Emergency Operating Center Design and Funding

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Certification Statement

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

Signed:_____

Abstract

In support of the Emergency Operations Center (EOC) process, and to improve the Central

Yavapai Fire District (CYFD) emergency response ability, the District has discussed including

space for an Emergency Operating Center (EOC) in the design of a new administrative building

that is under consideration for construction. The problem was that the Central Yavapai Fire

District had not established what an appropriate EOC design for the local area includes and what

funding options are available. The purpose of this research paper was to investigate the design

needs and funding options for an EOC in the Central Yavapai Fire District. This investigation

was accomplished using a descriptive research methodology and specifically addressed four

questions. (a) What are the State and Federal requirements for an EOC? (b) What have other

agencies found to work for EOC design? (c) What have other agencies found to cause problems

in EOC design? (d) What funding options are available through State, Federal, or other grants?

These questions were investigated by conducting a literature review, interviewing local heads of

emergency service agencies, visiting several EOCs, and the distribution of an informal

questionnaire to other emergency service agencies. The research indicated the existence of

general State and Federal requirements for governmental agencies to have EOCs but specific

guidance for EOC design was only found in voluntary standards. After looking at the

experiences of other agencies, it appears that EOC size, communications systems, and support of

basic needs stand out as areas for special focus in EOC design. Funding sources include limited

Federal money and standard local sources such as taxes and bonds. Based on the information

gathered, it is recommended that the Central Yavapai Fire District consider creating a plan for a

backup EOC so that the desired design requirements are well understood and ready for inclusion

in future construction of a District Administration building if such a project becomes feasible.

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Introduction

In the Federal Emergency Management Agency (FEMA) structure, Emergency Operating Centers (EOCs) exist to assist in support of larger incidents and are organized jurisdictionally (Federal Emergency Management Agency , 2011). These centers are prepared and activated by municipalities, counties, states, other types of jurisdictions, and some large businesses.

> Every community, large or small, urban or rural, will be able to improve its ability to centralize its flow of information during an emergency by establishing an EOC. The key to a community's disaster planning, response, and recovery lies in the EOC. In fact, the EOC is crucial to saving lives and reducing property damage. (Fagel M. J., 2008, p. 244)

In support of the EOC process and to improve the Districts emergency response ability, the Central Yavapai Fire District has discussed including space for an Emergency Operating Center (EOC) in the design of a new administrative building that is under consideration for construction.

The problem was that the Central Yavapai Fire District had not established what an appropriate EOC design for the local area includes and what funding options are available. The purpose of this research paper was to investigate the design needs and funding options for an EOC in the Central Yavapai Fire District. This investigation was accomplished using a descriptive research methodology and specifically addressed four questions. (a) What are the State and Federal requirements for an EOC? (b) What have other agencies found to work for EOC design? (c) What have other agencies found to cause problems in EOC design? (d) What funding options are available through State, Federal, or other grants?

Background and Significance

The Central Yavapai Fire District (CYFD) was established in 1965 for the purposes of providing fire protection to residents living outside the city of Prescott boundaries. The call volume for that year was 20 and consisted of fire responses only. In 2011, District personnel responded to over 7500 requests for service that included medical, hazardous materials, police assists, technical rescue, and a variety of non-emergent responses (Jaeger, 2011 Central Yavapai Fire District Alarm Summary, 2012). The District's boundaries now include 160 square miles of Yavapai County which varies from suburban to ranchland. Several mutual and automatic aid agreements are in place to ensure that the closest unit from the area emergency response agencies responds, regardless of jurisdiction. The District population underwent a particularly rapid expansion in the 1990's that extended until 2008. Drills had been held with the County and surrounding agencies on EOC operations although scenarios were generally limited to single municipality events and no drill had used a county wide problem as the scenario. When drills were held in Prescott Valley, the most populated area of CYFD, the Emergency Operations Center (EOC) was typically located in the Prescott Valley Police Department briefing room. The room is not large and was limited on its capacity. EOC supplies were stored in the room or nearby cabinets.

In December of 2010, the Northeastern portion of Yavapai County in Arizona experienced a winter storm that combined heavy snowfall followed by rain. The snow and rain combination was forecast to create a significant flood potential for the area. Several of the local municipalities activated their Emergency Operations Centers (EOCs) in preparation for the storm and kept them active for approximately 24 hours until the potential for increased emergency operations had passed. The county chose to work with the individual EOCs rather than activate

its own. During the operational periods that the EOCs were open, emergency operations were

monitored and resources directed as needed by the individual jurisdiction. Because CYFD is a

special district entity that covers several municipalities and adjacent unincorporated areas,

coordination with the separate EOCs was necessary. This proved to be challenging. The

situation was further complicated by the existing automatic aid agreements with neighboring fire

organizations. The facilities available to the District staff for management of the situation

consisted of a small room with a white board and one land-line phone. Cell phones were also

used.

In the time after the storm passed, informal discussion occurred regarding the need for

improving CYFD's ability to facilitate EOC needs for emergencies that occur within the District

and for larger area events that significantly impact area resources. This paper investigated the

different approaches to setting up EOCs including space requirements, equipment needs, and

potential pitfalls. Possible funding methods were also examined. By improving CYFD's staff

and personnel's understanding of the Districts EOC needs, the investigation directly correlates to

the Executive Analysis of Fire Service Operations in Emergency Management (EAFSOEM)

course purpose "… to improve the knowledge, skills, and attitudes (KSAs) required of fire

service leaders when applied to large-scale multiagency emergency incidents in their

communities" (U.S. Department of Homeland Security, 2012, pp. SM 1-9)

Literature Review

A literature review on the topic of Emergency Operations Centers (EOCs) reveals a

significant amount of writing from a number of authors that covers a wide span of EOC history.

Because "Emergency operations centers (EOCs) are nothing new…" (Furey, 2009, p. 112),

information exists on a variety of approaches to setting up a center. The Maricopa County and

Arizona State Emergency Operations Center in Phoenix, Arizona provides an example of an

early EOC that was "Built in the late 1950s…" for "….civil defense against nuclear attack"

(Spencer, 1999, p. 11). Michael J. Fagel has written several books on EOC design and operation.

The author pointed out, "These multipurpose spaces were born out of the context of civil

defense. They were fairly similar in layout and typically created with a bunker mentality as

survivability was paramount" (Fagel M. J., 2011, p. 286). More modern facilities may be built

with different concerns in mind and some now include the concept of the Virtual Emergency

Operations Center "…that exists solely or partially in cyberspace" (Davis, 2002, p. 48). Despite

this history, documentation of State and Federal requirements for EOCs is limited. In a study of

EOCs for the Miami Township, Glenn P. Jirka (2006) found "…no mandated EOC standards"

(p. 3). Similarly, McKay (2008) stated "A search for local mandates in Lincoln and State

mandates in Nebraska reveal none" (p. 24). The State of Arizona does have requirements for the

establishment of systems to respond to emergencies however the requirements are general and

make no specific mention of EOCs. For example, Arizona Statute Title 26-308, Section B states

"Each county and incorporated city and town of the state shall establish and provide for

emergency management within its jurisdiction in accordance with state emergency plans and

programs" (State of Arizona, 2007). Indeed, the lack of strict government requirements may

allow flexibility to match the observation that:

> The size and composition of most EOC's is dictated by both the local emergency
>
> management structure and local conditions. Communities in hurricane-prone regions
>
> often have large facilities designed to weather the storms. Those in areas hosting nuclear
>
> power plants may subscribe to a completely different set of guidelines, while smaller

rural communities will likely have facilities more reflective of their challenges. (Furey,

2009, p. 112)

Short of mandates, several voluntary standards were found which provide guidance for

EOC facilities. The most thorough standard found is the American Society for Testing and

Materials (ASTM) voluntary consensus standard that "...provides general guidelines for the

development of an emergency operations center (EOC)" (ASTM International, 2011, p. 508).

The ASTM (2011) guideline contains a large number of items to consider when building and

equipping an EOC including possible funding sources. The standard ends with a checklist style

summary that can be used for quick reference from the first step of needs assessment to

construction and ongoing maintenance. Another large checklist is provided by the Federal

Emergency Management Agency (FEMA) to evaluate risk and need relating to EOCs.

Completing the checklist enables the user to identify what risks need to be addressed and what

items should be considered in terms of location, design, and equipment (Federal Emergency

Management Agency, 2009). The National Fire Protection Association standard NFPA 1561

provides very basic guidance for establishing EOCs which is limited to the previously mentioned

idea that "…an EOC will depend on the size of the jurisdiction, resources available, and

anticipated incident management workload" (National Fire Protection Association, 2008).

An examination of descriptions of current EOCs is consistent with the idea that

requirements and EOC solutions are different for individual areas. A factor that varies widely is

size. "An EOC can range in size from a 4- by 8-foot cloak room furnished with one desk…."

(Larson, 2002a, p. 38) to the Alameda County, CA EOC that is over 24,000 square feet (Larson,

2002a, p. 39). As an example of a smaller, multipurpose approach, Chandler Harris (2007)

described the Arvada, Colorado EOC that "…doubles as a conference room" (p.41) and must be

set up when needed for an emergency. Different perspectives exist as to what the right size is.

Dr. Frances Edwards-Winslow, Director of the Office of Emergency Services for San Jose,

California noted "When the rooms get to be auditorium sized, they lose their purpose, which

requires a certain level of intimacy" (as cited in Larson, 2002, p. 9). However, Minneapolis

provides an example of the dangers of an EOC not being large enough. Furry (2009) writes

about a Federal Emergency Management Agency (FEMA) report that was released after the I-35

bridge collapse. The report "...bore critical statements concerning the emergency operations

center. Some participants felt that it was too small to accommodate the responding public and

public safety officials" (p. 114). Typical of many of the articles reviewed, Lunsford (1999)

provided a list of basic physical characteristics to look for when establishing an EOC. He

suggests that the site be:

- Close to City Hall and the Public Safety Building.

- Between the two interstate highways dissecting the city.

- Accessible, with at least two routes in and out.

- Parking

- Away from foliage, trees, parks, and wild land areas.

- Adjacent space for helicopter landings.

- Conducive to good communications.

- Simple to secure and limit access.

- Backup power source

- Outside of flood zone.

 (Lunsford, 1999, pp. 6-8)

When investigating what works versus what does not work in EOCs, technology plays a large role. Communications are an important area that New York City has addressed after 9/11. Chris Wooten was involved in the cites communications upgrade and said "We deployed our application that gives the fire department access to bring in incident audio, video, cell phone pictures, reports, documents [and] digital pictures about the incident, all under a single, unified incident-management application" (as cited in Roberts, 2009, p. 48). In contrast, when the San Leandro, CA. EOC was initially built prior to 1998, financial constraints limited their communications to cellular and land phone capabilities, the normal police and fire system augmented by ham radio volunteers, and a limited number of extra two-way radios (Lunsford, 1999). Some groups that work with EOCs are trying to make use of advanced software/communications systems such as WebEOC to provide better coordination (Paros, 2010, p. 218). Not all installation of newer technologies is successful. Shrader (2011) writes that the first use of a new EOC in Martinsville, VA had multiple problems which included failures with wireless technology. He stated that "…the new emergency operations center initially was more of a hindrance than an effective management tool" (Shrader, 2011, p. 10).

An item to be careful about when discussing the use of new communication and technology options in an older building is the electric infrastructure. Kim Zagaris, chief of the Fire & Rescue Division, California Governor's Office of Emergency Services said "Our old facility was never designed to take all the electrical capability that we eventually ran in there" (as cited in Larson, 2008, p. 36). When considering failure points Mike Martinet, executive director of Office of Disaster Management, Area G, in Los Angeles County reminds us "People look at EOC software and then forget it can fail, and they lose the ability to do it manually" (as cited in Harris, 2007, p. 40). He believes that "…an overreliance on technology can hinder emergency

management and EOCs" (Harris, 2007, p. 40). The Harris (2007) article also noted that a lesson

learned during the Katrina aftermath included the need for "good running shoes" to deliver

communications by hand during the week that power was out (p. 41). The idea of being

prepared for back-up plans extends beyond individual systems to the centers as a whole. "No

matter how secure an EOC may seem, it could still be vulnerable to damage from a catastrophic

incident. As a result, backup sites are no longer seen as purely optional" (Larson, 2002b, p. 34).

This sentiment is echoed in an article that was reprinted as part of the text for the Executive

Analysis of Fire Service Operations in Emergency Management. The author stated "In addition

to the main location, it is important for financial and logistical reasons to identify potential

alternate sites for reliability and suitability as part of an overall community risk management

plan" (Shouldis, 2010, p. 3).

Included in most of the literature that was reviewed, regardless of the standard, book, or

articles focus, was the need for inclusion of basic supplies in the EOC plan. Fagel (2011)

contained a section devoted to "minimum life support requirements" (p. 304) that listed the

categories of Sleeping accommodations, Food service, Water, Sanitary facilities, Medical

supplies, and Heating/ventilation. An article by Pat Moore (1999) contained a list of basic needs

that included "Personnel supplies: food, (MRES), water, dishes, utensils, coffeepot, first aid kit,

sleeping cots, blankets, portable toilet, and showers where possible" (p. 10). As indicated by the

author's use of all capital letters, an item of particular importance to Moore (1999) was "SPARE

BATTERIES FOR REQUIRED ELECTRONIC EQUIPMENT" (p.10). The ASTM standard

(2008) includes many of the previously mentioned basic considerations as well as line 6.4.8.11

"Accommodate adequate garbage removal" (p. 514).

Options to fund EOCs include "…civic organizations, private sector partners, nonprofit groups, voter referendums (or bonds), and grants from local, State, and Federal government for additional funding" (ASTM International, 2011, p. 515). In order to fund their center, Reno and Sparks, Nevada used a ¼ cent sales tax to build their center in 2003 (Larson, 2006, p. 26). New York City used a combination of three million dollars from city sources and 14 million dollars from Homeland Security to fund their EOC improvements three years after 9/11 (Roberts, 2009, p. 46). Interestingly, although not a current option, crowd funding may be a future possibility for public projects as presented in an article on the website Smartplanet about Spacehive which "…claims to be the world's first online crowd funding platform for public space projects" (Falk, 2012).

Procedures

For this research, interviews of the local county emergency managers were conducted to determine what their expectations for area Emergency Operations Centers (EOCs) are. These interviews also included discussions about funding mechanisms that exist through local, state, and national emergency management organizations. After talking with the county emergency managers, interviews were also held with local heads of Fire Departments to discuss their past experiences in the existing facilities and what they see as EOC needs in the future. Interview questions, contact information, and short biographies can be found in Appendix A. During the research process, several of the local EOCs were available for site visits. These sites were examined for items identified in the literature review, interviews, and questionnaire such as size, equipment, and location. Site visit information is contained in Appendix B.

After completing local research, a questionnaire was constructed and distributed to Executive Fire Officer students across the country and members of the Arizona Fire Chiefs Association (AFCA). The questionnaire was designed to sample what types of EOC facilities other agencies use and what their experience with the facilities has been. In order to provide context to the responses, questions of agency size, type, and call volume were included. A summary of the questions and results is contained in Appendix C.

This Applied Research Project (ARP) was descriptive in approach and researched requirements, common practices, and funding options for Emergency Operations Centers. The research was intended to provide the Central Yavapai Fire District staff with enough information to consider appropriate specifications of a District EOC and possible sources of funding assistance. The results will be used in future planning and budgeting sessions.

Limitations to the research were encountered when reviewing the results of the questionnaire. There appeared to be some variety in the knowledge base of respondents regarding available EOC facilities and equipment. An additional limitation to the research may be a relative local inexperience with EOC operations as compared to other parts of the country that contend with tornados and hurricanes on an annual basis.

Results

The interviews with County Emergency Manager Denny Foulk, Fire Chief Paul Nies, and Fire Chief Dan Fraijo provided information regarding their past experiences with Emergency Operation Centers (EOCs) and their views on what can help or hurt the centers. Chief Paul Nies's experience with EOCs has been limited to the centers in Chandler, Arizona and Prescott Valley, Arizona. His exposure to the Town of Prescott Valley's facility occurred during a drill.

Although functional, the space is usually used for other purposes. Chief Nies's impression was

that the size appeared small and the setup limited effective communication between the different

EOC sections. In contrast, the Chief described the Chandler center as purpose-built with a

kitchen, break room, access to traffic cameras, and a good internal communication system that

included both voice and text abilities. He said that there was special focus placed on the

communication portion of the system when it was built because the prior Chandler facility,

which was an older fire station, had multiple design problems such as poor acoustics and

inadequate separation from kitchen facilities that caused interference with the communication

process. Security of EOC facilities was another area that Chief Nies noted should be given

attention to. Chief Nies was not aware of specific laws or regulations that pertained to EOC

design and named the Department of Homeland Security grants as the only funding that he was

aware of for EOC costs (Nies, 2013).

Manager Foulk has been in all of the Yavapai County EOCs as part of his job

responsibilities and has prior experience in an EOC in Arkansas in which he participated in

management of seven disasters over a five year period that included floods and tornados. He

discussed the importance of being able to scale facility operations depending on the size of an

incident as well as uses for current technology such as the commercially available Web EOC

software. Manager Foulk's biggest concern based on his past experiences with EOCs is that

facilities must have the ability to communicate with field personnel. He stated that the interface

between the Incident Management Team and the EOC was critical. During the interview,

Manager Foulk also discussed the construction of a new Yavapai County EOC which will be

approximately 2200 square feet that includes 1500 square feet of space dedicated to the major

emergency management functions. The remaining space will be divided into three offices, a

small meeting room, and a radio room.   The design was based on past experience, an estimation

of area emergency needs, and available funds. Of the three interviews, Manager Foulk had the

most to say about government statutes and codes that address EOCs but agreed that the rules are

general in nature and do not address specific requirements. He suggested Homeland Security

grants as available funding sources for EOC construction and equipment while clarifying that

FEMA, Governor Emergency Funds, and County money are only used for actual emergency

operational costs (Foulk, 2012).

Prescott Fire Chief Dan Fraijo had the most extensive experience of the three people

interviewed. He has been exposed to EOCs through drill or actual activation in several large

western cities including Phoenix, Vancouver, Santa Barbara, Boise, and San Francisco. Actual

incidents have included floods, earthquakes, and terrorist threats. Chief Fraijo stated that some

of the facilities were purpose-built while others were converted from other uses. The most

interesting design feature that he encountered was the shock absorber system built underneath

the San Francisco facility. His largest concern with EOCs was provision for an appropriate

command and control structure and the ability of that structure to communicate with each other.

Chief Fraijo said that sometimes the problems he has seen have been related to political issues

rather than facility design but felt that the planned command and control infrastructure should be

solid in order to minimize any functional problems that might magnify other influences (Fraijo,

2013).

Responses to the questionnaire were received from 72 agencies. The majority were either

career or combination agencies with two volunteer responses. The populations served by the

responding agencies ranged from less than 10,000 people to over 250,000 with call volumes

ranging from less than 500 a year to over 12,000 annually. Of the responding agencies, 66.7%

described their agency type as career, 30.6 % as combination, and 2.7% as volunteer. Not quite

half (45.8%) set their centers up only as needed and 37.5% have centers that are always set up

and ready for immediate use. The remaining 16.7% have their centers set up part of the time and

disassembled at other times. Expected EOC staffing levels ranged from less than five to more

than 50. The data was examined to look for indications that population size or agency type plays

a role in the size of an EOC or how an EOC is set up. There does not appear to be any

relationship between those factors. Additionally, no convincing relationship was found between

the expected number of staffed EOC positions and the square footage of EOCs. All of the

responders to the questionnaire indicated that their EOCs had a telephone system and most

indicated that the centers had computers (93.1%) with internet access (95.8%). Some form of

radio system was reported in 88.9% of the EOCs. Paper and pencil backup equipment is present

in 86.1% of the centers and 61.1% are using a type of EOC software. Specific technological

equipment described included Smart Boards, satellite phones, access to traffic and building

cameras, and large video display systems. Only 34 of the 72 responses (47%) contained answers

to the question regarding long term operations features in their facilities. Of those that answered,

half had EOCs with sleeping quarters while less than half had any provisions for food supply or

stand alone water/sewer systems. In response to the question of funding, 18.1% claim that they

use federal funding, 56.9% use sources other than federal money, and 25% were not sure how

their centers were funded. Other sources were identified as local municipalities and State.

Several of the respondents clarified that portions of construction and equipment costs were

covered by federal grants while on-going operations costs must be covered by the fire agency.

          Site visits were performed at the EOCs for Prescott Valley, Prescott, and Glendale in

Arizona. Prescott Valley and Prescott were picked based on the information received during the

interviews with Chief Nies and Chief Fraijo. Glendale was selected as a result of the

questionnaire and provided a contrast to the other two facilities. An additional visit was

performed at the Central Yavapai Fire Training Academy (CYRTA) which was used as the site

of an EOC drill for the County. Information and pictures of the three EOCs are contained in

Appendix B as well as information and pictures for the CYRTA training site. The Prescott

Valley, Prescott, and the CYRTA sites are examples of smaller EOCs that are set up as needed.

The areas are used as class or conference rooms normally and were not built with an EOC in

mind. The Glendale site is an example of a large, purpose-built, always set up EOC with a large

amount of integrated electronics and communication equipment.

Discussion

The information collected in the course of this ARP provided an overview of Emergency

Operations Centers (EOCs). Included were a review of regulations, design options, actual

experiences with EOCs, and an investigation of funding methods. Information on regulations

and rules for construction of EOCs was found to be limited and generally non-specific. Authors

Jirka and McKay discovered their States to have no regulations governing EOC construction.

(Jirka, 2006; McKay, 2008). Others, such as Arizona, do provide statutes to direct that centers

be established but do not include specifics to govern the details of what an EOC is (State of

Arizona, 2007). These findings in the literature review were consistent with what was found

during the interviews of the local County Emergency Manager and the Fire Chiefs. All were

aware of regulations requiring establishment of centers but had no knowledge of regulations that

specified specific building directions (Foulk, 2012; Fraijo, 2013; Nies, 2013). Of the other

reference material found and examined, the NFPA standard fell into the same general direction

category as the minimal state rules, with few concrete requirements (National Fire Protection

Association, 2008). The ASTM publication and FEMA checklist provided more information that

could be used in practical application to a design process (ASTM International, 2011; Federal

Emergency Management Agency, 2009).

       Examination of what other agencies are doing that works and does not work provided a

wide variety of information on EOC sizes, equipment, and set-up styles. The information

obtained through the literature review, interviews, questionnaire, and site visits painted a picture

of many different approaches with little consistency in EOC construction. The reason for this

diversity probably rests in the idea that, as Furey (2009) and NFPA (2008) pointed out, EOC

design must meet community needs and resources and that both are very different from region to

region and department to department. The results of the questionnaire bear this variation out.

No relationships were found to exist among the data collected regarding department type,

population size, and type of EOC (permanent versus as needed). Even a connection between

needed EOC staff and the size of an EOC was too weak to draw any positive conclusion. Large

career departments do not necessarily have large, always ready EOCs while some small

departments do. In short, agencies are usually working with the resources that are immediately

available and preparing for the risks that are regarded as most likely to occur. This approach

may cause some sacrifice to functionality as noted by Lunsford (1999) in his description of an

EOC implementation limited by funding and again by Chief Nies (2013) in which he described

problems encountered in the older Chandler, Arizona EOC which was simply an older fire

station.

       Items that reoccurred during the research process as important to address when designing

an EOC included a building that could be easily secured from both environmental damage and

unauthorized entry, was appropriate in size and internal arrangement for expected command

structure, possessed adequate internal/external communications systems, and had provision for

basic needs such as food, water, and rest. Of these, the most discussed item was the question of

communications. Examples of good and bad experiences were found in all aspects of the

research. The use of new technology in EOCs as described by Paros (2010) is increasing and

some facilities, such as the Glendale Fire Department and the Fire Department of New York

(FDNY) have installed large, state-of-the-art systems that tie directly into dispatch systems and

integrate with city traffic cameras for video input (Roberts, 2009). Others, as seen in the

questionnaire results, do not have an established radio system as part of the EOC. Articles in the

review such those by Shrader (2001) and Harris (2007) pointed out potential pitfalls of the

newer, technology dependant systems and caution against over-reliance on such arrangements.

The questionnaire results indicate that a telephone system is still the most used method of

passing information while computers with internet access come in a close second. Radio

systems are widely, but not universally, used by EOCs and the paper and pencil approach is still

used as a backup even by the growing number of web based EOC system users. The ability to

communicate internally and externally was a topic raised by all three of the individuals

interviewed with the common theme that effective information exchange must be placed as a

priority when discussing the various aspects of EOC design (Foulk, 2012; Fraijo, 2013; Nies,

2013).

       Unlike the communications discussion, an interesting paradox appears to exist between

the institutional recognition that long term support of operations is needed and the actual

existence of such plans. Publications such as the ASTM standards included the establishment of

support plans (ASTM International, 2011) with specific areas to consider. Articles by Lunsford

(1999) and Moore (1999) contained shorter checklists. A book on EOCs by Fagel (2011)

devoted a section to this question. And yet, with the exception of emergency generators designed

to keep the communications systems working, the interviews, questionnaire, and site visits

indicated that back-up plans for water, food, and sewer are frequently not addressed. The topic

of long term support did not come up in the interviews (Foulk, 2012; Fraijo, 2013; Nies, 2013)

and the question specific to long term support in the questionnaire was answered by less than

half of the respondents. Of the ten questions asked, this was the only question that received less

than a 93% response rate. Of the responses that were received, less than half had made long term

support provisions for food and plans for water and sewer existed for roughly 30%. That

translates to about 10 agencies of the 72 that indicated an ability to support long term EOC

activation. None of the designated EOCs that were visited had addressed the area of long term

center support.

      Overall, the research results indicated a limited range of options to consider for EOC

funding. The methods of funding that were found fell into the two general areas of federal and

local. However, the questionnaire results to the question regarding funding indicate that,

although federal money is an option, the majority of agencies are not receiving it in support of

their EOCs. Emergency Manager Foulk (2012) described the federal options as operational or

preparedness. Operational money is only awarded by FEMA after a disaster and EOC activation

while preparedness money funnels through a variety of grants distributed by the Department of

Homeland Security. He further explained that agencies can obtain the Homeland Security

money when constructing or upgrading a new center and may receive help with training costs but

are rarely awarded grants to assist with ongoing upkeep. (Foulk, 2012). The article by Roberts

(2009) discussed New York's use of federal funding in this way when improving their EOC

capabilities. The ASTM standard also includes federal funds in its list of possible money sources

along with a variety of local sources which include taxes, bonds, and non-profit groups (ASTM

International, 2011). These local methods were also among the options discussed by Chief Nies

in his interview (Nies, 2013).   An interesting option that was discovered while conducting the

literature review was the possibility of crowd funding development. Although the references

indicate that this is a relatively new and unproven approach, it is worth noting (Falk, 2012).

Recommendations

The Prescott area has two existing Emergency Operations Centers (EOCs) associated

with the two larger municipalities of the region and a third center that is being built to serve as

the County EOC. All three EOCs meet or will meet the basic State regulations that require local

governments to provide for a system of emergency management. The choice for the two

municipal centers to be set up only as needed appears consistent with how a large percentage of

the questionnaire respondents approach their EOCs. However, the literature review,

questionnaire, interviews, and site visits also indicated that there are features of EOCs that the

local centers may fall short on. These include size, ability to communicate effectively within the

centers, and provisions for extended operations. Additionally, it was not evident that back-up

plans existed for providing basic needs such as water and sewer in the event of primary system

failure.

Based on the information gathered and to address future needs, it is recommended that

the Central Yavapai Fire District (CYFD) consider creating a plan for a backup EOC so that the

desired design requirements are well understood and ready for inclusion in future construction of

a District Administration building if such a project becomes feasible. The District staff should

develop a plan for a back-up EOC that could be used in the event that any of the other three area

centers were not able to be used or were found to be inadequate for a prolonged activation. The

plan should be formed based on the information found in the ASTM standard (ASTM

International, 2011), FEMA checklist (Federal Emergency Management Agency, 2009),

questionnaire results, and the experience of local emergency managers and leaders. The data

gathered in this research paper indicate that such a facility would be larger than the existing

municipal facilities and designed from the start to incorporate multiple forms of electronic

communication while retaining manual recording and communications systems to be used if

needed. Appropriate size should be based on the expected number of emergency positions that

are expected in a large activation. Further design considerations should include a cooking area,

an area for rest, and food supplies for a prolonged period. A back up plan for emergency power,

water, and sewer should also be included.   Because of the low incidence of area EOC

activations, it appears appropriate for any new facility to be built as a center that is only set up as

needed.   In order for the space to be used efficiently during the majority of time when the

facility is not needed as an EOC, consideration ought to be given to the primary use. A

classroom or computer lab might be an appropriate consideration.

In order to address the question of funding for new construction, coordination with the

local Emergency Manager will be required to determine what the likely hood of receiving federal

funds is and what level of funding could reasonably be expected.   It should be expected that

local funds will need to be used and included in long term fiscal plans. To be most cost

effective, inclusion of a back-up EOC into construction projects aimed at meeting other needs

should be considered. The financial side of the proposed center and other associated projects

will likely delay any implementation; however, work should be done to establish the center's

design needs in advance so that when an opportunity arises to move forward, either as a stand-

alone project or as part of a larger development, no delay is caused by the EOC portion. Also,

the concept of crowd funding as a tool for public domain construction should be considered for

inclusion into funding options if the practice proves practical.

Finally, there appear to be two areas that could benefit from further study and possible

action. The first is a closer look at what has caused agencies to use EOCs that are set up only as

needed versus centers that are purpose-built and maintained in ready status at all times. The data

collected did not show a connection between this item and other data points. Is the choice of the

type of center a result of many agencies simply using what is available? Or is there another

factor not examined, that triggers a decision to build a stand-alone facility? The second area for

further study is planning for backup systems to address basic needs. Are the observed

shortcomings in basic need support a result of lack of exposure to long term events? This area

requires further questions locally and possible actions to address the apparent preparedness

shortfall.

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Appendix A

Interview Questions and Biographies

Questions:

1. What was your most recent experience in an EOC? Drill or Actual activation?

2. How many people were in the room?

3. What was your impression of the space?
    a. To big, to small?
    b. Noise levels?
    c. Overall functionality?

4. What equipment was available?
    a. Computers, internet, TV, phones?
    b. Sleeping quarters, food stores, water supply?

5. What other EOCs have you been in?

6. What are specific features of EOCs that you have seen that work?

7. What are specific features of EOCs that you have seen that don't work?

8. Are you aware of regulations that govern the establishment or specifications of EOCs?

9. What types of funding for EOCs are you aware of?

Denny Foulk

Yavapai County Emergency Management Coordinator

(928) 713-3020

Denny Foulk is a retired soldier and logistician. Upon military retirement, Denny opened a computer business in Dover Arkansas specializing in small to medium size business needs. In 2001, Denny worked with various volunteer groups and began his career as a responder: Public Safety Diver, Search and Rescue Technician, and Swift Water Rescue Technician. He also began working with his local Office of Emergency Management as the Training Officer, and Deputy for the Sheriff's Office.

As a responder Denny has worked six presidentially declared disasters, five in Pope County Arkansas, one in Faulkner County Arkansas, and numerous emergency responses. His experience includes deceased recovery, equipment recovery, evidence retrieval, search and rescue operations, disaster response, as well as numerous swift water rescue operations. He has served in most all command and general staff Incident Command System (ICS) positions for all hazards to include Operations and Planning.

Continuing education became a primary focus in 2006. In 2007, Denny attended Arkansas Tech University where he completed his Bachelor of Science degree in Emergency Administration and Management, graduated Suma Cum Laude, and 2009 Student of the Year. While at Arkansas Tech Denny also completed his Master of Science in Emergency Management and Homeland Security. His area of research was in "*Cognitive Priming Used in the Development of Situation Awareness.*" While in college, Denny was employed by the University of Central Arkansas as the Emergency Management Coordinator. In this capacity,

Denny developed exercise plans, Hazards Identification Risk Analysis (HIRA), Emergency

Operations Plans, as well as Continuity of Operations Plans.

Since October 2011, Denny has served as the Emergency Management Coordinator for

Yavapai County.

Paul Nies

Fire Chief – Central Yavapai Fire District

(928) 772-7711

Chief Nies began his emergency services career in 1979 as an EMT. He attained paramedic

certification in 1981. Prior to joining CYFD, he was a member of the Chandler Fire Department

for 25 years, an adjunct faculty for several community colleges, a regional faculty for the

American Heart Association, and the chair of a regional EMS consortium. Chief Nies holds

current paramedic certification, an Associate degree in Emergency Medical Technology, and a

Bachelor of Science in Public Safety Administration. Chief Nies makes his home in the Walker

area.

Dan Fraijo

Fire Chief – Prescott Fire Department

(928) 445-5555

Chief Fraijo has had a long career with experiences in several fire departments of varying sizes. The length of his career and variety of departments has exposed him to a number of Emergency Operating Centers (EOC) and different types of emergencies. He began his career in the Phoenix Fire Department in the mid 1960's working his way through the ranks to Battalion Chief. After leaving Phoenix, Chief Fraijo moved to the west coast and served as fire chief for Vancouver, Washington, Santa Barbara County, and Boise, Idaho. He was the ranking Fire Officer in the San Francisco EOC on September 11, 2001 when there was concern that the third airplane might be headed to a target in California. Following his retirement as Deputy Director of Emergency Communications for the City/County of San Francisco in 2003, Chief Fraijo and his wife moved to Prescott. Chief Fraijo has worked for the Prescott Fire Department for 7 months in a temporary position while the city works through a hiring process to fill the position permanently.

Appendix B

Emergency Operations Center Site Visit Information and Pictures

Town of Prescott Valley, Arizona

Approximately 800 square feet

Type: Set up when needed. Supplies are stored in boxes and cabinets when EOC not in use.

Location: Police Department in center of town. Not far from Town Hall, large events center and

hospital.

Description: Small secure facility with bathrooms and limited showers. Domestic water supply.

No provisions for sleeping or cached food. Little to no risk of flood. Some computers available

at site. Hard line and wireless internet connections available. Standard phone service. Two large

displays available for video input. Regular and back up amateur radio equipment.
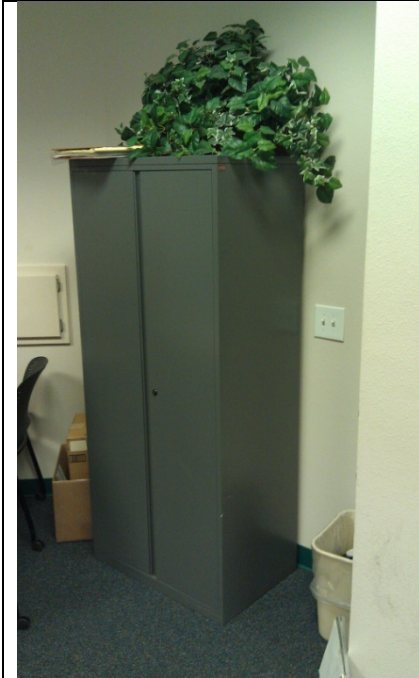

Figure B1. Prescott Valley Town EOC

Figure B2. Example of storage for EOC equipment at Prescott Valley Town EOC

City of Prescott, AZ

Approximately 800 square feet

Type: Set up when needed. Supplies are stored in boxes and cabinets when EOC not in use.

Location: Basement of City Hall in the center of town across the street from the County Court

House.

Description: Small secure facility with kitchen, bathrooms and limited showers. Domestic water

supply. No provisions for sleeping or cached food. Good computer availability. City

information technology (IT) department located in basement also. Hard line and wireless

internet connections available. Standard phone service. Large display available for video input.

Regular and back up HAM radio equipment.

Figure B3. City of Prescott EOC

City of Glendale, AZ

Approximately 3000 square feet

Type: Always set up.

Location: Glendale Regional Training Center Basement. Removed from other parts of the city.

Description: Large secure facility with bathrooms and limited showers. Domestic water supply.

No provisions for sleeping or cached food. Site is located in a flood plain. Flood risk was

mitigated during construction by installation of large earthen berms to channel water around site.

Emergency Operation Center appears to be above any potential high water. All stations

equipped with computers. Extensive video capabilities. Hard line and wireless internet

connections available. Standard phone service. Regular radio system equipment. Located next to
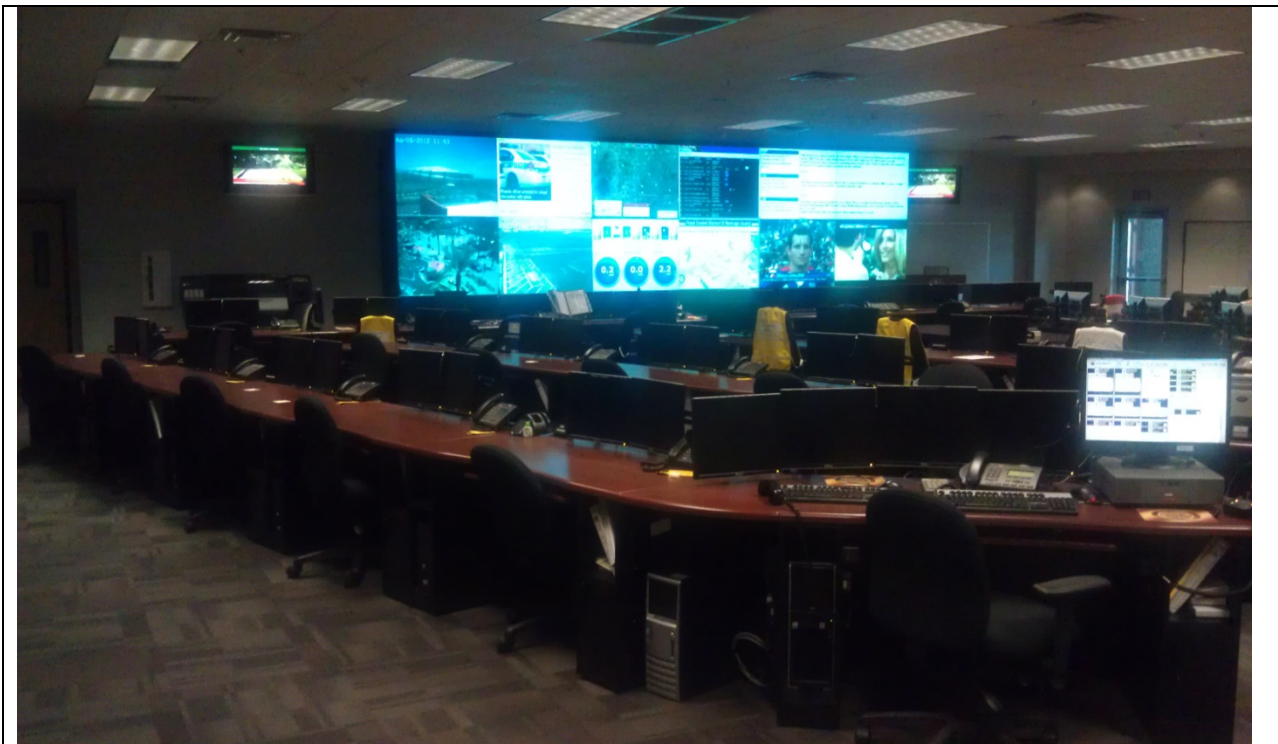
Glendale Police dispatch.

Figure B4. City of Glendale EOC

Central Yavapai Regional Training Academy (CYRTA)

Approximately 1500 square feet

Type: Not a designated EOC. This site was used for a regional drill. Emergency Operations

Center supplies were brought in by County Emergency Manager.

Location: Fire Department Training Center. Removed from town center. Located in an

industrial area.

Description: Facility normally used for training activities. Limited security. Bathrooms and

showers present. Domestic water supply. No provisions for sleeping although some possibility

of creating sleeping areas exist on site. Co-located with Fire District warehouse and emergency

food stores. Little to no risk of flood. Large number of computers available at site. Hard line

and wireless internet connections available. Internet Protocol (IP) phone service. Three large

displays available for video input.

Figure B5. Central Yavapai Regional Training Academy set up for drill purposes.

Appendix C

Questionnaire Results Summary

sbliss01   Sign Out   Help

+ Create Survey

My Surveys   Address Book   Resources   Plans & Pricing

You have a **BASIC account** | To remove the limits of a BASIC account and get unlimited questions, **upgrade now!**

EMS reporting survey
Healthcare Edit

Design Survey   Collect Responses   **Analyze Results**

View Summary
Browse Responses
Filter Responses
Crosstab Responses
Download Responses
Share Responses

Default Report   + Add Report

Response Summary

Total Started Survey: 38
Total Completed Survey: 38 (100%)

PAGE: 1

1. How would you describe your agency?   **Create Chart**   **Download**

	Response Percent	Response Count
Career	71.1%	27
Volunteer	2.6%	1
Combination	26.3%	10
answered question		38
skipped question		0

2. What population size does your agency provide service to?   **Create Chart**   **Download**

	Response Percent	Response Count
0-10,000	18.9%	7
10,001-25,000	8.1%	3
25,001-50,000	27.0%	10
50,000-100,000	16.2%	6
100,000-250,000	13.5%	5
Greater than 250,000	16.2%	6
answered question		37
skipped question		1

3. How many total calls does your agency run annually?   **Create Chart**   **Download**

	Response Percent	Response Count
0-500	5.4%	2
501-1,000	8.1%	3
1,001-2,000	5.4%	2
2,001-4,000	13.5%	5
5,001-8,000	24.3%	9
answered question		37
skipped question		1

3. How many total calls does your agency run annually?   Create Chart   Download

8,001-12,000	13.5%	5
Greater than 12,000	29.7%	11
	Exact number if available Show Responses	17
	answered question	37
	skipped question	1

4. What is the highest level of emergency medical service your agency provides?   Create Chart   Download

	Response Percent	Response Count
First Responder	7.9%	3
Basic Life Support	5.3%	2
Intermediate Life Support	0.0%	0
Advanced Life Support	86.8%	33
RN	0.0%	0
DR	0.0%	0
	Other (please specify) Show Responses	1
	answered question	38
	skipped question	0

5. Of the total number of calls your agency runs annually, how many are medical responses?   Create Chart   Download

	Response Percent	Response Count
0-500	11.8%	4
501-1,000	8.8%	3
1,001-2,000	5.9%	2
2,001-4,000	26.5%	9
5,001-8,000	14.7%	5
8,000-12,000	8.8%	3
Greater than 12,000	23.5%	8
	Exact number if available Show Responses	10
	answered question	34
	skipped question	4

6. How are your Patient Care Reports documented?   Create Chart   Download

	Response Percent	Response Count
Paper forms	52.6%	20
Electronic patient care reporting system	47.4%	18
answered question		38
skipped question		0

7. Is your patient care reporting system NEMSIS compliant?   Create Chart   Download

	Response Percent	Response Count
Yes	45.9%	17
No	18.9%	7
Don't know	35.1%	13
answered question		37
skipped question		1

8. Does your agency examine EMS response data for trends? (multiple answers ok)   Create Chart   Download

	Response Percent	Response Count
Never	24.2%	8
Occasionally	48.5%	16
Quarterly	24.2%	8
Annually	15.2%	5
Other (please specify) Show Responses		5
answered question		33
skipped question		5

9. Does your agency break down its analysis of EMS response data by: (multiple answers ok)   Create Chart   Download

	Response Percent	Response Count
Age	44.8%	13
Geographic area	58.6%	17
Time of day	72.4%	21
Type of medical problem	89.7%	26
Other (please specify) Show Responses		10
answered question		29
skipped question		9

10. What data summary reports does your agency utilize and find effective when examining EMS response data? Please add any other information on effectively using medical response data that you feel might be helpful.

Download

	Response Count
Show Responses	15
answered question	15
skipped question	23

Answers to Question 8

Monthly
8/23/2011 9:50 AM<u>View Responses</u>

Weekly on some issues...we are currently doing an MICR study..so data is captured often and as needed...i.e. flu season, measles, etc
8/23/2011 6:35 AM<u>View Responses</u>

Monthly
8/22/2011 2:50 PM<u>View Responses</u>

monthly for compliance with franchise requirements
8/14/2011 9:15 PM<u>View Responses</u>

Weekly
8/12/2011 4:14 AM<u>View Responses</u>

Answers to Question 9

The Zoll RescueNet Suite provides a large number of choices when it comes to analysis of EMS data.
8/30/2011 5:22 PM<u>View Responses</u>

We break it down any way we want to...depending on the data we are trying to collect.
8/23/2011 6:35 AM<u>View Responses</u>

we have the ability to sort as we wish
8/23/2011 6:15 AM<u>View Responses</u>

Interventions Initial complaint to actual complaint Mode of response
8/22/2011 2:50 PM<u>View Responses</u>

No analysis
8/15/2011 5:46 AM<u>View Responses</u>

Response times based on zones
8/14/2011 9:15 PM<u>View Responses</u>

Only to identify current issues. Nothing on a regular basis.
8/13/2011 4:26 PM<u>View Responses</u>

Race Priority dispatch (Alpha, Bravo, Charlie, delta, and Echo)
8/12/2011 4:22 AM<u>View Responses</u>

Not sure
8/12/2011 4:14 AM<u>View Responses</u>

Reports are generated on an as-needed basis. We don't have a data analyst or staff to stay on top of trends other than annual bench mark reporting, and when we look at specific issues.
8/11/2011 4:25 PM

Answers to Question 10

Showing **15** text responses
No responses selected

To this date, much of our analysis is covering completeness of documentation and a variety of skills completed by paramedics.
8/30/2011 5:22 PM View Responses

We currently utilize Firehouse RMS. We are acquiring the Mesa Fire EPCR system and "First Watch" software. The Firehouse Analytics software packet will be acquired this quarter as well allowing us to drill into the data further.
8/30/2011 10:21 AM View Responses

Response time data, greater than 8 minute response times, response times out of district.
8/23/2011 9:50 AM View Responses

None.
8/23/2011 8:35 AM View Responses

None at this time.
8/23/2011 8:23 AM View Responses

type of call chief complaint als/bls cardiac arrests
8/23/2011 8:18 AM View Responses

Any trends that are occuring or that we are wanting to determine we query. So it is all dependent on the type of research we are seeking.
8/23/2011 6:35 AM View Responses