geospatial tools that allow one government customer or another to better visualize data and location information. It built, for example, an interactive mapping tool for the U.S. Department of State that charted Secretary of State Hillary Clinton’s travels. It developed software for Goodrich Corp. that gave analysts real-time access to feeds from U2 reconnaissance planes, displayed over Google Earth.

Thanks to a recent expansion of that Google partnership, Thermopylae is eyeing extending that same offering to commercial customers in energy, telecom, finance and other sectors. That could mean creating an application to visualize the locations of storefronts, or mapping out where users on a website are coming from.

Thermopylae’s example offers a roadmap both for how a company can expand a relationship with Google, and how a federal contractor can push its core offering into the commercial markets with little pain.

At the same time, Thermopylae is increasingly shifting to a product over a service model, which will enable it to scale with a minimum of tweaking for each customer.

The agreement with Thermopylae is in many ways typical of how Google penetrates the enterprise, with heavy reliance on third parties.

“Google does a great job of building one thing, and then they stop, they release it into the wild and say, ‘Here’s an API, go do something with it,’” Clark said.

Thermopylae was this month named “Google Enterprise Innovation Partner of the Year” in maps for business. |

# How Could the Sequester Affect Geotechnology Companies?

By Larry Greenemeier

The federal government has been making a lot of news lately, for better or worse. AJ Clark, the CEO of Thermopylae, works closely with government contractors in the Washington, D.C., area, so he has an informed viewpoint on these topics.



GeoWorld Editor Todd Danielson recently interviewed Clark to find his take on the latest federal developments and more.

*Can you briefly describe your background in the geotechnology industry?*

My background in the geotechnology industry started after leaving the military in 2002. I used geospatial tools while in the military but was able to start playing a role on the technical side as a civilian.

I began by integrating geospatial tools to map out information provided from human-intelligence (HUMINT) sources. I worked with tools ranging from Esri to AGI. I also spent a lot of time working with geodata storage solutions, such as ArcSDE within Oracle. As Google Earth became available, I added that to the list of tools that I or my team worked with to integrate into a variety of systems for federal customers.

In 2007, I set out with Thermopylae to solve geodata management for cloud solutions. We partnered with Google immediately, because they were one of the only organizations that had really implemented cloud computing at that time. We identified areas we could provide value-added products to Google's geo solutions and assembled a team of experts in the geovisualization and geodata management areas. Since then, we have released three products that all deal with geospatial data.

*There's been much in the news lately about the federal government's sequestration that went into effect on March 1, 2013. Since your company works with the federal government, can you describe how sequestration will affect the GIS community? And what players may be affected the most?*

I think the clearest case will initially be in the procurement of imagery. Some of the largest imagery-collection activity is being reduced. Also, I think the federal government will move to consolidate legacy GIS systems where they have 10 different map tools to see 10 different pieces of information. With today's technology, there's little justification for that, and users will drive consolidation over a smaller set of mapping technology.



***How will cutbacks in the federal defense agencies affect satellite imagery collection? Will there be enough imagery in 2015-2020 to meet the future needs of an expanding GIS community?***

There will initially be some reductions to the amount of imagery available. However, the reality is that there's a real need to enhance the distribution methods of the imagery that's collected. Oftentimes, users in the federal government don't know what

imagery is available because the distribution channels are clogged, and a limited amount of data can be provided to the end user. Implementing technology that's smart enough to model the end user's activity and connect them with imagery that's sitting on a disk somewhere, but not accessible to that user, is something that would go a long way to solving the distribution problem.

***Will sequestration affect the commercial satellite-imagery companies as well as the government-owned satellite programs?***

I believe the commercial satellite companies are not immune to the cuts. The federal government is still a key player in the imagery business and, as the cuts are implemented, it's inevitable that commercial satellite-imagery companies will face some amount of impact.

***How do you expect the sequestration to play out in the coming weeks and months?***

I assess it will continue until there's enough pressure from the voting public that they want to see a change. What will be interesting is where the public feels cuts should happen, because the reality is that sequestration is just the tip of the iceberg in a much larger debt problem.

Right now it seems politically difficult to address the federal government's fiscal situation, so until a clear signal from the voters is heard, I think sequestration will hang around in its current state. I just don't think there is enough interest in it or knowledge of how it's impacting the country from most Americans.

***Touching on some geotechnology industry trends, how is the increasing use of mobile devices changing GIS?***

Location-based information is really changing the landscape in GIS. "Where you are" is really starting to matter now that it can be so easily determined from a ubiquitous stream of devices.

A good example is the way that news reporting occurs. Previously, someone attended an event and wrote about it later. Now, a flow of pictures, tweets, blogs and other digital media are captured in the present and posted back out. If all of this info includes the physical location of the writer, it has a lot of merit.

After organizations realize they have an investment in a geo system that's interacting with mobile users, it unlocks whole new options. We have a new media customer that leveraged Google Maps and our iSpatial software to build an internal system for tracking their news crews. As other offices saw that investment, they realized there were many other applications they may want to extend that GIS capability toward.

***“What will be interesting is where the public feels cuts should happen, because the reality is that sequestration is just the tip of the iceberg in a much larger debt problem.”***

GIS is becoming part of the information package that businesses want to see. We're seeing many commercial customers take tools that previously were "military grade" for tracking teams/personnel and finding all types of efficiencies with them. Some examples are tracking their personnel in the field, interacting with them in real-time, providing smart applications based on where the user is, and establishing location-based tools that allow the user to focus on their job and not searching for the right application or data to do it.

As we get the GIS out of the user's way and structure it to enable them, it becomes an intrinsic part of their work and life. Google calls this "work the way you live," and the current trend of consumer technology outpacing business technology is something I believe will continue.

***Many GIS tools have long existed as desktop applications. How are Web and mobile applications changing the landscape?***

Smart applications have evolved from smartphones and high-speed browser software. Somewhere over the last six years, I realized that Web and mobile applications were going to become ubiquitous in our work and life.

Users want to go to one place, have a familiar tool that shows them a map or an image, and then see all their data or run analytics seamlessly. They do not want to go to 10 different tools, and they also don't want to relearn something on the mobile side that they were using on the Web side. This is the expectation that the user starts with in today's world, because we live our life with a series of increasingly capable technologies that run as Web or mobile apps.

***Another bit of interesting news: Google Compute Engine recently broke the record for MinuteSort—the measure of the number of 100-byte records sorted in one minute. What implications does this type of cloud processing have for the geospatial community?***

In the early days of GIS, maps were still individual files (KML, SHP) that users passed around like they would physical maps. When you opened up a map, you would only see the data that that map is trying to convey (migration patterns, seismic activity, etc.). Now, however, maps are more of a backdrop for data on top of them, and technology allows us to display different datasets simultaneously on top a geographic backdrop.

Take Google Maps, for example: we have restaurants on a map, we have directions from one point to another, and we have traffic density on those routes. From this, we can begin to generate metadata, such as restaurant density relative to highway proximity, for example. The emerging trends in GIS allow us to learn more about the world by consolidating data and rendering all that data on maps simultaneously.

We see two trends emerging: the consolidation of data, and the generation of metadata from that consolidated data. Consolidated, real-time, “big data” is here and has a lot of great benefits. When you can put all of your information in one place, understanding the world and making decisions based on that understanding becomes easier than ever. I deeply believe that and have invested heavily within the latest generation of Thermopylae products to address this concept.

The Google cloud provides some unique solutions to the geospatial community because of the sheer volume of resources it can instantly apply to a problem set. Google Map Engine is a specific example of this that allows users to build and publish maps using the power of the Google cloud. The capital investment in hardware and software for this type of geospatial capability previously prohibited many mid-market companies from experiencing the benefits of geospatial knowledge.

With Google Map Engine, any company can have their own economy of scale with managing geospatial data. In five years, geospatial knowledge will be a much larger part of everyday business, and the companies that are early adopters will be rewarded with new insights about themselves, their customers and their competition.

***As many members of the geotechnology industry unveil or move completely toward cloud-based solutions, do you think there’s a limit to how widespread cloud use will become?***



There’s a limit to how widespread cloud use will become. However, that limit is being reduced every day by wireless network providers increasing their coverage around the world. Also, there’s a hybrid model in place that makes a lot of sense to bridge the gap between where the cloud ends and on-device processing/storage begins.

Taking the same mapping solutions that run on the cloud and providing on-device miniature versions of them creates a bridge. This bridge extends the same user experience on the device regardless of cloud access or not. I believe we’ll see an influx of these bridge technologies between now and when network access is more pervasive throughout the world. The cloud service providers that have these bridging technologies will be the ones that attract the largest user group.

***As a company that works with defense contractors, are they less likely to avoid cloud solutions based on security reasons? Or are those concerns being resolved?***

This is the inevitable use case where cloud solutions often hit a brick wall. However, that wall is starting to crumble. There are various pilots underway that take cloud solutions and bring them behind “the firewall.”

Unclassified military networks’ email servers have pilots underway to offload that email to Google’s Federal Cloud. Amazon is working closely with a variety of organizations that have secure networks shut off to the Web to identify how pieces of their cloud technology can be replicated on those networks. Also, having access to enterprise versions of a cloud-provider’s solution, such as Google Earth, provides an organization with the ability to let their user’s work the way they live. |

## Thermopylae Sciences & Technology Shows off Latest Geospatial Tools for Government and Business

By Adena Schutzberg

Yesterday (Mar 18) Thermopylae Sciences & Technology (TST) hosted its fourth annual Technology Summit (press release) for its development partners and government users. The company focuses on delivering Google-based geosolutions that take advantage of the cloud, mobile and the latest technology. I saw highlights of the new features coming to the company's 3.0 releases of Ubiquity and iSpatial products via an online meeting today.



The need for visual, real-time intelligence during battle has never been greater. Given the complexities of modern and often irregular warfare, many within America's defense and intelligence communities recognize the vital role of geospatial intelligence.

Gen. James R. Clapper, the Director of National Intelligence (ODNI), once said that geospatial intelligence is the "foundation for all other intelligence disciplines." It informs nearly every action from the command center to decision making by soldiers on the ground.

New geospatial technologies are rapidly linking operations and intelligence in ways never before conceived to protect soldiers.

However, as the defense and intelligence communities evolve, there are still barriers that slow the adoption of potentially lifesaving technologies. These barriers include redundancy, technological bloat, training difficulty, cost and data control among others.

For far too long, the defense and intelligence communities have had to rely on complex geospatial systems that were very cumbersome and time-consuming to use, which slowed down the ability to deliver real-time intelligence into the hands of the warfighter.

The next-generation of defense technologies has the ability to overcome these barriers. Instead of building massive new technology systems, innovators are creating nimble, user-friendly technologies that would be familiar to anyone with a smartphone or personal computer.

In addition, these new solutions are more cost-effective to implement, more streamlined and provide a level of simplicity and elegance that do not require intensive training. These new technologies are core to



the situational awareness that drives decision-making for the Defense Department and the intelligence community. They provide users with the ability to quickly distribute and visualize life-saving information to soldiers in combat.

As far back as the Empire Challenge event in 2011, mobile smartphones were being tied directly to everything from biometrics analytics to full motion video feeds from live sensors. The technology has matured since that time and requires deliberately coordinated effort to make it into day-to-day military operations.

For example, U.S. Strategic Command is leading the way with handheld GPS solutions that help the warfighter effectively navigate and lock in on key targets. These solutions allow the command to coordinate all of the intelligence, surveillance and reconnaissance capabilities required for U.S. and coalition forces to have a decisive edge that supports the mission and saves lives. With sequestration and other fiscal pressures pushing down on America's defense and intelligence communities, the need to find highly cost-effective technologies is paramount. While budgets are being cut, the reality is that mission requirements and threats are only increasing, creating the need for innovative solutions that drive smarter and faster decision-making.

One way new technologies are addressing this challenge is by leveraging existing commercial systems. For example, Google Earth's web interface can be modified to integrate and visualize intelligence data sources in one user-friendly location. This technology is evolving rapidly too.

These types of tools that modify Google Earth's interface can help reduce both cost and time to deploy a completely customized geospatial solution, as well as integrate with existing data sources for enhanced visualization and knowledge fusion.

Southern Command has used this approach for some time and their merged operations and intelligence picture provides concise information for expedited decision making. This technology provides unprecedented, real-time, visual information to protect soldiers.

**“For many years, both industry and defense leaders have played key roles in advancing innovations that meet these mission objectives.”**

These are examples of how providing actionable real-time intelligence has never been more important. For many years, both industry and defense leaders have played key roles in advancing innovations that meet these mission objectives.

With threats continuing – whether natural or man-made – the need for the right geospatial intelligence solutions has never been greater. While we face diminishing budgets and two wars wind down, we all must collectively strive to provide the right solutions that bring operational intelligence to any situation, whether the battlefield or for a coordinated humanitarian response.

Times are changing quickly and it's imperative to take an adaptive view of new technologies.

Resistance to change was more of an option at one point, but compelling new drivers for change such as fiscal pressure are ushering in a new period where change must be embraced. Doing so will support the rapid convergence of operations and intelligence and, ultimately, save lives. |

# Unintended Consequence The Death of Small-Company Innovation

By A.J. Clark

In times of national crisis, lawmakers tend to forget about small business. Sequestration is no exception.

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While the media focus on stories like the U.S. Navy docking ships, the Air Force reducing flying hours for training or intimidating across-the-board hiring freezes, there are many more unseen and unintended victims of sequestration in the \$500 billion cuts to defense.

Those big stories are important, of course, but there are other effects that no one is talking about. What impact will sequestration have on military recruiting in general, or the U.S.' reputation as a military power?

My concern is for the small businesses that work in defense. My industry, the small defense contracting world, has been feeling the pre-emptive effects of sequestration for months already. I believe many more sweeping changes are coming and that even in a best-case scenario, the small-contractor industry won't survive intact.

Even if a quick resolution to sequestration is found, the budget continuing resolution ends March 27, followed by the deadline for congressional budget adoption in mid-April. It's safe to presume that defense budget cutbacks are here to stay in one form or another.

The current pressure caused by sequestration on small defense businesses is centered on three dynamics. The first is obvious: The government, uncertain about the future, simply isn't releasing any work requests, which eliminates short-term work opportunities.

The second is less obvious. We know large companies are cutting overhead by laying off staffers. And while that doesn't seem to have a direct tie to smaller contractors, it adds up to a likely loss of subcontracting work. That's because the employees the big companies are keeping will need to do all of their work internally.

As most small businesses know, you hire your own staff when you are just starting out because subcontracting work results in a pass-through fee, but no contribution to your company overhead pools. Large companies are in the same situation right now. They need to use their own people to keep the contribution-to-overhead ratio high enough to save the buffer zone of employees they really want to keep through the sequester downturn.

The last issue is the continuing resolution, which has halted any new work requests and starts. Traditional work is tanks and planes, but new work is cyber tools and cloud computing solutions, the kind of work many small businesses have a real play in. Many of them are innovators who rely on new work to get started.

However, that said, small defense contractors shouldn't give up hope.

One piece of advice I can offer is to try looking at any partners where you act as value-added reseller or service provider. Propose to them a parlay of the relationship into the commercial space. You've probably done some great work with them in the federal space, and now is a good time to cash in on all that effort and ask for some latitude in the commercial arena.

At Thermopylae, we've been successful with our partner Google in their Enterprise Group, which recently named us Innovation Technology

Partner of the Year for Maps and Business Tools, and are now aligned as a service provider that can resell Google's software, with an emphasis on the Geo Tools part of the business, which we support development of with its engineering teams, in the commercial space. That opens up a massive distribution channel for us to put out our software as value-added for commercial customers.

“They need to trust that the institution that is the defense of our nation is not going to end. They need to trust in talented young people who need jobs.”

Another idea is for small businesses to invest in their internal intellectual property. If you see less work on the horizon, it could be the right time to focus on a new project or product you've been thinking about developing.

Also, don't forget to keep your message and brand alive. With government conferences and travel being canceled, you'll need to find ways to reach out directly to your customers, and potential customers, to stay top of mind.

We've been fortunate at Thermopylae, having had the benefit of some great advisers over the last few years who warned of sequestration's potential impact. Over the past two years, we've worked hard to follow up on commercial business opportunities with Google, for instance, which is now one of our largest partners. We also took every resource and dollar we possibly could and invested it back into our intellectual property, our software product line. Thankfully we are now seeing these efforts come together just when we need it the most.

Getting through this is going to take trust. Small businesses need to band together and trust each other for support. They need to trust that

the institution that is the defense of our nation is not going to end. They need to trust in talented young people who need jobs — take the risk and hire them. Use this opportunity to refresh your bench strength with candidates who otherwise might be scooped up by much larger firms.

There will be life after sequestration. When the small businesses who survive venture back into the new landscape, we can all be much better off with fresh talent and bright new ideas to provide to our clients across both the commercial and federal spaces.

# Tech Industry Warns Defense Policies Threaten to Stifle Innovation

By Sandra I. Erwin

The U.S. military has ambitious plans to deploy global information networks and equip troops with mobile devices that provide up-to-the-minute intelligence. These goals will be hard to achieve, however, because of outdated security policies and procurement methods, information-technology experts said.



Most of the products that the military needs exist in the commercial IT sector, and technologies such as mobile and cloud computing are advancing rapidly. But the culture of government, which puts secrecy ahead of sharing, is incompatible with commercial practices, said John M. Custer, a retired Army major general and director of federal strategic missions and programs at EMC Corp.

“Sharing is a dirty word to many people,” especially inside the Beltway, Custer said at an IT industry conference in Arlington, Va., hosted by Thermopylae Sciences and Technology.

The technology world is moving to cloud and mobile, where sharing is paramount, Custer said. As a senior officer at U.S. Central Command in 2006, Custer was overseeing information systems and was struck by the difficulties in sharing data with allied commanders. The CENTCOM commander at the time, Army Gen. John Abizaid, wrote a letter to the Joint Chiefs of Staff asking for permission to let seven British generals access the SIPRNet (secure Internet protocol router network), which is restricted to users with secret security clearances. The request was declined, Custer recalled. “The answer we got was, ‘spend a couple million dollars and build a SIPRNet light. Populate this new network so the British officers will have the same information that is on the SIPRNet.’”

That response captures the challenges faced by military commanders in the field who must work with partners and be able to exchange data, Custer said. “Policy and sharing are two different worlds,” he added. “There are many more people who worry about over sharing than under sharing.”

The way it typically works, he said, the operators in the field want to share, while the policy makers inhibit. “That’s not universal, but it’s been the paradigm,” he said. “It has dramatically changed over the past decade, but there are still a great deal of organizations that own a lot of information they don’t want to share.”

A.J. Clark, CEO of Thermopylae, said there are pockets of innovation in the military, although the Pentagon is still not able to fully take advantage of what commercial industry can offer. One of his company's clients, U.S. Southern Command, has adjusted its intelligence operations so that more information can be shared with Latin American military allies and civilian partners in areas such as humanitarian relief, counternarcotics and human trafficking detection, said Clark. The military excels at traditional intelligence collection methods such as overhead imagery and airborne electronic warfare. But being good at flying airplanes and launching satellites is not enough anymore, Clark said. "What we have is Google and social networks," he said. "How are we turning that advance in technology the United States is good at against our adversaries? It's lagging a little bit."

The intelligence community, he said, is starting to see the scope and quality of real-time information that is available out there on unclassified networks. The next step is figuring out how to take this information and start aggregating it, he said. SOUTHCOM already is moving in that direction.

“Saving money is one motivation to adopt commercial technologies.”

The latest Google cloud products are better, in terms of security, than what many government agencies have, Clark said. The challenge for the government is that, to make the best use of commercial cloud systems, it has to decide what information needs to be secure or classified, instead of trying to protect everything. After the latest wave of federal budget cuts, the government might not be able to afford to build its own clouds and will have to increasingly rely on much less expensive commercial alternatives, he said.

Companies such as Google fiercely protect their intellectual property and have invested billions of dollars in secure clouds. There is no logical reason why the government could not take advantage of this technology, said Michele Weslander-Quaid, chief technology officer at Google Federal. "From a policy perspective, the government has to catch up with best practices," she said.

Saving money is one motivation to adopt commercial technologies. But there is another, arguably more significant reason, said Clark, which is the need to retain skilled programmers and software engineers. His company specializes in Web-based geospatial systems, mobile software applications and cloud computing. This sector is seeing a government "brain drain," primarily of people under 30 who regard government contracting work as a hindrance to their careers and are opting for new opportunities in the commercial world, said Clark. "They expect cloud and API [application programming interface]," he said. "In our company we struggle to continue to bring a level of excellence inside the Beltway that is equivalent to what Google and Amazon have." Retaining the best talent is a daily battle, he said. "We constantly have to encourage our developers, 'It's OK, don't get frustrated, the government is getting there. Don't fret because they don't have any APIs.'"



Clark sees this is a worrisome trend. "What I have seen is a brain drain from this city," he said. "Folks from MIT and Carnegie Mellon, with security clearances, are leaving for startups in Silicon Valley. They don't care if they lose their clearance. They don't want to work in this space again. It's not creative," said Clark. "We are bankrupting ourselves and not creating technical depth for the future," he said. "It's important for the Department of Defense and the intelligence community to ensure the next generation of developers stay interested in this mission."

Thermopylae is one of many companies that is seeking to grow its defense business by offering commercial products that can be customized for government use. The geospatial imagery is a "fantastic market," said John Isaac Clark, the company's chief innovation officer. One of the newest products, called Google Liquid Galaxy, takes generic Google Earth and mapping data and creates an immersive dome-like digital environment that can be used to plan military operations or track drones flying over a battlefield. It can be set up for under \$10,000, compared to traditional military "caves" that might cost hundreds of thousands of dollars. The Air Force set up a system like this to monitor U-2 spy aircraft surveillance missions. "A user in the field with a laptop talks to the bird and sees what it sees," he said.

The government has an opportunity to save billions of dollars over time simply by transitioning legacy geo-intelligence systems to commercial technology, John Clark said. "The intelligence community is over saturated with tools that bring duplication and force users to have to understand eight different ways to interact and do the same job function." Google is not cheap, but it brings efficiency, he said. "It's one common way we all know how to look at geo data. Why pay for others?" And when analysts receive new imagery, it should not have to be copied to eight separate workstations. That adds up to huge operations and sustainment cost." |

# The Lifesaving Imperative of Adopting New Technologies

By A.J. Clark

The need for visual, real-time intelligence during battle has never been greater. Given the complexities of modern and often irregular warfare, many within America's defense and intelligence communities recognize the vital role of geospatial intelligence.

Gen. James R. Clapper, the Director of National Intelligence (ODNI), once said that geospatial intelligence is the "foundation for all other intelligence disciplines." It informs nearly every action from the command center to decision making by soldiers on the ground.

New geospatial technologies are rapidly linking operations and intelligence in ways never before conceived to protect soldiers.

However, as the defense and intelligence communities evolve, there are still barriers that slow the adoption of potentially lifesaving technologies. These barriers include redundancy, technological bloat, training difficulty, cost and data control among others.

For far too long, the defense and intelligence communities have had to rely on complex geospatial systems that were very cumbersome and time-consuming to use, which slowed down the ability to deliver real-time intelligence into the hands of the warfighter.

The next-generation of defense technologies has the ability to overcome these barriers. Instead of building massive new technology systems, innovators are creating nimble, user-friendly technologies that would be familiar to anyone with a smartphone or personal computer.

In addition, these new solutions are more cost-effective to implement, more streamlined and provide a level of simplicity and elegance that do not require intensive training. These new technologies are core to the situational awareness that drives decision-making for the Defense Department and the intelligence community. They provide users with the ability to quickly distribute and visualize life-saving information to soldiers in combat.

As far back as the Empire Challenge event in 2011, mobile smartphones were being tied directly to everything from biometrics analytics to full motion video feeds from live sensors. The technology has matured since that time and requires deliberately coordinated effort to make it into day-to-day military operations.

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For example, U.S. Strategic Command is leading the way with handheld GPS solutions that help the warfighter effectively navigate and lock in on key targets. These solutions allow the command to coordinate all of the intelligence, surveillance and reconnaissance capabilities required for U.S. and coalition forces to have a decisive edge that supports the mission and saves lives.

With sequestration and other fiscal pressures pushing down on America's defense and intelligence communities, the need to find highly cost-effective technologies is paramount. While budgets are being cut, the reality is that mission requirements and threats are only increasing, creating the need for innovative solutions that drive smarter and faster decision-making.

One way new technologies are addressing this challenge is by leveraging existing commercial systems. For example, Google Earth's web interface

can be modified to integrate and visualize intelligence data sources in one user-friendly location. This technology is evolving rapidly too.

These types of tools that modify Google Earth's interface can help reduce both cost and time to deploy a completely customized geospatial solution, as well as integrate with existing data sources for enhanced visualization and knowledge fusion.

Southern Command has used this approach for some time and their merged operations and intelligence picture provides concise information for expedited decision making. This technology provides unprecedented, real-time, visual information to protect soldiers.

These are examples of how providing actionable real-time intelligence has never been more important. For many years, both industry and defense leaders have played key roles in advancing innovations that meet these mission objectives.

“Times are changing quickly and it's imperative to take an adaptive view of new technologies.”

With threats continuing – whether natural or man-made – the need for the right geospatial intelligence solutions has never been greater. While we face diminishing budgets and two wars wind down, we all must collectively strive to provide the right solutions that bring operational intelligence to any situation, whether the battlefield or for a coordinated humanitarian response.

Times are changing quickly and it's imperative to take an adaptive view of new technologies.

Resistance to change was more of an option at one point, but compelling new drivers for change such as fiscal pressure are ushering in a new period where change must be embraced. Doing so will support the rapid convergence of operations and intelligence and, ultimately, save lives. |

# Industry Interview: Thermopylae Sciences and Technology

By Scott Parker

GIF 2013 Volume: 11 Issue: 1 (February)



*To start, could you tell readers a bit about Thermopylae Sciences and Technology?*

Thermopylae Sciences and Technology is a small company that's been around for six years. Our focus is on solving unique problems within the government IT space—ones that the larger companies aren't focusing on. By solving these problems in distinctive ways, we try to stand out as a company with a special culture akin to our partners such as Google, where they inspire creativity and openness amongst their development teams. Our developers can be as creative and innovative as they'd like. As such, we aim to come up with good ideas, while actually solving real government challenges at the same time.

*"Smart data" is a growing trend within government IT. What is behind this movement, and where do you see it leading?*

Smart data is an evolution of the "data deluge" that has occurred as a result of more sensors and intelligence collection assets. Today, everyone is accustomed to both creating and consuming more data. We aim to get the right data to the right person at the right time in the right context. The next step is developing applications for analyzing, collaborating and sharing data for making the right decisions. This is a concept called "smart apps." The apps are "smart" because we deliver them to users based on their context, which we call "context logic." Some of that logic could be based on the location of the user. Depending on where the user is—on the field or in a garrison— they may need a different set of applications. We spend a lot of time building the framework to manage that context logic in our product Ubiquity.

*What role do you see for cloud-based geospatial management in the future?*

Cloud-based geospatial management is interesting because much of it started in the intelligence community. The IC is unique because it can't necessarily use parts of the cloud that exist commercially. Our partner Google has a great capability called Google Map Engine, which is a cloud of geospatial servers that [provides] imagery and processing capabilities.

Say I am an insurance adjuster and I want to see which homes in an area had roof damage. I can take that imagery and put it onto a Google Earth globe and annotate the damages. The same applies to the military, which often uses classified imagery. As the IC has built their cloud infrastructure, it focuses on finding data with textual information—finding a possible adversary reported in the marketplace at the same time that a bomb detonated, as an example.

***Data fusion trends are creating new opportunities with data. How can “leavebehind technologies” help to introduce the government to new ways of using their information while, at the same time, not tying them to entrenched and expensive relationships with contractors?***

Operation Unified Response in Haiti is a great example of where we provided the operational data from partner nations, non-governmental organizations and U.S. agencies. There were some common rules that applied, which involved the U.S. sharing valuable data and providing the smart apps for users to consume that data. You also have to provide technology that is easy to use and is multi-lingual, resulting in a faster adoption rate. By using commercial cloud solutions, it is easier for partner nations to leverage leave-behind technologies, which often does not involve highly classified data.

For example, we use Amazon’s cloud, and instead of building a new cloud infrastructure, we apply the cloud to address the specific problems. It can scale up or down, and there is no shortage of studies showing the cost effectiveness of a cloud infrastructure. There are also ways for us to ensure secure collaboration. For example, many companies use Gmail and Google Apps for running their businesses. The security capabilities are already built in and at a low price. This approach also ties to open-source or free capabilities like Google Earth. So if an organization needs a map to collaborate, why not use a familiar leave-behind technology? There are no hosting costs. In addition, by adding smart applications like iSpatial as a framework on top of an Amazon platform, organizations can leverage many of these open, low or nocost technologies.

By investing time into architecting a way to bring these together, organizations can have a low-cost, leavebehind technology that enables them to stay connected and collaborate effectively. The government should identify the gap between open-source and lowcost commercial capabilities and focus their investment on the “glue” that pulls it all together so they own the framework to collaborate with partner nations at little to no cost.

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