

# DHS Embraces Remote Sensing



The U.S. Department of Homeland Security is implementing a dynamic environment to integrate and share Earth imagery.

*By Ron Langhelm, HLS GeoCONOPS Project lead, Booz Allen Hamilton (www.boozallen.com), Seattle.*

The homeland security community comprises a diverse set of stakeholders, crossing all levels of government. The U.S. Department of Homeland Security (DHS) was established to coordinate and unify this community to ensure a safer, more secure and resilient nation.

To drive these objectives, DHS has five broad areas or core missions: prevent terrorism and enhance security, secure and manage U.S. borders, enhance and administer immigration laws, safeguard and secure cyberspace, and ensure resilience to disasters. These core missions rely heavily on location-based decision-support capabilities to provide situational awareness and a common operating picture for an array of DHS operations centers that monitor and evaluate critical infrastructure and visualize the impact and extent of natural and man-made disasters.

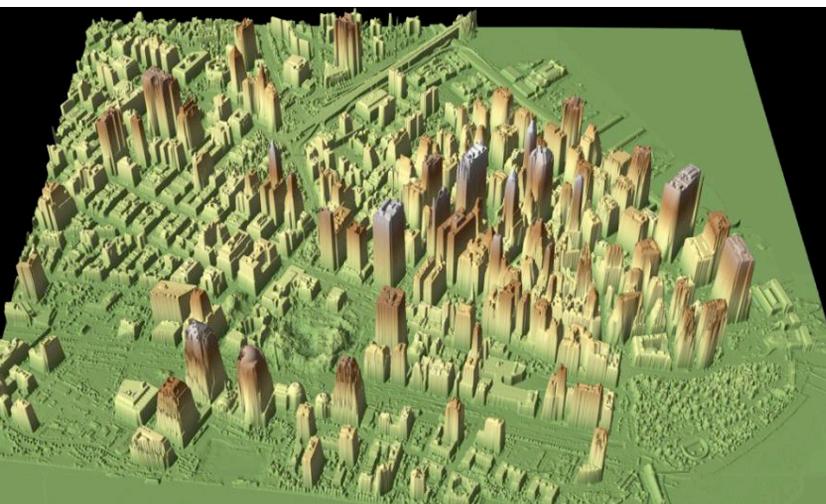


## Making the Most of Geospatial Data

The DHS Geospatial Management Office (GMO) was established under the Intelligence Reform and Terrorism Prevention Act of 2004 to lead and coordinate geospatial programs that support the DHS Homeland Security Enterprise ([www.dhs.gov/homeland-security-enterprise](http://www.dhs.gov/homeland-security-enterprise)). GMO also leads and coordinates the department's geospatial requirements for homeland security-related activities.

Recognizing the potential benefits that Earth imagery offers to the department and the greater homeland security community, the DHS GMO is leading several significant efforts to improve coordination among stakeholders and increase the use of geospatial and remote sensing information. These activities include maximizing geospatial and remote sensing technology within DHS, collaborating on the federal geoplatform, managing the Geospatial Information Infrastructure (GII) program and leading the Geospatial Concept of Operations (GeoCONOPS) effort.

These and many other DHS initiatives have come to rely on high-resolution Earth imagery to support their operations. The ability to compare imagery before and after an incident directly supports operations such as damage assessment, security planning, debris removal, law enforcement, situational awareness and many others. In addition, the ability to examine imagery temporally is an efficient way to assess damage. Imagery is also unique in its ability to capture detailed information of large areas quickly and is



*DHS takes advantage of a range of Earth imagery products, including (from top to bottom) orthophotography, aerial oblique imagery and LiDAR imagery.*

essential for situational awareness after a major emergency.

A key requirement for these missions is access to accurate high-resolution imagery that's delivered within 48 hours or less of an incident. Advances in remote sensing technology for positioning and processing continue to advance, making data delivery within hours of an incident realistic. Due to the increasing demand for imagery and technology's ability to deliver the information within the rapid timelines required, DHS has begun to standardize its technical requirements and procedures for acquiring, delivering and sharing imagery to support incidents that affect all aspects of homeland security.

### Coordinating and Provisioning Remote Sensing Services

The U.S. Coast Guard and U.S. Customs and Border Protection have a large fleet of aircraft that routinely collect imagery to support their internal operations and assist others during emergencies. In addition, DHS takes advantage of a broad array of satellite and airborne imagery sources from federal partners and commercial providers.

GMO invests considerable resources to coordinate with other federal agencies that support DHS during emergency and non-emergency incidents to identify imagery that will benefit decision makers and avoid duplication. GMO also maintains ongoing interaction and technical exchange with the private sector to better understand the changing capabilities of the surveying and mapping industry and to communicate the department's requirements to commercial providers to help them develop capabilities that will benefit DHS and the greater homeland security community.

GMO is working with emergency management mission owners to implement an annual testing program that will examine all aspects of acquiring and delivering imagery under the severe time constraints required during an emergency incident. The mission owners will help design the size, scope and delivery requirements for each year's test, examining different types of emergency incidents each year. These will be real-world tests, not simulations.

The tests will evaluate the ability of commercial providers to respond under the challenging conditions encountered

*GeoCONOPS aims to reduce redundancy and confusion and ensure efficient access to geospatial information across numerous agencies and organizations.*

during an emergency event as well as evaluate the government's ability to quickly decide on the imagery needed to support an emergency incident and to publish the processed imagery data for access across the department, including desktop and mobile devices. A critical part of these tests will

## Advances in remote sensing technology for positioning and processing continue to advance, making data delivery within hours of an incident realistic.

be to examine the successes and failures encountered; to look at what went well and what didn't, and to work with mission owners to revise and to document procedures, specifications and requirements based on lessons learned from the tests.

### GII Functionality

Imagery acquired internally or from commercial providers is published and shared through the DHS GII, which is the department's enterprise capability for discovering, publishing and accessing geospatial information through secure, trusted connections. GII is accessible across the department and provides the architecture used for many mission-critical systems. In addition,

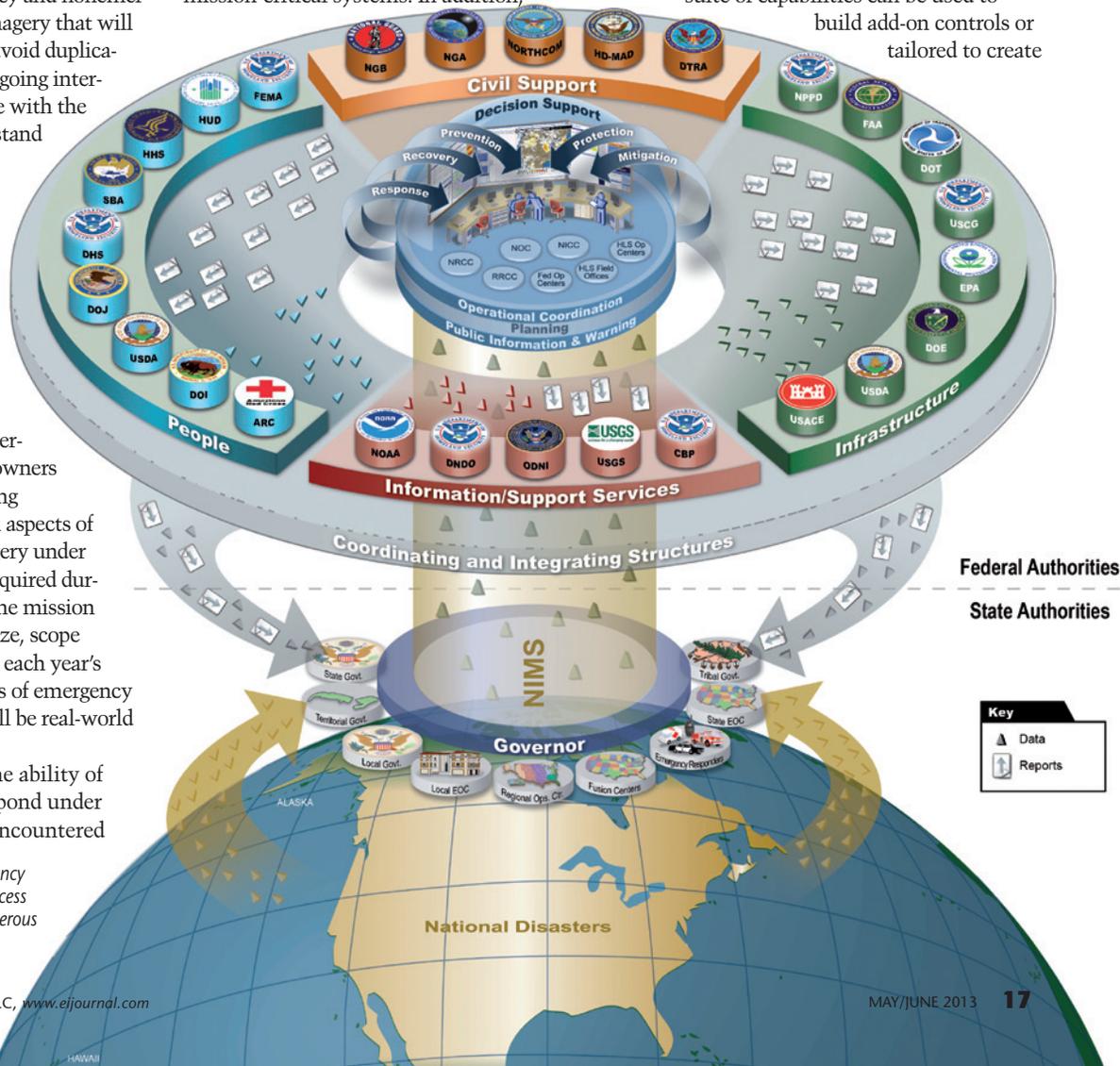
GII delivers high-performance Web services, allowing imagery to be accessed by any DHS field office or command post.

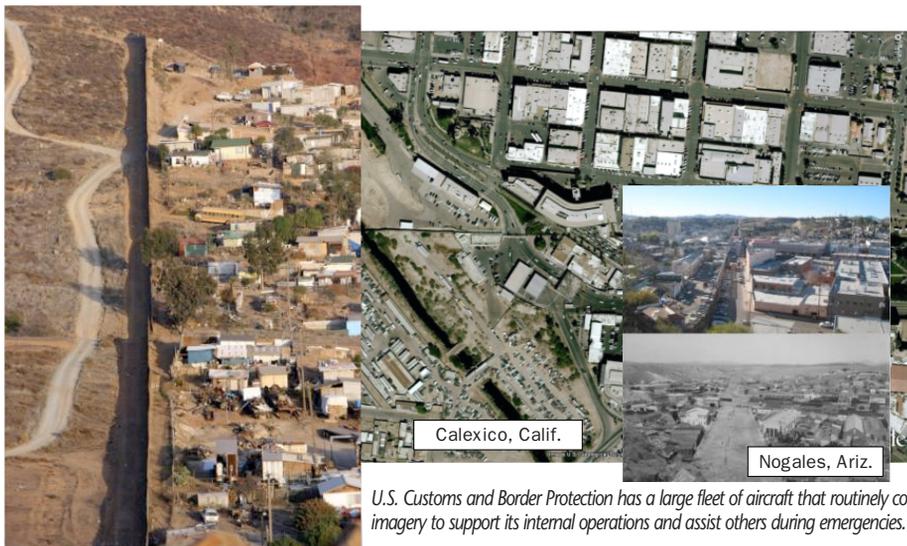
GII was designed so existing mission-critical systems could consume geospatial information from the GII without the need for extensive modification. Users who don't

have access to a mission system can still take advantage of GII data and tools through the DHS OneView visualization platform, a Web-based mapping application and visualization framework delivered through GII.

OneView provides end users access to a rich interface for viewing maps of critical infrastructure, natural hazards data, aerial imagery and other user-defined data sources as well as performing spatial analysis such as querying, geocoding and routing functions. OneView provides system owners and developers access to the same geospatial content as well as a rich set of reusable standards-based services that can be integrated easily into existing DHS Web-based systems. This suite of capabilities can be used to

build add-on controls or tailored to create





U.S. Customs and Border Protection has a large fleet of aircraft that routinely collect imagery to support its internal operations and assist others during emergencies.

### Complementary Efforts Speed Mission Response

These efforts collectively ensure that the use of imagery will continue to grow and expand across DHS as well as support the department's homeland security community goals. The GeoCONOPS efforts provide increased visibility and understanding of emergency response, recovery and mitigation missions as well as their information requirements, shaping the types of imagery that are useful and the timelines when the information is needed. With this, imagery resources are applied to all phases and missions within the community while providing an increased level of standardization in the types of imagery that are requested in response to emergency incidents.

When missions know with confidence when and where imagery will be available, coordination and communication efforts are reduced because partners can develop standard operating procedures. The DHS GII provides an expandable architecture to publish imagery and geospatial information and services for missions across the department. GeoCONOPS provides a forum for members of the homeland security community to better understand emergency management missions and to standardize data, tools, architectures and procedures to improve mission effectiveness and to provide increased assistance to citizens impacted by incidents. For more information, contact GMO at [GMO@HQ.DHS.GOV](mailto:GMO@HQ.DHS.GOV). [E]

custom Web-based mapping applications. OneView's design is based entirely on a Service Oriented Architecture (SOA) and built using approved DHS technologies and commercial capabilities to create a lightweight platform with rich content and robust tools.

### GeoCONOPS Development

GMO is also coordinating the development of the homeland security GeoCONOPS document, which serves as a mission blueprint for federal agencies and provides geospatial support to all aspects of homeland security, including emergency assistance to state and local governments, tribal nations,

eligible private nonprofit organizations and individuals affected by major disasters or emergencies.

This multiyear effort includes participants from federal, state and local government; nongovernmental organizations; and others. Through its adoption into the National Preparedness System and Presidential Policy Directive 8, GeoCONOPS has become a critical part of federal doctrine. GeoCONOPS is designed to align with other significant federal policies that include the National Incident Management System, the Incident Command System and the National Response Framework.



## Expedite National-scale Flood Monitoring with RADARSAT and MDA

Each year, seasonal flooding claims lives and wreaks havoc on a global scale. To effectively mitigate flood risks, disaster management organizations need accurate geospatial data as an input to hazard models.

MDA contributes to national-scale flood hazard analysis and response capability with the rapid generation of:

- Digital Elevation Models for hydrological modeling and landslide risk analysis
- Ortho Rectified Radar Images for accurate feature identification and broad-area flood monitoring services
- Detailed, accurate flood products
- Global imaging with cost-effective, flexible weather-independent acquisitions

RADARSAT imagery is a key component of multi-tiered national strategies for disaster mitigation, assessment, and response.

[www.mdacorporation.com](http://www.mdacorporation.com)

