

## Emergency Communications: Mashups or Mishaps

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For better or worse, the success of any tactical or disaster response operation will be judged on the culmination of the decisions made. Accordingly, anything that enhances decision making becomes a force multiplier. Of all the prerequisites for effective decision making, none exceeds the importance of an ability to communicate. Consequently, the military identifies communications as the “voice of command” and for good reason: you cannot command when you cannot communicate. Many a fiasco has been averted when good communications enabled corrective measures in a rapidly changing situation. Consequently, it would seem self-evident that establishing reliable and secure communications would be an imperative. Nevertheless, an inability to quickly and reliably exchange critical information across jurisdictions and between agencies and disciplines is consistently cited as a major shortcoming in handling major disasters.

While the problem is an aggravation between agencies, it is particularly troublesome when multiple disciplines are involved, such as law enforcement, fire services, public utilities, transportation, and so forth. Indeed, effective communication between disciplines occurs so rarely that it is a noteworthy achievement on the rare occasions when it does happen. Nowhere, however, is the problem more challenging—or exasperating—than when it is needed between domestic law enforcement and the military services.

As domestic law enforcement and the military services increasingly collaborate in protecting our communities in the war on terrorism (not to mention a myriad of other calamities that routinely befall us), the need for effective communications becomes even more compelling. While it would be easy to affix the problem as one of equipment incompatibility, it is far more pervasive than that. Indeed, even the most cursory observation will reveal disparate procedures, practices, protocols, nomenclature, and symbols. Even more alarming is that as technological advances provide increased abilities to communicate with data rather than voice, we are in danger of perpetuating the same incompatibilities. While an inability to easily communicate with voice is problematic, it is especially perturbing with data. This is because the most strategically oriented information is captured and created at command posts in the form of text, annotations, maps, diagrams, drawings, charts, matrices, illustrations, photographs, and the like. Factors and influences affecting field activities that are all but impossible to effectively convey with voice communications are conspicuous and clear when displayed.

Currently, there are nearly 200<sup>1</sup> emergency management software programs available, the majority developed by defense contractors for military applications. These powerful programs provide tremendous advantages for managing emergency responses, such as plotting incidents, establishing containments, locating command posts and staging areas, managing evacuations, and tracking friendly forces. In spite of the potential benefits for domestic applications,

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<sup>1</sup> A recent study done by the U.S. Navy identified 192 separate commercially available C4I software programs

however, they remain in the defense domain with little chance of being adapted for domestic emergency response applications. There are two predominate reasons for this. First, the software programs were funded by the Department of Defense and developed by defense contractors and federal laboratories specifically for military applications. Because there has been little demand from local safety services for the same capabilities on a national basis, defense contractors and corporations seeking profit have not seen domestic law enforcement as an appealing market. Moreover, because of the competitive nature of these companies, there is a disincentive for them to even be compatible with each other. Second, despite the large numbers of public safety agencies in the United States,<sup>2</sup> each of which are free to solve local problems without concern for national, or even regional compatibility, the market is tremendously fragmented. With no common voice, much less common standards, large corporations have been understandably reluctant to spend money on such a risky venture.

The most oft cited solution for communications interoperability issues between the various agencies, disciplines, and jurisdictions has been to create national guidelines, or even national standards, to compel participants to conform to mandated conventions and equipment specifications. This proposal grossly oversimplifies a solution and underestimates the allegiance that agencies have to their current methods and equipment. Consider that there are nearly 17,800 local law enforcement agencies in the United States, each with

their own jurisdictions, budgeting, political oversight, and individual problems and, more important, complete autonomy in how they solve a problem and what they choose to use. The problem is further compounded when the more than 30,000 fire departments are included. Indeed, the mere suggestion for such a solution arouses emotions to the point where even seemingly benign issues quickly become controversial, even contentious. Even if such a remedy were possible, it would take millions of dollars and years of effort to get the necessary "buy in" while being challenged and confronted at every step by stakeholders ranging from individual government jurisdictions to defense contractors and private investors seeking to sell their wares. Further, it ignores the time, effort, and expense of retraining personnel to use the equipment and comply with the protocols and procedures. While such a solution might someday provide universal capabilities, it is inconceivable that it would be any time soon. Herein lies the root of the problem because waiting is not an appealing option, and recent history is replete with examples of the communication problems associated with the attacks of 9/11, Hurricane Katrina, the riots and earthquakes in Los Angeles, and working with the military on border protection and drug interdiction.

With the development of a National Response Plan, the importance of a national communications plan to support it would seem self-evident. And, while no one seriously disputes the advantages of a robust, full-featured system designed from the ground up to provide reliable communications in the most austere circumstances, no universally accepted solution appears likely in the foreseeable future. Waiting for an ideal solution dooms the interim to the status quo. Even the most minimal ability to exchange information between agencies,

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<sup>2</sup> Even the most conservative estimates place the number of law enforcement and fire services at about 50,000 agencies.

disciplines, and across jurisdictional boundaries is preferable. To paraphrase General George Patton, a good plan implemented now is better than a perfect plan implemented later. Given the current state of affairs, this course of action seems prudent, indeed. Thus, a “work around” seems in order.

In developing a work-around solution, it is important to recognize that the current preferences that follow the conventional thinking of developing bridges and patches for voice communications and developing new or exploiting existing software applications for data communications have not provided any meaningful solutions. Nor are any expected in the near future. Thus, new thinking is in order.

Access to the World Wide Web is nearly ubiquitous in the United States, and the features, tools, and information on it are already being recognized and exploited by the safety services. It is not at all unusual to arrive at a field command post and observe law enforcement officers and fire fighters using laptop computers wirelessly connected to the Internet to get information on weather, generate maps, view satellite photographs, check traffic flow, or get travel directions. While these capabilities are currently being used to augment existing emergency response systems, it takes only a little bit of imagination to envision a single system incorporating all of them into an ensemble for emergency management.

If a Web-based emergency management software program was developed and made available to first responders, they would gain many of the same capabilities of the far more expensive commercial software programs. The most likely method would probably be the use of a “mash-up” program. A mash-up program is an application that resides on the Web and

combines data from more than one source into a single integrated tool.<sup>3</sup> Current mash-up programs already provide useful information for tactical operations such as length of routes on maps, terrain profiles, digital dashboard displays,<sup>4</sup> and other important information. Because mash-ups can also incorporate data from internal hard drives, an ability to access data and customize a program for an individual agency—or even a single event—is possible. The value of functions of a program specifically designed for emergency management would rival many of those already in use without purchasing, licensing, or buying subscriptions—and with minimal training.

Some of the advantages of such an approach include:

- A Web-based emergency management capability that provides an ad hoc, easy to use, and universally available “backbone” for sharing vital disaster information.
- Because the software resides on the World Wide Web, even agencies and disciplines that do not routinely use emergency management software would be capable of sharing information at a regional level without the purchase of additional hardware or software. Nongovernmental agencies, such as the American Red Cross or Salvation Army, who often support emergency operations, could also be included.

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<sup>3</sup> Description taken from Wikipedia

<sup>4</sup> A digital dashboard display provides several different types of data on a single, at-a-glance display from disparate “parent” programs. For example, for an emergency response a user might simultaneously choose a weather forecast from Weather.com, map of current traffic flow from Traffic.com, a satellite photo from Maps.Google.com, a live video Webcam, and even a phone book or operations plan from his/her own hard drive.

- Training time and effort would be minimal because such a program would exploit the same Web features and conventions that make them simple to learn and as easy to use as those of the “parent programs.”
- Widespread acceptance would be far easier to achieve than even the best commercial disk-resident programs because the Web-based program would be less expensive or even free to the user, and it would require no additional hardware or software.
- Changes, updates, and additional features would be instantly available to all because editing is done once for everything on the web. The addition of a feedback loop would encourage users to participate in refining and developing the ensemble.
- Synergy would occur naturally and easily through increased understanding and collaboration.
- Controversial and confusing issues, such as standardized symbology, procedures, protocols, and practices, would become a matter of common convention without necessitating oversight committees, focus groups, or mandates. Indeed, the acceptance of these common conventions would create national de facto standards by consensus, not committee.<sup>5</sup>

The Los Angeles Sheriff’s Department has already begun explorations into such a program and has identified many of the requisite features. Initial suggestions include collecting features unique to a particular discipline into modules. Each module would be devoted to a single discipline, such as law enforcement, fire services, utilities, traffic control, and so

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<sup>5</sup> Knowing what symbols and practices are universally meaningful and acceptable would also provide inestimable value to commercially available emergency management software.

forth. Icons necessary for tracking units and identifying organizational components (such as field command posts, staging areas, refugee centers, etc.) use those already identified in the National Incident Management System (NIMS). These can be augmented by incorporating common drawing features such as lines, circles, rectangles, and the like, and provide an ability to identify containments, plume clouds, fire lines, evacuation routes, and so forth. Each of these features can be annotated with a text feature. Even in the most rudimentary form, e-mailing a “screen shot” would provide an ability to remotely view deployments, as well as provide adjacent commands a greater situational awareness and higher headquarters a common operational picture. Moreover, administrators and subject matter experts not physically present could view an unfolding situation and offer input from remote locations without the lag time associated with travel. Other advantages to this approach include:

- Because anyone with a need to know could be given instant access, when responses to emergencies and disasters exceed the resources of the handling agency, a regional response would tremendously benefit by being able to anticipate such things as what type of resources would be most needed, by whom, and where they would be best deployed
- When complex responses involve more than one discipline, each of the annotated maps would become an electronic “overlay” for emergency operations centers who can build a “picture” of an ongoing operation by simply showing or hiding the various overlays on a monitor.
- Because information can be stored locally and shared regionally, a net-centric approach to disaster

management and emergency responses would be possible. Individual agencies would be free to gather, securely store, and maintain whatever information they believe important and then share it on a regional level when appropriate. The synergistic advantages of such an approach hardly need further comment.

- Using open standards, companies wishing to continue developing disk-resident solutions could create interfaces in much the same way that information is currently exchanged using Rich Text Format (RTF) or Portable Document Format (PDF) for exchanging files.

As might be imagined, such an approach would require a robust, fully functional capability immediately upon implementation. Any lackluster effort simply perpetuates the perceptions of the past and dooms the entire effort to skeptical comparisons of the failures to date. While it is unlikely in the near future that Web applications will provide the rich features of disk-resident programs, any functionality is better than continuing to wait. The good news, however, is that such a project could be implemented in less than 6 months and would cost less than half the cost of even adapting existing military applications. Furthermore, maintenance and upgrades would cost cents on the dollar in comparison to conventional methods. Perfect is the enemy of good. And good is better than nothing.