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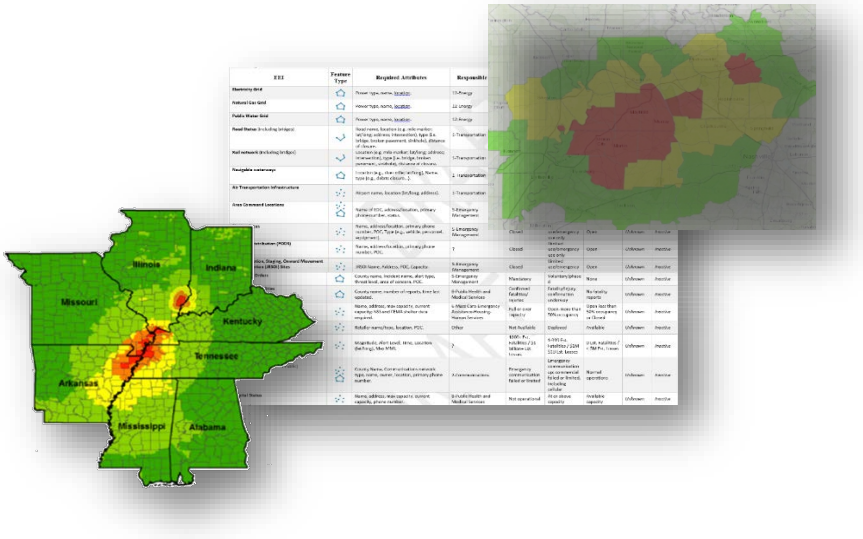
Central U.S. Earthquake Consortium CAPSTONE-14 Exercise

After-Action Report



by

First Responders Group

Department of Homeland Security, Science and Technology Directorate

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CUSEC CAPSTONE 2014 Exercise, FRG After-Action Report

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Executive Summary

This report provides a summary of the support provided by the U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T) First Responders Group (FRG) to the Central U.S. Earthquake Consortium (CUSEC) CAPSTONE-14 exercise that took place on June 16-20, 2014 across eight states.[1] FRG support to the exercise was focused on assisting with the following CUSEC defined objectives:

1. Multi-state communications;
2. Shared situational awareness;
3. Transportation coordination;
4. Private sector integration and public-private partnerships;
5. Resource allocation planning; and
6. Military support to civilian authorities.

In order to achieve these objectives, the Technical Implementation Assistance (TIA) team implemented the Virtual USA (vUSA) peer-to-peer information sharing and safeguarding principles.[2] The TIA team conducted operational and technical assessments, provided technical assistance and training, and delivered training and support for the deployment of capabilities for the CUSEC states. Provided below are a summary of key achievements, lessons learned, and operational leave behinds derived from the CUSEC Capstone 2014 exercise:

Key Achievements

- **2,400 Participants** - state-led exercise including local, federal, private sector, military, and non-profit partners.
- **Regional Data Sharing Model** - allowed CUSEC leadership to agree to share 18 Essential Elements of Information (EEIs). Status updates on these EEIs were shared from over 420 counties from eight states, totaling 13,137 EEI status updates in five days.
- **Mutual Aid Applications** - developed and implemented resulting in the simulated deployment of 143 Mission Ready Packages (MRPs).
- **Mobile Damage Collector app** - used to report more than 330 damage assessments.
- **Public-private Partnership** - achieved through the establishment of a Virtual Business Emergency Operations Center consisting of 78 companies, enabling fully shared situational awareness for all EEI status updates.
- **Data Discovery** - through the National Information Sharing Consortium's (NISC) vUSA ArcGIS Online Portal app, enabled discovery of over 2,000 GIS data layers shared by states and other exercise participants.

Key Lessons Learned

[1] CUSEC is comprised of eight states including Alabama, Arkansas, Kentucky, Illinois, Indiana, Missouri, Mississippi and Tennessee.

[2] Details on the Virtual USA information-sharing principals can be found here: http://nisconsortium.org/vusa.

- **EEIs** - identification and agreement upon 18 Essential Elements of Information (EEIs) implemented by involving operations, planning and GIS/IT staff.
- **"Bottom-up vs. Top-Down"** - state-led exercise planning process enabled participants to "train like they fight" based on real operational processes and procedures, as opposed to national level exercise models which states reported may focus too heavily on federal objectives and processes.
- **Industry Partnership** - reported receiving greater situational awareness from government agencies than in any other exercise they had previously participated in. Workflows and data model refinements are required to improve private sector status updates, bi-directional sharing, and shared situational awareness.
- "**Data Rich – Information Poor**" - although there was an unprecedented amount of information shared during this exercise, there is still a gap in enabling decision makers to act on the information. The development of analytical tools driven by operational needs is required to help guide decisions based on the wealth of information available.
- **IT System Resilience** - the use case for developing resilient information systems by combining local and cloud-hosted services was validated through simulated communications degradation during the exercise.

Operational Leave Behinds[3]

- **A regional data sharing model** that defines a common set of 18 essential elements of information that all states agreed to share and build capability toward, including supporting governance frameworks and standard operating procedure information sharing annexes.
- **Updated state/regional catastrophic plans** – In the course of three years, each of the states conducted a rigorous state/regional effort to update their earthquake plans.
- **The systems level connections** between WebEOC, ArcGIS Online, GIS servers, mobile applications and analytical tools were built to persist after the exercise.
- **Data as a Service** - The NISC has created several "data as a service" mash-ups of key information that is freely available to the Emergency Management (EM) community, including 511/DOT status, social media data, etc.
- **Training materials** – Recorded webinars, user manuals and video tutorials may continue to be leveraged for the use and deployment of the Mutual Aid Support System (MASS) and MRP geospatial tools.
- **Apps for EM** - freely available through the NISC and partners, including the Mission Explorer App, the MRP App, the vUSA ArcGIS Online Portal app and the Virtual Business Emergency Operations Center (vBEOC) app.

Next Steps

- The MASS and MRP app will be transitioned to a nationally-hosted environment managed by the National Emergency Management Association (NEMA) in 2015 The TIA team will

[3] See the National Information Sharing Consortium (NISC) http://nisconsortium.org/for details on operational leave behinds.

support this transition effort to ensure effective integration with the Emergency Management Assistance Compact (EMAC) Operations System.

- Several data models will be assessed for potential creation of a National Information Exchange Model Information Exchange Package Documentation (NIEM-IEPD), to include but not limited to: MRP data model, EEI data models, exercise data model, Resource Request Form (RRF) data model, and social media data models.

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1 Introduction

1.1 Purpose

The purpose of this After-Action Report (AAR) is to provide a detailed review of the U.S. Department of Homeland Security (DHS) First Responders Group (FRG) Technology Implementation Assistance (TIA) team work achieved in support of the Central U.S. Earthquake Consortium (CUSEC) CAPSTONE-14 Exercise (hereafter, "the Exercise"). This report will include a review and analysis of the multi-year planning effort leading up to and including the exercise, and provide lessons learned and recommendations for the path forward. While this AAR will touch on various aspects of the exercise, the focus is on the capacity building activities of the FRG related to information management, situational awareness, and mutual aid.

This AAR compliments two additional after action reviews, The National Information Sharing Consortium (NISC)[4] AAR, currently in preparation as of this writing and expected to be published in early 2015, will evaluate the regional information-sharing model and assess the use of various technologies. The CUSEC AAR[5] was published in November 2014, and provides an official holistic review of the exercise.

1.2 Exercise Overview

The CUSEC CAPSTONE-14 Exercise was designed to support the 2011 Presidential Policy Directive 8 (PPD-8) for National Preparedness. The effort, driven by the CUSEC Board of Directors, was a New Madrid Seismic Zone (NMSZ) and Wabash Fault earthquake mitigation, preparedness, recovery, and response-planning event. It included the eight CUSEC member states: Alabama, Arkansas, Illinois, Indiana, Kentucky, Mississippi, Missouri, and Tennessee. CUSEC is a partnership of the eight states listed above and the federal government, and is led by a board of directors formed by the heads of the Emergency Management Agencies of the eight member states. CUSEC serves as a coordinating hub for the region, performing the role of coordinating multi-state efforts.

CUSEC CAPSTONE-14 was designed to strengthen partnerships between local, state and federal governments, along with public and private sector entities to promote better post-disaster planning, response and recovery efforts. The exercise follows the 2011 National Level Exercise (NLE 2011) by focusing on interstate mutual aid, expanding upon the definition and agreement to share Essential Elements of Information (EEIs), and enhancing situational awareness by leveraging existing and emerging technologies that enable information sharing. The preparation for the exercise began in late 2012 and culminated with an exercise on June 16-20, 2014.

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[4] Information will be available on the NISC website, http://nisconsortium.org.

[5] The CUSEC CAPSTONE-14 AAR is available here: http://www.cusec.org/capstone14/documents/CAPSTONE-14_AAR.pdf

At the invitation of the CUSEC Board, FRG supported CUSEC states' participation in the exercise through technical assistance and the implementation of the Virtual USA® (vUSA)[6] information sharing model (see Figure 1). The FRG Technology Implementation Assistance (TIA) support team initiated project support for CAPSTONE-14 in January 2013 upon the completion of the 2012 Kentucky Mutual Aid Project. The 2012 KY Mutual Aid Project was supported by FRG in partnership with Kentucky Division of Emergency Management (KYEM) and focused on the development of a Mission Ready Package (MRP) data model and the development of an associated geospatial application.[7] The outcome of the 2012 KY Mutual Aid Project focused the TIA project team on the following objectives for the CAPSTONE-14 Exercise:

Figure 1. Virtual USA Program Mission and Principals.

- Supporting implementation of the SAFECOM Interoperability Continuum model to assist with systematically assessing the existing policies and procedures to better realize the goals of the exercise;
- Accelerating the request and acquisition of resources through the Emergency Management Assistance Compact (EMAC);
- Definition, adoption and usage of the MRP framework;
- Advancement of coordination with Private Sector partners;
- Establishment of a regional "pre-scripted missions" framework and doctrine;
- Identification and adoption of standard operational datasets / essential elements of information; and
- Institutionalization of sustainable processes, practices and technology usage that will enable cross-jurisdictional information sharing, request, and acquisition of mutual aid.

[6] More information on Virtual USA® can be found here: https://nisconsortium.org/virtualusa.

[7] More information and training materials are available on www.firstresponder.gov, including this article http://www.firstresponder.gov/Pages/Kentucky%20Emergency%20Management%20Successfully%20Deployed%20Model%20to%20Improve%20Mutual%20Aid.aspx.

1.3 Exercise Objectives

The CUSEC board established the following six primary objectives for the Exercise:

1. Regional communications
2. Regional shared situational awareness
3. Regional transportation coordination
4. Private sector integration and public-private partnerships
5. Resource allocation planning
6. Military support to civilian authorities

To accomplish the overall exercise objectives, the CUSEC GIS/IT working group (WG) focused their attention on the following tasks:

1. Develop processes for tracking and sharing the agreed upon set of EEIs;
2. Implement and test a regional WebEOC - WebFusion Board to track county-status EEIs;
3. Integrate existing ArcGIS Server infrastructure, Incident Management Systems (e.g., WebEOC, Alabama's custom EMITS);
4. Use the Mutual Aid Support System (MASS) to register Mission Ready Packages (MRPs) for resource allocation and processing requests for assistance;
5. Develop/adopt standards for information sharing (e.g., File/data naming conventions, metadata, minimum set of attributes, symbology, status variables, tags, etc.);
6. Facilitate interstate, state-to-federal, state-private, private-state and state-to-military information sharing utilizing vUSA sharing models; and
7. Develop situational awareness by sharing the EEIs in a way that is discoverable from within each state's common operating picture (COP).

1.4 Participants

Over 2,400 individuals participated in the exercise as players, observers or controllers representing local, county, state, federal, military, voluntary organizations active in disaster (VOAD), private sector and international organizations. Most of the activity around the exercise occurred across seven of the eight CUSEC members' State Emergency Operation Centers, Business Emergency Operation Centers, Joint Operation Centers or from FEMA regional offices.

Players: The players in the exercise included the key staff and associated Emergency Support Functions (ESF) leads for state emergency management agencies, personnel from FEMA regions IV, V, VI, and VII for mutual aid requests, private sector partners (including Walmart, Walgreens, Sears, Ameren, Baxter, Sprint, AT&T, Verizon, UPS, etc.), VOAD groups, and National Guard staff from multiple states. The eight CUSEC member states involved in the exercise were Alabama Emergency Management Agency (AEMA), Arkansas Department of Emergency Management (ADEM), Kentucky Division of Emergency Management (KYEM), Illinois Emergency Management Agency (IEMA), Indiana Department of Homeland Security (IDHS), Missouri State Emergency Management Agency (SEMA), Mississippi Emergency Management Agency (MEMA), and Tennessee Emergency Management Agency (TEMA) (see Figure 2). The extent of play for Mississippi was limited during the exercise due to significant weather effects leading up to the event.

Figure 2. CUSEC Member States.

Observers: There were many individuals that observed the exercise both virtually and in person. On June 17, a CAPSTONE-14 VIP day was held in Illinois for individuals not actively participating to oversee exercise play. The National Information Sharing Consortium (NISC) hosted a Virtual VIP webinar on the same day.

Controllers: Simulation Cells (SimCells) located in each state and the Master Control Cell located at IEMA in Springfield, Illinois controlled exercise play during the exercise. In addition, a virtual GIS SimCell was established to help manage the information sharing and situational awareness component of the exercise.

The TIA team participated in the exercise both as observers, controllers, and by actively supporting exercise play, with staff positioned onsite in Arkansas, Illinois, Kentucky, Tennessee, and in the Master Control Cell.

2 Methods

2.1 Capability Assessment

The TIA team conducted a Capability Assessment Survey in May 2013 in order to gather a baseline understanding of the eight CUSEC states' operating environments, and to determine where FRG could provide support to states in preparation for the exercise. The survey involved distributing an electronic questionnaire (see APPENDIX I – Capability Assessment Survey) followed by a phone-interview and focused on the following seven areas:

1. Governance of technology;
2. Situational awareness (IMS & GIS) capabilities;
3. Ability to consume map services;
4. Technologies used to create and publish data services;
5. Data security for IMS and GIS systems;
6. Current information sharing capabilities and roadblocks; and
7. Operational capabilities for mutual aid.

The findings of the Capabilities Assessment are summarized in Table 1. The assessment revealed several commonalities among the states, including widespread adoption of WebEOC (seven states) as an Incident Management System (IMS) and Esri's ArcGIS for Desktop and Server used by all but one state as the primary GIS application. The ArcGIS Viewer for Flex was the most commonly used Situational Awareness viewer (six states), with WebEOC tools (e.g., MapTac and Mapper Pro), Google Earth and ArcGIS Online also used to a lesser extent by states. While five states reported an integration of their IMS and Situational Awareness Viewers, no state provided shareable map services of that data to other states.

The approach to governance for GIS and IMS was not consistent across states, though standard operating procedures (SOPs) or guidelines (SOGs) that included IMS were more common than for GIS operations. Six of the states reported that they had executive level support for the implementation of incident management system sharing capabilities for the exercise.

Table 1. Summary of Capabilities Assessment for CUSEC States.

State	Incident Management System	GIS	SA Viewer	ArcGIS Online	IMS linked to SA viewer	Public GIS Sharing	SOG/SOP for IMS/GIS[8]	Mutual Aid Resource Inventory
Alabama	EMITS	ArcGIS Desktop/ Server	Flex Viewer	No subscription	Yes	N/A	Yes for disaster activations	Yes: AMAS and EMITS
Arkansas	WebEOC	WebEOC MapTac & Emergio	WebEOC MapTac	No subscription	Yes, via Maptac (limited)	Declaration status or recovery info	For IMS yes; for GIS situation dependent	Yes
Illinois	WebEOC	ArcGIS Desktop/ Server	Flex Viewer, Google Earth, WebEOC Mapper Pro	No subscription	No	Open shelters on Illinois Ready website	IMS	No
Indiana	WebEOC	ArcGIS Desktop/ Server	Flex Viewer	No subscription	Yes	Travel advisories through DOT	IMS	Yes
Kentucky	WebEOC	ArcGIS Desktop/ Server	Flex Viewer	Subscription pending	No - in progress	Limited	Yes	Yes - MASS
Mississippi	WebEOC	ArcGIS Desktop/ Server	Flex Viewer	Subscribed - Level 2 50 accounts	No	Power outage maps, PODs, DRCs, MDOT	IMS	No - Under development, Resource Manager in WebEOC
Missouri	WebEOC	ArcGIS Desktop/ Server	ArcGIS Online (FEMA owned)	Subscription (through FEMA)	Yes	Emergency Shelter locations and road closures; ArcGIS online maps public	IMS/GIS broadly	Yes - Division of Fire Safety coordinated In-state mutual aid

[8] Standard Operating Guidance/Procedures

State	Incident Management System	GIS	SA Viewer	ArcGIS Online	IMS linked to SA viewer	Public GIS Sharing	SOG/SOP for IMS/GIS[8]	Mutual Aid Resource Inventory
Tennessee	WebEOC	ArcGIS Desktop/ Server	Flex Viewer	No subscription	Yes	Photos on website; Ready TN App	Not formal	Yes but not in use - Resource Manager in WebEOC

2.2 Essential Elements of Information

The CUSEC Board of Directors agreed upon a set of 18 Essential Elements of Information (EEIs), which are described in Table 2. Additional detail for the EEIs can be found in APPENDIX II - List of the 18 Essential Elements of Information used in CUSEC CAPSTONE-14 and APPENDIX V - Essential Elements of Information (EEI) SOP Annex.

Table 2. List of the Essential Elements of Information used during CUSEC CAPSTONE 2014.

Essential Element of Information	Description
Electricity Grid	Operational status of Electricity Grid.
Natural Gas Grid	Operational status of Natural Gas Grid.
Water Grid	Operational status of Water Grid.
Private Sector Infrastructure	Store open/closed status of key private sector infrastructure, mutual aid resources and facility space for shelters, warehouse or staging supplies.
Road Status (including bridges)	Operational status of roadway transportation network, especially pre-defined emergency supply routes critical for response and recovery efforts.
Rail Network (including bridges)	Operational status of railway transportation network.
Navigable Waterways	Operational status of navigable waterways transportation network.
Air Transportation Infrastructure	Operational status and capabilities of airports and airspace.
Area Command Locations	Location and activation status of area command (often overlaps with state emergency operation centers).
Staging Areas	Location, status and type of staging areas, which are used to temporarily store resources required for emergency response and recovery.
Points of Distribution (PODS)	Location, type and operation status of PODs for distribution of food, water and other bulk commodities.
Joint Reception, Staging, Onward Movement and Integration (JRSOI) Sites	Location, status and points of contact for JRSOI sites, established by the State branch of the National Guard to coordinate emergency response efforts.
Evacuation Orders	Areas under current evacuation orders, and the details concerning the orders.
Injuries and Fatalities	Confirmed number of injuries and fatalities.
Shelters	Location and operational status of sheltering facilities.

Essential Element of Information	Description
Communications	Operational status of landline, cellular and internet access.
Hospital Status	Operational status of hospitals, including beds available, supply status, etc.
USGS Data	USGS damage assessment products, including Prompt Assessment of Global Earthquake for Response and ShakeMap.

The EEIs were designed to be used to support operation needs and provide the baseline set of data required to provide situational awareness (SA) following a catastrophic earthquake event. Where possible, CUSEC states aligned these EEIs to information already tracked within their GIS or Incident Management Systems through existing business processes.

Since seven of the eight CUSEC states used WebEOC as their primary Incident Management System, the GIS/IT group leveraged TEMA WebFusion license to kick-start the process, extending the concept of TEMA's existing 'County Quick Assessment' Board to include the 18 EEIs. The Board was populated with a list of the eight CUSEC states and their counties (see Figure 3). TEMA worked with the CUSEC states to establish connections between each state's WebEOC system and the TEMA-hosted Regional EEI Status WebFusion Board. The final Board allowed states to login to their own WebEOC server and update the county status of the EEI using a simple dropdown list (red, yellow, green, inactive, and unknown) and add descriptive text for the status. WebFusion allowed the information to be synchronized across the participating CUSEC states WebEOC systems through the TEMA WebFusion 'hub.' The TIA team assisted TEMA in developing a dynamic map service that displayed the live county-level status for the 18 EEIs by integrating their WebEOC and ArcGIS Server systems.

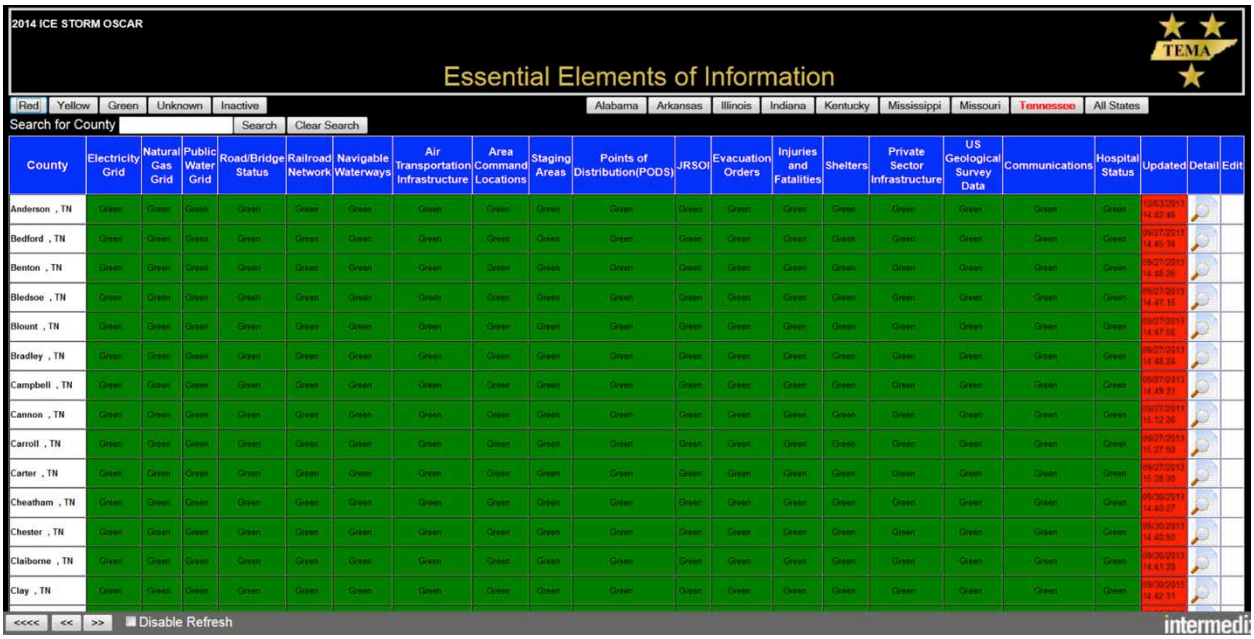

Figure 3. Example of the WebEOC Regional EEI Status Board hosted by TEMA.

The TIA team also assisted states with developing dynamic map services to report out on the status of these EEIs to accommodate instances where there was no existing process for tracking an EEI, or when there was a need to track information at a scale finer than the county-level Regional EEI Status Board. The end goal was to ensure that the status of each EEI could be updated through a sustainable process after the exercise.

2.3 Publishing and Consuming Data

Players in the CUSEC CAPSTONE-14 exercise used different technologies to manage, publish, and consume EEIs, including WebEOC, EMITS, ArcGIS, the Mutual Aid Support System, and the Virtual Business Operation Center. Prior to the exercise, each of these systems functioned as "silos of excellence" in that they were not fully integrated with other systems at the local, state or regional level (see Figure 4).

To improve information sharing during the CAPSTONE-14 Exercise, the TIA team focused on building capacity in each state and throughout the region by assisting with systems integration efforts and the development of workflows to better integrate the various systems required for daily use and exercise play (see Figure 5).

The TIA team summarized some of the model practices and processes in the Data Publication Guidance document and an Emergency Management Symbology Brief.[9] The Publication Guidance document describes the different technology components used during the exercise, and

[9] The CUSEC CAPSTONE 2014 Publication Guidance document can be found here: http://bit.ly/1kMJOKM, and the Symbology Brief is located here: http://bit.ly/1rkAseO.

provides examples on how information can be shared and distributed using ArcGIS Online for Organizations. It also provides suggested patterns for naming and tagging map services and other information resources shared by states. The Symbology Brief provides an in-depth review of symbology used in Emergency Management and was used to frame discussions on symbology standardization with CUSEC members.

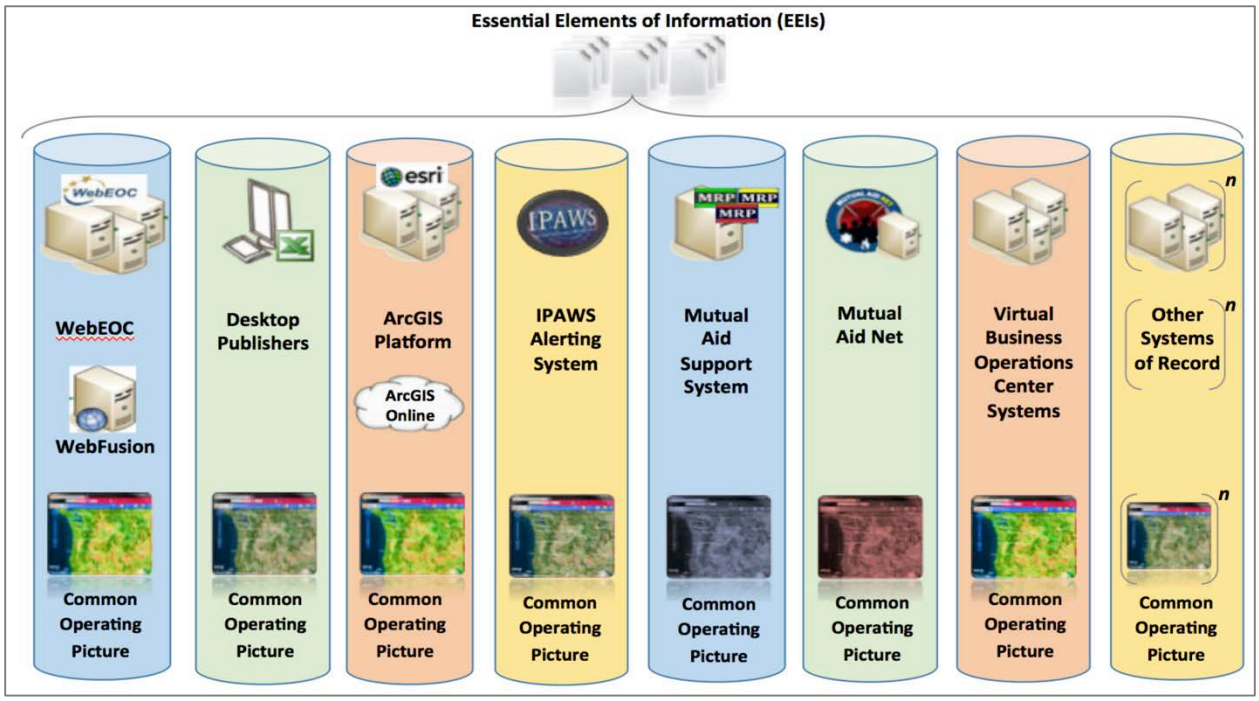

Figure 4. Representation of "Silos of Excellence" view of Situational Awareness.

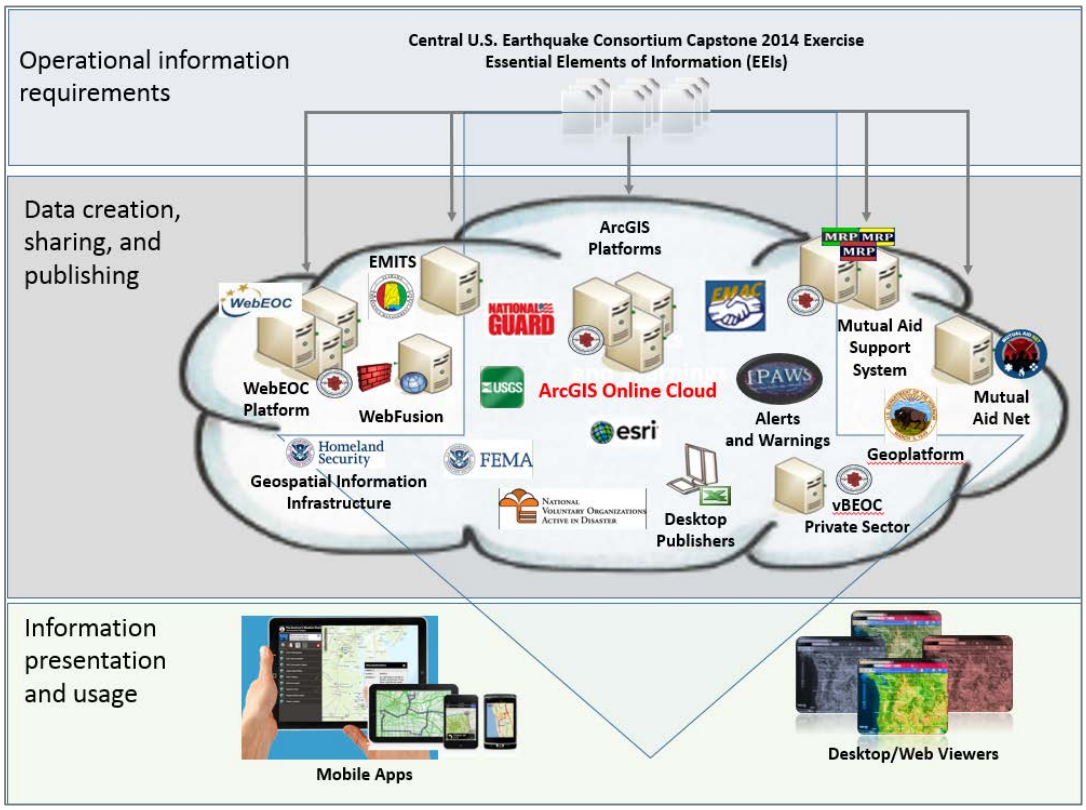

Figure 5. CUSEC CAPSTONE-14 Information Sharing Architecture.

2.4 Information Sharing

The information sharing strategy was based on the dominant systems used by the states involved in the exercise: ArcGIS and WebEOC. As described in Section 2.2, states leveraged their WebEOC systems by adopting a standard board based on the 18 EEIs, and integrated this board regionally using WebFusion. ALEMA, the only state that did not use WebEOC as their primary IMS, applied the data model from the Regional WebEOC Status Board in an ArcGIS based dataset and map service, thereby functionally sharing equivalent information with the other states.

Esri's ArcGIS Online platform was selected as a tool for sharing GIS information during the Exercise, including the map services exposed from the state IMS's (e.g., the Regional WebEOC County Status Fusion Board; see Figure 6). One-year subscriptions for ArcGIS Online were offered to all of the CUSEC member states,[10] and training webinars and an instructional guide

[10] FRG funded a base level subscription for one year for 5 states. CUSEC extended funding in July 2014 for all the states.

was provided by FRG.[11] Two states, Mississippi and Missouri, already had subscriptions at the onset of the exercise, and Indiana declined to participate in this component of the exercise.

An ArcGIS Online for Organizations account was managed by CUSEC[12], within which several groups were established for sharing private and public content with stakeholders. The CUSEC organization and the groups that belonged to it served as a regional coordination point for the member states and other exercise stakeholders to share and discover information. The TIA team, on behalf of CUSEC, administered user management for the ArcGIS Online groups.

In order to assist states' efforts to create, publish, share, and effectively use information, the TIA team conducted several onsite technical assistance visits with states. These visits were focused on the following tasks: (1) setting up and training for the state's ArcGIS Online accounts, (2) integrating the state's IMS and GIS, (3) publishing map services, including those from the IMS, and (4) configuring the COP with necessary widgets and services.

The following is a list of the onsite visits held between September 2013 and June 2014 with six of the CUSEC states:

- Tennessee Emergency Management Agency – September 2013 and March 2014
- Arkansas Division of Emergency Management – March 2014
- Kentucky Emergency Management Agency – April 2014
- Illinois Emergency Management Agency – April 2014
- Missouri Emergency Management Agency – March 2014 (site visit cancelled due to weather, instead held a two-day online meeting)
- Alabama Emergency Management Agency – June 2014

Trip reports detailing accomplishments of each onsite visit were previously submitted. It is particularly noteworthy that these site visits served to build capacity of each state to internally manage information and become postured to share with local, regional, and national partners. Without these onsite technical assistance support visits, the results of this exercise would have been markedly different. Additional information about the exercise's information sharing strategy is outlined in the CAPSTONE-14 Publication Guidance document.

2.5 Request and Acquisition of Mutual Aid

One of the primary objectives of the FRG was to assist with improving the ability for states to discover, request, and track mutual aid resources. As part of this effort, FRG partnered with KYEM, NEMA, and the FEMA National Integration Center to focus on developing a model that integrates the needs at the local, state, regional and national levels.

The MASS, created by KYEM with funding from NEMA, is an inventory and cataloging system for MRPs. MRPs are NIMS-typed response, recovery and mitigation capabilities that are organized, developed, trained and exercised prior to an emergency or disaster. MASS was

[11] CAPSTONE 2014: ArcGIS Online Getting Started Guide is available here: http://bit.ly/1pwFO3I.

[12] See http://cusec.maps.arcgis.com.

selected by the CUSEC Board to be used in the exercise beyond Kentucky for regional resource allocation efforts to include the creation, discovery, and tracking of MRPs.

The TIA team developed a geospatial tool for displaying and querying the registered resources in MASS during a pilot project in Kentucky in 2012, and Kentucky distributed this tool to CUSEC members and the National Information Sharing Consortium for regional test and evaluation during the CAPSTONE-14 exercise. The application is available as a stand-alone application as well as an ArcGIS Viewer for Flex Widget, and can be downloaded on GitHub.[13]

The TIA team also developed a series of training on both MASS and the MRP widget for Kentucky and the CUSEC membership. Ancillary content developed for the training included a user manual, video tutorials, and instructor guidance materials, all of which are available online.[14] The materials were used as job aides for KYEM officials to provide virtual and on-site training to CUSEC members and exercise participants twice a week throughout the month of August 2013, and to state, local, and private sector officials throughout the exercise preparation period.

The CUSEC CAPSTONE 2014 Exercise has helped to implement and shape the national dialogue around mutual aid through the following achievements:

- Applying a systematic way of describing MRPS by applying NIMS Resource Typing as the building blocks for the MRP data model.
- Creation of a MRP Data Model that supports inclusion of NIMS resource typing definitions, which was used to advance the development and adoption of MRPs. A NIEM IEPD for MRPs is currently in development (see APPENDIX III – DRAFT Mission Ready Package Data Model).
- Use of a Resource Inventory Model (Mutual Aid Support System) for cataloging both pre-scripted mission assignments and mission ready packages.
- Improving Request and Acquisition of Mutual Aid through a partnership with NEMA. The process of transitioning MASS to a nationally hosted platform is underway.

The CUSEC CAPSTONE 2014 Exercise has also been valuable in linking different mutual aid communities and their disparate resource tracking systems. Though the exercise specifically focused on using MASS for resource tracking and requests, NEMA was interested in gathering lessons learned for a national implementation of Mission Ready Packages through the EMAC Operating System (EOS).

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[13] Code is available from the NISC GitHub site here: https://github.com/NISCvirtualUSA.

[14] MASS Training Slides (PDF) http://bit.ly/1re0ZJX; MASS User Manual (PDF) http://bit.ly/W3DBo0; Mission Ready Package App Interactive tutorial http://bit.ly/1nl5rGd; Mission Ready Package Overview http://1.usa.gov/1q3DyWB; Mission Ready Package Toolbox Video on FirstResponder.gov http://1.usa.gov/1m0sscK.

In addition, discussions were held with the fire community, most notably with the International Association of Fire Chief's (IAFC) Mutual Aid Net program, on how to integrate their resource inventory of mutual aid resources with other communities by utilizing a NIEM IEPD for mutual aid requests. The TIA successfully achieved an initial operating capability to query both individual resources and MRPs from both MASS and MutualAidNet in a common viewer using the MRP geospatial app and presented the results to FEMA National Integration Center. The sentiment is that a NIEM-IEPD for the MRP data model would allow federated ability to discover, access and request resources from numerous mutual aid systems. Further testing and evaluation will be required to validate this assumption.

2.6 Exercise Support

The TIA Team supported CUSEC and the CUSEC member states both leading up to and during the exercise with the following actions:

- Developed a data model for the exercise Master Scenario Event List (MSEL) that provided both a spatial and temporal context to regional exercise injects.
- Worked with exercise planners to aggregate each state's cross-border exercise injects into a single MSEL to aid with the coordination of activities in the exercise Master Control Cell (MCC).
- Aligned the MSEL injects with the 18 EEIs.
- Developed a geospatial tool to help view, filter, and identify injects in the native GIS environment of each state.

3 Results

In total, CUSEC member states developed approximately 13,000 scenario injects to help drive exercise play. Nearly 500 of these injects were targeted to regional or cross-border events providing a place to test the six regional objectives (listed in section 1.3).

3.1 Information Sharing

During the four-day exercise, 420 counties in 8 states (63% of all of the counties in the seven states) reported live statuses of the 18 EEIs, and nearly 120 dynamic map services were updated regularly with EEI status information. States and other partners (including USGS, FEMA, Red Cross, National Guard, and private sector partners) shared more than 2,000 data layers, in accordance with the vUSA data sharing models and publication guidance leveraging their native systems (e.g., WebEOC, ArcGIS Online, EMITS, etc.).

Table 3. Summary of technologies used to share information during the exercise.

EEI	AL	AR	IL	IN	KY	MI	MO	TN
Electricity Grid	□	⊚	⊚ ❖	⊚	⊚	⊘	⊚	⊚ ❖
Natural Gas Grid	□ ✱	⊚	⊚	⊚	⊘	⊘	◎	⊚
Water Grid	□	⊚	⊚	⊚	⊚	⊘	⊚	⊚ ❖
Private Sector	□	⊚	⊚	⊚	⊘	⊘	⊚	⊚
Area Command	□ ✱	⊚	⊚ ✱	⊚	⊘	⊘	⊚	⊚ ❖
Communications	□	⊚	◎ ❖	⊚	⊚	⊘	⊚	⊚
Evacuation Orders	□	⊘	⊚	⊚	⊘	⊘	⊚ ❖	⊚
Hospital Status	□ ✱	⊚ ✱	⊚	⊚	⊘	⊘	⊚ ❖	⊚
Injuries / Fatalities	□	⊚	⊚ ✱	⊚	⊘	⊘	⊚	⊚
JRSOI	□	✱	⊚	⊚	⊘	⊘	⊚	⊚
Points of Distribution (PODS)	□	⊚ ✱	⊚	⊚	⊘	⊘	⊚ ❖	⊚ ❖
Shelters	□ ✱	⊚ ✱	⊚ ✱	⊚	⊚	⊘	⊚ ❖	⊚ ❖
Staging Areas	□ ✱	⊚ ✱	⊚	⊚	⊚	⊘	⊚	⊚
Air	□	⊚	⊚	⊚	⊘	⊘	⊚ ❖	⊚ ❖
Fuel*	□	⊘	⊘	⊘	⊘	⊘		⊘
Rail	□	⊘	⊚ ❖	⊚	⊘	⊘	⊚	⊚ ❖
Roads	□ ✱	⊚ ✱	◎ ❖	⊚	◎ ✱	✱	⊚ ❖	⊚ ❖
Waterways	□	✱	⊚ ❖	⊚	⊚	⊘	⊚	⊚ ❖

Legend

□	County Status 'Board' in ArcGIS Online	❖	ArcGIS Server Map Service
◎	WebEOC - WebFusion EEI Board	❋	ArcGIS Online Hosted Feature Service
⊘	Did not share		

3.1.1 ArcGIS Online

During the exercise, over 360 items were shared by nearly 70 members of the CUSEC CAPSTONE-14 group using the CUSEC ArcGIS online homepage (see Figure 6). In the CUSEC ArcGIS Online organization, the regional EEI content and related data received approximately 18,000 page views during the month of the exercise. (Note: This is just one report from one organizational account; seven other accounts must be reported on to obtain a full picture).

While states primarily utilized ArcGIS Online as a tool for registering services hosted on their own ArcGIS Server environments, ArcGIS Online was used during the exercise for a variety of other use-cases, including:

- To publish hosted map services in states that did not have ArcGIS Server.
- To publish services that were accessible outside of the state's firewall.
- To support a variety of situational awareness viewing tools (see Section 3.1.4).
- To support the use of the Collector App to conduct damage assessments (see Section 3.3).
- The NISC published hosted feature services containing near real-time transportation data (e.g., 511 systems and FAA Airport Status).

Figure 6. CUSEC ArcGIS Online homepage.

3.1.2 WebEOC

Of the eight CUSEC member states, seven used WebEOC extensively as a primary Incident Management System, as well as a tool for intrastate information sharing through the TEMA-hosted WebFusion EEI Status Board. Seven of the states provided 576 county level EEI reports that included a detailed description of the operating status beyond simple (red = bad, yellow = somewhat bad, green = good) status reporting. Illinois, Tennessee, and Arkansas provided the greatest level of detail in their EEI reporting (see Figure 7).

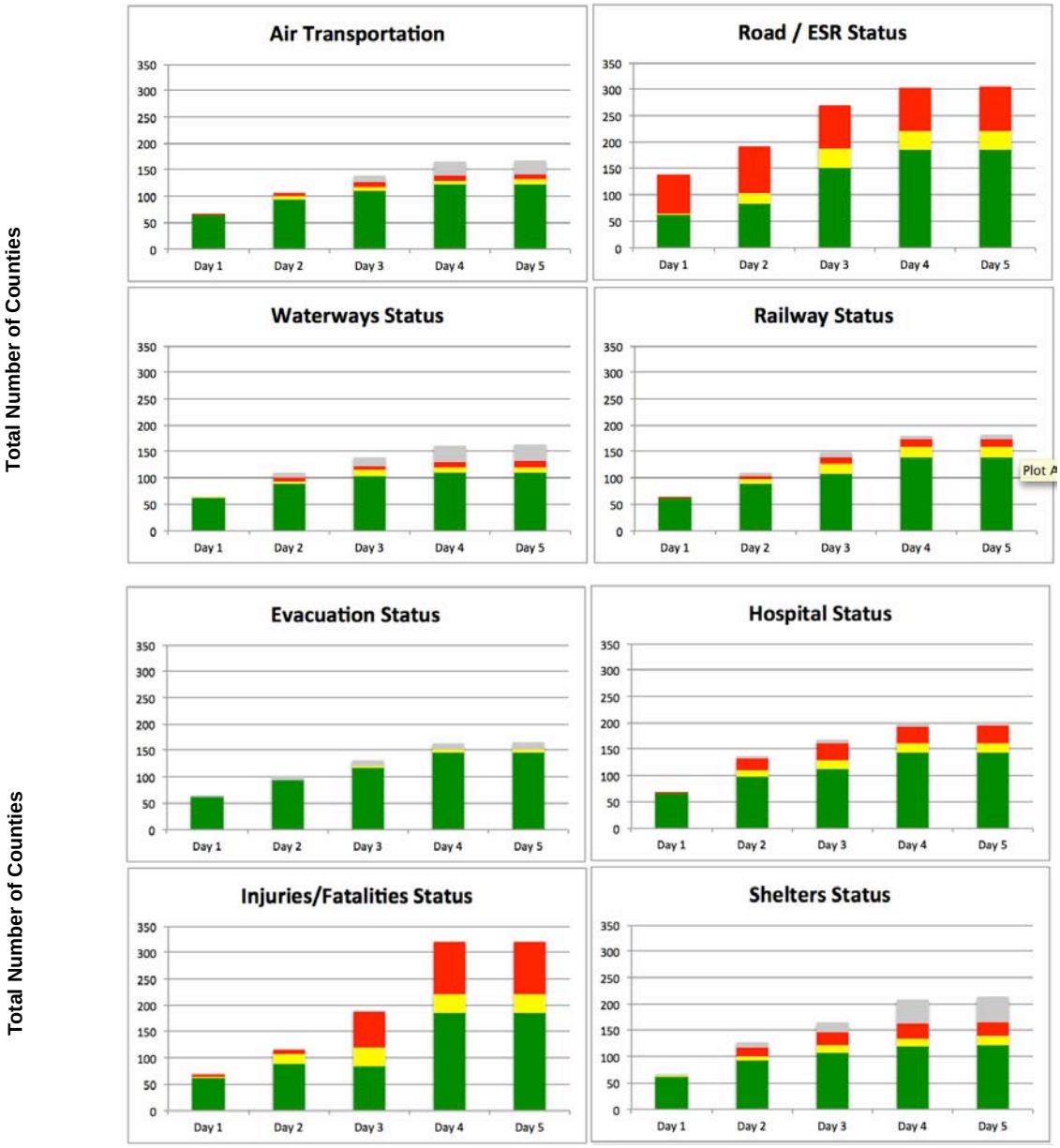


Figure 7. Region-Wide County Status Reports categorized as Red, Yellow, Green or Unknown (Gray) for each day of the exercise
(source: Regional WebFusion board, see Appendix II for EEI-specific color code key).

3.1.3 Virtual Business Emergency Operation Center

Over 40 private sector companies participated closely in the exercise, including developing their own injects and conducting company specific exercises concurrent with the regional exercise. Representatives from the private sector were either physically present within the SEOC or BEOC, or participated virtually over the Virtual Business Operation Center (vBEOC). A total of 78 organizations, including nine states, participated in the exercise by gaining situational awareness using the vBEOC.

The vBEOC was configured to connect to information shared by a variety of platforms, including ArcGIS Online, WebEOC, and the Single Automated Business Exchange for Reporting (SABER), notwithstanding several other applications. Private sector representatives provided important information on stores open/closed status, utility pole outages and resource teams throughout the exercise, and this information was used by public sector partners to make informed decisions.

All private sector companies were provided full access to the 13,137 EEI status updates provided by the states via ArcGIS Online and WebEOC through an embedded COP in the vBEOC. All private sector information status updates were successfully exchanged with the public sector vis-à-vis ArcGIS Online and WebEOC and accessible in the native COP of each public sector partner. Two-way information exchange via SABER was not achieved with the vBEOC, and none of the information provided from private sector partners via SABER could be accessed, exchanged or used by any public sector partner in their native COP.

The information provided to private sector partners both from states and other private sector partners was leveraged throughout the exercise to help companies make important decisions. For example, the private sector used the status of ESRs to help prioritize where to send resources to get utility services back online. Without private-public partnerships for emergency management during events like this, there would be less ability to respond and recover from disasters.

3.1.4 Other Common Operating Pictures

The presentation of information in the State Emergency Operation Center and other venues during the exercise took many forms, leveraging COPs that have been used by agencies for several years (e.g., the ArcGIS Viewer for Flex), as well as several new presentation tools (e.g., Esri Atlas Application, Briefing Book) summarized in Table 4.

Table 4. Summary of technology capabilities by state.

STATE	INCIDENT MGT SYSTEM	SITUATIONAL AWARENESS VIEWER
ALABAMA	EMITS	FlexViewer
ARKANSAS	WebEOC	Esri Atlas Viewer, ArcGIS Online
ILLINOIS	WebEOC / WebFusion	FlexViewer, Esri Thematic Atlas, Esri Briefing Book
INDIANA	WebEOC / WebFusion	FlexViewer

KENTUCKY	WEBEOC	FLEXVIEWER, ESRI BRIEFING BOOK, OPS DASHBOARD
MISSISSIPPI	WebEOC	FlexViewer
MISSOURI	WebEOC	ArcGIS Online
TENNESSEE	WebEOC / WebFusion	FlexViewer, Esri Thematic Atlas

3.1.5 Technology Breakthroughs

There were numerous significant technological breakthroughs during this exercise, including:

- Published data from WebEOC to ArcGIS Online (i.e., WebEOC -> ArcGIS Integration).
- Used Esri Collector App to collect damage assessments and insert data into WebEOC Board (i.e., ArcGIS -> WebEOC integration).
- Enabled shared SA of 18 EEIs using embedded geospatial viewer within vBEOC.
- Utilized the Esri plugin for MS Excel paired with a standard data model to assist states and private sector in publishing spreadsheets to ArcGIS Online-hosted feature services.
- Developed and deployed a vUSA Portal ArcGIS for Flex Viewer Widget to enable states to access content shared with the CUSEC Capstone 2014 ArcGIS Online group.
- Designed a standard WebEOC Board for reporting the status of 18 EEIs and linked seven out of eight CUSEC member states' WebEOC systems using WebFusion.
- Developed a data model to help standardize data on pre-scripted mission assignments from planners and were able to geospatially visualize this information alongside MRPs.
- Standardized exercise injects from eight states into a common MSEL data model and developed a geospatial tool to visualize the information.
- Generated shareable map services from live social media outlets (e.g., Google, Waze, GasBuddy).

3.2 Mutual Aid

Seven of the eight CUSEC members (all except for Missouri) cataloged over 360 MRPs in MASS prior to the exercise. Assisting states (including Georgia, Louisiana, North Carolina, Ohio, Oklahoma, South Carolina, Texas, Virginia, Wisconsin, and West Virginia) and several private sector companies registered nearly 160 additional MRPs. In total, there were 573 MRPs registered in MASS during the exercise.

At least 143 MRPs were utilized, deployed, and tracked using the Mutual Aid Support System and related geospatial applications. An operations dashboard view was setup to display the current total of MRPs by availability. Kentucky, Illinois, and Tennessee utilized the MRP widget for Flex to visualize the MRPs along with other information in their Flex Viewer COPs.

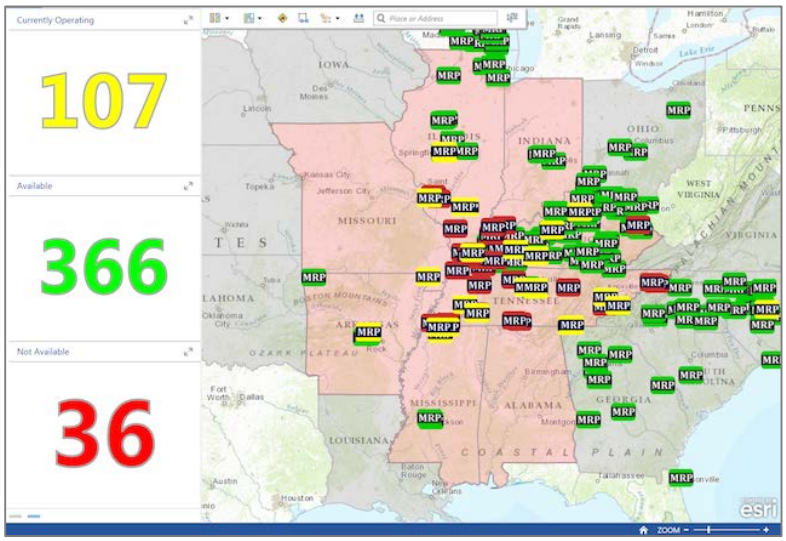


Figure 8. Screen Capture from the Esri Operations Dashboard displaying the operational status (Operating, Available, Not Available) of Mission Ready Packages on Day 4 of the exercise.

3.3 Damage Assessments and the Collector App

Several CUSEC member states used the exercise as an opportunity to develop, test, and evaluate mobile damage assessment data models. States elected to use the Esri Collector Application, a mobile application available for iOS, Android, and Windows systems, designed for data collection in the field (see Figure 10). Damage assessment teams in Kentucky involving 22 counties reported 130 damage assessments of commercial buildings, residential buildings, and public facilities valued at approximately $49M damage estimate using a mobile reporting application. Missouri used crowd-sourcing approach for damage assessments and the Collector App, capturing approximately 200 field reports and 14 facility assessments. Tennessee also used the Collector App, collected seven damage assessments during the exercise. During the exercise, states used the Esri Operations Dashboard to visualize real-time data being collected in the field (see Figure 11).

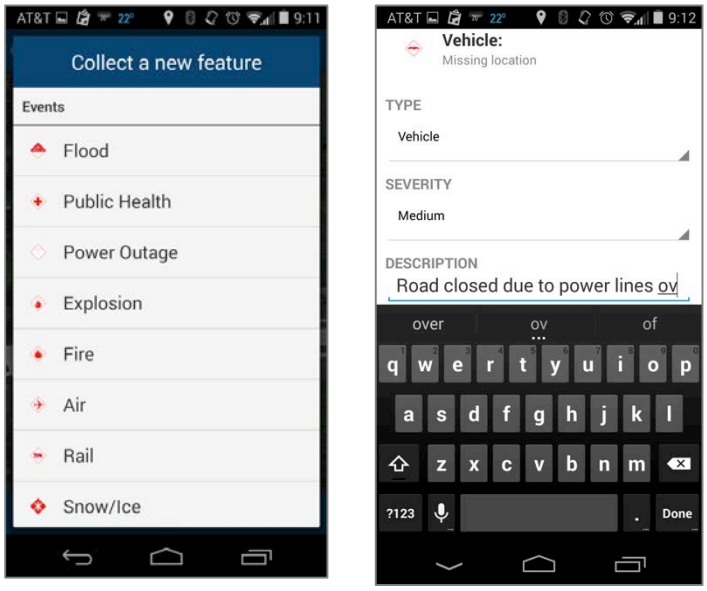


Figure 9. Esri Collector App screen showing a damage assessment form on an Android Device (Source: SEMA).

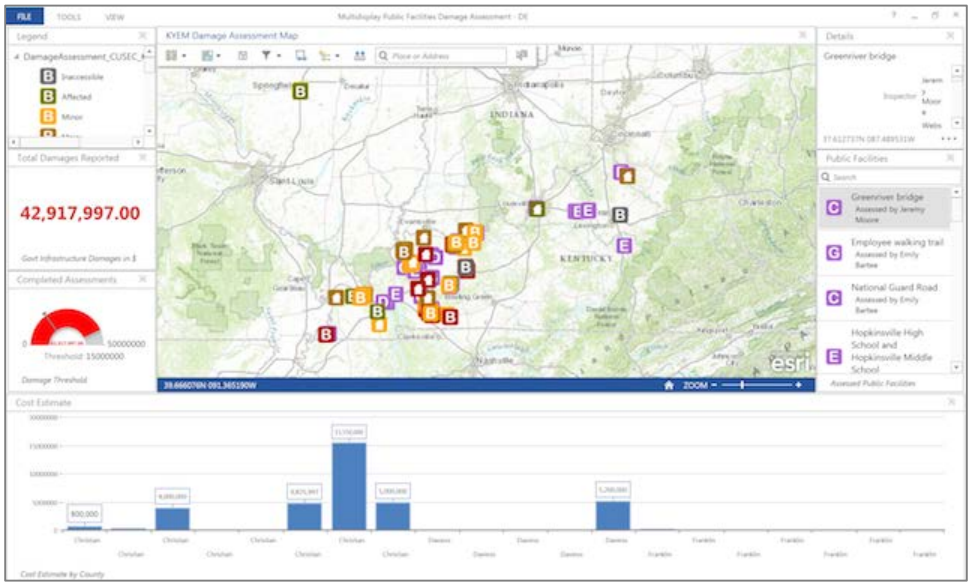


Figure 10. Screen Capture from the Esri Operations Dashboard displaying the damage assessments collected by KYEM during the exercise.

3.4 Operational Leave Behinds

- **A regional data sharing model** – Defines a common set of 18 essential elements of information that all states agreed to share and build capability toward, including supporting governance frameworks and standard operating procedure information sharing annexes.
- **Updated state/regional catastrophic plans** – In the course of three years, each of the states conducted a rigorous state/regional effort to update their catastrophic earthquake plans.
- **The systems level connections** – Integration between WebEOC, ArcGIS Online, GIS servers, mobile applications and analytical tools were built to last and still persist.
- **Shared EEIs** - Aside from the exercise data created explicitly for exercise play, more than 2,000 actual data layers continue to be shared amongst the CUSEC partners.
- **Data as a Service** – The NISC has created several "data as a service" mash-ups of key information that is freely available to the EM community. This includes, but is not limited to, 511/DOT status, social media data, etc.
- **Regional exercise model** – The state led exercise model included 8 state MSELs that were consolidated into a regional MSEL, providing a model for future regional exercise play.
- **Training materials** – Recorded webinars, user manuals, and video tutorials may continue to be leveraged for the use and deployment of the MASS and MRP geospatial tools.
- **Apps for EM**[15] - Freely available through the NISC and partners to include:
    - Mission Explorer App – enables states to track planned missions;
    - Mission Ready Package App – enables states to track and analyze status of mutual aid resources that are available, currently operating or not available;
    - vUSA ArcGIS Online Portal app – enables discovery of ArcGIS Online content in a native environment; and
    - Virtual Business Emergency Operations Center (vBEOC) app – enables private sector to collaborate, create, share, and discover public and private sector data.
- **Social Media for EM** – Several social media data models that align to and support the regional EEI data models were created. Virtual Social Media Working Group (VSMWG) participated in a tabletop analysis focusing on the role of social media as an additional information source to enhance situational awareness and decision-making, specifically as it might relate to mission objectives. See APPENDIX IV - Social Media Table Top Discussion for a detailed synopsis of the VSMWG CAPSTONE Social Media Analysis.

[15] There are numerous other apps that were not specifically tested and evaluated during the CUSEC CAPSTONE-14 exercise, but are worth referencing because they potentially may add value for state and local communities. These include but are not limited to: The National Geospatial Intelligence Agency RFI Generator; the U.S. National Grid Center's Mobile USNG; NASA and NOAA's National Weather Service GeoShare App; and Oak Ridge National Laboratory's Disaster Mitigation and Recovery Kit.

4 Conclusions

4.1 Lessons Learned

- The exercise successfully applied the Virtual USA sharing principles to ArcGIS Online for Organizations. This platform provided a central place to register, discover, and publish shared services, which was valuable to organizations that do not have ArcGIS Server licenses. The user and group based sharing model implicitly requires that users have a paid ArcGIS Online for Organizations account, other than in cases where the content being shared was specifically tagged for public viewing.
- The development and use of a Regional WebEOC Fusion Board to track county-level status information for the 18 Essential Elements of Information during this exercise was a step forward for interstate coordination and information sharing.
- The open APIs provided by Intermedix and Esri allowed for the integration of WebEOC with ArcGIS Server and enabled sharing information stored in WebEOC as map services, improving overall regional situational awareness.
- In many cases, workflows for capturing information in state Incident Management Systems can be improved to collect more standardized, geo-enabled information up-front, and avoiding the duplication of effort of having to enter information in multiple times. SOPs should be amended to include information on how EEIs will be updated ESFs. The TIA team developed an EEI SOP Annex Template to help codify information-sharing efforts with planners and trainers (see APPENDIX V - Essential Elements of Information (EEI) SOP Annex).
- A list of regional exercise injects and an 'Inject Explorer' tool were developed to help coordinate and visualize events over the course of the exercise, identify injects that involved cross-border play, and eliminate potential conflicts. The result provided a useful tool for the Master Control Cell; however, the development of a regional inject list would be made easier by defining a common data model for injects that participants could use during the planning stage of the exercise. Exercise planning models will succeed when aligned with operational and technical workflows to procure and share information.
- The exercise exposed opportunities to improve communication and situational awareness between State Emergency Operation Centers and the military Joint Operation Centers.
- Through dozens of workshops and teleconferences held between 2012 and 2014, the exercise provided states with an opportunity to forge better interstate, intrastate and private-sector partnerships.
- Although the workflows to create map service feeds from the IPAWS TDL and JITC environments were fully functional, the IPAWS COG-to-COG alerting test led by Arkansas Emergency Management failed to meet the exercise goals due to vendor-related technology issues in the alerting software. The On-The-Go Alerting app served as a useful backup and was successfully utilized during the exercise.
- Workflows and business processes that enable information creation and publication need to be updated to sustain information sharing. SOPs must be amended to include

information on how EEIs will be updated by Emergency Support Functions (ESFs) or data custodians.

- Nonstandard data model at times caused difficulty to data publishers and consumers. Standardization of data models (e.g., MRP, EEIs, Social Media, Radio Resource Request Forms) leveraging the National Information Exchange Model, when appropriate, would enable more effective and efficient information exchange and exercise coordination.
- Co-location in an exercise did not ensure efficient communications and collaboration. While many partners throughout the CUSEC region had shared situational awareness, participants from various agencies co-located at times struggled to understand what was going on. Standardization of operating procedures, business processes and training are critical to continued and sustained usage of the information management capabilities deployed in each CUSEC state.
- There was an unprecedented amount of information shared during this exercise, leading to improved situational awareness; however, there is still a gap in enabling decision makers to act on the information. Analytical tools need to be used to help guide decisions based on the wealth of information available.
- The engagement with the private sector early on in the exercise was beneficial to develop partnerships and develop the public-private mutual aid partnerships concept. Private sector businesses are generally most concerned with information on road status and power.
- The social media tabletop further defined data models, decision workflows and the basis for a concept of operations. In order to integrate social media in a meaningful way, a concept of operations for virtual support teams including a finite set of pre-scripted mission assignments that align to support operationally defined EEIs is required.

4.2 Recommendations

4.2.1 People Focused

- Develop and Maintain Partnerships: Over the past five years, there have been many opportunities for information exchange and collaboration between regional partners through the NLE-2011 and CUSEC CAPSTONE-14 Exercise. There was a general consensus that the relationships developed between states were one of the most important outcomes of the exercise. It is important to sustain these partnerships by continuing to hold meetings and open lines of dialog.
- Coordination of regional exercise injects: For future exercises, injects should be developed more collaboratively in advance of the exercise. They should also involve the GIS/IT Group so that there is a common understand of the type of information that will need to be tracked, as well as the processes for tracking that information.
- Provide additional training and collaboration opportunities:
    - Better integration of GIS into operations and planning in order to better link these programs.
    - Resource managers and operations staff should have better familiarity with both the SA technology and the data available to them to assist in decision-making.

- Continue building the local and state information processes and partnerships: These partnerships can help develop sustainable progress for interstate and intrastate Mutual Aid.

4.2.2 Process Focused

- Develop an Information Management and Information Systems Capability Maturity Model: A Capabilities Maturity Model would help agencies measure their maturity along a continuum and help to guide their path forward. For example, a review of how data is captured in their Incident Management Systems could result in significant opportunities to eliminate redundant data entry processes, reduce data entry errors and collect more detailed information.
- Incorporate EEIs and GIS into Standard Operating Procedures:
    - EEIs should be well defined, both in terms of what information is required, as well as what decisions the EEI is intended to drive.
    - The EEIs should be tracked by existing systems; otherwise processes should be developed to track them.
    - Where possible, Emergency Support Functions should maintain ownership of the EEIs that they are responsible for, and the systems (IMS, GIS) should support processes for collecting and sharing information from these sources.
- Develop Pre-scripted Mission Assignments for Mutual Aid needs: This exercise demonstrated how in-state resources would be insufficient to meet the needs following a disaster of this size. Identifying what resources are required to complete necessary missions and where those resources would be obtained is critical to mitigating additional loss of life and property after an event.
- Scale MASS Nationally: MASS was established as a potential solution for inventorying and discovering state MRPs. We recommend migrating MASS to a national framework in partnership with the National Emergency Management Association (NEMA) and potentially other mutual aid communities to ensure broader availability.
- Maintain current MRP data: Resource packages inventoried in MASS, or its eventual replacement, will need to be kept current by the resource owner in order for the system to be reliable for mutual aid at the state level.
- Establish a common symbology framework: During the exercise, some observers indicated that the non-standard symbology applied to the same EEIs by different states led to confusion when displaying these data simultaneously in a COP. The Regional EEI Status WebFusion Board hosted by TEMA helped to standardize the representation of county-level status information. There was not sufficient movement to standardize on any one symbol set during the exercise. Some map services allow end-users to customize the symbology, which can provide a workaround to the non-standard symbology. The findings related to symbology will be sent forward to the DHS Geospatial Management Office for consideration in multiple efforts underway to establish and propagate the use of a common symbol set for emergency management and homeland security.

4.2.3 Technology Focused

- Integration of states' IMSs was critical to information sharing: WebEOC and WebFusion offered states the ability to share high-level, county based status data with other states around an agreed upon format (e.g., 18 EEIs categorized by easily interpreted Red-Yellow-Green symbology). This provided a way to easily follow a standard, enable data redundancy if one system was compromised; however, there are some recommendations going forward:
  - Polygon-based status is probably not appropriate for all EEIs (e.g., hospitals, shelters)
  - The Regional Fusion Board needs to be updated based on common needs. For example, the Injuries/Fatalities field should be split to accommodate tracking injuries and fatalities separately.
- Areas for improvement for tracking EEIs: Several EEIs that were used during the exercise required additional detail for states to track consistently. For example, Staging Areas and JRSOI locations were often considered the same by some states and may not have been tracked, or duplication may have occurred.
- Common standards for MRPs are important for information exchange: NIMS resource typing definitions (i.e., NIMS Resource, Discipline, Category, Kind and Type) are a foundational component of MRP data model. A draft NIEM IEPD for MRPs was developed and tested during the experiment, which enabled a proof of concept interoperability between MASS and Mutual Aid Net.
- Need for Situational Awareness Alerting capabilities: During exercises and real-events, data is often published as the event unfolds. In order for shared SA to be achieved among a variety of users, an alerting system would be useful to notify users that new information has been published. Users would opt-in to the system by subscribing to the alerts for specific content providers or groups.
- Sharing issues:
  - The current named-user model for ArcGIS Online accounts does not meet the needs typical of an emergency management community where the number and set of potential users may fluctuate widely depending on the situation. A concurrent-use model would help to alleviate this problem.
  - Since there were several systems (e.g., WebEOC, ArcGIS Online, vBEOC, etc.) involved in this exercise, many users commented on the burden of multiple sign-on requirements. We recommend evaluating a single-sign capability using the oAuth2 capabilities with ArcGIS Online to enable access to content provided by ArcGIS Online through users of trusted applications (e.g., WebEOC, vBEOC, VIISE, etc.)
  - The vBEOC was unable to connect to information on the operational status of stores shared through the Single Automated Business Exchange for Reporting, or SABER. Instead, information was shared from the ArcGIS Plugin for MS Excel, which provided effective sharing capabilities between private sector and exercise participants that enabled shared situational awareness in each entity's respective operational environment.

- Communications Issues: On Day 1 of the CUSEC CAPSTONE 14 Exercise, Arkansas, which was playing under a scenario of downed traditional communication channels, encountered some difficulties submitting Resource Request Form (RRF)[16] using WinLinks software through the Military Aux. Radio System (MARS). The size of the RRF file, when digitized, was too large to send over the system. The workaround during the exercise was to scan the PDF as a JPG, reducing the file size and allowing it to be submitted over WinLinks/MARS. A standard exchange format (e.g., NIEM IEPD) could help prevent problems like this from occurring. A simple XML text based transmission would have payload orders of magnitude smaller than a scanned image file format. The required signature page could be included using a digital signature (which the EDXL wrapper supports) or a scanned signature page that can be attached to the XML as a payload object.

4.3 Sustainability

The report and specific findings are recommended for the IMIS-SC Future State Expert Working Group to include as part of their start-up background documents.

- System Connections: The systems connections between enterprise level applications (e.g., WebFusion, WebEOC to ArcGIS Online, ArcGIS Online to WebEOC) implemented by states during this exercise provide important, long-lasting capabilities to increase information sharing and provide resilience.
- Updating SOPs and continued training: The revision of SOPs and continued training opportunities are key to sustaining the advances made during this Exercise and progressing into the future.
- Mission Ready Governance, Policies, Plans and Procedures: Enabled through updated EQ response plans, CONOPS, integrated planning, and GIS through the development of the exercise MSEL injects and related information packages for use by decision makers.
- Mission Ready Technology Architecture: Enabled through integration of WebEOC Fusion, ArcGIS Online, Mobile Reporting Tools, Presentation Layer GIS Capabilities, etc.
- Mission Ready Data: Enabled through agreement on 18 Essential Elements of Information to be shared across borders, integration of data from numerous custodial owners of data, and assembly of mission-specific collections of information for decision makers.
- Mission Ready Packages Creation of MRPs: Enabled through the MASS. Discovery and access of mission ready teams/resources enabled through the MRP geospatial tools. Request and acquisition is enabled through the EMAC Operating System.
- Mission Ready "Whole of Community" Engagement: Enabled by definition of information requirements and inclusion of private sector, military, and VOAD communities in resource allocation planning effort.

[16] The RRF form can be downloaded from FEMA here: http://1.usa.gov/1k8CpKR.

APPENDIX I – Capability Assessment Survey

Capstone 2014

CUSEC GIS/IT Working Group

Capability Assessment

Name: _____

Title: _____

Agency: _____

Local/State/Federal Jurisdiction: _____

Email Address: _____

Work Phone: _____

Introduction

The capabilities assessment tool is designed to provide the CUSEC GIS/IT working group with a baseline understanding of each state's information sharing capabilities. Based on the objectives and goals of CAPSTONE 2014 identified by the CUSEC board of directors, this tool will aid the GIS/IT working group define and set expectations for what it means to be "CAPSTONE 2014 Ready."

Section 1: Governance

1. How does your EOC utilize information management technologies during day-to-day and emergency events?
2. Do you have executive level support for the implementation of incident management information sharing capabilities during CAPSTONE 2014?
3. Are the Incident Management System (IMS) and Geographic Information Systems (GIS) that your agency uses deployed at an enterprise level or managed within your agency?
4. Does your EOC have a Standard Operating Guidance (SOG) or Standard Operating Procedure (SOP) clearly defined for implementation of your IMS and GIS?

Section 2: Awareness

1. Are you aware of what datasets are available to you from the other CUSEC states? If so, which datasets?
2. Which data repositories do you visit to conduct data discovery missions from internal/external partners?
3. To what extent have you leveraged Virtual USA or the My Library Widget to discover data from CUSEC partners?
4. Do you have the capability or processes in place to consume data shared by the community (i.e., social media)?

Section 3: Consuming Data

1. Do you have a situational awareness viewer for operations that will be dedicated for use during CAPSTONE 2014? What software is it based on and who owns the viewer?
2. Do you have the capability to consume GeoRSS, KML, RESTful, or WMS map services in your geospatial viewer?

Section 4: Creating & Publishing Data

1. Which Incident Management System does your agency use to create and publish incident specific information?
2. Is your IMS linked to your situational awareness viewer used as an integrated part of your EOC operations?
3. Which operational datasets do you have capacity to create within your agency?
4. Which operational datasets do you rely upon other agencies to create and share with you?
5. Please identify which data sets are you currently are unable to obtain to achieve your mission(s) internally and/or externally.

Section 5: Sharing Information

1. What GIS information does your agency share with CUSEC regional states today?
2. Is there anything that precludes you from sharing additional GIS information with CUSEC states?
3. What GIS information does your agency share with the public during an emergency/incident?
4. Which operational datasets do you not presently have a process/capability to share internally/externally?

Section 6: Securing Data

1. What type of security do you use for IMS/GIS information? (e.g., LDAP, basic authentication, windows authentication, form authentication, token based security, etc.)
2. Do you require consumers of your data to have credentials on your system of record?

Section 7: Mutual Aid Systems

1. Does your agency have a mutual aid resource inventory?
2. To what extent have you had experience working with the EMAC Operations System? Who in your agency is trained to use the EMAC Operations System?
3. To what extent does your agency create/organize your mutual aid resources into Mission Ready Packages and display them within a GIS system?
4. To what extent does your state use any other mutual aid tools, systems or frameworks to support request and acquisition of mutual aid?

Section 8: CUSEC GIS/IT Working Group

1. Do you have any additional questions that should be addressed at an upcoming GIS/IT monthly conference call?
2. Who is your agency's point of contact for the following?
    a. Enterprise architecture
    b. IMS Administrator
    c. GIS Administrator
    d. Database Administrator
    e. IT Administrator – Network Administrator
3. When are you available to discuss the results of this assessment and begin to discuss the path forward?

APPENDIX II - List of the 18 Essential Elements of Information used in CUSEC CAPSTONE-14

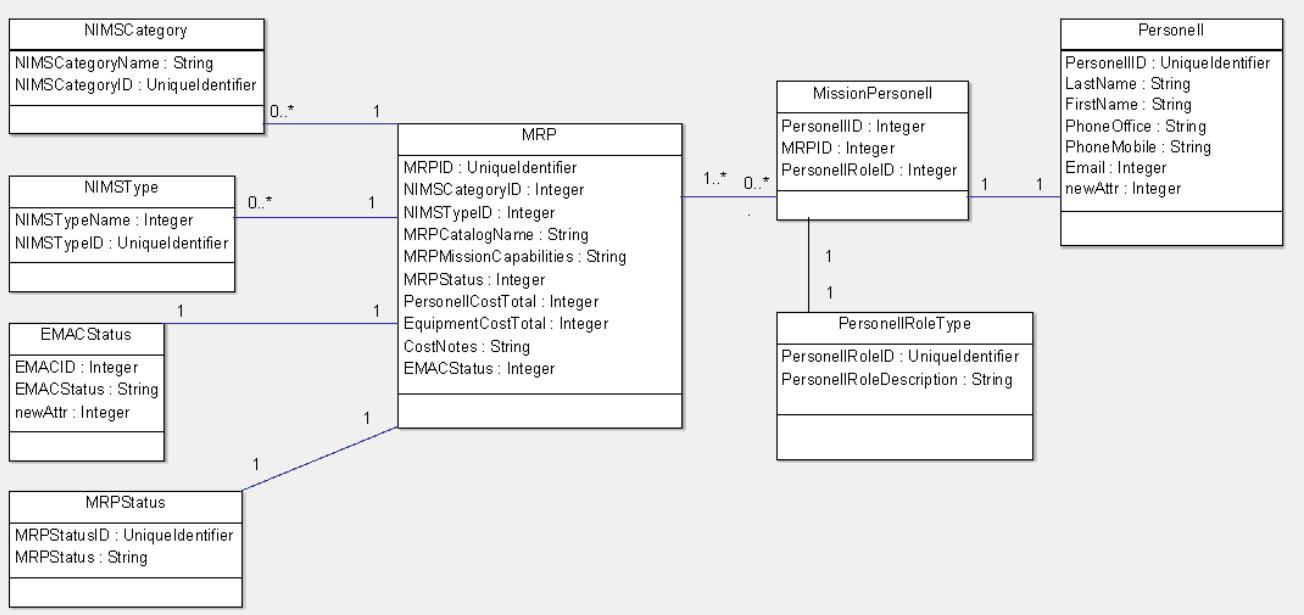
Category	EEI	Feature Type	Suggested Attributes	Responsible ESF	Status Red	Status Yellow	Status Green
Infrastructure	Electricity Grid	Polygon	Provider Name, Location (County), Status, Last Update Date/Time	12-Energy	No availability	Limited availability	Available
Infrastructure	Natural Gas Grid	Polygon	Provider Name, Location (County), Status, Last Update Date/Time	12-Energy	No availability	Limited availability	Available
Infrastructure	Public Water Grid	Polygon	Provider Name, Location (County), Status, Last Update Date/Time	12-Energy	No availability	Limited availability	Available
Infrastructure	Private Sector Infrastructure	Point	Company Name, Type Of Facility (e.g., Warehouse, Distribution Site), POC, Location, Status (Opened/Closed), Last Update Date/Time	Other	Not Available	Deployed	Available
Transportation	Road Status (including bridges)	Line	Road Name, Location (e.g. mile marker; lat/long; address; intersection), Type (e.g., bridge, broken pavement, sinkhole), Distance of Closure, Last Update Date/Time	1-Transportation	Major delays or closed	Minor delays due to road conditions	Passable
Transportation	Rail network (including bridges)	Line	Status, Community Impact (Hazmat, large fires, etc.), Rail Line Owner, Status of Bridges/Overpasses, stranded train, Last Update Date/Time	1-Transportation	Major delays or closed	Minor delays due to rail conditions	Passable
Transportation	Navigable waterways	Polygon	River Name, Location (e.g., river mile from and to; lat/long), Status, Description, Estimated Fix Time, Contact, Recent Progress, Last Update Date/Time	1-Transportation	Major delays or closed	Minor delays due to waterway conditions	Passable

Category	EEI	Feature Type	Suggested Attributes	Responsible ESF	Status Red	Status Yellow	Status Green
Transportation	Air Transportation Infrastructure	Point	Airport Name, Material Handling Equipment, Fuel Availability, Security, Maintenance, Staffing & Hours of Operation, Maximum-On-The-Ground (MOG) & Ramp Capacity, Runway Length, Last Update Date/Time	1-Transportation	Closed	Limited use/emergency use only	Open
Operations	Area Command Locations	Point, Polygon	Name Of EOC, Type of EOC (State, Local), Location (Address), POC, Primary Phone Number, Status, Last Update Date/Time	5-Emergency Management	Level 1-full activation	Level 2-partial activation	Level 3-operational/monitoring
Operations	Staging Areas	Point	Name, address/location, primary phone number, POC, type (e.g., vehicle, personnel, equipment), availability of electricity	5-Emergency Management	Closed	Limited use/emergency use only	Open
Operations	Points of Distribution (PODS)	Point	Name, Location (Address), Commodities being provided, POC, Phone Number, Status, Last Updated Date/Time	ESF 7- Logistics	Closed	Limited use/emergency use only	Open
Operations	Joint Reception, Staging, Onward Movement and Integration (JRSOI) Sites	Point	JRSOI Name, Address, POC, Phone Number, Capacity, Status, Last Update Date/Time	5-Emergency Management	Closed	Limited use/emergency use only	Open
Operations	Evacuation Orders	Polygon	County Name, Incident Name, Alert Type, Threat level, Area of Concern, POC, Phone Number, Effective Start Date, End Date, Last Update Date/Time	5-Emergency Management	Mandatory	Voluntary/phased	None
Operations	Injuries and Fatalities	Polygon	County Name, Number of Reports, Last Update Date/Time	8-Public Health and Medical	Confirmed fatalities/injuries	Fatality/injury confirmation	No fatality reports

Category	EEI	Feature Type	Suggested Attributes	Responsible ESF	Status Red	Status Yellow	Status Green
				Services		underway	
Operations	Shelters	Point	Name, location (address, lat/long), Phone Number, POC, Max Capacity, Current Capacity, Pets Accepted, Status, Last Update Date/Time	6-Mass Care-Emer Assistance-Housing-Human Services	Full or over capacity	Open-more than 50% occupancy	Open-less than 50% occupancy or Closed
Operations	Communications (Public Safety and General Public)	Point, Polygon	County Name, Communications Network Type, Name, Location, POC, Primary Phone Number, Status, Last Update Date/Time	2-Communications	Emergency and commercial communications network failure?	Emergency communication up; commercial failed or limited, including cellular	Normal operations
Operations	Hospital Status	Point	Name, Address, Max Capacity, Current Capacity, POC, Phone Number, Status, Last Update Date/Time	8-Public Health and Medical Services	Not operational or no capacity for new patients	At or above capacity	Available capacity
Incidents	US Geological Survey Data (e.g., **P**rompt **A**ssessment of **G**lobal **E**arthquakes for **R**esponse or PAGER)	Point	Magnitude, alert level, time, location (i.e., lat/long), Modified Mercalli Intensity Scale (MM) value		1000+ est. fatalities and/or $1 billion+ est. losses	1-999 est. fatalities and/or $1M-$1B est. losses	0 est. fatalities and/or < $M est. losses

APPENDIX III – DRAFT Mission Ready Package Data Model

Mission Ready Package UML Diagram



Mission Ready Package Exchange Subset (Draft NIEM IEPD)

```
<?xml version="1.0" encoding="UTF-8"?>

<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:ct="http://release.niem.gov/niem/conformanceTargets/3.0/" xmlns:nc="http://release.niem.gov/niem/niem-core/3.0/"
xmlns:cyfs="http://release.niem.gov/niem/domains/cyfs/3.0/"
xmlns:em="http://release.niem.gov/niem/domains/emergencyManagement/3.0/"
xmlns:intel="http://release.niem.gov/niem/domains/intelligence/3.0/"
xmlns:geo="http://release.niem.gov/niem/adapters/geospatial/3.0/"
xmlns:structures="http://release.niem.gov/niem/structures/3.0/" xmlns:nims="http://release.niem.gov/niem/codes/nims/3.0/"
xmlns:mrp="http://release.niem.gov/niem/codes/mrp/3.0/" xmlns:mrpx="http://mrp_exchange"
targetNamespace="http://mrp_exchange" elementFormDefault="qualified" attributeFormDefault="unqualified">

        <xs:import namespace="http://release.niem.gov/niem/domains/intelligence/3.0/"
            schemaLocation="../Constraint/niem/domains/intelligence/3.0/intelligence.xsd"/>

        <xs:import namespace="http://release.niem.gov/niem/domains/emergencyManagement/3.0/"
            schemaLocation="../Constraint/niem/domains/emergencyManagement/3.0/emergencyManagement.xsd"/>

        <xs:import namespace="http://release.niem.gov/niem/domains/cyfs/3.0/"
```

```
    schemaLocation="../Constraint/niem/domains/cyfs/3.0/cyfs.xsd"/>
<xs:import namespace="http://release.niem.gov/niem/adapters/geospatial/3.0/"
    schemaLocation="../Constraint/niem/adapters/geospatial/3.0/geospatial.xsd"/>
<xs:import namespace="http://release.niem.gov/niem/niem-core/3.0/" schemaLocation="../Constraint/niem/niem-
    core/3.0/niem-core.xsd"/>
<xs:import namespace="http://release.niem.gov/niem/structures/3.0/"
    schemaLocation="../Constraint/niem/structures/3.0/structures.xsd"/>
<xs:import namespace="http://release.niem.gov/niem/codes/mrp/3.0/"
    schemaLocation="../Constraint/niem/codes/mrp/3.0/mrp.xsd"/>
<xs:import namespace="http://release.niem.gov/niem/codes/nims/3.0/"
    schemaLocation="../Constraint/niem/codes/nims/3.0/nims.xsd"/>


 <!-- Start of definition of Complex Types for the information -->
 <xs:complexType name="MissionReadyPackageType">
        <xs:annotation>
            <xs:documentation>A data type containing  all the elements in here (which are complex) will be in the
            instance Document in this order (This is the ROOT Type).</xs:documentation>
        </xs:annotation>
        <xs:complexContent>
            <xs:extension base="structures:ObjectType">
                <xs:sequence>
                    <xs:element ref="mrpx:Cost" minOccurs="0" maxOccurs="unbounded"/>
                    <xs:element ref="mrpx:EMACReady" minOccurs="0" maxOccurs="1"/>
                    <xs:element ref="mrpx:Location" minOccurs="0"/>
                    <xs:element ref="mrpx:Mobility" minOccurs="0"/>
                    <xs:element ref="mrpx:MRPCatalogNameText" minOccurs="1"/>
                    <xs:element ref="mrpx:MRPMissionCapabilitiesDescription" minOccurs="0"/>
                    <xs:element ref="mrpx:MRPMissionStartEndDate" minOccurs="0"/>
                    <xs:element ref="mrpx:MRPOfferingJurisdiction" minOccurs="0"/>
                    <xs:element ref="mrpx:MRPStatus" minOccurs="0"/>
                    <xs:element ref="mrpx:Resource" minOccurs="0"/>
                    <xs:element ref="mrpx:MRPPOC" minOccurs="0" maxOccurs="1"/>
                    <xs:element ref="mrpx:EMACPOC" minOccurs="0" maxOccurs="1"/>
                    <xs:element ref="mrpx:URL" minOccurs="0"/>
                </xs:sequence>
            </xs:extension>
        </xs:complexContent>
```

```
        </xs:complexType>
        <xs:element name="Cost" type="mrpx:CostType">
                <xs:annotation>
                        <xs:documentation>MRP Cost</xs:documentation>
                </xs:annotation>
        </xs:element>
        <xs:complexType name="CostType">
                <xs:annotation>
                        <xs:documentation>A data type for details on the MRP related costs</xs:documentation>
                </xs:annotation>
                <xs:complexContent>
                        <xs:extension base="structures:ObjectType">
                                <xs:sequence>
                                    <xs:element name="PersonnelCostTotal" type="nc:NumericType">
                                     <xs:annotation>
                                          <xs:documentation>Total daily personnel costs (defined in
                                            USD)</xs:documentation>
                                     </xs:annotation>
                                    </xs:element>
                                    <xs:element name="EquipmentCostTotal"type="nc:NumericType">
                                            <xs:annotation>
                                                    <xs:documentation>Total daily equipment costs (defined in
USD)</xs:documentation>
                                            </xs:annotation>
                                    </xs:element>
                                    <xs:element name="TravelCostTotal" type="nc:NumericType">
                                            <xs:annotation>
                                                    <xs:documentation>Total travel costs (defined in
USD)</xs:documentation>
                                            </xs:annotation>
                                    </xs:element>
                                    <xs:element name="EstimatedFixedCost" type="nc:NumericType">
                                            <xs:annotation>
                                                    <xs:documentation>Estimated fixed cost for MRP (defined in
USD)</xs:documentation>
                                            </xs:annotation>
                                    </xs:element>
```

```
                                    <xs:element name="EstimatedDailyRate" type="nc:NumericType">
                                        <xs:annotation>
                                            <xs:documentation>Estimated average daily rate for MRP (defined in USD)</xs:documentation>
                                        </xs:annotation>
                                    </xs:element>
                                    <xs:element name="TotalCostsOther" type="nc:NumericType">
                                        <xs:annotation>
                                            <xs:documentation>Total uncategorized costs for MRP, additional details provided in Cost Notes (defined in USD)</xs:documentation>
                                        </xs:annotation>
                                    </xs:element>
                                    <xs:element name="CostNotes" type="nc:TextType">
                                        <xs:annotation>
                                            <xs:documentation>Comments related to MRP cost</xs:documentation>
                                        </xs:annotation>
                                    </xs:element>
                                </xs:sequence>
                            </xs:extension>
                        </xs:complexContent>
                    </xs:complexType>
                    <xs:element name="EMACReady" type="nc:BooleanListType" nillable="true">
                        <xs:annotation>
                            <xs:documentation>Is MRP sharable for interstate mutual aid through EMAC? (0 = no, 1 = yes)</xs:documentation>
                        </xs:annotation>
                    </xs:element>
                    <xs:element name="LocationBase" type="geo:PointType">
                        <xs:annotation>
                            <xs:documentation>Location of the MRP home location or base</xs:documentation>
                        </xs:annotation>
                    </xs:element>
                    <xs:element name="LocationDeployed" type="geo:PointType">
                        <xs:annotation>
                            <xs:documentation>Location of the MRP deployment</xs:documentation>
                        </xs:annotation>
```

```
</xs:element>
<xs:element name="Location" type="mrpx:LocationType"/>
<xs:complexType name="LocationType">
    <xs:annotation>
        <xs:documentation>A data type specifying the location of the MRP</xs:documentation>
    </xs:annotation>
    <xs:complexContent>
        <xs:extension base="structures:ObjectType">
            <xs:sequence>
                <xs:element ref="mrpx:LocationBase" minOccurs="1"/>
                <xs:element ref="mrpx:LocationDeployed" minOccurs="0"/>
            </xs:sequence>
        </xs:extension>
    </xs:complexContent>
</xs:complexType>
<xs:element name="MissionReadyPackage" type="mrpx:MissionReadyPackageType">
    <xs:annotation>
        <xs:documentation>ROOT ELEMENT - This is the root element which contains all of the elements of
an MRP</xs:documentation>
    </xs:annotation>
</xs:element>
<xs:element name="Mobility" type="mrp:MobilityType">
    <xs:annotation>
        <xs:documentation>Describes whether the resource is fixed or mobile</xs:documentation>
    </xs:annotation>
</xs:element>
<xs:element name="MRPCatalogNameText" type="nc:TextType">
    <xs:annotation>
        <xs:documentation>MRP Catalog Name</xs:documentation>
    </xs:annotation>
</xs:element>
<xs:element name="MRPMissionCapabilitiesDescription" type="nc:TextType">
    <xs:annotation>
        <xs:documentation>Details for the mission capabilities of the MRP</xs:documentation>
    </xs:annotation>
</xs:element>
```

```
<xs:element name="MRPMissionStartEndDate">
    <xs:annotation>
        <xs:documentation>For MRPs associated with a Mission deployment, this represents the Start and End dates corresponding to the Mission.</xs:documentation>
    </xs:annotation>
</xs:element>
<!-- LDY: there's a daterange type in NIEM -->
<xs:complexType name="MRPMissionStartEndDateType">
    <xs:annotation>
        <xs:documentation>A data type specifying the Start and End dates corresponding to the Mission.</xs:documentation>
    </xs:annotation>
    <xs:complexContent>
        <xs:extension base="structures:ObjectType">
            <xs:sequence>
                <xs:element ref="nc:StartDate"/>
                <xs:element ref="nc:EndDate"/>
            </xs:sequence>
        </xs:extension>
    </xs:complexContent>
</xs:complexType>
<xs:element name="MRPOfferingJurisdiction" type="nc:JurisdictionType">
    <xs:annotation>
        <xs:documentation>State offering MRP</xs:documentation>
    </xs:annotation>
</xs:element>
<xs:element name="MRPStatus" type="mrp:MRPStatusCodeType">
    <xs:annotation>
        <xs:documentation>Status of MRP </xs:documentation>
    </xs:annotation>
</xs:element>
<xs:element name="NIMSResource" type="mrpx:NIMSResourceType" substitutionGroup="mrpx:ResourceKind">
    <xs:annotation>
        <xs:documentation>The name of the NIMS resource</xs:documentation>
    </xs:annotation>
</xs:element>
```

```
<xs:element name="NIMSResourceCategory" type="nims:NIMSResourceCategoryCodeType">
    <xs:annotation>
        <xs:documentation>The function for which the resource is most useful (firefighting, law enforcement, health and medical, etc.)</xs:documentation>
    </xs:annotation>
</xs:element>
<xs:element name="NIMSResourceType" type="nims:NIMSResourceTypeCodeType">
    <xs:annotation>
        <xs:documentation>A measure of minimum capabilities to perform its function (Type 1 implies a higher capability than Type II)</xs:documentation>
    </xs:annotation>
</xs:element>
<xs:complexType name="NIMSResourceType">
    <xs:annotation>
        <xs:documentation>A data type specifying the minimum capabilities to perform its function (Type 1 implies a higher capability than Type II)</xs:documentation>
    </xs:annotation>
    <xs:complexContent>
        <xs:extension base="structures:ObjectType">
            <xs:sequence>
                <xs:element ref="mrpx:NIMSResourceCategory"/>
                <xs:element ref="mrpx:NIMSResourceKind"/>
                <xs:element ref="mrpx:NIMSResourceType"/>
            </xs:sequence>
        </xs:extension>
    </xs:complexContent>
</xs:complexType>
<xs:element name="NIMSResourceKind" type="nims:NIMSResourceKindCodeType">
    <xs:annotation>
        <xs:documentation>A broad class of characterization, such as teams, personnel, equipment, and supplies</xs:documentation>
    </xs:annotation>
</xs:element>
<xs:element name="MRPPOC" type="mrpx:POCType">
    <xs:annotation>
        <xs:documentation>Point of contact for MRP</xs:documentation>
    </xs:annotation>
```

```
        </xs:element>
        <xs:element name="EMACPOC" type="mrpx:POCType">
                <xs:annotation>
                        <xs:documentation>Point of contact for MRP</xs:documentation>
                </xs:annotation>
        </xs:element>
        <xs:complexType name="POCType">
                <xs:annotation>
                        <xs:documentation>A data type specifying the role of the point of contact (e.g., MRP Contact, EMAC
REQ-A Contact)</xs:documentation>
                </xs:annotation>
                <xs:complexContent>
                        <xs:extension base="structures:ObjectType">
                                <xs:sequence>
                                        <xs:element ref="nc:RoleOfPerson"/>
                                </xs:sequence>
                        </xs:extension>
                </xs:complexContent>a
        </xs:complexType>
        <xs:element name="Resource" type="mrpx:ResourceType"/>
        <xs:element name="ResourceKind" abstract="true"/>
        <xs:complexType name="ResourceType">
                <xs:complexContent>
                        <xs:extension base="structures:ObjectType">
                                <xs:sequence>
                                        <xs:element ref="mrpx:ResourceKind"/>
                                </xs:sequence>
                        </xs:extension>
                </xs:complexContent>
        </xs:complexType>
        <xs:element name="URL" type="nc:ElectronicAddressType">
                <xs:annotation>
                        <xs:documentation>Web accessible resource link for the MRP</xs:documentation>
                </xs:annotation>
        </xs:element>
</xs:schema>
```

APPENDIX IV - Social Media Table Top Discussion

Central U.S. Earthquake Consortium (CUSEC) CAPSTONE Exercise Social Media Analytics and Decision-Making Table Top Discussion

DHS Virtual Social Media Working Group (VSMWG)

June 2014

BACKGROUND

High impact and high visibility events, like Hurricane Sandy and the Boston Marathon bombing, have revealed the proliferation of new information and communications channels, with the widespread use of mobile devices and social media. Government, response organizations, the media and the public are increasingly using social media to find and share information and to communicate throughout disasters. In addition to traditional information sources, social media can provide the real-time "what," "who," "why" and "how." It may even help in predicting the cascading effects of decisions, actions and changing hazards. The proliferation of new channels and subsequent explosion in available data, however, coupled with an assortment of social media tools, platforms and data formats, is quickly overwhelming response organizations, ultimately leaving resources and critical information untapped, unused or unknown.

Obtaining real-time, accurate and actionable information during a disaster helps the public make critical decisions and response organizations to provide timely and effective resources where they are needed most. To truly integrate social media into the operational decision-making, however, applicable data must be found, aggregated, validated, analyzed and shared among the public and across the response community. The public safety community must learn not only how to leverage, but also to integrate social media into planning, response, and recovery operations, to enhance real-time and dynamic communication, information sharing, and decision-making.

FUTURE STATE

Once social media is fully accessed and integrated within the information-sharing environment and operational decision flow, the following may be possible:

- The ability to search for, identify and use information from social media sources to help answer questions applicable to mission and pre-existing information requirements;
- The ability to identify and detect anomalies or events, indicated by variations on social media channels from baseline activity, topics discussed, volume or frequency;
- The ability to use information from social media to help predict or model potential impacts, cascading effects and future needs; and
- The ability to use social media to help inform supply chain planning and logistics, resource allocation and prioritization of response activities and resources.

PROCESS

Members of the DHS Virtual Social Media Working Group (VSMWG) and VSMWG collaboration partners participated in a two-day discussion (June 16 and 17, 2014) focusing on how information from social media could be used to enhance decisions and actions taken. The discussion occurred simultaneously with the Central U.S. Earthquake Consortium (CUSEC) CAPSTONE event. The event tested communications, information sharing and mutual aid across the CUSEC and surrounding states in response to a fictional 7.7 earthquake within the New Madrid Seismic zone.

The following agencies or organizations participated in the CAPSTONE-14 discussion:

- Humanity Road
- The George Washington University
- Centers for Disease Control
- U.S. Northern Command
- SeeClickFix
- Federal Emergency Management Agency
- G&H International Services, Inc.

The group focused on three essential elements of information (EEI): 1. Mass Care and Sheltering; 2. Road and Fuel Status; and 3. Immediate Damage Assessment, specifically:

- Decisions to be made that are applicable to each EEI;
- Questions that need to be answered in order to make identified decisions; and
- Information that is needed to answer identified questions.

In support of the decisions, questions and information gaps, the group discussed various challenges (content and technical), how information might be presented on social media channels, appropriate presentation and visualization of the data once found, and specific data attributes requiring further consideration and research.

DISCUSSION

For the purposes of discussion, the group focused on fuel status. Several fuel-related or applicable data layers were available from a variety of sources through ArcGIS Online and the CAPSTONE Partnership Directory. These included Gas Buddy (location and price of gas), scenario-specific seismic data and damage reports, population density, evacuation routes, and the locations and statuses of Walmart stores, Walgreens, and CVS. From this data, with respect to the scenario specifics, the group identified various decisions requiring additional information. The group then identified various questions that would need to be answered, as well as information needed in order to answer the questions, including:

Decision Topic	Related Questions	Information Available/Needed
Gas (availability, location, supply, price and prioritization)	• What gas stations are open? • Is there gas available? • If no gas, are other resources available at gas stations? • What are current wait times? • Is there enough supply/will (where) or shortage? • What is the anticipated need? • Can the public pay for gas (what forms of payment are currently accepted and does the public have access to payment methods)?	• Public sentiment and understanding of directions • Awareness of available resources and location • Population movement (historical patterns and real-time trends) • Anticipated needs/plans • Experience in acquisition of gas and other resources (access, location, security, time, additional needs) • Accuracy of current data • Reports of price gouging • Rumors/misinformation • Awareness of directions • Evacuation and transit routes (planned and current) • Artery status to major transit routes (e.g., smaller streets) • Access to required payment type (access to cash) • Status of ATMs/banks
Evacuation (evacuation, sheltering-in-place, direction, timing, return)	• What is the status of the roads? • Is there gas available on transit and evacuation routes? • What other commodities are or are not available on transit routes?	
Changing Hazards and Emerging Threats; Changes in Action or Activity	• Are there significant and changing weather patterns (e.g., winter storms?) • Is there price gouging? • What is the anticipated need for gas? • Does the supply satisfy the anticipated need? If not, when will supply run out? • Is it possible to move gas into the area and if so, when? • How will gas shortage/outage effect population movement, safety, and future needs?	

Once the group identified various decisions, questions, and supporting information or information gaps, the group considered how the information, once acquired, might best be presented or visualized, including:

- Raw imagery and content;
- Imagery posted within proximity of a known gas station or specific area;
- Imagery tagged by status (once status is self-reported: e.g., all imagery that the public tags or calls "damaged");
- Color change to indicate discrepancies between anticipated need and estimated actual need;
- Heat map of gas station outage (polygons by number of offline stations by area/zip code);
- Status of evacuation routes by number of offline stations (as reported by the public: e.g., roads with more than a certain number of reports of gas outages would appear red);
- Color change indicating time before expected outage of supply; and
- Heat map of wait times.

The group also discussed various challenges associated with acquiring or using the data. These included:

- A need to identify baseline metrics on typical gas need and thresholds for identifying anomalies;
- A need to integrate baseline data from multiple partners;
- A need to integrate historical population movement, evacuation routes and potential needs;
- Varying taxonomies across multiple partners and data layers;
- Varying methods for reporting volume and standardizing weighted reporting;
- A need to identify lack of or underrepresented information;
- Varying coverage due to communications infrastructure outages; and
- Statistical validity in algorithms used to identify potential need and time until shortage/outage or a need for re-allocation/re-planning of resources.

Finally, the group identified and discussed specific attributes requiring further consideration, including:

- Credibility of available information (and level of credibility needed to inform specific decisions);
- Frequency with which information must be updated;
- Meaning of time passed since post of data and planning for implications of time lag;
- Validity and accuracy of information available and needed;
- Usability and completeness of available information;
- Relevance of available information to required decisions;
- Accessibility of information to response partners;
- Prioritization of data by type and by need;
- Scalability of information needed and gleaned, as attributed to specific instance or entity;
- Ability transformation of information and sharing of information products or derivatives;
- Compatibility and interoperability of data; and
- Level of specificity needed and available.

LESSONS LEARNED

Throughout the course of the two-day discussion, the participants captured operational and technical lessons learned and items for further consideration and research. These include:

- A need for the integration of social media within the full exercise plan and model;
- A need for a communications plan to help engage and inform stakeholders via social media throughout the course of the event;
- A need to pre-identify specific information requirements, decisions and questions, along with information potentially available via social media (for each essential element of information);
- A need to pre-identify available data (content, format and technical considerations); and
- Access to injects prior to event to map information from social media directly to injects.

NEXT STEPS

With the integration of social media into the information-sharing environment, the first responder community will be able to make decisions more quickly, more uniformly and with

more up-to-date information. The ability to leverage and integrate social media within the public safety workflow and information environment will ultimately assist public safety agencies in achieving and maintaining better situational awareness. These agencies will also have the ability to share information through various technologies, platforms and partners. The following table captures specific research gaps and considerations:

RESEARCH AREA	GAP	CONSIDERATIONS
Search	Setting Baseline	▪ A need for standardization of baseline search parameters given various mission objectives and pre-existing information requirements (essential elements of information)
	Anomaly Detection	▪ A need for standardization of baseline anomaly and event signatures
Aggregation and Validation	Search and Aggregation	▪ The ability to aggregate related information given contextual variables (keyword and natural language processing) ▪ The ability to assign geo-location to non-geo-located data (inferred, semantic and other) ▪ The development of automated algorithms for aggregation and validation
	Validation	▪ The development of crowd-sourcing processes (human-in-the-middle) for manual verification and/or enhancement or addition of essential information
Results Integration and Decision Support	Contextualization	▪ The ability to aggregate information based on EEI search parameters ▪ The ability to verify information as needed ▪ The ability to integrate information within the larger information-sharing environment ▪ Relationship modeling between information points ▪ The integration of social data to inform supply chain and logistics
	Data Standards	▪ Standardization of data structure ▪ Standardization of social data model ▪ Standardization of public safety ontology ▪ The ability to share identical information for various purposes across multiple platforms, agencies and varying taxonomies ▪ Update frequency ▪ Data storage standards, server location and other IT/DR considerations ▪ Encryption and other security concerns ▪ Records retention, sunshine and FOIA ▪ Privacy and HIPPA
	Relationship and Outcome Modeling	▪ The need for integration of social data with the Internet of Things (relationship and semantic mapping and multi-dimensional intelligence based on cascading effects)

RESEARCH AREA	GAP	CONSIDERATIONS
	Visualization and Representation	▪ A need for standardization of visual representation of social data ▪ Standardization of symbology of social data (more than platform icon) ▪ Standardization of relationship-mapping and visualization of multi-dimensional status and/or cascading effects

APPENDIX V - Essential Elements of Information (EEI) SOP Annex

Purpose:

This annex template helps to support one of the primary objectives of Central U.S. Earthquake Consortium (CUSEC) CAPSTONE-14 Exercise, which is to develop, codify and share the Essential Elements of Information (EEI) required to inform decision makers during a catastrophic New Madrid Seismic Zone Event. The EEIs will be derived from various sources of information, including data from predictive modeling, Situation Reports and data collected in the field. EEIs may be tracked in various systems of record, including WebEOC, ArcGIS-based systems or other database systems. The aim of the CAPSTONE-14 Exercise is to develop geospatial map services for EEIs, enabling broader access to current information for situational awareness.

The EEIs that will be used for the CAPSTONE-14 Exercise are divided into the following three categories: Transportation, Infrastructure and Operations. Each EEI contains one or more data layers and several important components, including the responsible Emergency Support Function (ESF), Data owner, geometry type, the minimum set of attributes for the dataset, the estimated availability of the data after a disaster occurs, and the deliverable type. Many of the EEIs include links to dynamic web mapping services hosted on ArcGIS Online. Those listed For Official Use Only (FOUO) are only accessible for members of the CAPSTONE-14 ArcGIS Online Group. To request access to this group, please submit this form: http://bit.ly/1dtHZ44.

Transportation: Air

Air transportation has been identified as an EEI to support response and recovery operations following a catastrophic earthquake event. The layers included in this EEI are intended to inform the operational status and capabilities of airports and airspace.

Responsible ESF
ESF 1 – Transportation

Data Owner/Sources
FAA, Local Authorities, EMA, NOAA

Primary Layer	Geometry Type	Attributes	Estimated Availability	Deliverable
Airport Status		Airport Name, Material Handling Equipment, Fuel Availability, Security, Maintenance, Staffing & Hours of Operation, Maximum-On-The-Ground (MOG) & Ramp Capacity, Last Update Date/Time	24 hours	Map Service, examples: FAA Status GeoRSS Service CUSEC Airport Status WebMap
Ancillary Layers				
Contingency Response Air Support Schedule (CRASS)		TBD	24 hours	Map Service
Current Weather		TBD	None	Map Service
National Aerospace System (NAS)		Air Navigation System, Air Traffic Control, Airspace Status, Temp. Flight Restrictions	24 hours	Map Service
Notice To Airman (NOTAM)		TBD	24 hours	Map Service

Transportation: Rail

Rail transportation has been identified as EEI to support recovery operations following a catastrophic earthquake event. Immediately after a catastrophic earthquake event, information needs will focus on life safety issues associated with the rail infrastructure, for example, stranded trains or HazMat concerns along rail lines. Longer term information needs will focus on the status of rail lines, crossings and rail yards for the purposes of commodity transport. The major focus will be on rail yards as intermodal transportation hubs to connect to other transportation networks.

Responsible ESF
ESF 1 – Transportation

Data Owner/Sources
DOT, Private

Primary Layer	Geometry Type	Attributes	Estimated Availability	Deliverable
Rail Line Status		Status, Community Impact (Hazmat, large fires, etc.), Rail Line Owner, Status of Bridges/Overpasses, stranded train, Last Update Date/Time	24 hours	Map Service
Ancillary Layers				
Passenger Rail Status		Train Station Status, Passenger Rail Operator Name, Evacuation operations, Stranded Trains (Y/N), Last Update Date/Time	24 hours	Map Service, examples: Amtrak Stations WebMap
Rail Yard Status		Status, Community Impact (Hazmat, etc.), Rail Yard Owner Name, Type (e.g., Humpyard, Intermodal), Last Update Date/Time	24 hours	Map Service, examples: Rail Yards Status WebMap *(FOUO)*
Bridge/Other Crossings Status		Status, Last Update Date/Time	24 hours	Map Service, examples: WebMap

Transportation: Roads

Emergency Service Routes (ESRs) along road networks have been identified as EEI to support response and recovery operations following a large scale earthquake event. ESRs are roads designated to support the movement of life-sustaining commodities and supplies to affected areas. Route inspections or assessments will be conducted through both aerial and ground surveillance through state DOTs and Civil Air Patrol. Routes will be presumed closed after a major earthquake event and opened in segments following ground truth data. In the event of aftershocks, routes will show closed again and be reassessed. All CUSEC states currently have roadway information or 511 systems that provide near real-time information on road status, which can be used to support the ESR EEI.

Responsible ESF
ESF 1 – Transportation

Data Owner/Sources
DOT

Primary Layer	Geometry Type	Attributes	Estimated Availability	Deliverable
Emergency Service Routes Status		Road Name, Location (e.g., mile marker; lat/long; address; intersection), Type (e.g., bridge, broken pavement, sinkhole), Distance of Closure, Last Update Date/Time	12-24 hours	Map Service, examples: ESR WebMap *(FOUO)*
Ancillary Layers				
Bridge/Other Crossings Status		Status, Last Update Date/Time	48 hours	Map Service, example: WebMap

Transportation: Waterways

Waterways have been identified as an EEI formation to support response and recovery operations following a catastrophic earthquake event. River transportation can support moving bulk resources outside logistical staging areas. The layers included in this EEI are intended to inform the operational status and capabilities of waterway transportation systems.

Responsible ESF	*Data Owner/Sources*
ESF 1 – Transportation	**USACE, USCG**

Primary Layer	Geometry Type	Attributes	Estimated Availability	Deliverable
River Mile Status		River Name, Location (e.g., river mile from and to; lat/long), Status, Description, Estimated Fix Time, Contact, Recent Progress, Last Update Date/Time	10 days	Map Service, example: Webmap
Ancillary Layers				
Landslide / Ground Failures		Description, Last Updated	1-24 hours	Map Service
Port Status		Port Name, Location (e.g., river mile; lat/long), Status, Description, Estimated Fix Time, Contact, Recent Progress, Last Update Date/Time	24 hours	Map Service, example: Webmap
Lock Status		Location (e.g., river mile; lat/long), Status, Description, Estimated Fix Time, Contact, Recent Progress, Last Update Date/Time	24 hours	Map Service, example: Webmap *(FOUO)*
Bridge/Other Crossing Status*		Location (e.g., river mile; lat/long), Status, Description, Estimated Fix Time, Contact, Recent Progress, Last Update Date/Time	48 hours	Map Service, example: Webmap
Boat Ramp Status*		Location (e.g., river mile; lat/long), Status, Description, Estimated Fix Time, Contact, Recent Progress, Last Update Date/Time	Unknown	Map Service
Navigation/Recovery Boat Status*		Location (e.g., river mile; lat/long), Status, Description, Estimated Fix Time, Contact, Recent Progress, Last Update Date/Time	Unknown	Map Service
Fueling Point Status*		Location (e.g., river mile; lat/long), Status, Description, Estimated Fix Time, Contact, Recent Progress, Last Update Date/Time	Unknown	Map Service

* These layers were identified as lower-priority information by the Waterway breakout group during the PRECAP 2014 workshop.

Transportation: Fuel*

Fuel has been identified as an EEI to support overall response and recovery operations following a catastrophic earthquake event. The fuel supply chain involves bringing fuel from the source to the end users. The Fuel EEI requires operational status for fuel storage sites, fueling sites, terminals, pipelines and refineries. The fuel supply chain is primarily under private ownership, so while information on the locations and ownership of the fuel infrastructure is available (for example, from the Homeland Security Information Network or HSIN), information on the availability and status of fuel infrastructure can be more difficult to obtain. Other information, such as the fuel burn rate for a given area, can be critical for determining the necessary capacity and refueling frequency for fueling sites.

Responsible ESF
ESF 1 – Transportation

Data Owner/Sources
Private

This EEI was not identified as one of the initial 17 EEIs by the CUSEC Board; however, it was highlighted as a critical EEI for the Transportation sector during PRECAP (October 2013).

Primary Layer	Geometry Type	Attributes	Estimated Availability	Deliverable
Bulk Fuel Storage Sites		Location (fixed or mobile), Temporary Tank Farms (staging areas along ESRs), Capacity, Serviced by Transporters (Y/N), Accessibility by Short Haul Trucks, Service for Emergency Vehicles	Unknown	Map Service
Dedicated Emergency Response Fueling Sites (Fuel Farms)		Location, Status	Unknown	Map Service
Fuel Terminals Status		Owner, Location (address), Fuel Source (Pipeline, Barge, etc.), status (*Operational status probably not available)*	Unknown	Map Service
Pipelines Status		Owner, Location, Status, Problem Points	Unknown	Map Service
Refineries Status		Company name, Location, Products, Status	Unknown	Map Service

* Note: The Fuel EEI was not identified as one of the initial required EEIs by the CUSEC board of directors; however, it was highlighted at the October 2012 PRECAP meeting as critical to the transportation network following a NMSZ seismic event.

Infrastructure: Electricity Grid

The status of the electric grid has been identified as an EEI to support overall response and recovery operations following a catastrophic earthquake event. The operational status of the electric grid is typically available from electric utility companies, of which most maintain status maps on their websites. The status of electricity availability is often summarized by State Emergency Operation Centers at the county level.

Responsible ESF
ESF 12 - Energy

Data Owner/Sources
Energy Provider, SEOC

Primary Layer	Geometry Type	Attributes	Estimated Availability	Deliverable
Electric Grid Status		Provider Name, Location (County), Status, Last Update Date/Time	24 hours	Map Service *(FOUO)*
Ancillary Layers				
National Energy Infrastructure (NEI)		n/a (NEI contains multiple static layers with different lists of attributes)	Immediate (static data)	Map Service

Infrastructure: Natural Gas Grid

The status of the natural gas grid has been identified as an EEI to support overall response and recovery operations following a catastrophic earthquake event. The operational status of the natural gas grid is typically available from natural gas utility companies, of which most maintain status maps on their websites. The status of natural gas availability is often summarized by State Emergency Operation Centers at the county level.

Responsible ESF
ESF 12 - Energy

Data Owner/Sources
Energy Provider, SEOC

Primary Layer	Geometry Type	Attributes	Estimated Availability	Deliverable
Natural Gas Grid Status		Provider Name, Location (County), Status, Last Update Date/Time	24 hours	Map Service
Ancillary Layers				
National Energy Infrastructure		n/a (NEI contains multiple static layers with different lists of attributes)	Immediate (static data)	Map Service

Infrastructure: Water Grid

The status of the water grid has been identified as an EEI to support overall response and recovery operations following a catastrophic earthquake event. The operational status of the water grid is generally available from utility companies. The water grid status is often summarized by State Emergency Operation Centers at the county level.

Responsible ESF
ESF 12 - Energy

Data Owner/Sources
Water Utility Provider, SEOC

Primary Layer	Geometry Type	Attributes	Estimated Availability	Deliverable
Public Water Grid Status		Provider Name, Location (County), Status, Last Update Date/Time	24 hours	Web Service *(FOUO)*

Infrastructure: Private Sector Infrastructure

Private sector infrastructure has been identified as an EEI to support overall response and recovery operations following a catastrophic earthquake event. The Private Sector EEI may include information in the following areas, including: 1) facility space for shelters, warehouses or staging supplies; 2) Mutual Aid resources; and 3) Information on the status of key infrastructure, including commercial stores providing commodities like food and water. Physical or Virtual Business Emergency Operation Centers (BEOC/vBEOC) will play a role in collecting information from private sector partners and providing it out to the State Emergency Operation Center (SEOC).

Responsible ESF
ESF 5 – Emergency Management

Data Owner/Sources
Private Sector partners

Primary Layer	Geometry Type	Attributes	Estimated Availability	Deliverable
Status of private sector facilities		Company Name, Type Of Facility (e.g., Warehouse, Distribution Site), POC, Location, Status (Opened/Closed), Status Description, Last Update Date/Time	Unknown	Map Service

Incidents: USGS Impact Assessment / Damage Estimates

USGS damage assessment products have been identified as an EEI to support overall response and recovery operations following a catastrophic earthquake event. Within the first hours after a significant seismic event, USGS provides information on impacted areas and damage estimates based on geospatial models. These data products are important for multiple other EEIs. More information on the USGS PAGER program can be found here: http://earthquake.usgs.gov/earthquakes/pager.

Responsible ESF
ESF 5 – Emergency Management

Data Owner/Sources
USGS

Primary Layer	Geometry Type	Attributes	Estimated Availability	Deliverable
USGS Prompt Assessment of Global Earthquakes for Response (PAGER) / ShakeMap		Magnitude, Alert Level, Time, Location (lat/long), Max MMI	1 hour	Map Service

Operations: Area Command Locations

Area Command Locations has been identified as an EEI to support overall response and recovery operations following a catastrophic earthquake event. Area Command locations are often situated at Emergency Operation Centers (EOCs) and are used to provide coordination, resource allocation and establish priorities during an emergency. The Area Command EEI focuses on the operational status or activation level of individual Area Command locations.

Responsible ESF
ESF 5 – Emergency Management

Data Owner/Sources
SEOC, Local EMAs

Primary Layer	Geometry Type	Attributes	Estimated Availability	Deliverable
Area Command Locations		Name Of EOC, Type of EOC (State, Local), Location (Address), POC, Primary Phone Number, Status, Last Update Date/Time	12 hours	Map Service (FOUO)

Operations: Communications (Public Safety and General Public)

Communications has been identified as an EEI to support overall response and recovery operations following a catastrophic earthquake event. The Communication EEI contains information on the operational status of Landline, Cellular and Internet access status.

Responsible ESF
ESF 2 – Communications

Data Owner/Sources
State EOC

Primary Layer	Geometry Type	Attributes	Estimated Availability	Deliverable
Communications Status (Public Safety and General Public)		County Name, Communications Network Type, Name, Owner, Location, POC, Primary Phone Number, Status, Last Update Date/Time	12 hours	Map Service *(FOUO)*

Operations: Evacuation Orders

Evacuation Orders have been identified as an EEI to support overall response and recovery operations following a catastrophic earthquake event. Following a catastrophic NMSZ earthquake event, evacuations orders may be placed to move affected populations; however, complications can arise from a compromised transportation infrastructure, including damaged roads and bridges, as well as the availability of temporary housing/shelters for evacuees.

Responsible ESF
ESF 5 – Emergency Management

Data Owner/Sources
State EOC

Primary Layer	Geometry Type	Attributes	Estimated Availability	Deliverable
Evacuation Orders		County Name, Incident Name, Alert Type, Threat level, Area of Concern, POC, Phone Number, Effective Start Date, End Date, Last Update Date/time	24 hours	Map Service *(FOUO)*

Operations: Hospital Status

Hospital Status has been identified as an EE to support overall response and recovery operations following a catastrophic earthquake event. Following a catastrophic NMSZ earthquake event, hospitals resources may be stressed by large numbers of casualties. The Hospital EEI will be important to identify the operational status of hospitals (for example, ability to accept injured disaster survivors, supply shortages, etc.) and help incident commanders direct resources and casualty evacuations accordingly.

Responsible ESF
ESF 8 – Public Health and Medical Services

Data Owner/Sources
State EOC and/or State Health Dept.

Primary Layer	Geometry Type	Attributes	Estimated Availability	Deliverable
Hospital Status		Name, Address, Max Capacity, Current Capacity, POC, Phone Number, Status, Last Update Date/time	4 hours	Map Service

Operations: Injuries and Fatalities

Injuries and Fatality status has been identified as an EEI to support overall response and recovery operations following a catastrophic earthquake event. The layers included in this EEI are intended to help inform where to send emergency resources.

Responsible ESF
ESF 8 – Public Health and Medical Services

Data Owner/Sources
State EOC and/or State Health Dept.

Primary Layer	Geometry Type	Attributes	Estimated Availability	Deliverable
Injuries and Fatalities		County Name, Number of Reports, Last Update Date/time	24 hours – 6 days	Map Service *(FOUO)*

Operations: Joint Reception, Staging, Onward Movement and Integration (JRSOI) Sites

Operations: Joint Reception, Staging, Onward Movement and Integration (JRSOI) Sites have been identified as an EEI to support overall response and recovery operations following a catastrophic earthquake event. Command and Control for JRSOI sites is provided by the State branch of the National Guard, which will use the JRSOI Sites to coordinate the emergency response effort. This EEI includes the location, current status and contact information for the POC associated with the JRSOI site.

Responsible ESF
ESF 5 – Emergency Management

Data Owner/Sources
State EOC, State ANG

Primary Layer	Geometry Type	Attributes	Estimated Availability	Deliverable
Joint Reception, Staging, Onward Movement and Integration (JRSOI) Sites		JRSOI Name, Address, POC, Phone Number, Capacity, Status, Last Update Date/Time	24 hours	Map service (FOUO)

Operations: Points of Distribution (PODS)

Points of Distribution have been identified as an EEI to support overall response and recovery operations following a catastrophic earthquake event. PODS are often located in conjunction with intermodal transportation hubs, and are important for the storage and distribution of food, water and other bulk commodities. The POD EEI provides a variety of information, including the PODs' location, type (food, equipment, etc.) and status.

Responsible ESF
ESF 5 – Emergency Management

Data Owner/Sources
State EOC

Primary Layer	Geometry Type	Attributes	Estimated Availability	Deliverable
Points of Distribution (PODS)		Name, location (address, lat/long), primary Phone Number, POC, Type (e.g., vehicle, personnel, equipment), Availability of Electricity, Status, Last Update Date/Time	4 days	Map service (FOUO)

Operations: Shelters

Shelters have been identified as an EEI to support overall response and recovery operations following a catastrophic earthquake event. Emergency shelters provide a service for displaced populations in order to bridge the gap between longer term temporary housing or until utility service is resumed. Shelters are typically operated by the American Red Cross, although other organizations may open 'ad-hoc' shelters depending on need. The former are included in existing geospatial datasets, the latter will require effort to locate and inventory following a catastrophic earthquake event. Shelters will have requirements including utility service and availability of food and water supplies.

The Shelter EEI contains important information on the capacity (current and maximum), whether pets are accepted and the current status.

Responsible ESF
ESF 6- Mass Care-Emergency Assistance-Housing-Human Services

Data Owner/Sources
Red Cross, SEOC

Primary Layer	Geometry Type	Attributes	Estimated Availability	Deliverable
Shelters		Name, location (address, lat/long), Phone Number, POC, Max Capacity, Current Capacity, Pets Accepted, Status, Last Update Date/Time	6 hours	Web Service, Example: Shelters WebMap *(FOUO)*

Operations: Staging Areas

Staging Areas have been identified as an EEI to support response and recovery operations following a catastrophic earthquake event. Staging areas are used to store resources important for response and recovery close to affected areas. The Staging Areas EEI will include information on the type, status and location.

Responsible ESF
ESF 5 – Emergency Management

Data Owner/Sources
State EOC

Primary Layer	Geometry Type	Attributes	Estimated Availability	Deliverable
Staging Areas		Name, Location (Address, Lat/Long), Primary Phone Number, POC, Type (e.g., Vehicle, Personnel, Equipment), Status, Last Update Date/Time.	24 hours	Web Service *(FOUO)*