

» GEOINT APPS FOR GOVERNMENT » LEARN ABOUT LIDAR » THE TERRAIN OF TERRORISM

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# trajectory

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## THE GEOGRAPHY OF CYBERSPACE

WHY 'WHERE' MATTERS







FOR THE AVERAGE SMARTPHONE USER,  
LOCATION-BASED APPS ARE COOL AND CONVENIENT.  
FOR GOVERNMENT AND DEFENSE, THEY'RE MISSION-CRITICAL.

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# mission: MOBILE

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BY MATT ALDERTON

*It's morning* in the new millennium. Jeff, a civilian, wakes up and checks the weather on his smartphone, making a mental note to remember his umbrella. He's out of coffee, so he adds it to his digital shopping list. Later, when he drives past the grocery store, he'll receive an alert reminding him to stop. He starts his day at the gym, where location-aware videos stream serendipitously to his smartphone, demonstrating proper form for each exercise in his workout when he arrives at the corresponding machine. He checks Facebook and sees that his neighbor is enjoying a morning swim, so he stops by the pool to say hello. After showering, he heads to work using whichever route his phone says is fastest—but not before filling his tank at a nearby gas station, which his phone tells him is the area's least expensive.

On the same morning, a soldier wakes up in Afghanistan. Although her day is nothing like Jeff's, she craves the same access to information. Like Jeff, she seeks mobile tools with which to navigate the people and places around her, maximize her resources, and inform her decisions. Thanks to cutting-edge government efforts, she has some of Jeff's favorite tools at her disposal. Many of them, however, she does not—yet.

"We've seen an explosion in the use of mobile apps," said John-Isaac Clark, chief innovation officer at Thermopylae Sciences and Technology, which provides mobile technology to the federal government. "But when you look at [technology in] the commercial sector and the government sector: Do government users have the same capabilities as civilian users? The answer is no, they don't."

Advocates in both the public and private sectors are working around the clock to change this, developing mobile apps that will one day give government users the same geo-dexterity as their civilian counterparts—in the office, on the road, and even on the battlefield.

#### A BUREAUCRATIC TECH BOOM?

If the adoption of new technologies were a race, it comes as no surprise: Government would be the tortoise and enterprise the hare.

[government entities] are taking a really hard look at how the mobile paradigm can benefit their employees, their agencies, and their missions," said Larri Rosser, chief engineer for Raytheon's Appsmart marketplace, an online shop that provides apps for users in the defense, intelligence, and first-responder communities. "Once they determine the benefits, they will leapfrog the commercial offerings and deploy some revolutionary capabilities."

Although it still has a long way to go toward realizing those capabilities, government already is moving in the right direction. In 2009, for instance, President Barack Obama appointed the first federal chief information officer with the goal of bridging the web-services schism that separates the public and private sectors. That was followed in 2012 by the introduction of the nation's first Digital Government Strategy.

"At a time when Americans increasingly pay bills and buy tickets on mobile devices, government services often are not optimized for smartphones or tablets, assuming the services are even available online," the president said in a 2012 memo. "[The Digital Government Strategy] will enable more efficient and coordinated digital service delivery by requiring agencies to establish specific, measurable goals for delivering better

at Agilex, which provides technology services to the federal government. "Everybody who works for the government has mobile devices. They might not be able to bring them to work, but they use them in their home. They see the power of what [these devices] can do and that puts pressure on [the government] to move forward."

#### EARLY ADOPTERS

Among the first government entities to recognize the benefits of LBS were the U.S. Army and the National Geospatial-Intelligence Agency (NGA), both of which have pioneered the adoption of mobile apps for the Department of Defense and the Intelligence Community.

The Army began its exploration in March 2010, when the service launched its "Apps for the Army" (A4A) mobile application-development challenge. Typically, the Army's process for acquiring and developing new software is time-consuming, often lasting several years from conception to implementation. By contrast, approving commercial mobile apps for the Apple and Android stores typically takes just two weeks. A4A helped the Army pilot a similar approach to rapid innovation.

As part of the challenge, the Army invited internal and external developers to submit apps in five categories: morale, welfare, and recreation; Army mission; information access; location awareness; and training. In total, 53 apps were submitted, 25 of which were ultimately certified for inclusion in an Army-specific app store—the U.S. Army Marketplace, which will eventually be part of a DoD storefront that will provide access to app stores across the Department of Defense.

Luke Catania, a computer scientist at the U.S. Army Topographic Engineering Center, was one of 15 winners who received a cash prize for app development. Like Waze, a commercial app that was launched in 2009 to help drivers report and navigate around traffic jams, his "Movement Projection" app for Android devices calculates the best and quickest off-road routes by allowing soldiers to input obstacles and threats.

"The Apps for the Army contest gave you 75 days [to develop an app]," Catania said. "The idea was: Let's see if you can

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—Luke Catania, computer scientist, U.S. Army Topographic Engineering Center

"The public sector as a whole tends to always be a step or two behind," acknowledged Jack O'Byrne, 311/CRM industry specialist at PublicStuff, which develops location-based apps for municipal governments.

Like the fabled tortoise, however, many expect government to eventually catch up with—and perhaps even surpass—the commercial sector. "I think

digital services [and] encouraging agencies to deliver information in new ways that fully utilize the power and potential of mobile and web-based technologies."

The impetus for public-sector innovation is coming not only from above, but also from below. "The consumerization of IT is having a major impact in the government," said Melissa Adamson, vice president of advanced technologies



develop something that would be useful in the field, and let's not worry about the bureaucracy it has to go through to get there ... It was a way to get a lot of people together, thinking about what a soldier would want in the field. Sort of like a big brainstorming session."

The acquisition process piloted during A4A would allow the Army and other government entities to imagine a mobile mission capability, then provide public-

and private-sector developers 30 days to produce prototypes of appropriate apps. Upon receiving proposals, commanders would vote on their favorite solution and give the developer 60 days to develop the final app to Army specifications. The result: a new solution in three months instead of three years.

"The government seems to be heading toward a path where they provide a statement of desired capabilities and

objectives versus well defined functional and performance requirements, and then look to the commercial marketplace to provide innovative, flexible, and lower-cost solutions that fit the fiscally constrained climate and profile," observed Kevin Brown, senior manager for GEOINT strategy at Raytheon.

Although the A4A project has yet to advance from "pilot" to "program," it was an important first step, as are the

## LOCATION-BASED GOVERNMENT

Built into mobile apps for government users, location-based services promise a host of geospatial-aware benefits across the public sector.

"Using location awareness as a part of a mobile app, governments can improve user services and alert citizens to upcoming events," said T.L. Neff, executive vice president of global client services for Verivo Software, which provides enterprise mobility

platforms for numerous government clients. "For example, multiple government agencies are developing apps to alert citizens to incoming inclement weather and notify them of pending road closures."

The Federal Emergency Management Association (FEMA), which introduced its mobile app in 2009, is one example among many.

"The FEMA app offers interactive mapping where users can find FEMA Disaster Recovery Center locations and shelters," Neff continued. "This information has the

maximum impact because the pointed alerts directly affect the user's current location."

These business cases point to a more engaged government, which can now deliver services that were previously thought to be unachievable, Neff said. Among the many other public-sector applications for LBS:

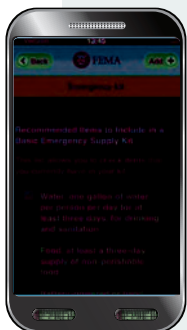
- **WAYFINDING:** Government agencies can use LBS in much the same way businesses do—to help citizens locate places and things. The National Park Service, for instance, has an app for the National Mall that provides turn-by-turn directions to landmarks and uses augmented reality to disseminate location-aware information. Likewise, Arlington National Cemetery's ANC Explorer app, developed in partnership with Geographic Information Services, Inc. and Army Installation Management Command, offers directions to points of interest within the cemetery, including more than 260,000 gravesites.

- **CIVIC ENGAGEMENT:** Location-aware apps can direct voters to the nearest polling place or help them discover their taxpayer dollars at work. For example, the Recovery.gov mobile app, published by the Recovery Accountability and Transparency Board, allows citizens to discover projects around them that were funded by the American Recovery and Reinvestment Act of 2009.

- **PUBLIC WORKS:** Many progressive cities—including Denver, Honolulu, Boston, Philadelphia, San Francisco, and Chicago, among others—have launched "311" apps that allow citizens to submit geo-tagged reports of hazards or eyesores such as potholes, fallen trees, and graffiti, then track their request from submission to resolution. In Florida, meanwhile, the National Park Service's I'veGot1 app allows people to report geo-tagged sightings of invasive species, thereby assisting with eradication.

- **DATA COLLECTION:** The "311" apps being developed by cities improve data collection as much as citizen services. In the case of graffiti reports, for instance, location tracking allows city government to map incidents, and then deploy police officers to high-risk areas for prevention. At the federal level, agencies like FEMA and the U.S. Census Bureau use apps to digitize and geo-tag everything from land surveys to damage assessments to population studies, simultaneously increasing data quantity and quality.

- **WORKFORCE MANAGEMENT:** Location-aware apps can also help governments deploy human resources more effectively. Military and law enforcement agencies, for instance, can use LBS to strategically deploy units to nearby incidents, improving mission speed and response time. Personnel at Arlington National Cemetery are likewise using the aforementioned ANC Explorer app to synchronize the teams involved with gravesite preparation and burials.



NGA'S APP STORES CURRENTLY BOAST SOME 150 APPS, APPROXIMATELY 75 PERCENT OF WHICH WERE DEVELOPED INTERNALLY.

efforts underway at NGA, which started developing geospatial apps in 2011. The agency launched three app stores in 2012—one for each of the three intelligence networks on which it operates: unclassified, secret, and top-secret.

"We wanted to leverage the current technology that everyone uses in their private lives, and use that technology to ... put the power of geo into the hands of the [government] user," explained Mark Riccio, director of application services within NGA's Online GEOINT Services Directorate, which manages NGA's app stores. "We wanted to make our information and our content as accessible and as extensible as possible, and mobile provides that."

Elsewhere in the federal government, more early adopters are moving ahead with the development of location-aware apps. The Defense Advanced Research Projects Agency launched a Transformative Apps program in 2010 with goals similar to those of A4A, focused on situational awareness for warfighters. The Defense Information Systems Agency is expected to open its

own app store this year, and the National Reconnaissance Office's Windshear program integrates biometric and location data for intelligence purposes on soldiers' handheld devices.

### CONFIDENTIAL COMPUTING

What makes mobile development efforts by the Army, NGA, and others so remarkable is how these programs have progressed in spite of considerable challenges, the most significant of which is security.

"The requirement government generally has is that government data—especially anything sensitive—can't be stored outside its own environment," Clark explained. "Mobile phones, because of storage [limitations], tend to send data that's created on the phone somewhere else [for processing]. When you're using location-based apps, your location data is sent over the network to a commercially hosted server that's fairly secure, but still out there on the open Internet. Government can't allow that."

Added Gabriel Chang, senior client IT architect at IBM, "Mobile security is

one area which is increasingly important to everyone. In the security spectrum, one item alone—malware—grew 155 percent across all platforms in 2011."

"It's really hard to develop a game-changing app when you can't even connect it to the network," said Tom Suder, president and founder of Mobile Government Solutions, also known as Mobilegov, which develops mobile apps—including LBS—for government clients.

In the case of military apps, especially, a fundamental challenge is network connectivity.

"The No. 1 requirement we hear [from government users] is we can't start on the assumption that we're going to have a solid network connection," said Ben Tuttle, a project scientist with NGA's InnoVision Directorate, which develops apps for the NGA storefronts. "Most of the commercial apps out there don't take that into account, and don't need to. But for us that's a big thing."

Along with connectivity, mobile technology requires agility—which government, unfortunately, lacks.

"[Mobile] capabilities require a more agile acquisition environment that provides access to a broader audience of potential application service developers with a much lower cost of entry," said Joseph Obermeier, vice president of Mission Analysis and Business Solutions at TASC. "The government has yet to develop a market engagement strategy to deal with this new and challenging environment."

Another major hurdle is funding. Government IT budgets are usually limited and restrictively earmarked, but app creation generally is also resource-intensive, requiring not only development, but also testing and deployment to multiple codebases.

"Mobile application development will likely keep pace with—or outpace—any traditionally developed programs in the [government] enterprise, and could easily surpass schedule and budget constraints if you are not careful," Chang explained.

Orwellian privacy concerns pose yet another challenge.

"The expectation of personal privacy has been much debated across the executive, legislative, and judicial branches of the government," Obermeier

## 3 REASONS TO EMBRACE LBS

**1 EFFICIENCY:** By automating data collection, sharing, and reporting, LBS allows governments to be more efficient and act on information more quickly. Streamlining is especially useful in law enforcement, homeland security, intelligence, and defense, where the distribution of information far, fast, and wide is mission-critical.

**2 COST SAVINGS:** Efficiency leads to cost-savings, another major benefit of LBS. In Philadelphia, the city's "311" app paid for itself within one month, according to Jack O'Byrne, 311/CRM industry specialist at PublicStuff. O'Byrne cited lower transaction costs for requests submitted electronically through the app compared to those submitted using the city's 311 hotline.

**3 BETTER LAWS:** Yet another perk of public-sector LBS is improved policymaking. Understanding what routes citizens drive to work, for example, can help lawmakers optimize decisions about infrastructure spending. "We've always had maps—and pretty good maps, in some respects—to help us understand where things in cities are," said Asif Khan, founder and president of the Location Based Marketing Association, a Toronto-based LBS trade association. "What we have now is the ability to understand where citizens are at any given time relative to those things. There are huge inefficiencies right now in how governments spend money. Those inefficiencies can be lessened if we understand how citizens flow around geo-addressable objects."

said. “However, location-based services bring a whole new level of issues to the forefront that will need to be resolved, such as individuals having some level of privacy expectation related to their location ... Many are becoming concerned, some even paranoid, about the potential possibilities which are now available to encroach on an individual’s privacy. Consequently, this upcoming set of location-based issues needs to have an open debate across the government.”

### THE WAY FORWARD

The growing number of apps already permeating local, state, and federal government is proof: The challenges facing LBS adoption in the public sector are temporary and surmountable.

“Where there’s a mission that needs these technologies, we see people trying to figure out how to implement them,” said Adamson.

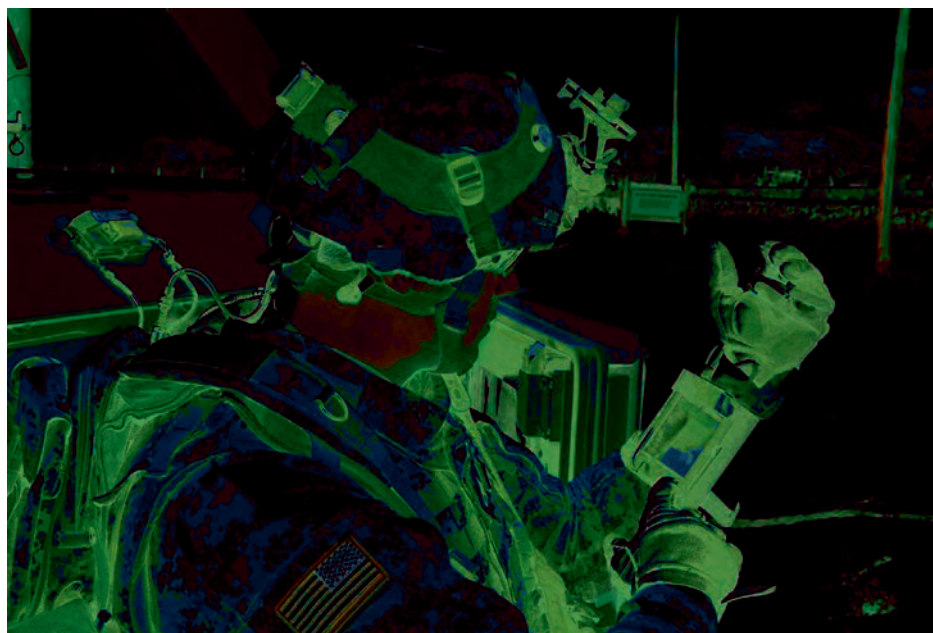
So far, the strategy that has advanced the public sector the farthest is inter-agency collaboration—traditionally rare, given the fragmented nature of government agencies.

“Before, government was in silos,” Suder said. “Mobility to a large degree has broken the ice on that. With budgets the way they are, people are more willing to share information. It’s changing the way we’re doing business in government. It’s a little unprecedented.”

Catalyzed by the Digital Government Strategy, federal agencies are actively sharing best practices and lessons learned.

“Reaching out to others that have been successful has a lot of legs,” Adamson said. “Never before have we seen so much agency collaboration because people really do want to move forward.”

NGA, in particular, has embraced collaboration and is working actively to partner not only with other government agencies, but also with the private sector. NGA’s app stores currently boast some 150 apps, approximately 75 percent of which were developed internally, with the remaining 25 percent coming from commercial developers. According to Riccio, the agency is in the process of developing a compensation model that would allow it to invert that ratio by



paying private developers based on user downloads, thus maximizing creativity and minimizing cost.

“There’s a lot of innovation happening in the private sector,” Riccio said. “We want to be able to capitalize on that.”

NGA’s InnoVision Directorate has likewise pursued a public-private part-

ner partnership through a series of mobile app summits, bringing government developers face-to-face with those in industry and academia.

“If you don’t start building solutions and capabilities today, eventually we’ll

**STAFF SGT. REAG WOOD** of 1st Combined Arms Battalion, 5th Brigade, 1st Armored Division, illustrates how he uses an iPhone to obtain a visual during a field training exercise at White Sands Missile Range, N.M.

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—Mark Riccio, director of application services within NGA’s Online GEOINT Services Directorate

nership through a series of mobile app summits, bringing government developers face-to-face with those in industry and academia.

“No one group is going to be able to tackle and surmount all the challenges that face us,” Tuttle said. “So, we’re actively growing our community and encouraging folks to talk to one another.”

Along with increased collaboration, advocates say the public sector can stimulate LBS adoption by re-allocating

solve the challenges and there will be absolutely nothing for the user to use,” Clark said.

Agilex Chief Technology Officer Tim Hoechst agrees: The only way to reach Destination Mobile is to start moving.

“The question, ‘Should I start to go mobile?’ is an old question,” Hoechst said. “There is no more, ‘Should I?’ [Mobile] is going to happen in every part of every agency that has information and people who need it.” ■