

June 2, 2010

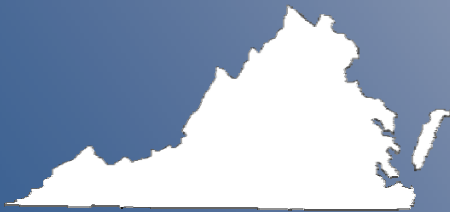


Commonwealth of Virginia

Virginia Interoperability Picture for Emergency Response (VIPER)

Category

Information Communication Technology Innovations



Nomination Submitted by

Samuel A. Nixon Jr.
Chief Information Officer
Commonwealth of Virginia
Virginia Information Technologies Agency

2010 Commonwealth of Virginia NASCIO Award Submission
Category: Information Communications Technology Innovations
Project: Virginia Interoperability Picture for Emergency Response (VIPER)

Executive Summary

The Virginia Interoperability Picture for Emergency Response (VIPER) is a crisis management data aggregation project of the Virginia Department of Emergency Management (VDEM). With VIPER, Virginia pioneered production of detailed visual imagery which assimilates multiple data streams to assist emergency responders, decision makers and citizens.

VIPER uses a Web interface to acquire and integrate real-time data from numerous sources with geospatial information. It provides a timely, accurate and user-defined operating picture, which allows decision makers to perform “real time” analysis of previously disparate information. VIPER facilitates situational awareness at all levels of government and improves response times for first responders. Citizen awareness also has been facilitated through social media tools, including Twitter and an iPhone application.

VIPER is an open-source application, constantly running analytical tools and operational planning overlays to provide comprehensive situational awareness. Additionally, it provides the ability to utilize previously static planning efforts in a dynamic environment. VIPER data can be updated instantly from the field or command center. Requirements are user-defined and role-based.

In addition, the system has been designed so that only information that reaches a certain critical level will automatically notify the user of its existence. This characteristic further leverages the value of the system to sort multiple streams of real-time data, recognize actionable information for decision makers and enable more rapid response in an emergency.

The VIPER concept originated in Virginia and now is used 24x7x365 in the Virginia Emergency Operations Center (VEOC). VDEM can anticipate major weather events, monitor systems, brief leaders, and alert decision makers and citizens to developing situations. The Web-based system is available to emergency partners at local, state and federal levels.

VIPER first launched in August 2008 and has since been fielded successfully in support of several important statewide response operations. It is being lauded nationwide for its ability to provide previously unattainable situational awareness. Virginia now is assisting other states and governmental entities with development of situational awareness pictures.

Using existing Commonwealth assets, including hardware, software and manpower, VIPER was developed with no costs beyond staff time.

Description of the business problem and solution

Emergencies require acquisition, processing, and analysis of disparate information by decision makers in a time-constrained and often rapidly-changing environment. Understanding what is happening, when and at what location is critical to determining what must be done.

With the wealth of information now available to decision makers and emergency/first responders, part of the business problem has moved from one of information availability to one of information selection - amidst sometimes overwhelming volume - and also one of effective combination and display.

Further, in the case of emergency management, effective direction of responders to appropriate sites based on level of criticality and opportunity for positive intervention becomes vital. If responders are sent to a wrong location or are unable to find the location to which they have been instructed to report, manpower is unavailable or delayed.

In emergency situations, a gap can mean the difference between life and death at worst, with cascading possibilities showing less than desirable outcomes beneath this worst case scenario.

Therefore, production of timely, accurate situational awareness in a fast developing situation became the stated business problem. To most effectively manage information used to direct response to emergencies and other situations, the Virginia Department of Emergency Management (VDEM) developed the Virginia Interoperability Picture for Emergency Response (VIPER).

VIPER first launched in August 2008. It acquires a multitude of emergency-generated and other information with a geospatial reference and then efficiently and economically displays different combinations of this data as defined by user requirements.

VIPER is a Web-viewable GIS-based enterprise platform that integrates numerous information systems and about 250 data feeds. The system allows emergency commanders, first responders, police, fire fighters and government officials from local, state and federal agencies to tap into a single information resource to define and gain an accurate, visible picture of events in real time.

The VIPER system is based at the Virginia Emergency Operations Center (VEOC), a collaborative command-and-control facility developed as a part of the state's overall continuity-of-operations planning. VDEM is the recognized business owner of the center; many state agencies as well as federal and local entities collaborate through VEOC in the interest of public safety and response.

VIPER is an open-source application of real-time information, constantly running analytical tools and operational planning overlays to provide comprehensive situational awareness. Additionally, it provides the ability to utilize previously static planning efforts in a dynamic environment. VIPER can be updated from the field or command center. Requirements are user-defined and role-based.

In addition, the system has been endowed with a “brain” so that information that reaches a certain critical level (and only certain levels) will automatically notify the user of its existence. This characteristic further leverages the value of the system to sort multiple streams of real-time data and recognize actionable information for decision makers.

As VIPER moved into production, additional users and managers were recruited to help define data which would be most useful to them. This process meant that the approximately 400 members of the Virginia Emergency Response team, including federal and state agencies, private and volunteer partners, had opportunities to develop their own requirements and usage methods. This hands-on outreach and involvement was a key part of project communication.

The VIPER team represents the spirit of open source and freely shares the application source code with any local, state, or federal agency that would like to develop its own common operating picture. The only requests accompanying this code share are for return share of code creations, and that users must not profit.

VIPER leverages the ESRI platform and Virginia Geographic Information Network (VGIN) geospatial data. It also accesses a vast array of data – over 250 sources, from Twitter feeds to state-specific information from local, state and federal sources.

Though the system was created to assist decision makers and emergency responders, its design also facilitated development of citizen-facing alerts. VIPER produces a citizen-facing Twitter feed, and a free iPhone application now is available. Public-facing information is vetted and then disseminated by authorized VDEM staff.

View VIPER online: <https://cop.vdem.virginia.gov/viper/> VIPER homepage with briefing and screenshots: <https://cop.vdem.virginia.gov/>

VIPER is one of the featured systems in a commercial video by ESRI; see video and screenshots: <http://www.youtube.com/watch?v=0l4kH4NwhZU>.

Significance

VIPER provides a timely, accurate and user-defined operating picture to allow decision makers to perform “real time” analysis of previously disparate information. VIPER facilitates situational awareness at all levels of government.

VIPER now is being used by multiple levels of decision makers to portray normal patterns and new combinations of data that can then be used as a basis for levels of abnormality in the future.

VIPER closely aligns with each of five goals of the [Commonwealth Strategic Plan for Information Technology](#). It increases accessibility to government, including increased electronic interaction with and to government, increased information availability and usability; it is a model partnership initiative between state, local and federal government entities, and the citizen alerts through social media increase awareness of available services in a format already consumed by many citizens.

VIPER is an innovative partnership program which greatly facilitates IT collaboration. The solution supports common business processes across many governmental entities in emergency situations, thanks to agile architecture and easy data share across government boundaries. The project illustrates achievement of a knowledge-sharing culture.

The product ensures consistent, anytime, anywhere service levels for public servants and citizens. At the same time, through role-based access, it securely protects the assets of Commonwealth systems and the privacy of her citizens.

VIPER creates a reputation of performance for technology that is responsive and results-oriented; its architecture allows for continuous improvement as new technology becomes available, and it has been created using existing assets in a time of budget scarcity. VIPER also enables a mobile workforce with two-way communication, putting vital and real-time information in the hands of first responders to the benefit of citizens in crisis.

VIPER closely aligns with NASCIO's top State CIO priorities, including *strategies* of consolidation, shared services, budget and cost control, security, e-discovery and *priority technologies* including content management, unified communications, identity and access management, geospatial analysis and GIS, business intelligence and mobile workforce enablement.

The target audiences and beneficiaries include both government and citizens. Its unique partnerships and deployment at the VEOC stream benefits to local, state and federal governmental entities across a wide spectrum of business functions.

Benefit of the project

With the annual hurricane and forest fire seasons approaching and vigilance for possible terrorist attacks always a requirement, VIPER stands ready to assist first

responders, law enforcement, decision makers and citizens. Even during non-emergency periods, VIPER is accessed daily at the Watch Center.

Though emergencies are by nature unplanned events, VIPER now has been successfully fielded in support of statewide response operations for several high-profile incidents with broad citizen impact including the Presidential Inauguration, the November Nor'easter of 2009, the historic snow storms of February 2010, and numerous smaller events in Virginia.

Even during non-emergency periods, VIPER is accessed daily by VDEM staff at the Watch Center and other emergency management professionals at all levels of government.

The system primarily was created to assist decision makers and emergency responders, but its flexible data-sharing design also facilitated development of citizen-facing alerts using freely available social media channels.

No budget existed for the VIPER project, beyond existing assets and the innovation, dedication and vision of VDEM staff. Open source code was used in development, creating a cost avoidance opportunity.

VIPER represents a significant return on other investments made by the Commonwealth in recent years. It runs efficiently and securely due to Virginia's earlier development of the VEOC including a hardened data center on site. The state's proximity to the nation's Capitol, previous experience with emergencies including terrorist attacks and hazardous weather systems, and significant defense installations in the state prompted creation of this secure facility as part of Virginia's overall emergency planning.

VIPER also leverages the Commonwealth's investment in the Virginia Geographic Information Network's (VGIN) geospatial imagery including road centerline data from localities and digital orthophotography. A complete "flyover" of the state in 2008-09 created a pinpoint-accurate aerial view of the Commonwealth as a base GIS layer. Localities and state agencies participate in significant two-way geospatial communication through VGIN; at least quarterly, localities update information.

Cost savings are difficult to quantify, because VIPER offers previously unavailable functionality. Speed and effectiveness of response are vastly improved thanks to its expansive ability to unite and display disparate data. Results are displayed instantaneously according to user requirements; gathering similar data and marrying it effectively could have taken hours if not days.

The concept for VIPER originated in Virginia. While the original business problem was identified at the Virginia Emergency Operations Center, it became clear as

the project moved forward that the solution had a target audience well beyond the Center. In fact, national interest has been generated in Virginia's solution.

Both the U.S. Congress and the Virginia General Assembly have requested ideas on how to expand use of this tool for emergency management and disasters.

Since VIPER's deployment in Virginia, its source code has been given to several government entities to help create situational awareness pictures, including the Florida Department of Emergency Management (GATOR), the Georgia Department of Emergency Management (GoDAWGS), and Miami-Dade Emergency Management (FLIPPER). The team has worked with governmental entities from as far away as Singapore.

Virginia is now part of a nine-state effort under the Department of Homeland Security to demonstrate how well the system portrays situational awareness. VIPER now is included in the Virtual USA (vUSA) project sponsored by the Department of Homeland Security's Science & Technology Directorate.