13th ICCRTS: C2 for Complex Endeavors

"Common Operating Picture and Planning Environment for Disaster Response"

C2 Concepts, Theory, & Policy; Networks & Networking; Civil- Military Endeavors; and
C2 Technologies & Systems

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Report Documentation Page

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1. REPORT DATE **JUN 2008**	2. REPORT TYPE	3. DATES COVERED **00-00-2008 to 00-00-2008**

4. TITLE AND SUBTITLE **Common Operating Picture and Planning Environment for Disaster Response**	5a. CONTRACT NUMBER
	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **NORAD and USNORTHCOM J42,250 Vandenberg Street, Suite B016,Peterson AFB,CO,80914**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES
13th International Command and Control Research and Technology Symposia (ICCRTS 2008), 17-19 Jun 2008, Seattle, WA

14. ABSTRACT
The Common Operating Picture (COP) is a military acronym synonymous with seeing and understanding the battlespace and Joint Operating Area (JOA). When applied to a significant disaster, whether natural or manmade, the COP provides a timely view and perspective of responses within the JOA. In a large scale disaster the challenges of planning, coordinating and executing interagency, international and domestic response elements are compounded by the need for a quick life-saving response. The Common Operational Picture and Planning Environment (COPPE) is a theoretical approach and planning methodology, designed to leverage technology, Geospatial Information Systems (GIS) data and the situational awareness of the COP. The COPPE uses a basic principal to determine the population and critical infrastructure assets within a disaster area on to base response plans. Portions of the COPPE have been prototyped in coordination with the University of Denver ensuring technical viability of the proposed features. There are several technical prototype design issues that have been glossed for brevity. Lastly, the COPPE and its accompanying methodology are described against a mock disaster scenario to demonstrate its effectiveness.

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**41**	

Common Operating Picture and Planning Environment (COPPE) for Disaster Response

Abstract

The Common Operating Picture (COP) is a military acronym synonymous with seeing and understanding the battlespace and Joint Operating Area (JOA). When applied to a significant disaster, whether natural or manmade, the COP provides a timely view and perspective of responses within the JOA. In a large scale disaster the challenges of planning, coordinating and executing interagency, international and domestic response elements are compounded by the need for a quick life-saving response. The Common Operational Picture and Planning Environment (COPPE) is a theoretical approach and planning methodology, designed to leverage technology, Geospatial Information Systems (GIS) data and the situational awareness of the COP. The COPPE uses a basic principal to determine the population and critical infrastructure assets within a disaster area on to base response plans. Portions of the COPPE have been prototyped in coordination with the University of Denver ensuring technical viability of the proposed features. There are several technical prototype design issues that have been glossed for brevity. Lastly, the COPPE and its accompanying methodology are described against a mock disaster scenario to demonstrate its effectiveness.

Keywords: COPPE, COP, GIS, HSIP, USNORTHCOM, National Guard, planning factors

Introduction

The COPPE concept grew out of a dinner discussion and assignment offering by the National Guard to assist some states in planning for future disasters. Civilian job commitments prohibited accepting the assignment, but a lasting interest was generated. During that same discussion the challenge was framed. Any approach had to be rapid, reproducible and fairly accurate. It is understood during a disaster response, an 80% solution available within minutes is better than an eventual near 100% solution. The conditions or challenge was phrased as:

1) Given a deliberate or crisis response within the United States and territories

2) Given an incident or event of known or unknown origins

3) Given base set of GIS data

How does one create a response plan and consider first responders, interagency partners, non-governmental-agencies (NGOs) and contractors? What does the plan look like? What will the response force look like? How will the response forces be coordinated? Lastly, how will plan execution be tracked?

The potential benefits include saving more lives, better oversight of response resources, more efficient and effective responses tailored to a state's needs and saving money. There are two major facets to the discussion of the COPPE. The first part deals with the functional attributes. The second part deals with the COPPE's technical or system attributes. Lastly, a disaster scenario discussion is used to illustrate how the COPPE would be used and where improvements would be realized. This provides the advantage of better sized and targeted just-in-time responses.

Functional Approach

The functional approach deals with the challenge of having diverse participating responders including their organizational structure and limitations. This defines the coalition of responders, their capabilities and limitations.

The Challenge

Disaster responses within the United States have become quite complicated when all the potential participants are engaged. The planning tapestry includes: the National Response Plan, soon to be revamped as the National Response Framework, 54 state (and territories) response plans, 3033 county plans, 33 city-county government[1] plans and numerous city response plans. The only way to geospatially view this plethora of plans is to consider them as a coalition. Every entity with its own plan tries to work with others, but usually can be viewed as its own sovereign political body.

The basic construct for these plans is one of agencies that are supported and agencies that provide that support. In concept, the state government is the entity that engages directly with FEMA and through FEMA other federal agencies provide support. In practice there is one other agency or entity has both Federal and State linkages and is regularly engaged directly by the individual states – the state National Guard.

As David Alberts and Richard Hayes discuss in their book, **Planning: Complex Endeavors**, there is an overarching goal to have an organization that is agile. They stated, Agility is a multidimensional concept that is predicted on the achievement of a threshold of effectiveness. In other words, by definition, one cannot be ineffective *and* agile."[2] With the complexity a domestic catastrophic disaster brings, all levels of government, to include the military need to be agile.

In their book, Alberts and Hayes depict a Network Centric Approach. Figure 1 is a recreation of their diagram. When this approach is viewed for a domestic catastrophic

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[1] National Association of Counties, An Overview of Counties, retrieved on 14 March 2008 from http://www.naco.org/Content/NavigationMenu/About_Counties/County_Government/A_Brief_Overview_of_County_Government.htm

[2] Planning: Complex Endeavors, Alberts and Hayes, 2007, p. 157.

disaster, the planning challenge becomes complex. It becomes very hard, if not impossible to know all of the responding agencies let alone their plans.
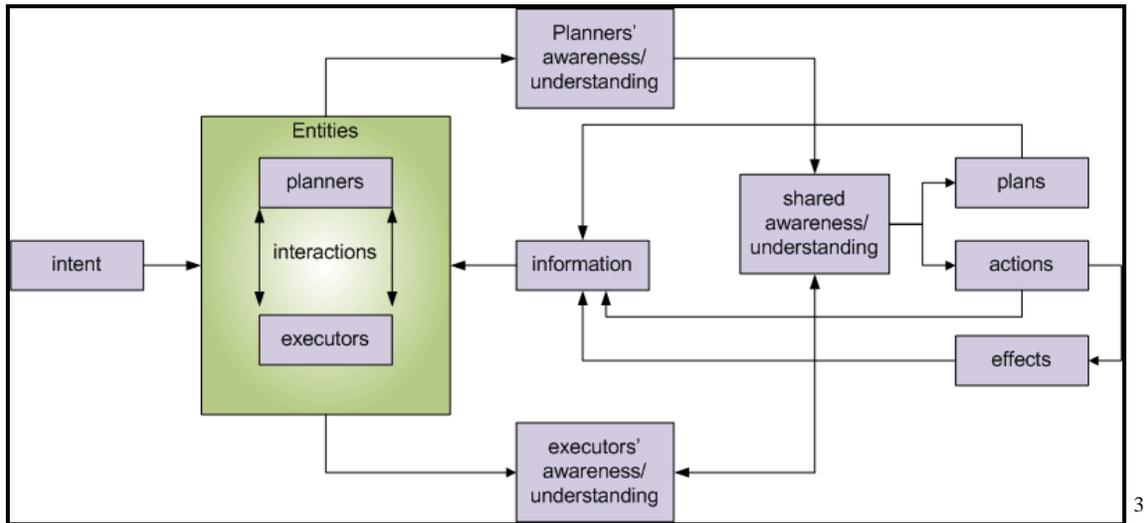

Figure 1. Network Centric Approach

Focus and Convergence versus Command and Control

The Department of Defense (DoD) lexicon for a Unity of Command and Command and Control (C2) does not do the challenge justice. A better approach would be to view the response and the associated plans from a Unity of Purpose compared to Unity of Command.[4] An even better way may be to view this challenge as an effort to focus the converging response. David Alberts in his paper, "Agility, Focus and Convergence: The Future of Command and Control" advances the concept that the Command and Control (C2) construct of DoD could be replaced with:

> *Focus* as a replacement for command speaks directly to what command is meant to accomplish while being agnostic with respect to the existence of someone in charge or particular lines of authority. Similarly, *convergence* speaks directly to what control (the verb) is meant to achieve without asserting that control as a verb is possible or desirable. The combined term, ***Focus & Convergence***, speaks to the existence of a set of dynamic interactions between the two functions.[5]

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[3] Planning: Complex Endeavors, Alberts and Hayes, 2007, p. 145.

[4] Command Operations for Peace Operations, Alberts and Hayes, 1995, p. 129.

[5] The International Command and Control Journal, Volume 1, Number 1, November 2007, "Agility, Focus, and Convergence: The Future of Command and Control", p. 18, retrieved on 3 March 2008 from http://www.dodccrp.org/files/IC2J_v1n1_01_Alberts.pdf

The State is considered to be the supported entity when Federal Emergency Management Agency (FEMA) arrives to a disaster under a federal disaster declaration. In this situation the state includes its' own personnel, first responders, citizens and volunteers. It is unrealistic to believe there is actually one agency or person in command, let alone controlling the entire catastrophic disaster response. The multi-agency, multi-echelon, response for a catastrophe demands a new lexicon for command and control. Focus and Convergence seems to have the most credibility at this point.

Distinct from the National Guard there are other military forces capable of responding to a disaster. The Reserves from the different services can be ordered to active duty under US Code Title 10, Subtitle E, Part II, Ch. 1209, § 12304 "Selected Reserve and certain Individual Ready Reserve members; order to active duty other than during war or national emergency"

> **(1)** a use or threatened use of a weapon of mass destruction; or

> **(2)** a terrorist attack or threatened terrorist attack in the United States that results, or could result, in significant loss of life or property.

> **Limitations, section (3)** No unit or member of a reserve component may be ordered to active duty under this section to provide assistance referred to in subsection (b) unless the President determines that the requirements for responding to an emergency referred to in that subsection have exceeded, or will exceed, the response capabilities of local, State, and Federal civilian agencies.[6]

With USC Title 10 being the legal means for ordering Reservists to active duty, it is difficult to create effective plans that include these military assets that may or may not be available.

There are two planning levels as well. There is the state and local level where first responders, emergency managers and planners. The other level is performed at the federal level between agencies and with states.

Key coalition players include the National Guards of the States, the Joint Force Headquarters and coordination by National Guard Bureau (NGB). The central reason the Guard is the primary disaster responder is because Title 32 forces are not restricted by Title 10 limitations above. This subtle distinction means that Title 32 and State Active Duty (SAD) forces are under the command and control of their Governors and The Adjutant Generals (TAGs), not the Department of Defense or United States Northern Command (USNORTHCOM).

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[6] Cornell Law School, US Code Title 10, retrieved on 3 March 2008 from
http://www.law.cornell.edu/uscode/html/uscode10/usc_sec_10_00012304----000-.html

Response Coalition

The responders during the Hurricane KATRINA response were from federal, state and local levels of government, military, international organizations, citizens and private sector volunteers. Since this coalition is all working with the same intention to help. How are all of these factored into plans?

The primary focus in a catastrophic disaster needs to center on the people and the state. States strongly rely upon their National Guard assets to be trained, exercised and ready to quickly respond whenever they are called. Another aspect of the National Guard is its ability to interface with federal agencies in a classified manner. With rare exception, no other state agency regularly deals with classified information.

During the summer of 2007 preparations of Hurricane Dean's expected landfall in Texas, numerous National Guard assets were prepositioned in training status to Texas. Some of these assets were pre-positioned to evacuate special needs patients who may be threatened by Hurricane DEAN. As was witnessed in the NORAD and USNORTHCOM Command Center, this special needs evacuation could not occur until local Texas Judges issued the legal orders to do the movement.[7] This reinforces the coalition terminology and that the concepts of Focus and Convergence apply to catastrophic disaster responses.

The newly enacted National Response Framework specifically call-out the State as the primary interface with FEMA, and the states work through FEMA to reach other federal agencies. In January 2008, the National Response Framework indentifies:

> **A primary role of State government is to supplement and facilitate local efforts before, during, and after incidents.** The State provides direct and routine assistance to its local jurisdictions through emergency management program development and by routinely coordinating in these efforts with Federal officials. States must be prepared to maintain or accelerate the provision of commodities and services to local governments when local capabilities fall short of demands.[8]

In December 2007, President Bush added Annex 1 to the Homeland Security Presidential Directive (HSPD) 8. In Annex 1, section 30, planning definitions were detailed. In subsections (e) and (f):

> The term "concept plan" or "CONPLAN refers to a plan that briefly describes the concept of operations for integrating and synchronizing existing Federal capabilities to accomplish the mission essential tasks, and describes how Federal capabilities will be integrated into and support regional, State, local, and tribal plans.

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[7] Author's observations while on duty at the Command Center, August 2007.

[8] National Response Framework, January 2008, US Department of Homeland Security page. 21, retrieved on 4 March 2008 from http://www.fema.gov/pdf/emergency/nrf/nrf-core.pdf

The term "operations plan" or "OPLAN" refers to a plan that identifies detailed resource, personnel and asset allocations in order to execute the objectives of the strategic plan and turn strategic priorities into operational execution. An operations plan contains a full description of the concept of operations, to include specific roles and responsibilities, tasks, integration, and actions required, with supporting support function annexes as appropriate.[9]

The COPPE's intent is to create a methodology and accompanying toolset that enable dynamic synchronized OPLAN development and execution throughout the response community.

Technical Approach

The technical approach discusses the processes and technology used. This approach includes: 1) bounding the area, 2) a grid system, 3) standardized GIS data 4) planning tools that aid in a) planning and plan centralization, b) progress and status tracking, and c) response gap identification

Bounding the Area

During the Cold War, deliberate plans were made for defending NATO countries from a Soviet invasion. Target folders, unit locations and the remainder of the plans were explicitly detailed. For this process, the initial planning step templated unit locations over the terrain. For a given area, for example the Fulda Gap in Germany, the quantity of infantry platoons could be templated based on the amount of terrain they had to cover.

The same approach can be applied to a disaster. The first step is to bound or set limits for the terrain being considered. Are we talking about the entire state of Louisiana? Or are we considering Louisiana south of Interstate 10 to the coast? Or a few specific parishes that received storm surge? In itself, this is not an easy task. In post Katrina discussions with Louisiana National Guardsmen, understanding the extent of the disaster without communications was one of their challenges. Therefore the easy answer, albeit a cop-out would be to consider the entire state or the political geographic area the disaster area.

Once the area is bounded, response planners and responding forces need detailed information about the affected area. This information includes: What is the population and critical infrastructure; and what type of response forces and logistics are needed? A systematic approach is needed to compile this information.

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[9] Homeland Security Presidential Directive 8, Annex 1, retrieved on 4 March 2008 from
http://www.iaem.com/publications/news/documents/HSPD8Annex1.pdf

Grid System

Overlaying a grid over the affected area is very common approach to dividing and conquering the response planning challenge. Using a standardized grid or geographical matrix would allow various and geographically remote elements to use the same reference points. A standardized grid or footprint would allow enhanced knowledge of "what is locally within" each specific sector. Knowledge of what is located within a sector or grid would reveal numbers of hospitals, nursing homes, schools, refineries and provide a detailed estimate of how many people are in there are. The United States National Grid projection (http://www.fgdc.gov/usng/index.html) based on the military Universal Transverse Mercator (UTM) is the same one used for military maps.
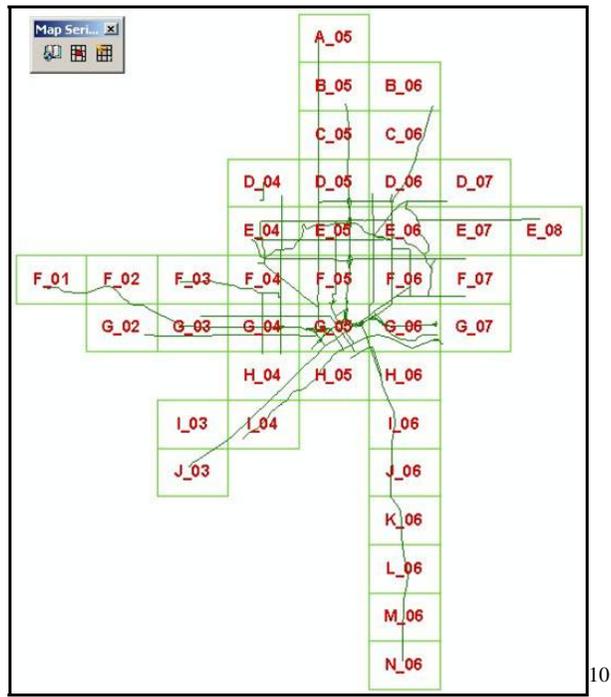
Figure 1. Grid Overlay

Figure 2 depicts a theoretical example of a gridded overlay displayed over an urban area. Grid G_06 provides an excellent starting point for understanding the affected area. For example knowing the population and critical assets located within the grid square will dictate the needed response elements. Knowing the same information for all 39 grid squares a situational awareness key and essential for planning disaster response and recovery operations.

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[10] ArcUser, ArcGIS Software Simplifies Map Book Generation, retrieved on 4 March 2008 from http://www.esri.com/news/arcuser/0702/dsmapbook.pdf

Standardized GIS Data

A National Geospatial-Intelligence Agency (NGA) project called the Homeland Security Infrastructure Program (HSIP) has created a two (2) DVD set of data of the United States' critical infrastructure. HSIP is only available to federal agencies performing homeland defense and homeland security related tasks, and can be shared with state and local agencies during certain emergency situations. The National State Geographic Council in its December 18, 2006 newsletter describes this policy the best.

> *These data are only available to state and local governments for viewing purposes across a thin client network. This is referred to as "disclosure" in the Federal licensing agreements with the private sector contributors. However, Federal licenses also require that in the event of declared emergencies, that the data may be released to state and local governments to support their operations.*[11]

The wonderful aspect of HSIP is that it offers a concise, standardized set of GIS data that includes day and night-time population data. If a standardized grid were overlaid, summaries of critical infrastructure could be made for each grid or sector. For example, grid G_06 could be summarized as having three hospitals, fourteen schools, two refineries and a daytime population of 6710 and nighttime population of 7250.

Another feature is the HSIP data and DVD set is delivered with the standard emergency management symbology built in. This is one more way that federal, state and local agencies can interact and exchange meaningful maps among each other.
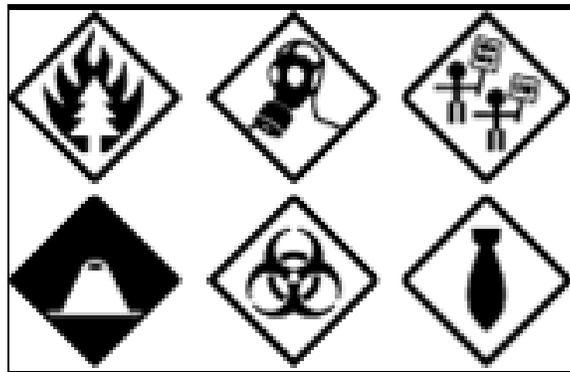
Figure 2. FGDC Symbols

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[11]National States Geographic Information Council, December 16, 2006 retrieved on 14 March 2008 from http://www.nsgic.org/hottopics/hsip_ci_geospatial_data_sharing_program_121806.pdf

The Federal Geographic Data Committee (FGDC) Homeland Security Working Group symbology[12] shown in Figure 3 is built into the HSIP. Standardizing symbology will make enabling interagency partnerships and sharing maps and plans possible.

Planning Tools

A set of planning tools have been functionality prototyped in conjunction with the University of Denver, Geographic Technical Application Center (GTAC) (http://www.gtac.du.edu/). The prototype tools are based around ESRI's ArcDesktop and ArcServer products that perform rudimentary summary totals for a given grid-square or feature. There are several potential functional and performance enhancements discovered during the prototyping. These enhancements are not discussed due to paper length constraints.

Workstation Capabilities

Due to computational efficiencies and projected workflow two capabilities were created using a workstation. This represents 5-20 % of the user community.

Area Summarizations. This capability was created as an ArcView extension that for a given feature or grid, determines, the population (day or night), number of hospitals (and beds), nursing homes, schools, and any other selectable critical infrastructure attribute.

DSMapBook. This capability was created by using DSMapBook to create maps/mapbooks grid square by grid square. Use of a ready-made software component enabled the rapid production of maps for email dissemination to responders.

Server Capabilities

Due to efficiencies offered by a distributed and projected sharing needed by users three capabilities were created at using a web-based server. This represents the remainder of the user community, between 80-95 %.

Orders process to response units. Email distribution of maps/mapbooks to responding elements, that could be sent to their armories/homestations/firehouses, etc.., and be used to assign their grids of responsibility.

Shared Plans and Planning Tools. Using server and web technology, the ability to share a map or plan as a part of their Service Oriented Architecture (SOA) was proven. This means that a state could create a map showing their disaster area, their status of each grid

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[12] Homeland Security Working Group, Emergency Management Symbology, retrieved on 4 March 2008 from http://www.fgdc.gov/HSWG/index.html

as they know it and also show their gaps where additional resources are needed. Being part of a SOA, a pass-worded service is opened for other interested parties to view the same map real-time with the State. Since critical infrastructure data is used in generating these products, encryption and authentication mechanisms must be incorporated. Therefore, unless a standardized Public Key Infrastructure (PKI) is made available, a SOA solution is recommended.

Response Status Reporting. Using the grid system, correlated with assigned grids, it will show Green/Amber/Red for status within the grid. Coupling this information with knowledge about what each grid contains is crucial for effective planning and management.
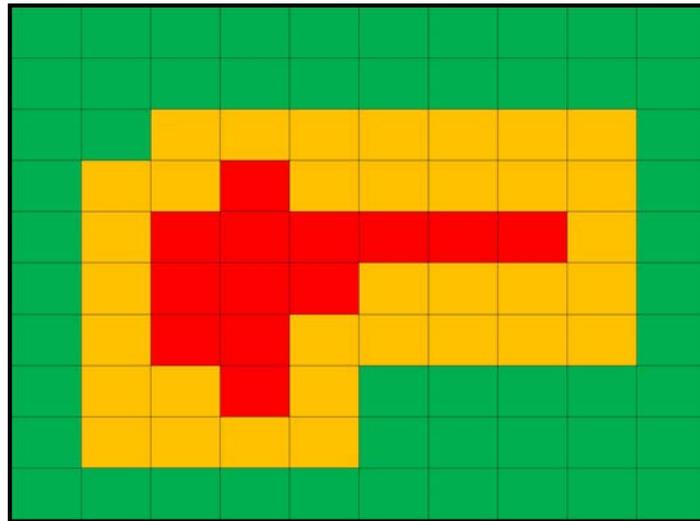
Figure 3. Grid Status

Planning Factors

If one digresses back to the Fulda Gap scenario, it is rather easy to template or estimate how many infantry units were needed to defend a static defense for a given piece of ground. In disaster scenarios, given a grid square, a given population, and known quantity and type of critical infrastructure potentially affected, it is possible to approximate the size and mix of the response package needed. More historical research and focused analysis is needed in this area. There are still a couple of challenges: (1) Responses are from several separate agencies, entities, military units, private sector, and first responders, (2) There are limited published planning factors and (3) There is a limited amount of response units that have been "typed" or defined by Federal Emergency Management Agency (FEMA). The definitive source for this effort is located at http://www.nimsonline.com/resource_typing_system/index.htm. The typing effort is continuing to evolve. The National Guard Bureau J5 Strategic Initiatives Branch is working with FEMA to define what Guard resource type or units should look like. Although research into levels of work and planning factors are in the future.

Collaborative Planning Environment and Architecture

Based on the premise of standardized critical infrastructure and population data, sharing plans, and status the response in relation to the developing situation is one of the goals for COPPE.

The prototyped COPPE uses a Service Oriented Architecture (SOA) to push out plans as a service to enrolled agencies e.g. State Emergency Operation Centers (EOC) and National Guard Joint Operation Centers (JOC) are able to broadcast their resource status, plans, and gaps to FEMA, NGB, and other supporting agencies and activities.

Additionally, using a SOA push, tactical assignments can be forwarded, i.e. What grid squares are allocated to resources (1st responders, FEMA teams, USACE team, Guard elements) and which grids are unsourced.
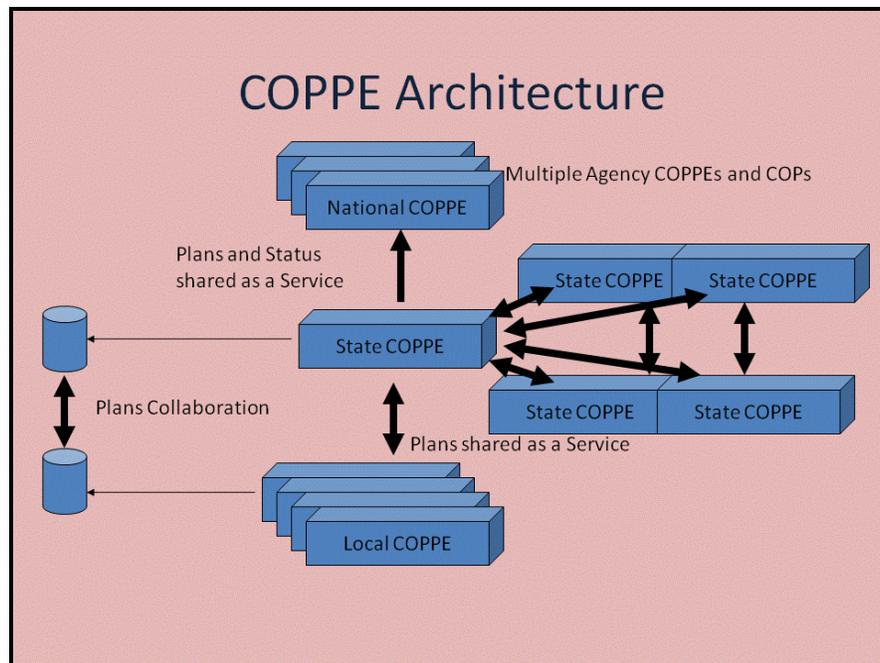
Figure 4. Collaborative COPPE Architecture

Infrastructure Provider

Providing the GIS data on a server is technically very easy. The challenge is not technical but of a political nature. The most cost effective solution would be to build one large redundant server, centrally manage access with small, light and redundant access. The political nature is the basic premise of state's rights versus federal mandates. {With this in mind, a preferred solution from the states may be to have a COPPE architecture with decentralized execution, decentralized management and centralized oversight}.

The COPPE or enterprise architecture in Figure 5 would have standardized national and state servers with consistent data. The state server provides the nexus providing the ability to share their information and plans. This sharing can be down to local agencies and governments as well as up to national agencies. The power of using a SOA also supports sharing and collaborating based on state level management.

Decentralized execution is also provided by the SOA. The state is empowered so they can limit what is seen and shared and to whom. They controls who can see and update their plans based on permissions.

Centralized oversight is provided with technical standards, standardized procedures and policies. Standardized information assurance and security ensures only the properly credentialed people and agencies have access to the data and maps.

One solution is for the National Guard located in every state and territory to provide the COPPE, with the required information assurance and protection. The COPPE would be used for their federal mission of force protection, and are trusted by state and local governments and their citizens.

Another benefit of having the National Guard provide the COPPE infrastructure is by hosting a GIS clearinghouse for National Special Security Event (NSSE) [13] planning and execution. NSSEs are nationally recognized events that have heightened security, like the Democratic National Convention, G8 Summit and Superbowl. Just like in a catastrophic disaster it is essential that all participants are on the same map, and understand that the data on the map.

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[13] US Secret Service, National Special Security Events, retrieved 3 March 2008, http://www.ustreas.gov/usss/nsse.shtml

Disaster Planning Scenarios

DHS and FEMA have identified fifteen disaster scenarios for planning. Figure 6 shows the National Planning Scenarios.

National Planning Scenarios	
Improvised Nuclear Device	Major Earthquake
Aerosol Anthrax	Major Hurricane
Pandemic Influenza	Radiological Dispersal Device
Plague	Improvised Explosive Device
Blister Agent	Food Contamination
Toxic Industrial Chemicals	Foreign Animal Disease
Nerve Agent	Cyber Attack
Chlorine Tank Explosion	

Figure 5. [14]

Any of these scenarios would cause serious harm to the country as a whole, let alone the affected area and population. The challenge for several of these scenarios is how to plan for a no-notice event like a nerve agent attack or a dirty bomb? A test lies with planning for catastrophic accidents/toxic spills and natural disasters. One approach would be to have a standardized approach, tools and data to plan with. Disasters come in the no-notice variety and those where landfall can be approximated. There is a finite amount of coastline and using the Area Summarization tool it is relatively easy to generate ready-made gridded contingency plans for the entire coastline. In the future elevation and construction quality could be added by using HAZUS-MH data from FEMA.

Nearly all of the planning scenarios fit into the No notice variety. The standardization offered by COPPE would bring these no-notice incidents into as a "just-in-time" response planning resource cycle.

COPPE Example

Background

One of the fifteen scenarios is a major earthquake. This is a notional discussion about how a COPPE implementation could be used to facilitate the planning and response for this type of catastrophe. The New Madrid Seismic Zone spans several states along the Mississippi River. The entire seismic zone is best illustrated by a US Geological Service factsheet on New Madrid. In the factsheet, a comparison is made between 1895 6.8

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[14] US Department of Homeland Security, National Preparedness Guidelines retrieved 3 March 2008, http://www.dhs.gov/xlibrary/assets/National_Preparedness_Guidelines.pdf, pg 37.

magnitude New Madrid earthquake and the 1994 6.7 magnitude Northridge, CA earthquake.
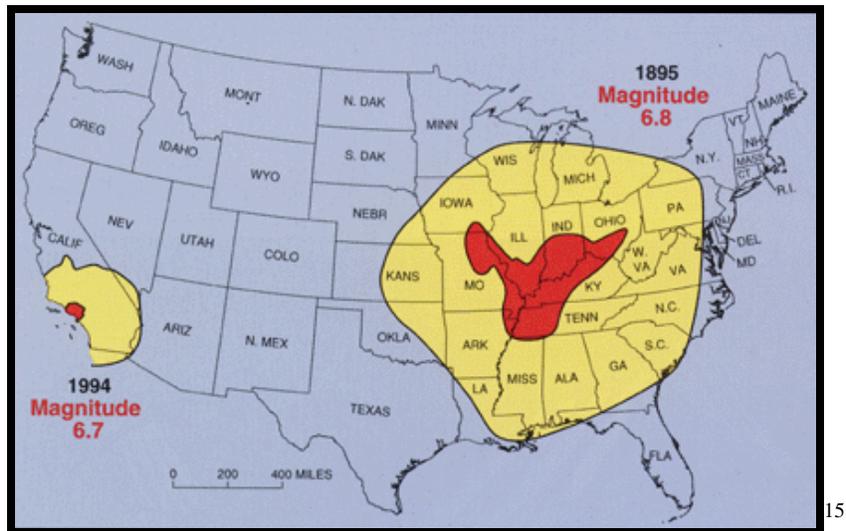
Figure 6. New Madrid Seismic Zone Earthquake Compared to the 1994 Northridge, CA Earthquake

For Figure 7, "*Red indicates minor to major damage to buildings and their contents. Yellow indicates shaking felt, but little or no damage to objects, such as dishes.*" [16] Missouri Department of Natural Resources technical bulletin restates the New Madrid Seismic Zone (NMSZ) potential:

> 1990 Federal Emergency Management Agency (FEMA) report estimates damage and injuries in St. Louis from a 7.6 magnitude NMSZ earthquake to be $2.8 billion, 260 deaths and 1,060 serious injuries.[17]

As one can imagine, for those living in the NMSZ there is increased anxiety or any area prone to natural disasters. Planning and mitigation are two steps that can be taken in advance.

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[15] US Geological Survey, The Mississippi Valley-"Whole Lotta Shakin' Goin' On", retrieved on 3 March 2008 from http://quake.wr.usgs.gov/prepare/factsheets/NewMadrid/

[16] US Geological Survey, The Mississippi Valley-"Whole Lotta Shakin' Goin' On", retrieved on 3 March 2008 from http://quake.wr.usgs.gov/prepare/factsheets/NewMadrid/

[17] Missouri Department of Natural Resources Earthquake Facts about the New Madrid Seismic Zone, retrieved on 3 March 2008 from http://www.dnr.missouri.gov/geology/geosrv/geores/techbulletin1.htm

FEMA has created a software program called HAZUS-MH. It is a powerful risk assessment software program for analyzing potential losses from floods, hurricane winds and earthquakes

> In HAZUS-MH, current scientific and engineering knowledge is coupled with the latest geographic information systems (GIS) technology to produce estimates of hazard-related damage before, or after, a disaster occurs.[18]

Using HAZUS-MH, a FEMA study was conducted on the effects of a magnitude M6.5 New Madrid earthquake centered on Memphis, Tennessee as shown in Figure 8.
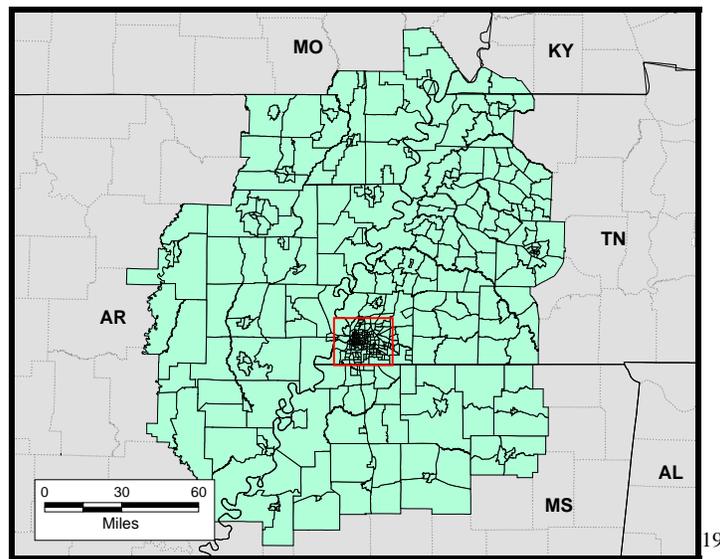
Figure 7. Greater Memphis NMSZ Area

Their estimates for the **greater Memphis area alone** for M6.5 earthquake would affect: 5 States, 40 Counties, 461 Census Tracts, 23,000 sq. mi, Population: 1.9 Million, and Households: 700,000.[20] The COPPE example discussion will focus on the New Madrid fault and an earthquake centered near Memphis, Tennessee.

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[18] FEMA – HAZUS Home, retrieved on 3 March 2008 from http://www.fema.gov/plan/prevent/hazus/

[19] Federal Emergency Management (Application of HAZUS to the New Madrid Earthquake Project PowerPoint® Presentation, retrieved on 3 March 2008 from http://www.fema.gov/ppt/plan/prevent/hazus/dl_madrid_eq.ppt

[20] HAZUS Madrid Earthquake Presentation, retrieved on 3 March 2008 from http://www.fema.gov/ppt/plan/prevent/hazus/dl_madrid_eq.ppt
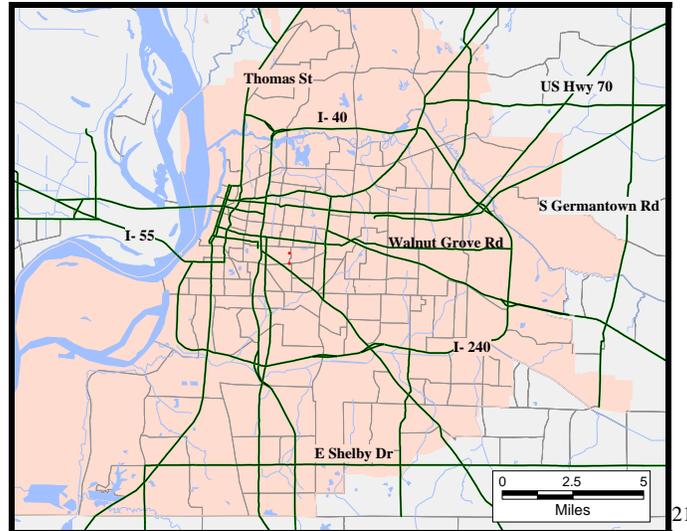
Figure 8. Greater Memphis, TN Study Area

Sharing Plans

With a COPPE enterprise the National Guards in the 5 states would be networked and be able to share their plans, GIS data, and status of response forces. Since the National Guards within these states work closely with their local responders this information could be updated easily. The sharing of COPPE information is based on a secure network and system implementation that allows owners to limit access to their maps and data as they deem appropriate.

At any given time any COPPE is able to perform the previously described steps. The results of these steps: (Create Area Summarizations, Create Maps and Mapbooks, Collaborative Maps, Disseminating Maps and the perform Orders process to response units) results in:

 Within minutes

- A relatively accurate population (day or night) estimate,

- A number of hospitals (and beds), nursing homes, schools, and any other selectable critical infrastructure attribute are available.

- how many responders are needed, when coupled with planning factors

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- Maps and mapbooks with up to date information is rapidly ready for electronic dissemination to responders

- Real-time maps are shared, allowing distant users the ability to update and share changes to the information being positioned on the map.

- Planners and EOC personnel would be able to work on maps simultaneously and then publish these maps.

- As information and updates are received as recons are completed or support provided on site.

With a secure[22] internet connection the COPPE would be able to perform the previously described network steps, such as: Shared Plans and Planning Tools, Response Status and Reporting Gap Identification

- A state could create a map showing their disaster area, their status of each grid as they know it and also show their gaps where additional resources are needed.

- A pass-worded service is opened for other authorized parties to view the same map real-time with the State.

- Using the grid system, correlated with assigned grids, it will show Green/ Amber / Red for status within the grid. Coupling this information with knowledge about what each grid contains is crucial for effective planning and management.

- Assorted tools and procedures would also be able to identify areas within the bounded zone that have not been reporting, have not had any resources assigned, or may not have

Prototype Results

Portions of the COPPE were constructed to validate the software vendor's product features. These included sharing a map via ArcServer, publishing a map via ArcIMS, creating mapbooks via DSMapbook, overlaying the US National Grid, creation and use of a COPPE ArcView prototype extension to critical infrastructure summaries and lastly generating a map status board. HSIP data was not used in the creation of the prototype since this activity was not done on US Government equipment nor under a federal government contract.

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[22] This refers to authorized use of an authenticated and encrypted VPN network connection over the internet and does not refer to a SIPRNET connection. The security level is commensurate with the classification level of the data being used.

Conclusion

The complexities of a catastrophic disaster are enormous. This is compounded by the multiple governmental agencies involved. Attaining an effective, shared collaborative disaster planning environment is indeed a "complex endeavor" as defined by Alberts and Hayes, but is technically possible, and many of the components needed for success are readily available. The components include:

- Standardized data (accomplished for Federal agencies and State National Guards through HSIP)

- Standardized grid (accomplished via the US National Grid)

- Standardized Response Unit Typing (underway for First Responders and National Guard Bureau)

- Standardized Toolset – prototyped for this paper

- Standardized map symbols

The Catalyst for these components being fully implemented at the greatest time of need, are the two key components below, and COPPE brings them together:

- Standardized Planning Factors

- Standard Planning Methodology

References

Homeland Security Infrastructure Program (HSIP), retrieved on 3 March 2008 from http://www.hifldwg.org/

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Resource Typing, retrieved on 3 March 2008 from http://www.nimsonline.com/resource_typing_system/index.htm

FEMA Disaster Planning Scenarios, retrieved on 3 March 2008 from: http://training.fema.gov/emiweb/edu/docs/Pawlowski%20-%20Catastrophic%20Disaster%20Planning.ppt

Homeland Security Working Group, Emergency Management Symbology, retrieved on 3 March 2008 from http://www.fgdc.gov/HSWG/index.html

"Common Operating Picture and Planning Environment for Disaster Response"
by
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Colorado Army National Guard
NORAD and USNORTHCOM J42

19 JUNE 2008

This Briefing is

Unclassified

19 JUNE 2008

Agenda

- Challenge
- Functional Approach
- Technical Approach
- Examples
  - New Madrid Seismic Zone
  - NSSEs
- Components / Catalysts

The Challenge

➢ **Given a deliberate or crisis response within the United States and territories**

➢ **Given an incident or event of known or unknown origins**

➢ **Given base set of GIS data**

➢ **How does one create a response plan and consider first responders, interagency partners, non-governmental-agencies (NGOs) and contractors?**

➢ **What does the plan look like?**

➢ **What will the response force look like?**

➢ **How will the response forces be coordinated?**

➢ **Lastly, how will plan execution be tracked?**

The Challenge (Cont.)

The planning tapestry includes:
  ➢ National Response Plan / National Response Framework
  ➢ 54 state (and territories) response plans
  ➢ 3033 county plans
  ➢ 33 city-county government plans
  ➢ numerous city response plans.

➢ *Focus and Convergence versus Command and Control*
  ➢ Two planning levels as well. state & local
  ➢ Federal level between agencies and with states.
➢ *Coalition*
  ➢ Includes the National Guards of the States, the Joint Force Headquarters and coordination by National Guard Bureau (NGB).

Technical Approach

- *Bounding the Area*
- *Grid System*
- *Standardized GIS Data*
- *Planning Tools*
  - Workstation Capabilities
    - **Area Summarizations**
    - ***DSMapBook***
  - Server Capabilities
    - **Orders process to response units**
    - **Shared Plans and Planning Tools**
    - **Response Status Reporting**
- *Planning Factors*
- *Collaborative Planning Environment and Architecture*
- *Infrastructure Provider*

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Bounding the Area

➢ **The size and scope of KATRINA**

➢ **Example: New Madrid Seismic Zone**
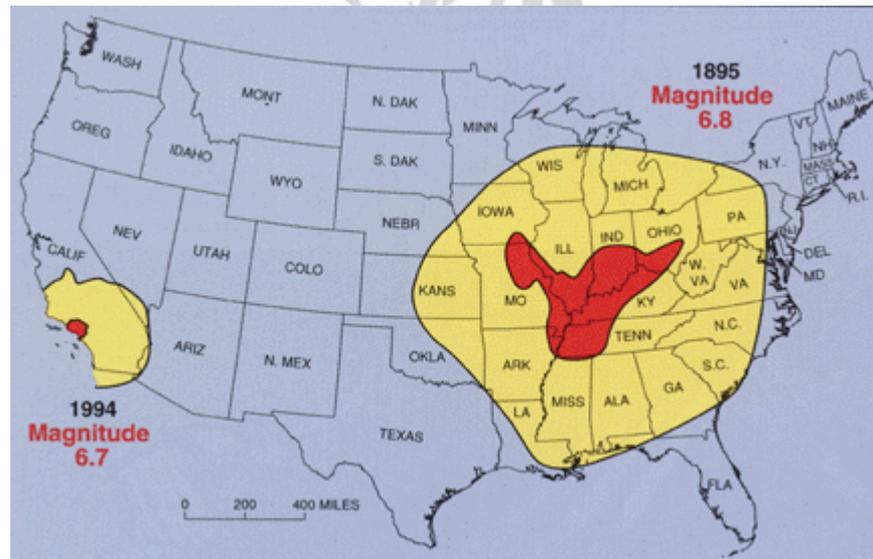
Standard Grid System
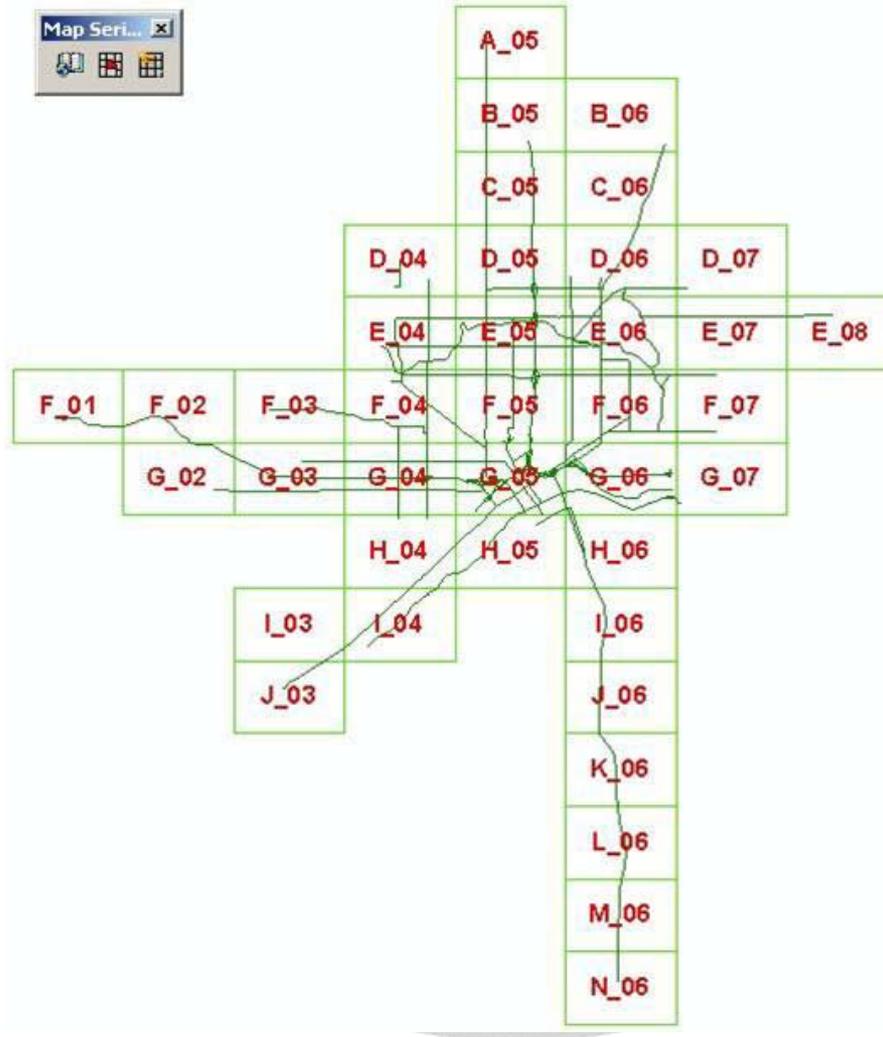
Standardized GIS Data

➤ **Homeland Security Infrastructure Program (HSIP) Data**

➤ **Standard Symbology**

➤ **Results in similar results when planning**

Planning Tools

➢Workstation Capabilities
    ➢**Area Summarizations**
    ➢*DSMapBook*

➢Server Capabilities
    ➢**Orders process to response units**
    ➢**Shared Plans and Planning Tools**
    ➢ **Response Status Reporting**

➢ *Planning Factors*

➢ More historical research and focused analysis is needed in this area.

➢ FEMA's Unit Typing Effort www.nimsonline.com/resource_typing_system/index.htm.

➢ National Guard's history full of responses
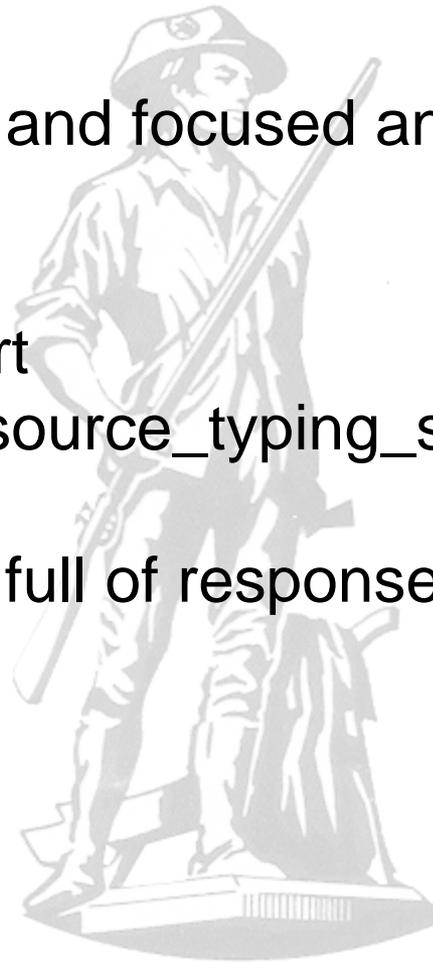
COPPE Architecture
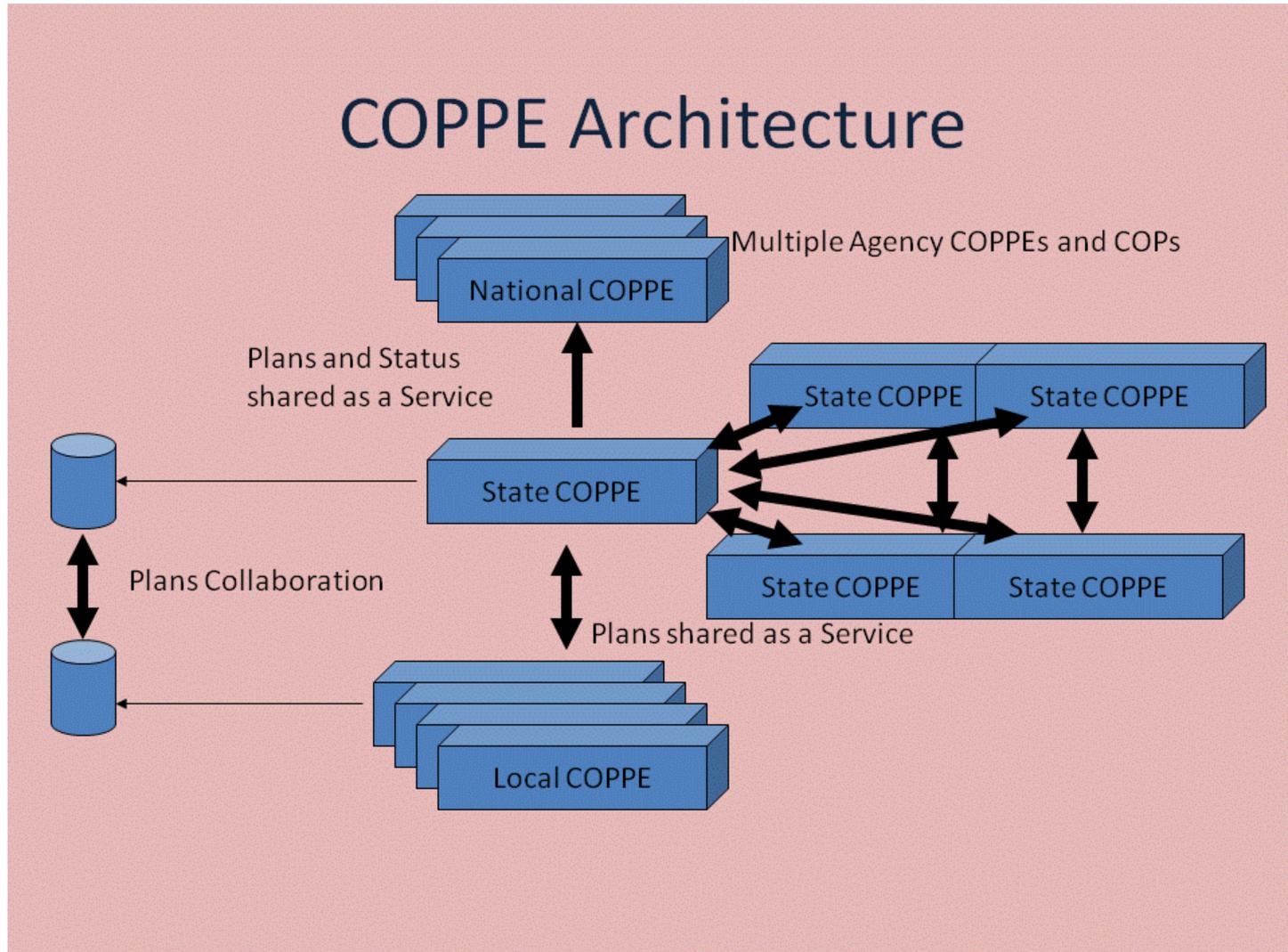
Infrastructure Provider

➢Decentralized execution is also provided by the SOA.

 ➢The State Guard is empowered so they can limit what is seen and shared and to whom. They control who can see and update their plans based on permissions.

➢Centralized oversight is provided with technical standards, standardized procedures and policies.

 ➢Standardized information assurance and security ensures only the properly credentialed people and agencies have access to the data and maps.

➢The National Guard located in every state and territory to provide the COPPE, with the required information assurance and protection.

➢The COPPE would be used for their federal mission of force protection, and are trusted by state and local governments and their citizens.

Examples
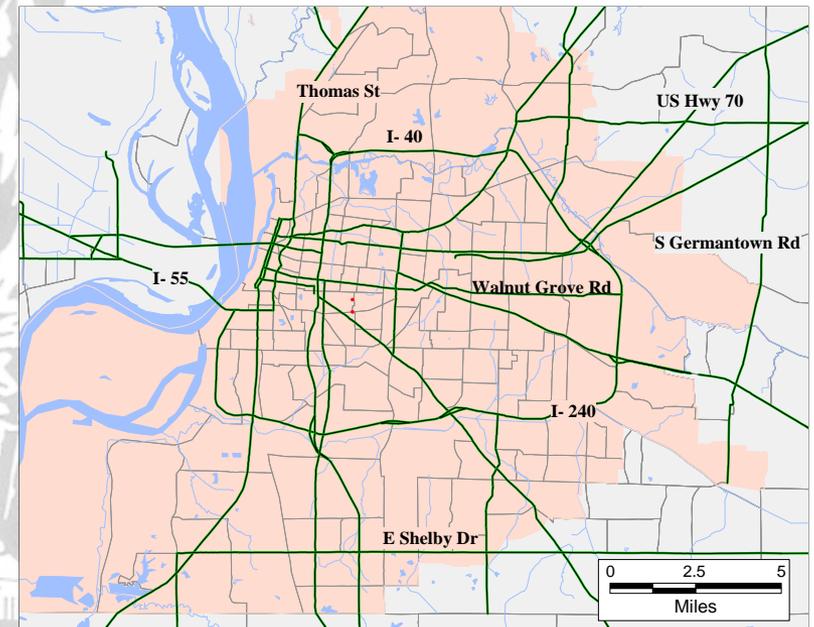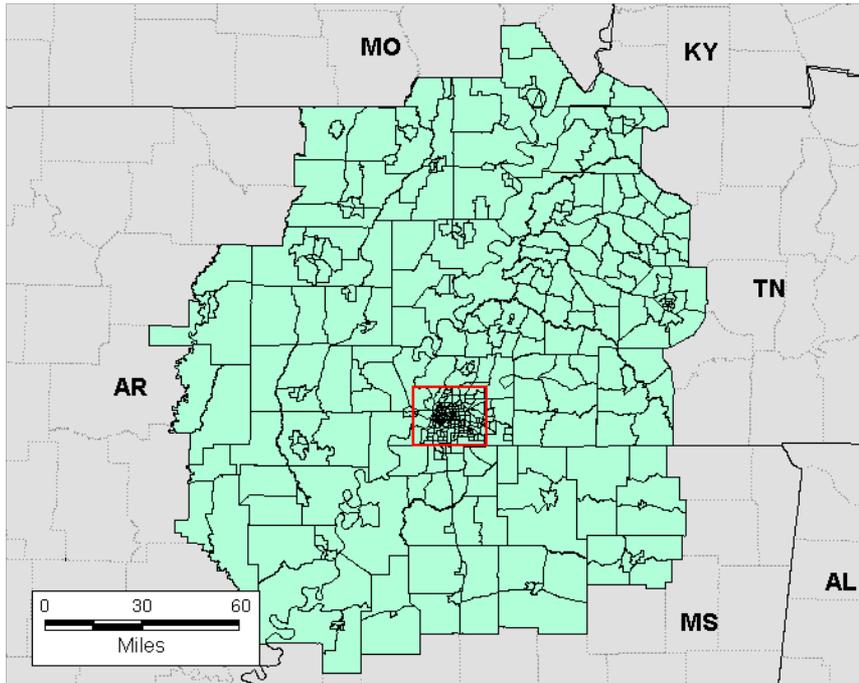
National Special Security Events

Another benefit of having the National Guard provide the COPPE infrastructure is by hosting a GIS clearinghouse for National Special Security Event (NSSE) 13 planning and execution.

NSSEs are nationally recognized events that have heightened security, like the Democratic National Convention, G8 Summit and Superbowl. Just like in a catastrophic disaster it is essential that all participants are on the same map, and understand that the data on the map.

GuardMap

RaSOR-EM

US Northern Command's SAGE

NGA's INTEL-U Login

"COPPE"

The *components* include:

- **Standardized data (accomplished for Federal agencies and State National Guards through HSIP)**

- **Standardized grid (accomplished via the US National Grid)**

- **Standardized Response Unit Typing (underway for First Responders and National Guard Bureau)**

- **Standardized Toolset – prototyped for this paper**

- **Standardized map symbols**

Catalysts for bringing the COPPE together:

- **Standardized Planning Factors**

- **Standard Planning Methodology**

QUESTIONS

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