May 10, 2013
Award Submittal

URISA EXEMPLARY SYSTEMS IN GOVERNMENT AWARD (ESIG)
The Department of Homeland Security Common Operational Picture (DHS COP)

Submitted by:
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A. SYSTEM

The Department of Homeland Security, National Operating Center, Common Operational Picture (COP) is a system that provides information to numerous federal, state and local first responders, emergency managers and incident commanders to support improved situational awareness and decision making.

A.1 NAME OF SYSTEM AND ESIG CATEGORY

ArdentMC and the Department of Homeland Security (DHS) Geospatial Management Office (GMO) submit the Common Operational Picture for an URISA ESIG Award in the category of Enterprise Systems.

A.2 LETTER FROM THE EXECUTIVE ADMINISTRATOR AUTHORIZING THE SUBMISSION – APPENDIX A

May 10, 2012

Kari Brennan
Education Manager
701 Lee Street, Suite 680
Des Plaines, IL 60016

RE: LETTER OF AUTHORIZATION

Ms. Brennan,

It is with great pride in the Department of Homeland Security’s Common Operational Picture (COP) team that I submit this award submission for the URISA Exemplary Systems in Government Award in the category of Single Process Systems.

The DHS COP is an application that supports the DHS mission of responding to threats and hazards to the nation by collecting, sharing and displaying multi-dimensional information that facilitates collaborative planning and responses to these threats. The DHS COP addresses the enormous responsibilities and challenges facing NOC - the single national entity to unify situational awareness and response, recovery and mitigation functions.

With the rapid and successful adoption of the COP across the entire federal space, it provided the spring-board needed to really progress the conversation around information sharing between components and agencies within the government. From these conversations, agencies are now working to adopt the DHS COP or expand their systems to allow for the flow of information between systems.

Thank you for your consideration.

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A.3 ONE PAGE SUMMARY ON SYSTEM ACCOMPLISHMENTS AND WHY IT’S EXEMPLARY

The Office of Operations Coordination and Planning (OPS), National Operations Center (NOC), has a statutory responsibility (Section 515 of the Homeland Security Act (6 U.S.C. § 321d(b)(1))) to provide situational awareness and establish a common operating picture for the federal government, and for state, local, tribal governments as appropriate, in the event of a natural disaster, act of terrorism, or other man-made disaster, and (2) ensure that critical terrorism and disaster-related information reaches government decision-makers. To meet these statutory requirements a team comprising of subject matter experts (SMEs) from the NOC and information technology specialist from the DHS Office of the Chief Information Officer (OCIO) was established. This team successfully rolled out the DHS COP prior to the 2012 hurricane season and in time for the June 2012 National Level Exercise that now serves as the core DHS situational awareness (SA) capability for effective decision-making, rapid staff actions, and appropriate mission execution.

The DHS COP is an application that supports the DHS mission of responding to threats and hazards to the nation by collecting, sharing and displaying multi-dimensional information that facilitates collaborative planning and responses to these threats. The DHS COP addresses the enormous responsibilities and challenges facing NOC - the single national entity to unify situational awareness and response, recovery and mitigation functions.

The DHS COP addresses the challenges in the expanding information environment by harnessing the information flood to rapidly find and apply the relevant contextual relationships needed to interpret implications. This situational awareness capability, utilized by NOC, is now supporting decision-makers such as the White House, DHS Secretary and Deputy Secretary, DHS operations leadership as well as other key staff at the federal, state, tribal, and local levels. COP stakeholders are benefiting by receiving consistent, timely and accurate reporting of critical information for events of national/international significance. The DHS COP is automating and facilitating the receipt and ingest of electronic correspondence from multiple sources such as private entities and federal and state agencies. The benefits of these enhancements include real time situational awareness, alerts, advanced analytics, data visualization and collaboration with the DHS Geospatial Information Infrastructure.

The DHS COP has been fully functional since May, 2012, and is now being used on a daily basis to support the operational needs of the DHS NOC, including for ongoing wildfires, floods, severe weather, national security special events and other missions. During the National Level Exercise conducted in June 2012 and during Hurricane Sandy, the DHS COP was the single resource used by all mission partners for situational awareness and sharing of information. Currently, the number of DHS COP users had exceeded 3,400. Users represent over 40 different DHS mission areas and over 50 partner federal departments and agencies. In addition, roll out of the DHS COP beyond federal mission partners has been initiated, with multiple state and local fusion centers and non-governmental organizations currently on aboard.

A.4 THREE USER TESTIMONIALS – APPENDIX B
B. JURISDICTION

B.1 NAME OF JURISDICTION
DHS Office of Operations Coordination and Planning (OPS) - National Operations Center (NOC); Developed and Maintained by DHS Office of the Chief Information Officer (OCIO) – Geospatial Management Office (GMO).

B.2 POPULATION SERVED BY THE ORGANIZATION/AGENCY
Senior federal decision-makers including the DHS Secretary and Deputy Secretary, White House Situation Room, national security staff, and DHS operations leadership as well as other key staff at the federal, state, tribal and local levels to include first responders, emergency managers and incident commanders. Current user count is over 3,400 and expands daily in terms of number of users and breadth of outreach.

B.3 ANNUAL TOTAL BUDGET FOR JURISDICTION
$4 million

B.4 NAME, TITLE, AND ADDRESS OF CHIEF OF ELECTED AND OR APPOINTED OFFICIALS
Richard Chávez
Director, Office of Operations Coordination and Planning
245 Murray Lane SW, Building 410
Washington, DC 20528

B.5 NAME, TITLE, ADDRESS, TELEPHONE, FAX, AND EMAIL FOR THE CONTACT PERSON FOR THE SYSTEM
David Alexander
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C. SYSTEM DESIGN

*COP uses cutting-edge technology coupled with Agile software development and existing DHS enterprise services to deliver robust functionality and rapid deployment to mission stakeholders.*

C.1 WHAT MOTIVATED THE SYSTEM DEVELOPMENT?

DHS was plagued with an information sharing problem due to 32+ Common Operational Pictures (COP) across the department. The Legacy DHS COP had not been updated since 2007, and it was obvious the system needed an over-hauling to better serve the needs of both the NOC and the entire federal government. With a focus on common technologies, information sharing through common standards, and the utilization of existing enterprise services, the legacy system was overhauled in just three months using Agile development methodology. Focusing on user requirements and mission needs, it was obvious that the legacy system lacked some fundamental functionality that was needed to help everyone complete their missions. This included improved information sharing between agencies and users, ease of use, enhanced geospatial and mapping capabilities, alerting and the ability to more rapidly triage and respond to mission critical data. Since development focused on these goals and the actual system users, adoption of the new DHS COP has been overwhelming.

C.2 WHAT SPECIFIC SERVICE OR SERVICES WAS THE SYSTEM INTENDED TO IMPROVE?

The improved COP was intended to improve the following areas of performance:

- **Data and Information Assessment** - Providing an easy to use integrated suite of tools for incident data management and dissemination.
- **Facilitate Interoperability** - Allow sharing (within DHS policy guidelines) of incident data across systems such as Homeland Security Information Network (HSIN), Geospatial Information Infrastructure (GII), and fusion centers’ systems.
- **Visualize Information** - Develop new and useful ways of displaying reports and updates along with other relevant data in clear and manageable structures.
- **Display Geospatial Information** - Allow reports and other information to be displayed automatically in a geospatial tool.
- **Facilitate Collaboration** - Allow trusted users to view, create, update and share incident reports and information. Allow local responding agents direct access to reports.
- **Archive Information** - Ability for the COP users to retrieve all historical information from a data archive.

C.3 WHAT, IF ANY, UNEXPECTED BENEFITS DID YOU ACHIEVE?

With the rapid and successful adoption of the COP across the entire federal space, it provided the spring-board needed to really progress the conversation around information sharing between components and agencies within the government. From these conversations, agencies are now working to adopt the DHS COP or expand their systems to allow for the flow of information between systems. A National Information Exchange Model (NIEM) standard is even in the works for federal incidents.
Due to the successful DHS COP, the development team was asked to lead a spin off project, Request for Information (RFI), that was deployed in late September 2012 with 100 users and 500 RFI’s answered in the first month. RFI is a solution tool to maintain, tracks and manages official inquiries. This project is expected to have 3,500+ RFIs per year and further enhance DHS’s ability to fulfill its mission.

Another unexpected benefit of the COP project was the tasking to create a mobile application that could work with the DHS COP. From this, Sentry Mobile (Sentry) was selected and customized. Sentry is an event management tool featuring real-time collaboration and communication for security leadership, first responders and law enforcement professionals using a social media style event stream on a mobile platform. Other unique features of the application include GPS-enabled asset tracking in space and time, intuitive mapping tools, location-aware photo management, location-aware status boards and reporting capabilities. The app is able to work with existing command center desktop applications to add mobile capability. The application consumes data from the COP web application to show events and incidents as a live feed within the Sentry interface.

C.4 WHAT SYSTEM DESIGN PROBLEMS WERE ENCOUNTERED?
The most significant problems are oddly associated with the success of the project. Some of these included:

- Needing to expand the physical footprint to account for increased traffic.
- Needing to work closely with data center personnel to allow for information sharing traffic across the data center.
- Needing to rapidly expand aspects of the software to allow other agencies to push their data to the COP without human interaction.

Additionally, due to the utilization of many technologies and existing enterprise services, system designers and implementers had to work very closely with each other, often against their personal agendas, to ensure the successful launch and further enhancements of the application.

C.5 WHAT DIFFERENTIATES THIS SYSTEM FROM OTHER SIMILAR SYSTEMS?
The system differentiates itself from other resources by:

- The ability to share out incident data to other projects and agencies.
- The technology is superior to other systems as it leverages the GII for spatial data and uses MS FAST servers for parsing email and delivery notifications.
- The ability to rapidly prototype and deliver new functionality to end-users when needed within very short timeframes (less than a day in some cases).
- Its use of existing enterprise capabilities to save money.
D. IMPLEMENTATION

The success of COP is rooted in the software development methodology, Agile. The team delivered module increments of useable software allowing them to be flexible to user requirements.

D.1 What phases did you go through in developing the system?
DHS COP was initially delivered in three phases. DHS COP 1.0 was delivered as a prototype on five servers using a Flex API and was meant to help SMEs and requirement experts to really hone in on what DHS needed in a new COP application. COP 2.0 migrated technologies to improve the user experience by utilizing Silverlight, and existing DHS services including the Geospatial Information Infrastructure (GII) for visualization. The production released, COP 3.0, included the ramp up of MS FAST servers to help with the triage of data.

Throughout the process, the system was developed using DHS the DHS approved Systems Engineering Life Cycle (SELC) and best practices. The progression between the phases, interaction with end-users and successful adoption of the system was due to the use of the Agile software development method. Agile methodology focuses on completing discrete increments of software functionality, through team collaboration and engagement with key stakeholders. Agile methodology significantly reduces project risk, delivering value and working software capabilities much earlier in the lifecycle. Other benefits of Agile include: increased productivity, increased return on investment, creates a sustainable development environment, enables innovation, builds trust and relationships, expects continuous improvement and is motivating and engaging.

Since the DHS COP utilizes Agile software development, incremental releases are happening on a quarterly basis. These quarterly releases focus on both application and system enhancements meant to improve the user’s ability to meet their mission goals. COP 4.0 will be released using Silverlight 5, Esri Silverlight API. The switch from Bing Maps is due to as requirements becoming more robust from a geospatial perspective.

D.2 Were there any modifications to the original system design? Why? What?
Several modifications were made to the original design to improve performance and decrease costs by utilizing existing enterprise services and technology, as well as adopting more technology geared towards open standards. The system now leverages all of its maps and mapping services from the Geospatial Information Infrastructure and DHS Email as a Service (EaaS) is leveraged to help triage data.
E. ORGANIZATIONAL IMPACT

After 9/11, emphasis was placed on information sharing. Today the Department of Homeland Security is able to leverage information from numerous sources to get the right information, to the right people at the right time.

E.1 WHAT USER COMMUNITY DOES THE SYSTEM SERVE AND HOW?
Senior federal decision-makers including the DHS Secretary and Deputy Secretary, White House Situation Room, National Security Staff, and DHS Operations leadership as well as other key staff at the federal, state, tribal, and local levels to include first responders, emergency managers and incident commanders. The DHS COP allows all stakeholders the ability to view and contribute to man-made and natural threats in real-time. This has led to increased situational awareness, increased data sharing, and increased decision support across the entire federal space.

E.2 WHAT ARE THE ULTIMATE DECISIONS/OPERATIONS/SERVICES BEING AFFECTED?
The DHS COP is an application that supports the DHS mission of responding to threats and hazards to the nation by collecting, sharing and displaying multi-dimensional information that facilitates collaborative planning and responses to these threats. The DHS COP addresses the enormous responsibilities and challenges facing NOC - the single national entity to unify situational awareness and response, recovery and mitigation functions.

E.3 WHAT WERE THE QUANTITATIVE AND QUALITATIVE IMPACTS OF THE SYSTEM?
System impacts can be quantified in the following ways:

- The number (3800) of application user adaptations, (the number of users will significantly grow in coming years).
- The time it takes to report on an incident has decreased due to the automatic workflows of the application.
- Reporting on incidents has become more robust as the system has allowed for improved information sharing across DHS components and the government.
- First responders and other incident personnel are getting mission critical information in a more efficient and effective manner.

E.4 WHAT EFFECT HAS THE SYSTEM HAD ON PRODUCTIVITY?
The system has improved productivity in the following ways:

- Quicker time to market on incident reporting.
- Users are no longer spending countless hours filtering out the noise due to the automatic triage and bucketing of disparate information sources.
- Users are no longer duplicating efforts across multiple systems.

E.5 WHAT, IF ANY, OTHER IMPACTS HAS THE SYSTEM HAD?
Other impacts are the ability for the department to move forward and include new technologies for event management now that the geospatial capability came to fruition.
E.6 How did the system change the way business is conducted with and/or service delivered to clients?
The system changed the way business was being conducted in the following ways:

- Many manual processes were able to be done away with after the deployment of DHS COP.
- Decision makers are now able to direct others to the COP for real-time information instead of having to spend precious resources during an incident answering and responding to repetitious requests for information.

F. SYSTEM RESOURCES
The hardware and software were selected as the industries best and most flexible components allowing for a longer life span.

F.1 What are the system’s primary hardware components?
The COP is located on 26 servers utilizing a three-tiered approach at the DHS Datacenter 2. This includes six load balanced and fire-walled web-servers, 16 fire-walled application servers and four clustered database servers.

F.2 What are the system’s primary software components?
The system is comprised of Windows 2008 R2 64 bit OS, IIS7.5 (web servers), .NET 4.0, SQL Server 2008, ESRI Maps API, and Microsoft FAST software components.

F.3 What does the system work with?
The technology plan established by the team was predicated on three primary goals:

- Maximum use of standards to allow ready sharing of DHS COP content with federal, state, local, tribal, private sector, non-government organizations and other mission partners.
- Maximum re-use of existing DHS technology infrastructure.
- Alignment with the Federal Chief Information Officer’s 25-point plan for Federal IT reform, particularly regarding use of cloud services.

The DHS COP architecture utilizes both public and private cloud infrastructure. Base map, imagery services (including incident imagery), street views, geocoding, gazetter and other services are provided by leverage of public cloud infrastructure.

DHS private cloud services support access to secure but unclassified data, including the Homeland Security Infrastructure Protection (HSIP) Gold Common Operating Data, DHS mission data, geospatial software and data feeds from mission partners. Data feeds and services leverage Open Geospatial Consortium (OGC) standards such as Web Map and Web Features Services, and geo-RSS, as well as REST, KML/KMZ and other common standards.

Visualization services are provided by DHS OneView. OneView is interoperable with OGC compliant web map services and provides access to both private and public cloud data and
services of the DHS COP. A OneView Software Development Kit (SDK) provides developers a Silverlight Map Control for building web mapping applications to create customized, or user defined operating pictures, to meet the particular needs of any mission.

The DHS Homeland Security Information Network (HSIN) identity management services are used to perform access control to the DHS COP. Re-use of the DHS HSIN identity management services both reduces the overall cost of the DHS COP program and also provides a single sign on capability to both HSIN and the DHS COP for mission partners.

Technologies provided by Esri, Google and MS Bing support key aspects of the DHS Geospatial Information Infrastructure that underlies the DHS COP.

F.4 WHAT STAFF RESOURCES WERE REQUIRED TO IMPLEMENT THE SYSTEM?
The team was comprised of project managers, GIS architects, software developers, QA testers and graphical interface developers coupled with a leadership team.

F.5 COMMENT ON ANYTHING UNUSUAL ABOUT THE RESOURCES USED TO DEVELOP THE SYSTEM?
The team was bi-coastal with offices in Reston, VA and Kihei, Maui, Hawaii. This allowed for a 14-hour engineering day helping the development happen quickly while offering DC-Metro area clients after hours support from the Maui Software Development Center.
Appendix A – Authorization Letter
May 10, 2012

Kari Brennan
Education Manager
701 Lee Street, Suite 680
Des Plaines, IL 60016

RE: LETTER OF AUTHORIZATION

Ms. Brennan,

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Appendix B – User Testimonials
Testimonial for DHS Common Operating Picture application to the Urban and Regional Information Systems Association (URISA), Exemplary Systems in Government (ESIG) Award.

The NOC serves as the primary National-level hub for domestic situational awareness and operations coordination for the prevention of terrorist attacks and domestic incident management. Prior versions of the DHS Common Operating Picture (COP) provided static documents and reports, but did not meet the needs of our dynamic mission. The deployment of the new COP dramatically improved our mission performance. The COP’s modern web map, with over 500 user-selectable data layers, makes it very easy to see exactly what incidents and events the NOC is monitoring and understand their impact. During a large scale event like Hurricane Sandy, the NOC was able to add current geospatial data from DHS agencies and our interagency partners. For example, NGA was analyzing imagery to identify damaged structures, producing geospatial data files which we were able to display in the COP. Users were able to add that incident specific information to the map along with the existing data layers and get a very good understanding of the storm’s impact. While the DHS COP is a critical tool for the people that work in the NOC, it is also extremely valuable to users all over the Homeland Security community. We have steadily grown from a few hundred users to several thousand. The DHS COP was designed to be intuitive, so much so that most new users don’t require any formal training. It is truly an all-hazards, all-threats situational awareness tool.

Scott Brumbaugh
Operations Officer, DHS National Operations Center
Testimonial for DHS Common Operating Picture application to the Urban and Regional Information Systems Association (URISA), Exemplary Systems in Government (ESIG) Award.

The DHS National Operations Center serves as the primary National-level hub for domestic situational awareness and operations coordination for the prevention of terrorist attacks and domestic incident management. We monitor events and track incidents to ensure the Secretary and senior leaders receive timely, accurate reports of critical information. The previous version of the DHS Common Operating Picture (COP) was mainly a document posting site, it did not give us the tools we needed to manage the extremely rapid information flow during incidents of national significance. The new COP dramatically improved our ability to manage our dynamic operational mission by displaying real time geospatial information from the authoritative data sources. It has over 500 layers in the Table of Contents and we can add geospatial layers during an incident if something valuable comes online. Official reports are associated with incidents in the COP and are easily and immediately accessible. It has been the NOC’s primary tool during every natural disaster and homeland security event since it came online in February 2012; everything from wildfires and flooding, to Hurricane Sandy, the Inauguration, and the Boston Marathon bombing.

Carl Gramlick
Director, DHS National Operations Center
Testimonial for DHS Common Operating Picture application to the Urban and Regional Information Systems Association (URISA), Exemplary Systems in Government (ESIG) Award.

The Department of Homeland Security (DHS) Common Operating Picture (COP) is an application that supports the DHS mission of responding to threats and hazards to the nation by collecting, sharing and displaying multi-dimensional information that facilitates collaborative planning and responses to these threats. The DHS COP addresses the enormous challenges facing the DHS National Operation Center (NOC) - the single national entity to coordinate situational awareness and response, recovery, and mitigation decision support. The DHS COP addresses expanding information sharing challenges by harnessing the flood of information and rapidly finding and applying relevant and requisite contextual relationships needed to interpret, and even forecast, implications. Having a secure, Internet-accessible, geospatial web application allows DHS to leverage modern data services from hundreds of authoritative and trusted sources. This same situational awareness capability used by the NOC is now supporting decision-makers at the White House, other federal departments, executive leadership within DHS, and key staff at the federal, state, tribal, and local levels. COP stakeholders benefit by receiving consistent, timely, and accurate reporting of critical information for events of national/international significance. As of May 1st, 2013, the COP has over 3400 users from 40 DHS mission areas and 50 homeland security partner departments, agencies, and organizations. The most recent software release provides access to the DHS COP for more than 50 state and local Fusion Centers. The DHS COP is an unmitigated success story and an exemplary model of how agile software development helps ensure that the COP continues delivering ever-improving, mission-critical functionality.

Donald Triner
Director, Operations Coordination Division
Department of Homeland Security

Clean version: