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Executive Analysis of Fire Service Operations in Emergency Management

An Executive Analysis of Orange County Regional Data Interoperability

Rick Robinson

Orange County (CA) Fire Authority

July 2006

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:_____

Rick Robinson

Abstract

The Orange County (CA) Fire Authority (OCFA) has the opportunity to participate in a county-wide data interoperability initiative. This project sought to determine the scope of leadership and fiscal commitment appropriate for the OCFA. Using the evaluative method, research included literature review, relevant interviews and directed surveys. Questions pertained to the current data architectural layers for county fire agencies, available technology to achieve data interoperability, projected costs, and strategic recommendations. The research shows compelling evidence supporting interoperability and OCFA participation. Recommendations for OCFA involvement include supporting a coalition of participants, utilizing a change management strategy within an Incident Command System structure and serving in an appropriate leadership capacity for the project.

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The Orange County Fire Authority (OCFA) is a regional, all-risk department with a diverse service area including urban, suburban, coastal and rural interface. With a vision statement that begins with "you can count on us" (OCFA, n.d.), the OCFA is committed to providing excellence in comprehensive emergency services to the citizens and visitors of the twenty-two member cities and unincorporated areas of Orange County.

In pursuit of continued best practices, the OCFA is embarking on a major communications technology upgrade. This provides a fortuitous window of opportunity to collaborate with the other county fire agencies for a truly interoperable data network to compliment the voice network in place. The problem is determining the commitment to and level with which the OCFA leadership will engage in this process. As the largest fire service organization in the county, the resources that the OCFA can provide can be very useful but also overwhelming. The purpose of this research is to determine the scope of the logistics of this potential collaboration and insight into the practical options for OCFA leadership obligation in this opportunity.

The evaluative method of research will be used for the development of this ARP. The research methodologies will consist of literary review, personal interviews and directed survey instruments.

This ARP will seek to answer the following questions. What is the current state of data technology and infrastructure for all OC fire agencies? What technology is available to create data interoperability between these agencies? What are the initial and recurrent costs with each option? And finally, what is the best strategic course for the OCFA and Orange County related to this initiative?

Background and Significance

The Orange County Fire Authority is an all-hazard fire department that protects contracted cities and the unincorporated areas of Orange County. Cities in the Fire Authority are Aliso Viejo, Buena Park, Cypress, Dana Point, La Palma, Laguna Hills, Laguna Niguel, Laguna Woods, Lake Forest, Los Alamitos, Mission Viejo, Placentia, Rancho Santa Margarita, San Clemente, San Juan Capistrano, Seal Beach, Stanton, Tustin, Villa Park, Westminster and Yorba Linda (OCFA, n.d.). These member cities are served by the Emergency Communications Center (ECC) within the OCFA for dispatch and other vital communications.

The ECC is staffed with civilian supervisors and employees managed by a Battalion Chief from the Authority. A description of the Communication Services Program was prepared in 1998 by Toro, a Communications Services Senior Supervisor, providing a good overview of the scope of the services provided by the OCFA ECC (Appendix A).

> The Communication Services Section is responsible for the installation, repair and maintenance of all telephone, radio, mobile data and paging equipment used throughout the OCFA. Additionally, the Section researches new and emerging technologies, provides for the development of specifications, and oversees the acquisition of all telecommunications and emergency communication equipment (Appendix A).

While this description is truthful, it is more limited than the current scope of the ECC. In fact, the nomenclature was changed to the Emergency Command Center (C. Kinoshita, personal communication, February 10, 2006) to more accurately reflect the broadening scope and scale of what this relatively new center is capable of. Dedicated in 2005, the OCFA Regional Fire Operations and Training Center (RFOTC) includes the new, state-of-the-art ECC in a separate, earthquake hardened building in the center of a secure complex. The design of this facility

includes the ability to move the coordination of major incidents into physically separate rooms to assist with the complexities of these types of events.

Additionally, the California fire service has been acutely aware of the importance of interoperability in communications. During major fires in the 1970s and 1980s, steps to mitigate communication issues resulted in new organizational strategies such as the Incident Command Center (ICS) concept currently used as a standard for fire service operations across the country (B. Waller, personal communication, June, 20, 2006). Also developed with visionary leadership is a network of progressive mutual aid that required developing a communications plan for real interoperability.

The fire departments of Orange County have had such an interoperable voice communications network in place for several years. There are two larger communications centers: the OCFA ECC and MetroNet, a consortium contractor to several Orange County cities. In addition to the County and MetroNet, there are a few additional cities that handle their own communications. All of these fire communications centers are interoperable on some level, and may also have some level of data available as well.

Much of the communications infrastructure in development over the years since 9-11 have been funded by federal grant funds from various sources, and Orange County is no exception. With two Urban Area Security Initiative (UASI) areas, Anaheim and Santa Ana, interoperability also becomes a matter of compliance (Orange County, 2005). A Tactical Interoperable Communications (TIC) plan was finalized in 2005 for the County, and provided the first comprehensive insight into the current hard and soft resources for communications in the county.

Once voice communications became interoperable between all fire departments in the County, these agencies can turn to the exciting possibilities of interoperable data communications. The OCFA has the development of data resources for fire operations, including an expanded Global Information System (GIS) database, within its strategic plan (OCFA, n.d.). Consultants have been engaged to assist the Authority in the development of the data initiative. With grant funds still available for the development and expansion of interoperability among all public safety agencies, there was an opportunity for all of the agencies to coordinate their internal data development so that interoperability would be a possibility.

This applied research intends to pull together information about the current state of data use by public safety agencies as well as the vendor opportunities available to bring a county-wide system together. The analysis of this collaborative effort supports the framework for executive decisions regarding the scope of the OCFAs involvement in emergency management, and so is a relevant contribution to the Executive Analysis of Fire Service Operations in Emergency Management course in the Executive Fire Officer Program. Interoperability assessment strongly supports the United States Fire Administration (USFA) objective to reduce loss of life for firefighters (USFA, 2003). In addition, it promotes a community-wide risk reduction plan with the data interoperability element, and concretely investigates a current emerging issue in the fire service (USFA).

Literature Review

Published and trade information for analysis of this status as well as what options are available and which are most suitable for the goal of county-wide data interoperability were reviewed. The literature review focused mostly on the issue of interoperability, a crucial point

for organizational commitment, and the question of what technology options were available to bridge the gap between the legacy systems and the desired interoperability.

Case for Interoperability

Interoperability is the current buzz word in public safety response and preparedness. The International Association of Fire Chiefs (IAFC) Fire Service Communications link states that "Interoperability is essential to operability" (IAFC, 2006, para. 1). This strongly worded statement fundamentally proposes that the fire service can not operate with any degree of effectiveness without the ability to share with other fire departments and response agencies (IAFC).

In testimony before the House Science Committee, Paulison, then Director of the Preparedness Division of the Department of Homeland Security (DHS), reminded the committee members that the four basic mission areas of the Preparedness Division are fire service training, planning and awareness, technology, and research and data analysis (Paulison, July 17, 2003). These mission areas provide supporting framework for the promotion of interoperability as crucial. By using the DHS national position of leadership as a focal point, Paulison states that cooperative relationships supported by this agency will "maximize the impact of limited resources" (para. 26). Paulison thinks that interoperability is "one of the most significant matters to be overcome" (para. 40), and includes in the scope of interoperability not only communications, but also equipment, operations and training.

Interoperability is a prized benchmark by other groups as well. In a recent survey instrument in *JEMS*, a magazine for EMS providers, high scores were given for communication centers that met the following description: "Interoperability and system redundancy are high priorities. Individual units routinely interact with allied agencies and all jurisdictions, both

contiguous (border) and coordinate (e.g., state for counties, state and county for cities, etc.), on major incidents." (Fitch, 2006, p. 104) Another high score is given for organizations that actively reach out for partnership opportunities to develop shared radio and data infrastructure (p. 104).

While radios in the OCFA have been interoperable with all other fire and response agencies in the county since the mid 80s, the big gap and the next big hurdle in Orange County is data interoperability (R. Stoffel, personal communication, June 20, 2006). Most first responders, including the OCFA, heavily rely on "experience, practiced skills, good equipment and teamwork" (ESRI, 2005, p.1). However this is increasingly insufficient for the demanding and complex realities of population and economic development. By a better balance in the allocation of resources between response-related investments and tools and technologies for information management and sharing, the fire service will provide better "risk prevention and consequence reduction" (p. 1).

In addition to the traditional protective gear and response apparatus, first responders deserve the best data and information available for the exposed risks (Paulison, July 17, 2003). This can be provided in part with spatial intelligence, information on the specific location of critical assets, exposures, occupancy inventory, history and other information that can promote efficiencies and safety (ESRI, 2005). This produces "faster, safer, informed deployment" (p. 2-3).

This information is available in almost any community, but is it useful? Most digital information is "often inaccessible" (ESRI, 2005, p. 3) because of interoperability issues; one example are geographic information systems (GIS). GIS has the ability to demonstrate potential scenarios during an incident through spatial modeling that can show plumes, fire behavior,

disease outbreak and the like (ESRI). More than just an interesting exercise, this gives fire ground leaders the ability to accurately predict requirements for evacuations and transportation or infrastructure support (ESRI).

A strong ancillary benefit is not only the ability to disperse the relevant spatial information across a large and diverse group of responders, but there is also the by-product of keeping a curious public informed (ESRI, 2005). While a common operational picture can provide effective guidance for preparedness and response, having an informed public provides them the opportunity to mitigate the crisis on a personal level, perhaps reducing panic (ESRI). An integrated interoperable cache of appropriate GIS information will take "uncommon diligence" (ESRI) to ensure that collaboration occurs appropriately.

How bad can it be if interoperability is not addressed? This is actually known because of many recent events that were analyzed in after action reports and summarized in a Justiceworks paper through the University of New Hampshire (Lund, 2002). While the lack of communication equipment can be devastating for a field responder, interoperability issues include coordination failures, breach of protocols and standards, and lapses in communication systems (Lund).

Interoperability logistics

Connectivity and interoperability of voice communication across agencies and jurisdictions have been in place for Orange County responders since the mid 80s (R. Stoffel, personal communication, June 20, 2006). This allows the OCFA the relative luxury of turning their attention to the need of a cooperative effort for shared data. The needs can be defined as "architectural layers" (Comcare, 2005, p. 2) that are required for effective, true interoperability. The necessary layers are policies and protocols, agency applications, facilitation services, data

standards and transport (Comcare). This will not come as a result of forcing agencies into a system that requires them to leave the legacy system they are familiar with; instead standards, protocols and facilitation will create an "internetwork" (p. 2) to connect all standards and applications with the appropriate wired and wireless systems under the control of local entities.

Transport. This is the architectural layer that comprises the physical networks for the travel of voice and data (Comcare, 2005). Common solutions are a combination of the public internet as well as private IP networks; they all include controls and logic link management for the interface between users (Comcare). Standards allow the thousands of individual agency systems the ability to share data through a common language (Comcare).

Currently, many agencies neither want someone to make these decisions for them, nor are they willing to switch during missions to a solution that is not used every day. There are expensive solutions that are customized to each unique situation, but the real solution is a national standard for data interoperability. A key issue as identified by the DHS, national data standards are in development for data interoperability, server interfaces and common transactions (Comcare, 2005).

Facilitation services. These integral services are a layer of tools and resources that are available by authorized entities to enable interoperability (Comcare, 2005). Shared services facilitate an air of confidence around data sharing enabling better cooperation (Comcare). Facilitation services also include credentialing of users in a group to authenticate communications (Comcare).

Agency applications. More than raw data, applications are another layer in widespread use and include Computer Aided Dispatch systems (CAD), and software such as hospital capacity notification systems, GIS systems and law enforcement databases (Comcare, 2005).

Many of these applications are familiar to public safety such as OnStar, Health Alert Network (HAN) messages from public health agencies like the Centers for Disease Control (CDC) and 9-1-1 data. There is no reason why this information can not also be interfaced with data available to first responders to promote effective and safe responses (Comcare); an example would be GIS information from OnStar dumped directly into the first responder's Mobile Data Terminal (MDT).

Policies and Protocols. Written procedures are a final layer providing rules to govern the use of technology and information sharing so that the amount is balanced between a need to know and the real potential for irrelevant overload (Comcare, 2005). Interoperability Policies and Protocols are a large gap seen especially in the fire service because of an inability to share a great deal of information between agencies before; this architectural layer is vital to the health and stability of any system (Comcare).

Technical Options

In *9-1-1 Magazine* (Fiderer, 2006) discusses the challenges that can be met in the short term with Internet Protocol, commonly called IP. The technology for IP is readily available to connect agencies that have been operating as "separate islands" into a "reliable and resilient network" (p. 46). The author explains the difference between the Internet telephony that the public uses and the IP telephony that would be the infrastructure of public safety agencies. The Internet telephony for the public uses the Internet for voice or data; this system can actually cause problems for 9-1-1 call takers because of the inability to accurately and rapidly pinpoint user location (Fiderer). There is also a lack of security that is vital for public safety communications.

An advantage of the IP telephony used in public safety is that it can be completely separated from the Internet, eliminating some of these issues. While the Internet telephony and IP both share the characteristic of being significantly cheaper than traditional telephony technology before IP because the voice and data travel over the same lines, saving redundancy (Fiderer, 2006).

Additional advantages of IP over Internet telephony include the technical ability to connect multiple agencies (Fiderer, 2006). Without the technology as well as interoperability standards, currently in development by organizations such as the Association of Public Safety Communications Officials (APCO), the best that com centers can currently do is coordinate or connect voice sessions (Fiderer). With IP, data and voice can be easily shared rather than just patched through (Fiderer). IP also allows users in different locations to coordinate efforts in incidents, managers to monitor events from their home, participating agencies to simultaneously share information such as CAD screens and critical safety or time sensitive information shared simultaneously with all involved (Fiderer).

The author's excitement extends to the leaps that will be made in the next few years in the public safety arena with IP networking (Fiderer, 2006). The data sharing standards discussed above will use IP as a "bridge" (p. 46) that unifies all operations, data and voice, into a single integrated system. Emerging IP-enabled technologies will include the use of video; one example is for incident commanders to have real-time video from security cameras in a bank or school during an incident (Fiderer). Many systems are already connected with video going to the Internet; it is a short leap to send this video over IP. When high-speed wireless data access beyond what is commonly currently available as WiFi or third generation (3G) is available for public safety, dispatchers will be able to send more than just simple progress information. They

will be able to share detailed data such as floor plans, finger prints and hazmat threats (Fiderer). Firefighters could view real time aerial footage for tactical decision making (Fiderer).

The caveat in the article is that most agencies will not be able to migrate completely from their legacy system (Fiderer, 2006). The author suggests that it is incumbent upon vendors to best serve their customers with a "migration path" (p. 47) that not only connects IP systems to those legacy (non-IP) systems, but includes a replacement strategy that plans on upgrading components as they are exchanged during the normal life span of a communications system. Astute communications managers will need to critically assess whether their vendor partner really understands all of the intricacies involved with implementation of a critical communications network using IP technology (Fiderer).

One way to use the new technology is to use mobile *mesh* networking – known technically as mobile ad hoc networking or MANET (Canning & Rauf, 2006, p. 34). This "specific-purpose, license-exempt" (p. 34) mesh usage by public safety agencies will likely triple by 2008. The authors explain that mesh networks are different from other networks for two main reasons. The first has to do with the mesh aspect; originally developed from military applications in the late 1970s, the primary objective was an ad hoc network that was "rapidly deployable, mobile and could automatically reconfigure itself" (p. 36).

This paradigm shift moved from the traditional hub and spoke model which is still primarily used in public safety to one that does not need a centralized controller and can be visually pictured as a web or mesh (Canning & Rauf, 2006). In this aspect, they work by extending the footprint of traditional networks because each component of the system essentially works as a router (Canning & Rauf).

The second important factor is that a mesh network is very affordable (Canning & Rauf, 2006). The communications are still deployed through towers and vehicles, but these repeaters do not repeat every bit of communication, but rout messages and data to the intended receiver (Canning & Rauf). This results in fewer costly tower sites, even as compared to the "ubiquitous" (p. 38) WiFi.

Another cost saver is the significant reduction in recurring fees (Canning & Rauf, 2006). There are no monthly cellular usage access fees, and there are no licensing fees as seen in trunked radio systems because many mesh networks operate in license-free frequency bands (Canning & Rauf). Another financial benefit of these networks is that they are eligible for Homeland Security or Department of Justice funds, which monthly access fees are not (Canning & Rauf). These all contribute to IP as a fiscally responsible option for public funds.

Like Fiderer (2006), Canning and Rauf (2006) agree that the migration from cellular or trunked radio to mobile mesh networks can be planned and managed for agencies to minimize impact. Most important is knowledgeable integration partners using the right products. This promise extends to layering data on top of voice communications, and requires diligence by agency leadership to secure the vision and commitment to make it happen (Canning & Rauf). No one wireless technology current supports all of the needs everywhere (MRT, 2006). As an example, one trade publication article states that while 4.9 MHz band solutions are good for public safety personnel, the roaming required by fire and EMS apparatus needs a different, more cost effective solution (MRT).

The three needs of a VPN, secure connectivity, session persistence and intelligent routing for the wireless network users, are combined in a recently offered solution by Motorola (MRT, 2006). It was a response to customers complaining that they really wanted a complete solution

from one vendor partner, while most companies were entering into agreements to outsource different functionalities (MRT). The Motorola solution, called Multi-Net Mobility, uses a client application that constantly monitors available wireless applications and intelligently routes the connection between networks; the core network server application is responsible for ensure a secure connection (MRT).

So while there appears to be a variety of solutions for different types of users with different scales and scopes, the significant work remains the logistics of cooperation among the jurisdictions required for interoperability between agencies (Canning & Rauf, 2006). In fact, that is considered the biggest hurdle: the administration interoperability problem. Any technical problem can be solved because of the solutions available through IP (Canning & Rauf). This article again points to the requirement of establishing interconnectivity between administrations and jurisdictions to truly make this opportunity available for a region (Canning & Rauf).

Summary of Review

The major theme seen throughout the review of relevant literature is interoperability. The priority of this theme was supported by organizations such as the IAFC (2006), DHS (2003) and the EMS profession (Fitch, 2006). The challenges of interoperability are several. One is that while the technology is possible, most organizations can not just toss aside their legacy system to purchase an entirely new solution. This requires careful planning and integration strategies for an organization to smartly integrate as they perform routine upgrades over the life of a com system (Fiderer, 2006; MRT, 2006; Canning & Rauf, 2006).

However the toughest integration issue is that of integrating standards and administrations (Fiderer, 2006; Canning & Rauf, 2006). Public safety agencies will not be able to have interoperability without a common language expressed in standards for all vendors

(Fiderer, 2006). And they will also not have it without the leadership and vision to reach a cooperative level that removes silos and flattens the hierarchal management of a region (Canning & Rauf, 2006). The influence on this applied research is that the interoperable network not only must be a technologically agile system, but significant attention must be paid to the connections between the people involved with policies, standards and information flow.

The literature review provided concrete support for the philosophy of communication interoperability, so the review's influence on this ARP is to focus the procedures on determining the status of architectural layers (Comcare, 2005). For this phase of the analysis, where the focus is on determining the level of financial and leadership commitment that is required, layers involved would include transport, agency applications and facilitation services (Comcare). Policies and protocols, as well as data standards, will be addressed in future phases or by other groups.

Procedures

Procedures to determine the current level of architecture involves analysis of each of the county fire departments' current data management infrastructure and technology through a survey. Literature reviews and vendor interviews will provide information for relevant available technology to assess options for consideration. An executive level analysis of all gathered information will make recommendations on the best option for the OCFA and the County of Orange to pursue.

The first part of the procedure involves determining the state of communications within Orange County fire departments. This activity fell to Communication Services because of the scope of the ECC mission. A description of the Communication Services Program was prepared in 1998 by the Communications Services Senior Supervisor Toro (Appendix A). While some of

this information is in need of updating, the document gives a good overview of the scope of the services provided by OCFA Communications Services. Also included is a description of the responsibilities of this section:

> The Communication Services Section is responsible for the installation, repair and maintenance of all telephone, radio, mobile data and paging equipment used throughout the OCFA. Additionally, the Section researches new and emerging technologies, provides for the development of specifications, and oversees the acquisition of all telecommunications and emergency communication equipment (Appendix A).

Establishing standing in an issue of this scope is important; the division contributing resources to such an analysis should show direct benefit to their own mission. In lieu of such a report, other documents that could be used by an organization would be a strategic plan or job descriptions from communications center employees.

Regionally, there had recently been a Tactical Interoperable Communications (TIC) plan produced as a requirement of the Office for Domestic Preparedness (now Office of Grants & Training) 2005 UASI grant program (Orange County, 2005). The Orange County Operational Area includes the Anaheim and Santa Ana Urban Area Security Initiative (UASI) Areas (Orange County). The TIC Plan is intended to document what interoperable communications resources are available within the operational area, who controls each resource and what rules of use or operational procedures exist for the activation and deactivation of each resource.

This TIC includes a plan of how the Communications Unit would fit under the Service Branch Director within the command of the Logistics Section Chief (Orange County, 2005) as part of the NIMS compliance section; the Fire Scope California Field Operations Guide, used

within this Executive Fire Officer course, does not mention data at all within the Communications Unit Leader list of responsibilities (FIRESCOPE, 2004).

The bulk of the document however described the geographic area, the combination of entities involved with the TIC plan, the interoperable resources available and the policies and procedures regarding their usage (Orange County, 2005). Any region including or contiguous with a UASI area should have a TIC for reference. This type of report is an essential resource for an urban area; if unavailable, this should be developed as a part of the analysis procedure.

The TIC includes a vast array of agencies that have an interoperable connection with the Orange County plan (Orange County, 2005). This listing is important to determine the population set and contact for survey purposes. The 34 agencies represented in the TIC Plan are listed in Appendix B

Out of this long listing of agencies, each of these cities was represented in a survey for this ARP that would determine the status of relevant technology for interoperable communications. For this purpose, 100% of the Communications Managers for each of these centers were contacted. This resulted in agency contact with the managers of MetroNet (a private consortium communications service provider serving the communities of Anaheim, Orange, Garden Grove, Newport Beach, Huntington Beach, Fountain Valley and Fullerton); Costa Mesa, Santa Ana, Laguna Beach and Brea as separate agencies; and the OCFA representing the communities who receive Fire/EMS services from them (Orange County; Appendix B).

Survey questions include basic information such as the number of stations in the community, the Computer Aided Dispatch (CAD) host provider and the CAD server type (Appendix B). Questions were asked relative to the network in place with stations and CAD, and

wireless data questions related to the coverage, the equipment and the applications were also asked. A summary of this information would be provided with the raw information from the survey. The assumption about this survey is that it would accurately reflect the current status because the active managers in each communications center were the points of contact.

A workshop was conducted that asked about potential operational use of Fire Prevention (FP) data, a potentially limitless resource for useful data information. Discussions were facilitated with Integrated Fire Prevention Project Team members during this workshop conducted by an external consultant. Approximately twenty team members were selected from operations, fire prevention and planning work through questions related to the potential use of this database.

Discussions related to Inspection Programs, Inspection Planning, all phases of the Inspection process, Complaints, and all phases of the Operations/Incident response that could benefit from FP data. Within each operationally functional area, project members were asked who needed the information, what information was needed, and where and how it is needed to be useful. Assumptions regarding this topic was that the EMS and Vegetation Planning operational functional areas did not need FP data at this time. This would identify where there needed to be some strategic planning involving GIS topographical integration with FP data as well as a comprehensive preplanning initiative with the data that would be collected.

Limitations for these results are that there would not be a way to find all of the potential uses for all agencies; however an assumption would be that enhancements could be added to the type of nimble system that a region of this complexity would require. The literature helped to ensure that potential uses of the data that might not be thought of by the group would be considered.

Next, a matrix would be developed using the equipment and applications needed to implement an interoperable data network based on the survey needs assessment and review of literature and vendor proposals. Projected costs as provided by vendors would be entered into a spreadsheet, and the one time and recurring costs for this proposed system could be calculated. Assumptions of this matrix would be that costs could increase, so a 10% buffer would be added to the total for grant submission purposes. Literature review helped to provide a base of knowledge to understand the options as recommended by the vendors.

Finally, an analysis of the compiled information would be made from an executive level to make a recommendation regarding the commitment of resources. Limitations to this process and approval could hinge on financial resources and any requirements for the grants that would be necessary to fund a project of this scope.

Results

What is the current state of data technology and infrastructure for all OC fire agencies?

Based on the completed OC Fire Services CAD/MDC Survey (Appendix D) there is some variety in the data architecture among fire agencies in the county. There are five different CAD systems among the 12 agency communications centers: seven use Keystone, two Motorola, one Tiburon, one PRC/NG and one West Covina. The CAD servers are primarily Compaq/Unix.

All stations have some form of high capacity data circuits adequate for current data requirements (Appendix D). For station alerts, they use either a data circuit or radio; the data circuits currently require a dedicated circuit from their dispatch center. These circuits however can be easily converted as needed. CAD to CAD is only used by MetroNet, OCFA and the city of Costa Mesa, but this covers a majority of the agencies in the County. Also, mobile data

functions are similar for most agencies with the most common TxMessenger for their text data for CAD, dispatch and status messaging.

The primary theme of the workshop conducted with the Integrated Fire Protection Data Task Force was the need for strategic planning involving GIS topographical integration with FP data as well as a comprehensive preplanning initiative with the data that would be collected (Appendix E). Clearly the comments verified the need for Operations to be involved with this planning. Specifically requested was for all inspection data related to a facility be accessible in Operations to anyone needing it. Features such as Pictometry to customize site maps and notification updates of construction projects were also desired so the Operations Department can be involved throughout the construction phase of a new building (Appendix E).

What technology is available to create data interoperability between these agencies?

The technology gap is different for each agency (Appendix F). The infrastructure of T-1 data circuits to 72 fire stations in the County is needed (the OCFA already has T-1 to their 60 stations), along with 72 routers and six central server routers. One central server, and five DSU/CSU routers and T-1 lines to a central message switch are needed for CAD to CAD infrastructure.

One of the most important installations is to merge the capacities of mobile data for the OCFA and MetroNet systems. This requires seven additional base stations, reconfiguration of the OCFA network controller, a T-1 line between MetroNet and the OCFA and Radio IP encryption and compression. 4.9 MHz transceivers with data servers are needed for the continuous wireless updating of map and data to each of the 132 fire stations, as well as 400 software licenses (one per fire response apparatus in the county). The fire apparatus would also

need the GPS hardware and CAD/GIS software for a county-wide Automatic Vehicle Locator (AVL) system.

What are the initial and recurrent costs with each option?

The county-wide technology initiative on the scale and complexity of this one is an expensive proposition (Appendix F). The cost estimates to be born by the consortium is more than $4.7 million. This is just the initial setup costs. An estimate for the monthly costs of T-1 service and monthly preventative maintenance is $25,400.00. These quotes are described here in more detail.

Infrastructure – No Current Network Standard. The county wide Fire Service initiatives require standardization of fixed telecommunications facilities at all fire dispatch centers, fire stations and for applications in mobile apparatus (Appendix D). The Infrastructure initiative proposal includes installing T-1, or greater, leased lines and network components between 6 dispatch centers and 132 fire stations to support CAD to CAD, mobile mapping and data sharing. This network will be used for large file transfer such as maps, database files and various report functions. The 60 OCFA fire stations already have this installed so only 72 stations need the T-1 lines and DSU/CSU routers (Appendix D). Six central servers are also needed: the total of the infrastructure circuit costs according to SBC/AT&T are $384,000.00 (Appendix F).

CAD to CAD. Currently, there are two point to point connections between MetroNet and OCFA and Metro Net and Costa Mesa for the purposes of sharing basic CAD information for response purposes. The CAD to CAD initiative proposal only includes the telecommunications requirements between each of the dispatch centers. Further CAD to CAD development will identify additional applications and data requirements. The CAD to CAD infrastructure costs according to SBC/AT&T include five T-1 installations, routers and a central server for

installations between the OCFA, MetroNet, Costa Mesa, Santa Ana, Brea and Laguna Beach for $32,500.00 (Appendix F).

Merge of OCFA and MetroNet Mobile Data Systems. Currently, most OC fire agencies own and maintain Private Mobile Data Systems for mission critical functions including CAD Dispatch, Status Messaging and point to point messages (Appendix D). Privately owned systems are the preferred choice for emergency data communications because of overall cost, reliability, control of throughput and fault tolerance measures employed. However, none of the existing systems are equipped with integrated mapping, AVL or other third party applications (Appendix D). Each separate system operates independently on a single radio frequency serving a specific geographic area with no connectivity to the other mobile data networks or other CAD systems. Both MetroNet and OCFA utilize less than 10% of their system potential, preserving capacity for mission critical needs.

The County Wide Mobile Data initiative proposal includes combining the OCFA and Metro Net mobile data networks into one countywide network with two frequencies. The proposed combined network will increase efficiency and channel utilization by over 100% (Appendix D). Additional network enhancements such as IP message formats, packet compression and encryption are available to increase capacity up to four times. This proposal also provides for Santa Ana, Costa Mesa, Brea and Laguna Beach to join the network. The total installation costs according to Motorola Communications for seven additional base stations, a T-1 from MetroNet to the OCFA, and radio/IP/encryption/compression are $410,000.00 (Appendix F).

Wireless LAN using the 4.9 MHz Public Safety Spectrum. Mobile mapping is a vital function to emergency response. Currently, Orange County fire services primarily use paper

maps. Maps are stored in vehicle compartments and are difficult to access and read during a response. Frequent map updates are required and prepared by personnel at headquarters before sending to fire stations manually via departmental mail.

Electronic mapping utilizing GIS programs is available and the preferred choice for mobile mapping. However, updating maps requires a practical method for data transfer to the mobile computer. This initiative proposes using the new 4.9 MHz public safety spectrum for file transfers of mapping, data, and graphics between the agency enterprise network and the mobile subscriber (Appendix F). Each fire station will have access to a database server with maps and other files used by first responders. The server will connect to the enterprise network using the T-1 connection and the mobile computer via 4.9 MHz wireless equipment components at the station and in the vehicles. In addition to performing mission critical functions, the new multi-channel network will also support automatic vehicle locator (AVL) reporting for more efficient resource management and allocation.

According to Alvarion/Enterprise Systems Solutions Inc., the requirements for this network includes 132 data servers and 4.9 MHz transceivers for each fire station in the county plus 400 mobile 4.9 MHz receivers with software for all mobile units at a total of $2,452,000.00 (Appendix F).

AVL System. To support the concepts above, there needs to be AVL equipment installed on each of the 400 county fire mobile units. An estimate would be approximately $1,000,000.00 (Appendix F).

Totals. With an additional 10% buffer, the total for all of the one time costs for equipment, installation and applications is $4,706,350.00. The total estimated monthly costs for

all T-1 lines as well as monthly maintenance costs to Motorola for the OCFA and MetroNet system merge are approximately $25,400.00, or $304,800.00 annually (Appendix F).

What is the best strategic course for the OCFA and Orange County as a whole?

It is clear from a strategic level that interoperability, both voice and data, are essential to safe emergency response practices. As seen in the literature, "Interoperability is essential to operability" (IAFC, 2006, para. 1), and from the highest levels of the Department of Homeland Security it is seen that interoperability will "maximize the impact of limited resources" (Paulison, 2003, para. 26).

With the technology and the relevant data available to these municipalities, the dots are there to be connected. The literature review identified the types of opportunities available, and the surveys and vendor bids have provided the hard information needed. It is difficult to conceive that the inspection department may have critical information on a structure that could impact a safe emergency response, and operations personnel in the same department not have immediate access to the data, but this is a clear mandate from focus groups that are aware of what is available (Appendix D). Additionally, having both voice and data available throughout the potential mesh that can be created provides redundancy to mitigate the disastrous communication failures of large events in our country's recent past (Lund, 2002).

Discussion

The analysis of regional data interoperability on the scale of this one is a challenge. Like any region, each municipality has their own way of managing fire services within their community. Even if neighboring departments use the same equipment, each one has a slightly different way of oversight or they use different applications. Some have favorites based on

current relationships with vendors or may have strategic plans within their governance that affect the choices they can make as capital purchases.

However the clear picture is that interoperability is right. No matter how complex or how difficult or how expensive, the fire service owes it to their communities to talk and share information with each other. If building plans exist in an OCFA database, operations personnel should have it at the scene of an incident; and if the OCFA can have it at the scene of an incident, Santa Ana or Laguna Beach should also have it when they respond into OCFA territory. This should be seamless, so communications centers coordinating more complicated incidents at an ever increasing volume can concentrate on the human decisions of their job rather than the technology needed.

As stewards of public resources, expenditures of this magnitude are sometimes difficult to make. This is not an installation that will be as visible to the community like a shiny new quint or a firehouse full of firefighters in their neighborhood. But this project has the capacity to revolutionize the standard for interoperability for large, complex urban areas. It can contribute to safer emergency responses, saving lives and taxpayer monies. Much of the funding can be acquired through grant sources; also many of the departments are pursuing upgrades at this time, so data infrastructure purchases may already be in the budget.

If true interoperability is ever going to be achieved by the fire service in Orange County, this is a golden opportunity. There is a leadership culture of cooperation that is being championed by the Orange County Fire Chiefs. A project of this magnitude could not get off the ground without support of this type from the highest levels. Everything seems to be in alignment to make this a possibility for the public servants, citizens and visitors of Orange County.

Recommendations

Recommendations for this project not only address the hard questions about expenses but also what should be done to ensure the project's success. To that end, a coalition should be formed among all fire agencies impacted. Currently a group of the county fire chiefs are already meeting, and they should continue to do so. However as the project begins to coalesce, an additional group of the communications center managers should begin also to meet. An ICS structure could organize the effort, with the Chiefs becoming the Policy Group for major decisions, and members of the manager team working as Section Chiefs and Division Supervisors.

Part of the job of this team should be to implement a change model to anticipate the major issues. Projects with similar complexities are managed everyday, and the problems are predictable. A good change management plan within the ICS Planning Section would be invaluable to keep the participants on track and minimizing negatives. A public education plan would also be an excellent part of this idea.

The cost is likely a big issue with many departments. Smaller ones may not have the resources, and larger ones may not want to help support them. The benefit to participation should be so clear that it is perceived as practicing below the area's standard for excellence if a community's fire department chooses not to. With this in mind, an organization such as the OCFA can help with some of the soft costs of this endeavor. Supporting regional data interoperability with personnel, paying for studies and coverage testing, and through engaging consultants are examples where the OCFA can support the project fiscally without inappropriately using funds to purchase capital items for other communities. By taking some of these costs off the table, more of the other communities may be able to participate.

This ARP sought to determine the level of commitment that the OCFA should support this county-wide data initiative with. What is clear from the research is that the OCFA is a dominant force on the landscape of the fire service in Orange County with regard to resources. Partnering with MetroNet as well as the other independent communication centers creates a coalition of independent communities with the synergy that would come from true interoperability. Individuals driving around Orange County probably can not easily tell when they are moving from one community into another; a safe and effective emergency response should be just as seamless. Based on the interdependence and seamlessness between all of the County's communities, the OCFA should do everything they can reasonably do to make this happen.

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Appendix A

ORANGE COUNTY FIRE AUTHORITY

COMMUNICATIONS SERVICES

Introduction

The need to maintain communications equipment is as real as the equipment itself. Fire Authority communications systems must operate with a high level of reliability and consistency. The reliability of the equipment depends on the quality of the installation, routine maintenance and emergency repairs. The complicated nature of modern communications equipment, dictate the involvement of specialists in every aspect of the work. The testing, servicing, and replacement of communication equipment must take place in a timely and cost effective manner.

Responsibility

The Communication Services Section is responsible for the installation, repair and maintenance of all telephone, radio, mobile data and paging equipment used throughout the OCFA. Additionally, the Section researches new and emerging technologies, provides for the development of specifications, and oversees the acquisition of all telecommunications and emergency communication equipment. Repair procedures are established and monitored for efficiency in order to identify problems with any aspect of the repair process, including reporting problems, troubleshooting procedures, scheduling and invoicing.
A list of systems and equipment supported by the Communication Services Section is provided below.

TELEPHONY

- Administration and Support Bureaus
    - PBX, M1/Option 61 with ACD
    - 911 integration, 300 lines (include voice, fax and modems)
    - 200 stations (Multi-line, console and single line instruments)
- Fire Stations -60
    - Electronic Key systems, 1A2 KSU
    - 280 lines, (includes voice, fax, call box, fire alarms)
    - 450 stations (instruments)
    - Emergency Call Box
- Emergency Dispatch and Telephone System
    - 911 system - VESTA Intelligent Work Stations
- FAX Services
    - 35 Machines, Plain Paper, Thermal and Portable

- Voice Mail Services
    - Call Pilot (HQ only)
    - SBC, GTE (Field Offices)
    - Integrated Voice Response (IVR) Fire Prevention.

RADIO SERVICES-INSTALLATIONS, MAINTENANCE AND SUPPORT

- Mobile Communications (300+ vehicles)
- Emergency Apparatus (Engines, Trucks, Medics, BC Sedans and Support Vehicles)
- Incident Command Vehicles and Aircraft
- 800 MHz voice
- VHF State Mutual Aid Radio Systems
- Mobile Data Systems and Terminals
- Cellular Telephones
- Vehicular Intercom and Charging Systems
- FAA Aircraft Communications
- Dispatch Console Systems

FIRE STATIONS SOUND/ALARM SYSTEMS

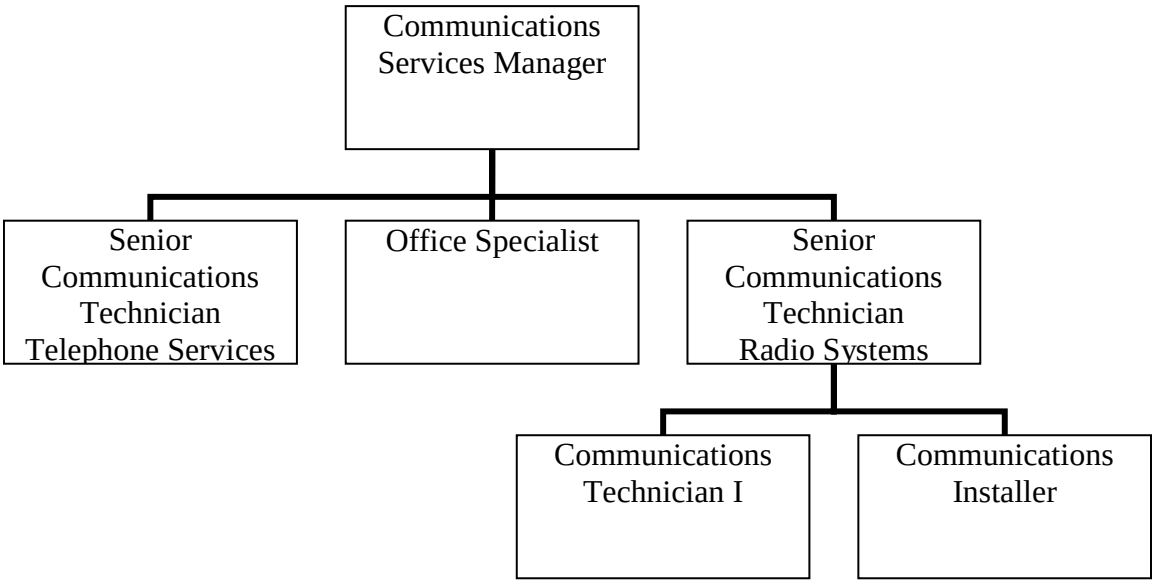
- 60 Fire Stations / Emergency Communications Center
- Public Address/Sound Systems
- Emergency Alerting Systems
- CAD System Interface
- Back-up Paging System
- Supervised Fire Alarm Systems

PAGING SERVICES

- 900mHz Digital Simulcast Paging System
    - County Wide Coverage
    - Emergency and Administrative Paging (Tone, Numeric, Alpha Numeric)
    - Automatic Alerting through C.A.D (750 Reserve Firefighters
    - 56 Fire Stations Alerting Systems
    - Emergency back-up system

ORANGE COUNTY FIRE AUTHORITY
COMMUNICATIONS SERVICES

July 7, 1998



Personnel Overview:

The Communication Services Section employs office and technical staff who perform installation and repair of various communications equipment and systems. Private contracts for service are also used within the section.

Staff Classifications are:

Communication Services Supervisor
Sr. Communications Technician - Telephone Services
Sr. Communications Technician – Radio Systems
Communications Technician I
Communications Installer
Office Specialist

Section Manager

Under the direction of the Battalion Chief in charge of Emergency Communications, the SFCS oversees technical staff whose duties include the repair and maintenance of communications

equipment and the technologies of telephony, radios and data communications. This includes the installation, repair, modification, maintenance, research and development of various telecommunications equipment and systems.

Description of Duties

- Develop and coordinate repair and installation of telecommunications equipment
- Prepare periodic status reports of section performance
- Make recommendations for program improvements
- Direct technical staff
- Prepare and approve technical specifications for equipment and service contracts
- Prepare purchase proposals, evaluate bids and recommend awards for contracts
- Establishes employee performance criteria, provides employee evaluation, recommends disciplinary action, and oversees the recruitment and promotion Communication Service's staff
- Plan and approve training program for technical staff
- Prepares the budget for the Communication Services Section
- Conducts record management for the installation, maintenance and repair of telephone, radio and other telecommunications equipment as required by the Federal Communications Commission
- Develop and maintain automated communications equipment inventory and service request processing system.

Senior Communications Technician – Telephone Services

Generally, this position coordinates all telephone related services. This includes providing timely service and maintenance requests for the following systems:

- HQ Telephone System- PBX, trunk lines, station equipment
- 60 Fire Station lines and equipment
- Telephone Service Program
- Fax Machines
- Telephones-PacBell, Positron
- Telephone Billing System
- Data Circuits
- 911 Call Boxes
- Cellular Phones
- Voice Mail and Message Systems

The Senior Communication Technician also assists with the development and maintenance of:

- Telephone system budget and fiscal status of all telephone systems
- Telephone system records including service requests, new orders and installation
- Cable and wiring plans and MPOE locations
- Line inventory- voice, data, cellular, special circuits

- Telephone use policy and procedures
- Training programs
- Prepare technical specifications for new equipment and service contracts
- Research and development of new technologies and telecommunications services including wireless voice and data
- Disaster recovery plans

Senior Communication Technician – Radio Systems

This position is an advanced radio technician. The primary responsibilities for the Senior Communications Technician are installation, repair and maintenance of the fire station sound and alarm systems. Ancillary responsibilities include repair of mobile, portable and base station radio equipment. This position may work as lead worker to lower level technicians.

Description of duties:

- Install, repair, replace and modify public address sound system and alerting equipment
- Design wiring plans for facility sound systems including speakers, remote controls, priority attenuators, microphones and external interfaces
- Install and replace speakers and AC/DC control relays for emergency alerting systems
- Program logic controllers using proprietary PC software
- Repair, maintain and modify emergency communications equipment including base station radio control stations, 800MHz, VHF, and remote links to mountain top base radios
- Maintain central electronics bank for Motorola Centracom II Plus
- Maintain back up paging system, security monitors and control systems
- Maintain Radio ID interface system (SCAD)
- Repair mobile radios and perform periodic maintenance on radio equipment, electrical system connections, transmission cables and antenna systems
- Repair, install and modify mobile radio equipment including mobile data radios, cellular phones, speakers, DC power systems, power harness, transmission cable, antennas
- Recommend and design communications systems using current radio data and telecommunications technologies
- Communications Services Maintenance Program
- Perform periodic maintenance of fire station alarm systems
- Maintain repair records and equipment inventories.

Office Specialist

The office specialist is a key position of the Communication Services Section. This individual processes repair requests for communications equipment and tracks work orders from start to finish. This person must have good communication and office skills. Good organizational skills are necessary to maintain repair records, equipment inventories, and equipment service contracts. Interprets requests from users reporting problems with communication equipment and relays problems orally and in writing to technicians.

Equipment and service knowledge:

- E911 and administrative telephones equipment and line service
- Logging and recording equipment
- Computer data circuits
- Pagers and paging services
- Fax machines, voice mail and messaging systems
- Mobile and portable radios
- Fire Station alarm and alerting systems

Description of duties:

- Receive requests for communications repair services, enter request in computer and assign work order number, issue a copy of work order to technician or contractor, track the progress of any open work order and close work order with repair detail including costs
- Update inventory when equipment is replaced or relocated
- Program pagers, issue pagers and track all pager repairs
- Notify ECC of pager code changes for CAD
- Back up data base and tracking system
- Maintain and restock office supplies and forms
- Identify and recommend improvements in repair service system

Communications Technician / Installer

The Communications Installer performs semi-skilled installation work that does not require knowledge of electronic theory. Repair work is limited to such things as replacing speakers or antennas, wiring outside of the equipment itself and similar items. The Installer may be assigned to assist a Communications Technician on communications system installation. They may also assist in the installation and moving of computers and peripheral equipment.

Description of duties:

- Install and removal of radio equipment from emergency vehicles
- Fabricate mountings and brackets
- Install electrical and coaxial transmission cables, antennas, and speaker wire
- Perform simple repair work on radio equipment
- Assist in the installation and removal of communications systems
- Learn to use basic test equipment and to do other work as required
- Prepare work orders and equipment inventory in computer data base
- Perform periodic inventory of communications equipment

Appendix B

Agencies Represented by the Orange County TIC Plan

Jurisdiction	Law Provider	Fire/EMS Provider	Public Works	Lifeguard
Aliso Viejo	Sheriff	County	County	N/A
Anaheim	City	City	City	N/A
Brea	City	City	City	N/A
Buena Park	City	County	City	N/A
Costa Mesa	City	City	City	N/A
Cypress	City	County	City	N/A
Dana Point	Sheriff	County	County	County
Fountain Valley	City	City	City	N/A
Fullerton	City	City	City	N/A
Garden Grove	City	City	City	N/A
Huntington Beach	City	City	City	City
Irvine	City	County	City	N/A
La Habra	City	LA County	City	N/A
La Palma	City	County	City	N/A
Laguna Beach	City	City	City	City
Laguna Hills	Sheriff	County	County	N/A
Laguna Niguel	Sheriff	County	County	N/A
Laguna Woods	Sheriff	County	County	N/A
Lake Forest	Sheriff	County	County	N/A
Los Alamitos	City	County	City	N/A

Mission Viejo	Sheriff	County	City	N/A
Newport Beach	City	City	City	City
Orange	City	City	City	N/A
Placentia	City	County	City	N/A
RSM	Sheriff	County	County	N/A
San Clemente	Sheriff	County	City	City
SJC	Sheriff	County	City	N/A
Santa Ana	City	City	City	N/A
Seal Beach	City	County	City	City
Stanton	Sheriff	County	City	N/A
Tustin	City	County	City	N/A
Villa Park	Sheriff	County	City	N/A
Westminster	City	County	City	N/A
Yorba Linda	Brea	County	City	N/A

Note. RSM: Rancho Santa Margarita; SJC: San Juan Capistrano.

Appendix C

CAD Survey of Communication Center Managers

	Anaheim	Brea	Costa Mesa	Fullerton	GGV	FVY	HB	LAB	NB	OCFA	Orange	Santa Ana
CAD												
Number of Stns												
Cad Host Provider												
CAD Server type												
Station Networks												
Stn Data Conection (56k, T-1, Frame												
Relay; Fiber												
Station Applications												
Dispatch												
Email												
Incident Rpting.												
Staffing												
Training												
Mapping												
Intra/Internet												
CAD to CAD												
Cad Connection												
Circuit Type												
Wireless Data												
Private/Public												
Network Provider												
Single/multi-channel												
Number of Subscribers												
Number of Base Stns.												
Coverage Local/Regional												
Site Locations												
Shared System												
Data Speed												
Msg Switch/WNG												
System Reliability												

	Anaheim	Brea	Cost Mesa	Fullerton	GGV	FVY	HB	LAB	NB	OCFA	Orange	Santa Ana
MDC APPS												
CAD												
Mapping/GIS												
Dist Maps												
Pre-Plans												
Email												
RMS												
Premise History												
HazMat												
MDC Client Software												
Broadband Data												
AVL												
Command APS / ICS												
How MDC is updated												
MDC Devices												
Type; Mobile Portable												
HD Capacity												
Data Media CDWR												
Data Radio Modem												
GPS Hardware												
Device Performance												

Appendix D

CAD Survey of Communication Center Managers - Completed

	Anaheim	Brea	Costa Mesa	Fullerton	GGV	FVY	HB	LAB	NB	OCFA	Orange	Santa Ana
CAD												
Number of Stns	10	4	6	6	7	2	8	3	8	60	8	10
Cad Host Provider	Keystone	Tiburon	Motorola/Printrak	Keystone	Keystone	Keystone	Keyston	Wst Covina	Keystone	PRC/NG	Keystone	Motorola/
CAD Server type	Compaq/Unix	Unx/Oracle	Tandem/SQL	Compaq/Unix	Compaq/Unix	Compaq/Unix	Compaq/Unix		Compaq/Unix		Compaq/Unix	Stratus/SQL
Station Networks												
(56k, T-1, Frame Relay; Fiber	Frame Relay	SBC T-1 Fiber	Fiber	56k	56k	Frame Relay	Frame Relay	??	SBC T-1	SBC T-1	SBC T-1	SBC T-1
Station Applications												
Dispatch	No	Yes	Yes	Yes	No	No	No	Yes	No	Yes	No	Yes
Email	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Incident Rpting.	4D	Yes	Yes	Yes	SunPro	4D	Yes	No	SunPro	OCFIRS	4D	RMS.Dot.net
Staffing	Yes	no	No	No	Telestaff	Telestaff	Telestaff	No	Telestaff	Yes/Custom	No	Telestaff
Training	Yes	Yes	No	No	4D	No	Firehouse	No	Custom/Firehouse	no	no	Yes
Mapping	Yes	No	No	No	Yes	No	No	No	No	Yes/Visio	No	no
Intra/Internet	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
CAD to CAD										xx		
Cad Connection	ORC/Costa		METNET	ORC/Costa	ORC/Costa	ORC/Costa	ORC/Costa	none	ORC/Costa	METNET	ORC	
Circuit Type	56k/Serial		56k/Serial	56k/Serial	56k/Serial	56k/Serial	56k/Serial	none	56k/Serial	56k/Serial	56k/Serial	56k/Serial
Wireless Data												
Private/Public	Private	Public	Private	Private	Private	Private	Private		Private	Private	Private	Future Public
Network Provider	Motorola	Sprint	Motorola	Motorola	Motorola	Motorola	Motorola	none	Motorola	Motorola	Motorola	AT&T
Single/multi-channel	1	Shared	1	1	1	1	1	none	1	1	1	Shared
Subscribers	30	109	80	15	17	8	30	0	22	200	20	25
Base Stns.	6	Sprint	1	6	6	6	6	none	6	9	6	1
Coverage	Regional	National	Local	Regional	Regional	Regional	Regional	none	Regional	CWD	Regional	Local/Regional
Site Locations	Sierra/CityHall	Sprint	City Hall	City Hall	Sierra	Sierra	City/Signal	none	Signal	CWD	Sierra	Fire Station/Reg
Shared System	No	Yes	No	No	No	No	No	none	No	No	No	Yes
Data Speed	19.2k	700k	9.6k	19.2k	19.2k	19.2k	19.2k	none	19.2k	19.2k	19.2k	?
Msg Switch/WNG	RNC	Msg Swtch	RNC	RNC	RNC	RNC	RNC	none	RNC	RNC	RNC	?
System Reliability	Excellent	90%	Not Good	Good	Good	Good	Good	none	Good	Good	Good	Good

	Anaheim	Brea	Costa Mesa	Fullerton	GGV	FVY	HB	LAB	NB	OCFA	Orange	Santa Ana
MDC APPS												
CAD	Yes	Yes	Yes	Yes	Yes	Yes	Yes	None	Yes	Yes	Yes	Future
Mapping/GIS	GST/GIS/GPS	Yes	No	No	No	No	GST/GIS/GPS	None	GST/GIS/GPS	No	GST/GIS/GPS	Future
Dist Maps	Yes	No	No	No	No	No	Yes	None	Yes	No	Yes	Future
Pre-Plans	No	No	No	No	No	No	No	None	No	No	Yes	Future
Email	No	Yes	No	No	No	No	No	None	No	No	No	Future
RMS	No	Yes	Yes	No	No	No	No	None	No	No	No	Future
Premise History	Limited/Text	Limited/Text	Limited/Text	Limited/Text	Limited/Text	Limited/Text	Limited/Text	None	Limited/Text	Limited/Text	Limited/Text	Future
HazMat	Limited/Text	Limited/Text	Limited/Text	Limited/Text	Limited/Text	Limited/Text	Limited/Text	None	Limited/Text	Limited/Text	Limited/Text	Future
MDC Client Software	TxMsgr	Tiburon	Printrak/PMDC	TxMsgr	TxMsgr	TxMsgr	TxMsgr	None	TxMsgr	TxMsgr	TxMsgr	Future
Broadband Data	Sprint	Sprint	no	no	no	no	no	None	no	no	Sprint	AT&T
AVL	No	No	No	No	No	No	No	None	No	No	No	Future
Command APS / ICS	No	Fieldsoft	No	No	No	No	No	None	No	No	No	Future
How MDC is updated	Manually	Manually	Manually	Manually	Manually	Manually	Manually	None	Manually	Manually	Manually	Future
												Future
MDC Devices												Future
Type; Mobile Portable	MW520/800	CF-29	MW-800	MW520/800	MW520/800	MW520/800	MW520/800	None	MW520/800	MW520/800	MW520/800	Future
HD Capacity	40/60gb	60gb	60gb	40/60gb	40/60gb	40/60gb	40/60gb	None	40/60gb	40/60gb	40/60gb	Future
Data Media CDWR	PCMCIA	PCMCIA	PCMCIA	PCMCIA	PCMCIA	PCMCIA	PCMCIA	None	PCMCIA	PCMCIA	PCMCIA	Future
Data Radio Modem	VRM850	Sprint	VRM850	VRM650	VRM650	VRM650	VRM650	None	VRM500/850	VRM650	VRM650	Future
GPS Hardware	Nextel	Yes	None	None	None	None	None	None	Non	None	None	Future
Device Performance	Excellent	Good	Good	Good	Good	Good	Good	None	Good	Good	Good	??

Appendix E

Operations Requirements for Integrated Fire Protection Data

Report from OCFA Integrated Fire Protection (IFP) Data Task Force

February 21, 2006

	Who needs it	What is needed	Where / How it is needed
Inspection Program			
	Ops staff	Clear understanding of inspection priorities and rationale (e.g. target hazards exist, life loss potential, permits and fees due)	
	Ops staff	Training: (1) What is required, mandated, permit-obligatory (2) What are the priority inspections (e.g. create priority ratings) (3) Instructions for specialty inspections (e.g. high rise) (4) Clear process for performing the inspection (e.g. before, during, after)	
	Ops staff	Training must be ongoing	
	Ops staff	Support (e.g. Inspector Help Desk)	Ability to get immediate help from an inspector in a consistent way while in the field conducting an inspection.
	Ops staff	Online tools (e.g. Code Reference)	
Inspection Planning			
	Ops staff	Inspections required including due date, location, responsibility, priority, approximate duration, if an appointment is required.	
	Ops staff	Reinspections required	
	Ops staff	Appointments scheduled	
	Ops staff	Identification of most significant hazard locations (e.g. locations with multiple fire incidents, long term non-compliance issues)	
	Ops staff	GIS tools: Identification of geographically related inspections to support geography based planning and routing efficiency. Issue: need to resolve permit cycle (i.e. billing cycle) versus geographic based inspection cycle (e.g. planning for nearby inspections to be due at the same time). These two drivers may be in conflict.	
	Ops staff, chiefs	Accountability tools: inspections due, inspections complete, inspections past due.	All levels in the organization should be able to see these reports so that late inspections can be addressed before they are escalated.
	Ops staff	Query tools: e.g. show 1st quarter inspections, show inspections by priority	
	Ops staff	Referral tracking: status of referrals, referral responsibility	

	Ops staff	Scheduling and rescheduling tools: moving inspection due dates, including permanent rescheduling and temporary rescheduling (e.g. for this year only).	GIS enabled. One-at-a-time as well as bulk rescheduling. Bulk rescheduling can be performed by multi-selecting businesses from a list or from a map.
	Ops staff	FMZ Audit tools	GIS enabled mechanism for identifying businesses not in the system
	Ops staff	Note: There is no requirement to allow Operations to reassign inspection responsibility. This is handled by FMZ coordinator and Fire Prevention.	
	Ops staff	Note: All reports and data entry screens should be print-able.	
	Ops staff	Note: The system will require data entry for critical data fields.	

Pre-Inspection (Immediately before or during inspection)

	Ops staff	Site history summary. Refer to the **2006-02-21 Operations - Preinspection Requirements.doc** document for a proposed sample of this report including all of the drill down options.	In vehicle and/or in station. Summary only with flags and warnings to indicate drill down data is available. Don't show too much information up front. Use drill down for details.
*	Ops staff	Inspection contact information. There may be more than one. Some may be mandatory.	In vehicle and/or in station.
*	Ops staff	Violations (categorized by severity)	In vehicle and/or in station. Drill down option.
*	Ops staff	Hazardous Materials (categorized by type/severity) including locations, maximum amounts, photos/images	In vehicle and/or in station. Drill down option.
	Ops staff	Hazardous Processes: (1) hazmat processes (2) permitted processes (3) other processes not currently stored in IFP such as confined spaces	In vehicle and/or in station. Drill down option.
*	Ops staff	Permits	In vehicle and/or in station. Drill down option.
	Ops staff	Protection Systems (e.g. standpipes, sprinklers)	In vehicle and/or in station. Drill down option.
	Ops staff	Construction / Tenant Improvements	In vehicle and/or in station. Drill down option.
	Ops staff	Complaints	In vehicle and/or in station. Drill down option.
	Ops staff	Inspection History	In vehicle and/or in station. Drill down option.
*	Ops staff	Fire History (from CAD or OCFIRS)	In vehicle and/or in station. Drill down option.
	Ops staff	All IFP information (summary with drill down)	In vehicle and/or in station. Drill down option.
	Ops staff	Pictometry and photo images	In station only. On demand.

During Inspection

Ops staff	Field data entry	(a) Auto-time logging (b) digital signature
Ops staff	Field data entry	Tablet PC recommended, not hand-held devices. New Requirement: Need one device per person, not one per vehicle so that multiple inspections can be conducted at one time. Cancel the one-per-person requirement due to (a) cost and (b) quality control issues. One device per unit only, not even a need for one device per shift.
Post-Inspection		
Ops staff	Verification from the field that the inspection is marked complete (i.e. the inspection is removed from the Inspections Due report and appears immediately on the Inspections Complete report).	
Complaints (and referrals to Operations)		
Ops staff	Use the Preinspection Review report as described in the following document: **2006-02-21 Operations - Preinspection Requirements.doc.**	
In Station		
Ops staff, chiefs	All the reports, screens, capabilities that are available to Fire Prevention	User friendly interface
Pre-Incident (i.e. pre-planning)		
Ops staff, chiefs, mapping	All the reports, screens, capabilities that are available to Fire Prevention for creating special area maps.	
Ops staff, chiefs, mapping	Site plans from new construction for creating special area maps.	
Ops staff, chiefs, mapping	Access to pictometry for creating special area maps.	
Mapping	Auto-notification to mapping group of construction projects for preplanning under some criteria. Ask B. Petroff for criteria, as this was just negotiated with Ops.	
Pre-Incident (i.e. awareness)		
Ops staff, chiefs	Notification to Ops of construction projects in order to be informed and involved during construction	
Ops staff	Notification to Ops when there are new assemblies (and other criteria)	
Ops staff	Notice to Ops when suppression systems are temporarily out of service.	Send to CAD / and/or display in FP. Needs an auto-expiration date.
Ops staff	New construction reports, on demand, in order to identify new structures, tenant improvements and upcoming projects.	

On Incident			
	Dispatch	Fuel mod areas in order to send fewer resources if area protected by fuel mod zones	
	Dispatch	Emergency contact(s)	
	Dispatch	Alarm center and contact(s)	
	Dispatch	Site plans	
	Dispatch	All IFP information (summary with drill down)	
	First Responders	Emergency contact(s)	In vehicle. On demand.
	First Responders	Hazardous materials (summary with drill-down)	In vehicle. On demand.
	First Responders	Hazards (i.e. permits) including class, volumes, locations	In vehicle. On demand.
	First Responders	Warning if hazardous materials exceed 2-4-1criteria	In vehicle. On demand.
	First Responders	New Requirement: Protection systems including location: sprinklers (Y/N), some of the other protection systems (Y/N), special system configurations, FDC locations, alarm panel locations	In vehicle. On demand. Can be GIS-based locations or text-based location descriptions.
	First Responders	New Requirement: Gate, Knox, Opticon locations	In vehicle. On demand. Note: These new requirements will require data collection (a) during new construction (b) S&ES inspections. Ops agreed that OCFA should do this, even though it increases the burden on all inspectors, Ops included.
	Incident Command	All IFP information (summary with drill down)	Was this an in-vehicle requirement? On demand.
	HMRT	Specific chemicals, categorized by hazard level, volumes, locations	In vehicle. On demand.
	HMRT	Containment systems and containment processes to prevent shutdown of systems that can help incident control.	In vehicle. On demand.
	HMRT	Building construction and configuration	In vehicle. On demand.
	HMRT	All IFP information (summary with drill down)	In vehicle. On demand.
Post Incident			
	FP	New Requirement: Automated transfer building information after a fire (e.g. sq ft, stories, property use) from OCFIRS to IFP. They capture a lot of data in OCFIRS that is also entered in IFP (e.g. building, building owner, systems, bill-to, responsible parties).	
On Special Activities			
	Ops staff	Notice to Ops when there are special activities and special events	May not make sense to automate this. Fire Prevention may only know 24 hours in advance.
When Business Vacated			
		No requirement	

When Structure Demolished

Notification to mapping

In Disaster

No dependence on Fire Prevention system. Only dependent upon what is in CAD.

Notes

EMS	No need for IFP data.
EMS	Requirement for hardware compatibility (e.g. PCRs and Inspections)
Vegetation	No need for IFP data.
Vegetation	As provider of wildland, topo and roads content via GIS, there may be a future need to integrate this data with IFP data in order to deliver incident support information to Ops.
Preplanning	No current directive, process or accountability to do preplanning. It will be the responsibility of the mapping group after the SAM's project is complete. Chief Roberts (mapping group) is piloting a high rise pre-plan effort at this time.

Appendix F

Orange County Interoperability Cost Summary

Infrastructure: T-1 Data Circuits to 72 Fire Stations (OCFA not included)	**Source: SBC/AT&T**		**Quantity**	**One Time Costs**	**Monthly Costs**
	72 OC Fire Stations (OCFA has T-1 to 60 Fire Stations)				
	Per Station:				
	SBC/Verizon T-1 Installations	2,000.00	72	144,000.00	
	DSU/CSU Router (T-1 or T3)	2,500.00	72	180,000.00	
	Routers Central Servers	10,000.00	6	60,000.00	
	SBC/Verizon T-1 Mo/Recurring Costs	300.00	72		21,600.00
			Total	**384,000.00**	
CAD to CAD: Infrastructure Costs Only / CAD Message Switch not included	**Source: SBC/AT&T**				
	T-1 to Central Message Switch				
	SBC/Verizon T-1 Installations	2,000.00	5	10,000.00	
	(OCFA,MetroNet,Costa Mesa				
	Santa Ana, Brea, Laguna Bch)				
	SBC/Verizon T-1 Mo/Recurring Costs	300.00	5		1,500.00
	DSU/CSU Routers	2,500.00	5	12,500.00	
	Routers / Central Server	10,000.00	1	10,000.00	
			Total	**32,500.00**	
Countywide Mobile Data: Merge OCFA and Metro Net Systems	**Source: Motorola Communications**				
	Upgrades to OCFA and MetroNet Mobile Data System				
	7 additional base stations	200,000.00	1	200,000.00	
	Reconfigure OCFA Network Controller				
	Metro Net T-1 to OCFA	2,000.00	1		300.00
	Radio IP/ Encryption/Compression	210,000.00	1	210,000.00	
	RNC Maintenance/Monthly	2,000.00			2,000.00
	System Engineering Analysis				
			Total	**410,000.00**	

Wireless LAN: (4.9Mhz) to 132 Fire Stations and 400 mobiles for mobile mapping/data updates	**Source: Alvarion/ Enterprise Systems Solutions Inc.**				
	Fire Station 4.9Mhz Transceiver (ea.)	6,000.00	x 132 =	792,000.00	
	Data Server	5,000.00	x 132 =	660,000.00	
	Fire Mobile 4.9 Receiver /Software	2,500.00	x 400 =	1,000,000.00	
	(subscriber units)				
			Total	**2,452,000.00**	
AVL System	**Source: Estimate based on best practice industry standards.**				
	400 Fire Apparatus, GPS, CAD/GIS software			1,000,000.00	
		Projects Total		**4,278,500.00**	
		10% Buffer		427,850.00	
		Grand Total		**4,706,350.00**	**25,400.00**