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Automating Military Support to Civil Authorities

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ABSTRACT

This paper discusses how the Department of Defense can use automation in accomplishing its Military Support to Civil Authorities (MSCA) mission. It describes the successful implementation of a commercial, off-the-shelf graphical information software system at an Army-level headquarters. Lessons learned from that experience demonstrate the feasibility of exporting a similar system to all headquarters responsible for MSCA. The final section of the paper suggests that the Federal Emergency Management Agency take the lead in promoting improvements in the automation environment for all organizations participating in disaster management.

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Automating Military Support to Civil Authorities

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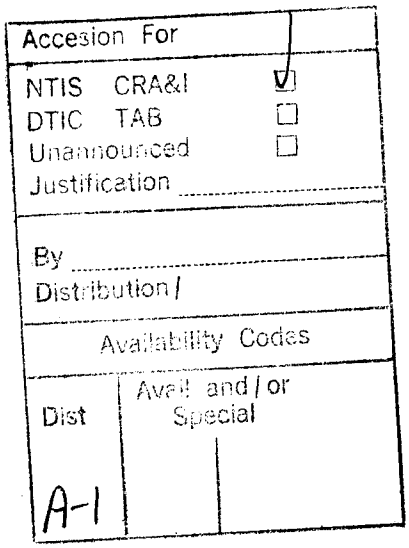

ABSTRACT

This paper discusses how the Department of Defense can use automation in accomplishing its Military Support to Civil Authorities (MSCA) mission. It describes the successful implementation of a commercial, off-the-shelf graphical information software system at an Army-level headquarters. Lessons learned from that experience demonstrate the feasibility of exporting a similar system to all headquarters responsible for MSCA. The final section of the paper suggests that the Federal Emergency Management Agency take the lead in promoting improvements in the automation environment for all organizations participating in disaster management.

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INTRODUCTION: READINESS IS ALL

Not a whit, we defy augury; there's a special providence in the fall of a sparrow
If it be now, 'tis not to come; if it be not to come, it will be now;
if it be not now, yet it will come: the readiness is all.

William Shakespeare 1564-1616[1]

On the evening of October 27, 1993, as fire fighters battled brush fires in Southern California, Ray Tingstrom, the senior Emergency Response Coordinator at Headquarters, Sixth United States Army on the Presidio of San Francisco was busy posting the latest situation reports into the Emergency Information System. He received a phone call from a staff member of FEMA Region IX: could he furnish a concise report that would convey the seriousness of the situation to senior officials in Washington, DC? Ray collected what information he had up to that moment, and transmitted it together with computer generated maps by modem to FEMA headquarters in Washington, DC.[2] The following morning, FEMA Director James Lee Witt briefed President Clinton on the emergency response effort using information Ray had put together. That same day, President Clinton declared the fire-ravaged counties disaster areas.[3]

Had the same request been made only ten months earlier, Ray would not have been able to respond in this fashion, since the Emergency Information System had not yet been installed. It was not until February 1993 that the system was activated for training and evaluation on Sixth US Army's local area network. But once it was operational, it matured quickly into a valuable system that served the entire Crisis Action Team at Sixth U.S. Army well. This is an account of how the system was installed, what we learned during the project, and what we could do to improve our ability to give military support to civil authorities in times of crisis.

A disaster can have enormous impacts on the region which it strikes, on its people, property, structures and economy. The human suffering disasters cause is well documented in detailed and extensive media coverage. The cost associated with disasters is astronomical.

For example, estimates of the damage from the Northridge earthquake in California go as high as 30 billion dollars. [4] Whole industries are affected, as for instance the insurance industry in general, and more specifically agriculture and waterway transportation during the floods of 1993. Disasters can have significant political impact as demonstrated in the scrutiny and criticisms of FEMA and its response following the devastation of Hurricane Andrew in southern Florida in August 1992. It is therefore altogether appropriate to treat these impacts on the same level as national security emergency situations and to conduct preparedness planning at the highest levels of government and the military.

Improving the quality and timeliness of response to a disaster can contribute significantly toward mitigating its social, environmental, economic and political impact. The focus of this paper is that using automation can improve the process by which the DoD meets its mission of providing military support to civil authorities. More narrowly, it discusses automation and information management at the organization most directly involved in operational planning and directing of MSCA, the Continental Army Headquarters. Although communications and their integration into automated systems are critical to disaster response, they are not a primary focus here because that entire field is an area worthy of its own study.

This paper is organized into three parts. The first part is a brief review, from an Army perspective, of the organizations involved in authorizing and providing military support to civil authorities (MSCA). The second part is a description of the Sixth U.S. Army project and the lessons learned from it, and the third part consists of recommendations and suggestions for using automation to improve our ability to provide MSCA throughout the continental United States and areas of the Pacific.

The information used for this paper came partly from published material, partly from meetings and telephone interviews, and partly from my notes and reports reflecting my experience gained as project officer.

PART I: INSTITUTIONS FOR THE COMMON PROTECTION

Government is, or ought to be instituted for the common benefit, protection, and security of the people, nation, or community

George Mason 1725-1792[5]

There are many organizations that respond in time of crisis or disaster to lessen its impact on citizens. These organizations run across a wide spectrum from private volunteer organizations to local, county and State government to Federal government agencies. It is well beyond the scope of this paper to address their contribution to disaster relief. Instead, the focus is on the specific contribution made by the Department of Defense (DoD) in the form of providing Military Support to Civil Authorities (MSCA). And even here there are more contributors than space to discuss them in detail. What follows, therefore, is but a brief sketch of organizational responsibilities and authority to help understand the environment from the perspective of crisis response at an Army headquarters level.

On November 18th, 1988, President Reagan signed the Executive Order that assigned the current national security preparedness responsibilities to twenty-four Federal departments and agencies, among them the Department of Defense (DoD).[6] In its definition of what constitutes a national security emergency, it included "natural disaster." It assigned each of the Federal Departments and Agencies both lead responsibilities and support responsibilities. The responsibility for coordinating the entire effort went to the Federal Emergency Management Agency (FEMA).

To implement this and other executive orders as well as several applicable public laws, most notably the Stafford Act, FEMA prepared, coordinated and published The Federal Response Plan.[7] This plan establishes procedures by which Federal agencies respond to emergencies by augmenting State and local relief efforts. It groups the types of Federal assistance by function into twelve numbered Emergency Support Functions (ESFs). Each of these ESFs has one agency designated as the primary agency; other agencies that support that func-

tional area are designated as supporting agencies. It provides for the appointment, on behalf of the President, of a Federal Coordinating Officer (FCO) with the responsibility for coordinating the activities of the various Federal agencies in an affected State.

Under the Federal Response Plan, the Department of Defense has primary responsibility for ESF #3, Public Works and Engineering, and ESF #9, Urban Search and Rescue; the latter has reverted back to FEMA as the lead agency.[8] For the other ten ESFs, the plan designated the DoD as a supporting agency. The DoD published an implementing directive that assigned the Secretary of the Army as the Executive Agent for providing military support to civil authorities (MSCA), and gave him authority to task the other component services within DoD.[9] In general terms, the directive's purpose concerning MSCA was to "... plan for, and respond to, requests from civil government agencies for military support in dealing with the actual or anticipated consequences of civil emergencies requiring Federal response... [in order] ...to save lives, prevent human suffering, or mitigate great property damage... [and] ... to alleviate the suffering and damage that result from major disasters or emergencies."

For the Secretary of Defense, the Director for Emergency Planning, Office of the Deputy Under Secretary of Defense (Security Policy), performs the actual policy planning functions. The Deputy Director for Emergency Planning, Maxwell Alston, explains that current planning is carried out under three guiding principles:

> "First, defense resources are employed in civil emergencies only where essential to supplement inadequate or exhausted civil resources.
>
> "Second, only effectively decentralized civil and military capabilities save lives and ensure continuity of civil government functions in a major disaster.
>
> "Third, the nation's defense posture cannot be jeopardized to facilitate any response to a civil emergency."[10]

The DoD implementing directive also established a new office under the Secretary of the Army called Directorate of Military Support (DOMS). This office issues the orders for emergency response on behalf of the DoD Executive Agent. The directive assigned the planning function to the Commanders in Chief (CINCs), Forces Command (FORSCOM), U.S. Atlantic Command, and U.S. Pacific Command for their respective geographic areas; FORSCOM was later placed under the redesignated Atlantic Command, ACOM. Within FORSCOM, the four Armies in the continental United States (CONUSAs), have the operational responsibility for carrying out the MSCA function.

Normally, the MSCA process is initiated when a Governor requests that the President declare a disaster for affected areas in the State. Upon such declaration, the Federal Response Plan is executed and an FCO is appointed by FEMA. Since this is most likely a situation requiring response on a regional level, the Regional Director of one of FEMA's ten Regional Offices will activate a Regional Operations Center (ROC). This center serves as point of contact for State and other Federal supporting agencies. The CONUSA responsible for the affected area activates an Emergency Operations Center (EOC) and dispatches an appointed Defense Coordinating Officer (DCO) to the site of the disaster. The CONUSA EOC then acts on any requests for assistance routed through the FEMA chain by tasking bases, posts, units or other DoD organizations that can best respond to the need. In case a serious condition requires an immediate response, however, a military commander may take action under his or her own initiative to save lives or prevent extensive damage without waiting for a Presidential declaration. This entire process and the chain along which information and authority flow is illustrated in Figure 1 on the next page.

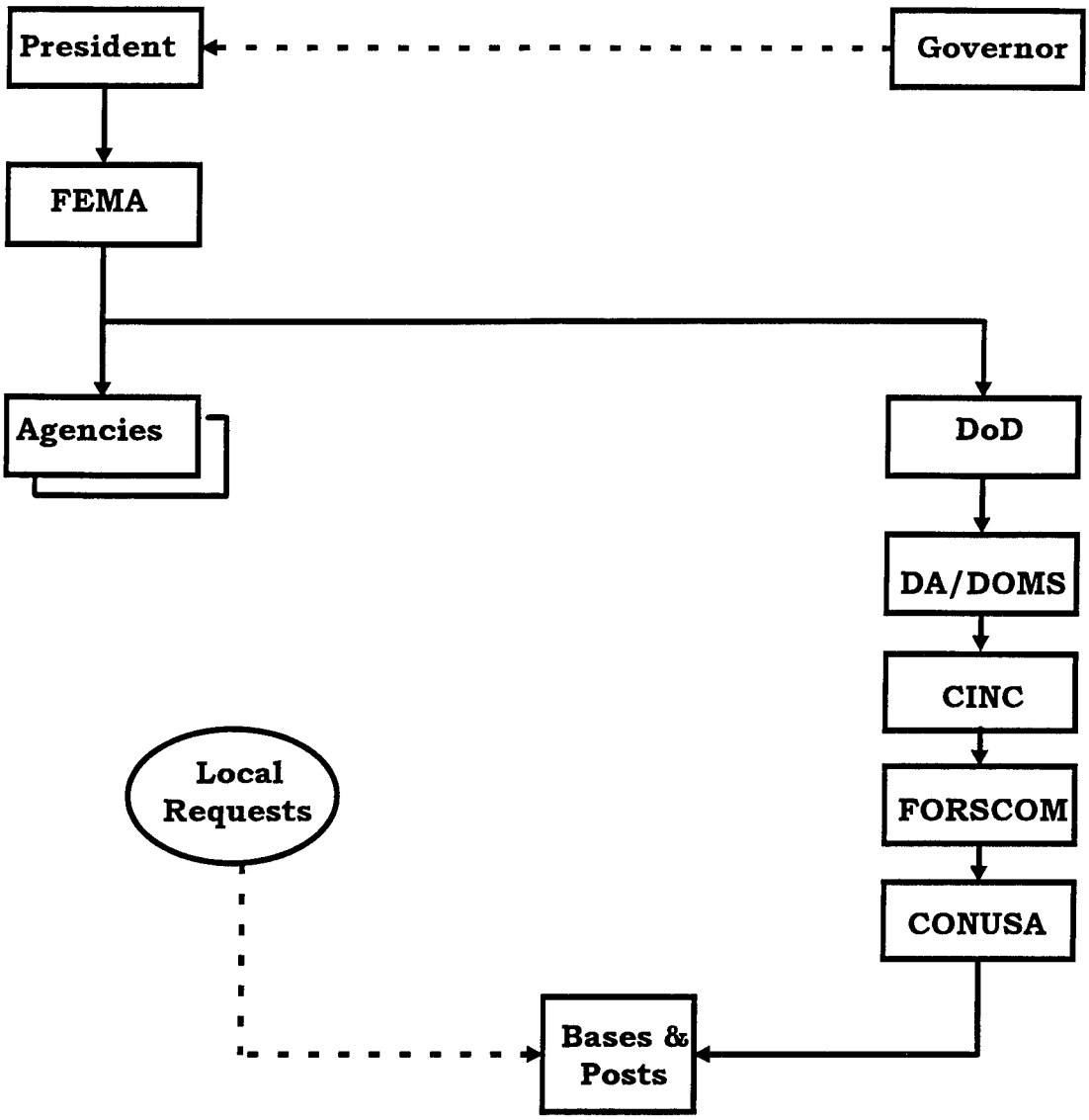

Figure 1
Organization for Military Support to Civil Authorities

PART II TRYING SOMETHING

The country needs and, unless I mistake its temper, the country demands bold, persistent experimentation. It is common sense to take a method and try it. If it fails, admit it frankly and try another. But above all, try something.

Franklin Delano Roosevelt 1882-1945[11]

GENERAL. The purpose of this part is to show by the example of the Sixth U.S. Army project that it is possible to make significant improvements in the methods used to implement MSCA using relatively inexpensive, commercial off-the-shelf software (COTS) and an innovative approach to bring about positive changes. The project is a classic example of how to take excellent advantage of COTS. It succeeded because it was user-driven, and stayed within sparse resource constraints. After applying lessons learned and some of the recommendations later in this paper the success of the project could be duplicated at the other three CONUSA headquarters and at headquarters, CINCPAC. The description that follows consists of three parts. The first discusses design considerations, the second focuses on implementation, and the third lists some of the lessons learned during the project.

1. DESIGN CONSIDERATIONS.

The Crisis Action Team. To conduct MSCA and operations, the Sixth U.S. Army had organized a Crisis Action Team from the members of its staff. Called "Crisis Action Officers," these staff members had expertise generally consistent with the functional lines of the ESFs. Approximately thirty-five permanent members of the headquarters were appointed to this team as an additional duty; this was enough to provide personnel for two shifts. There were some twenty or so others, mostly liaison officers from other services or organization, who were also identified as team members, but who, because of their reserve status or geographic location, participated less frequently, usually only in major exercises and real world situations. The team also had responsibility for mobilization operations.

Software Procurement. The commercial software used in the Sixth U.S. Army project is called the Emergency Information System (EIS). The system is designed to assist with command, control and communications during crisis situations and to help manage response to natural and technological disasters. Combining "PC-based interactive programs and critical databases with colorful computer-generated maps to support crisis decision making,"[12] its strength is its ability to display situational information, to help determine appropriate responses, and to communicate. In the resource-constrained Sixth U.S. Army Headquarters, its relatively affordable price made it an "enabling technology" that was economically feasible for use.[13] Originally procured for approximately $ 20,000 with Fiscal Year 1992 year-end funds, it was intended for use solely in the Office of the Staff Medical Advisor at Headquarters, Sixth U.S. Army to track the status of medical resources. However, when the system was installed on the Headquarters, Sixth U.S. Army Local Area Network (LAN) in January 1993, it became apparent that it had the potential for much broader use throughout the headquarters, and perhaps even throughout Forces Command (FORSCOM) and at the other CONUSAs which also have the MSCA mission for their assigned geographic areas. The system was upgraded from the initial three licenses to six for another $ 12,000 and installed for use in the Sixth U.S. Army Operations Center (SAOC).

Concurrent Development. The general focus was on providing automation support to the Crisis Action Team (CAT) operating from a single location at its home station or at a remote site. In conducting its operations, the CAT depends on information and requests received from liaison officers at the scene of the event under management, from FEMA, from other ESFs and from other organizations involved in the process. The operational concepts and procedures dealing with additional forward disaster control elements from Sixth U.S. Army or DoD, their composition, their equipment, their requirements and their capabilities were still under development. This introduced some ambiguity into the project goals, and we

recognized that we might need to redesign parts of the system in order to integrate any new requirements into an overall system concept.

Method of Analysis. The method of analysis chosen for the project is important because it provides the structure -- the road map -- to success. The information engineering method[14] is one that is commonly accepted, but because we worked under severe time and personnel constraints, we did not use this elaborate and deliberate method to take the project through its various stages. Instead, we confined our planning to working out a gross design report.[15] That approach calls for definition of the problem, setting objectives, identifying constraints, determining information needs, and determining information sources, followed by developing alternative gross designs, selecting the best design, and then preparing a gross design report.

Problem Statement. Because of the manner of the initial procurement, no detailed and rigorous problem analysis was done prior to procurement. However, observations of existing crisis action management techniques at Headquarters, Sixth U.S. Army revealed the following opportunities for improvement:

- The CAT was limited by use of strictly manual procedures.
- There was a requirement for operation (and automation support) at an alternate, remote site, but there were no procedures developed to accomplish this.
- Reference material needed for crisis operations was widely dispersed throughout the headquarters. Crisis Action Officers (CAOs) brought reports, SOPs, regulations, notes, and phone books with them when the CAT assembled.
- Senior decision makers required at least one situation briefing daily. Two more briefings were required each day upon shift change. Yet there was no briefing tool available to the team that was also integrated with the crisis action process.

System Objectives. Based on informal interviews and the opportunities for improvement noted above, we set out the objectives for the project accordingly. They were: to update and automate manual procedures; to establish remote automated operations; to consolidate records and references in one system; and to establish integrated briefing procedures.

Constraints. If there had been no constraints, the project might have looked different, done more, and undoubtedly cost more -- much more. But we did work under constraints which limited our exploration of EIS' potential. The constraints we identified were limited personnel, funds, system design skills, and the need to use existing equipment.

Information Needs. Because of the time constraint, we performed only an abbreviated, preliminary survey of information processed in the Emergency Operations Center. The survey revealed that the CAT needed the following types of information:

- Resources (Personnel, Equipment, Sites)
- Geographic Data (maps and overlays)
- Plans, Standard Operating Procedures (SOPs) and Checklists
- Log of events and actions taken

Information Sources. As sources of information, we found that the following entities were the major contributors to the system:

- Federal Emergency Management Agency (FEMA) and related organizations
- Plans, SOPs and Checklists
- Crisis Action Officer (CAO) rosters, lists, documents, notes and other reference material
- External data bases (e.g. DoD Resources Data Base)
- EIS International, EIS customers and user groups
- In-house data collection and research

Alternative Designs. Normally, several alternative designs are considered before the most suitable one is selected for implementation, but because EIS was already procured and

installed, alternative designs were not considered. The Deputy Chief of Staff for Information Management, Sixth U.S. Army attempted to locate and evaluate alternative COTS systems before we expanded the project with more EIS licenses but he did not find any that were suitable.[16]

2. IMPLEMENTATION.

The Crisis Response Process. Figure 2 below describes in broad terms the flow of information in the Emergency Operations Center (EOC) during crisis operations. System inputs arrive mostly by voice communications. The dotted line represents data communications available when an EIS-capable computer is at a remote location. Crisis Action Officers (CAOs) act on the input requests using the on-line data bases. The results of their actions are shown on the right side of the figure.

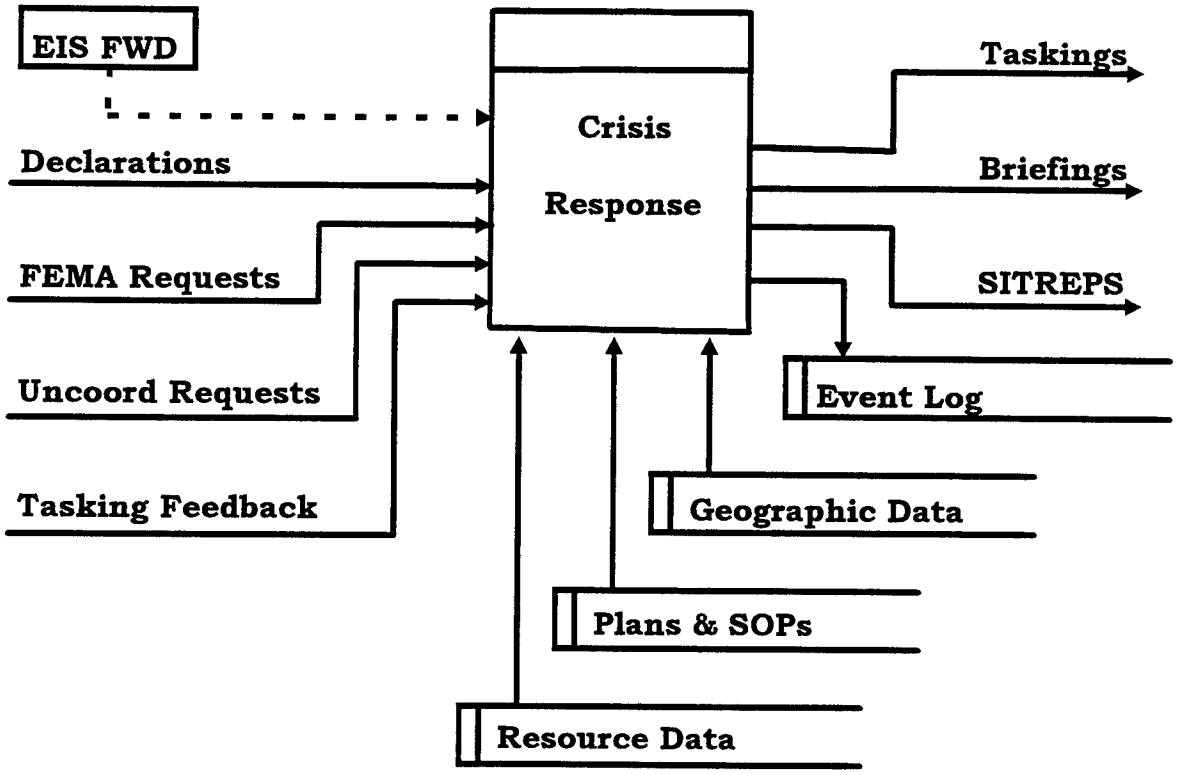

Figure 2
Crisis Response Process

System inputs can consist of declarations from the Director of Military Support (DOMS), Department of the Army, via the Forces Command Headquarters with specific taskings and delegation of authority to respond to FEMA requests for assistance; FEMA requests for assistance,[17] uncoordinated requests, which are those requests made directly to the CAT by state and local authorities without prior coordination with FEMA; and tasking feedback from tasked organizations relating to the status of a request. On-line information consists of resource data, plans and SOPs, and maps and map overlays.

The results of the CAOs' actions, the system outputs, are shown on the right side of Figure 2. These are the taskings to organizations in response to FEMA requests; briefings to decision makers and to other CAOs upon shift change; periodic Situation Reports (SITREPs) to higher headquarters; and logged records of events, requests received and actions taken in response to them.

Upon receipt of declarations and delegation of authority, the Crisis Action Team (CAT) consisting of approximately 35 primary Crisis Action Officers (CAOs) is activated in the Sixth U.S. Army Emergency Operations Center (EOC). Step-by-step instructions and plans are available to CAOs for reference. Validated requests from FEMA are received and entered into the event log. A CAO is assigned to research available resources using the on-line data. When the CAO determines which unit or organization can best meet the request, he or she obtains approval of the CAT Team Chief and issues a tasking. The CAO makes an entry in the event log showing action taken and continues to monitor the action until it is completed. Entries from the event log form the basis for briefings to decision makers, and to other CAOs upon shift change. Event log entries are also used for periodic SITREPs to higher headquarters, except that SITREPs must be assembled off-line because of format requirements. Event log entries can be printed upon termination of the crisis to provide a basis for cost recovery.

Software System Functions. Another way of viewing the process just described is to break it down into its component functions. The system functions shown here are those that we applied to the EOC crisis response process. (EIS has many additional capabilities that may warrant exploration in the future. For example, contamination management, aerial locations of hazardous atmospheres (i.e. plume display); or accepting images from aerial overflights or from satellites.) A summary listing of those functions shows that the system:

- Serves as central repository for reference material and plans. Tracks progress of plans.
- Provides a log of events and actions, and tracks their status.
- Locates resources and tracks their use.
- Displays geographic relationships.
- Serves as an integral briefing tool.
- Provides a means of data and message communications.

Software Design. After the problem is analyzed, after processes and data are identified, the next step would normally be to develop the software needed to accomplish the various functions. However, the commercial software we used had its screen formats already designed, its data base had been defined, and it had a data dictionary as part of its documentation. Its processes, map interfaces, map overlays, and data definitions had been designed specifically for disaster management. Therefore, the software design phase normally called for at this stage was not necessary, an advantage that COTS provides. Rather, our design effort concerned itself more with making EIS useful to the CAT in a variety of physical configurations. We developed and tested three of them.

Equipment Configuration at Home Station. The home station configuration (Figure 3) was designed for permanent support of the CAT and the Sixth U.S. Army Command Group. In this configuration, EIS was installed on one of the servers on the HQ, Sixth U.S. Army Local Area Network (LAN). It was configured such that CAOs can access it from desk top or Z-Note work stations in the EOC or from their section office. Briefings were presented in the EOC

briefing room using an LCD Overhead Projector Panel driven by a normal EIS work station. This configuration performed satisfactorily throughout all tests.

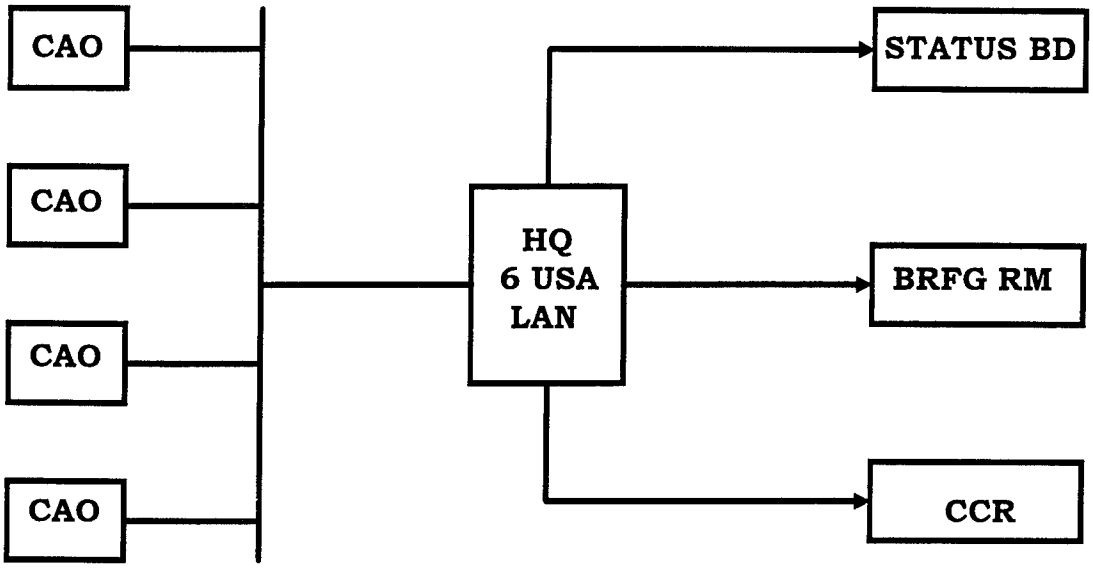

Figure 3
Home Station Equipment Configuration

Equipment Configuration at an Alternate Site. Since the Presidio of San Francisco is located in a high risk earthquake zone, the CAT had to be prepared to operate from an alternate site in case the EOC became unusable. The alternate site configuration (Figure 4 on the next page) called for establishing a remote LAN using portable Z-Note computers connected to a backup server that had EIS installed and was functionally alike to the HQ, Sixth U.S. Army LAN. If the home station LAN was still operational, communications were possible over the work stations using EIS' ECOMM module or Remote Mail. Although there were some difficulties in using the communications fully,[18] this configuration was tested successfully during RESPONSE 93 exercise at Camp Williams, Utah.[19] Further refinement of this configuration, to make it as fail-safe as possible, should be undertaken as part of an integrated disaster recovery plan using techniques similar to the ones used by Arby's to recover from Hurricane Andrew.[20]

The alternate site configuration can also be used in those cases where a substantial number of CAOs -- perhaps ten or so -- are located away from the home station near the site of a disaster. The server has the capability to support perhaps up to twenty users simultaneously, and to provide them with essentially the same capabilities as the home station LAN. This was an important consideration because much effort had been invested in training staff members in the use of the home station LAN, and asking them to learn a different system would have been counter productive.

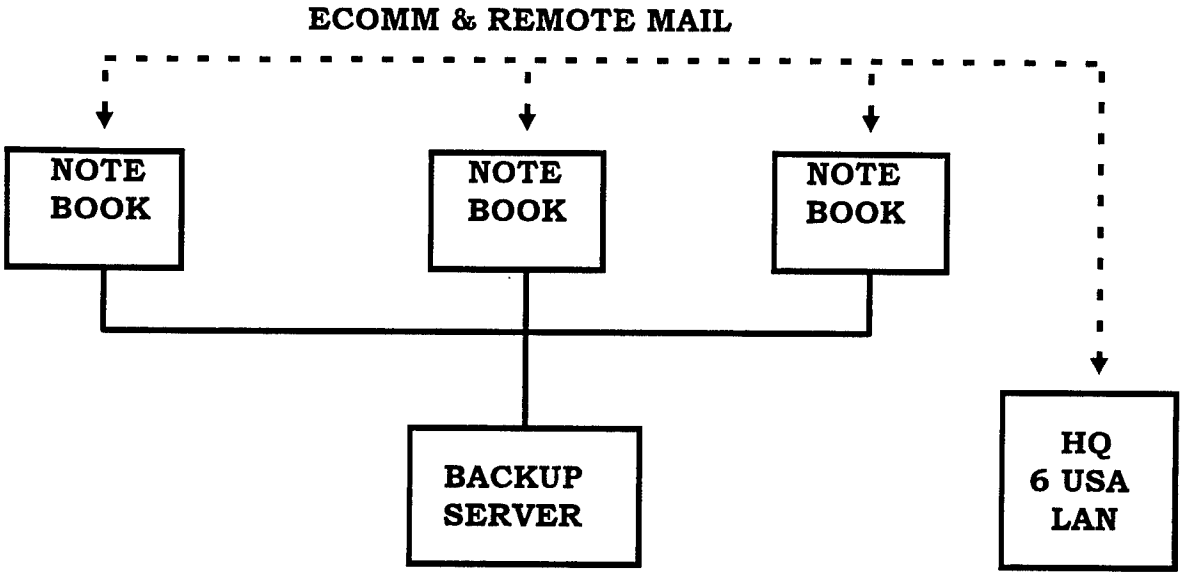

Figure 4
Equipment Configuration for CAT at Alternate Site

Equipment Configuration for Forward Elements. Experience from exercises has demonstrated the need for sending liaison personnel to the scene of the disaster soon after its occurrence. If there is a Presidential disaster declaration later, this forward party forms the core of the Defense Coordinating Element (DCE). Availability of computers and EIS substantially improves their ability to exchange information with the Sixth U.S. Army headquarters, the CAT and local EIS users. The local EIS users could be from State or county emergency operations offices, the National Guard, or any other Federal offices. When several computers are located forward they, too, benefit from being linked in order to share a common data set.

Since the forward element is small -- typically only one or two liaison officers at first -- their computers can be linked using Windows for Workgroups. This is the concept depicted in Figure 5 below.

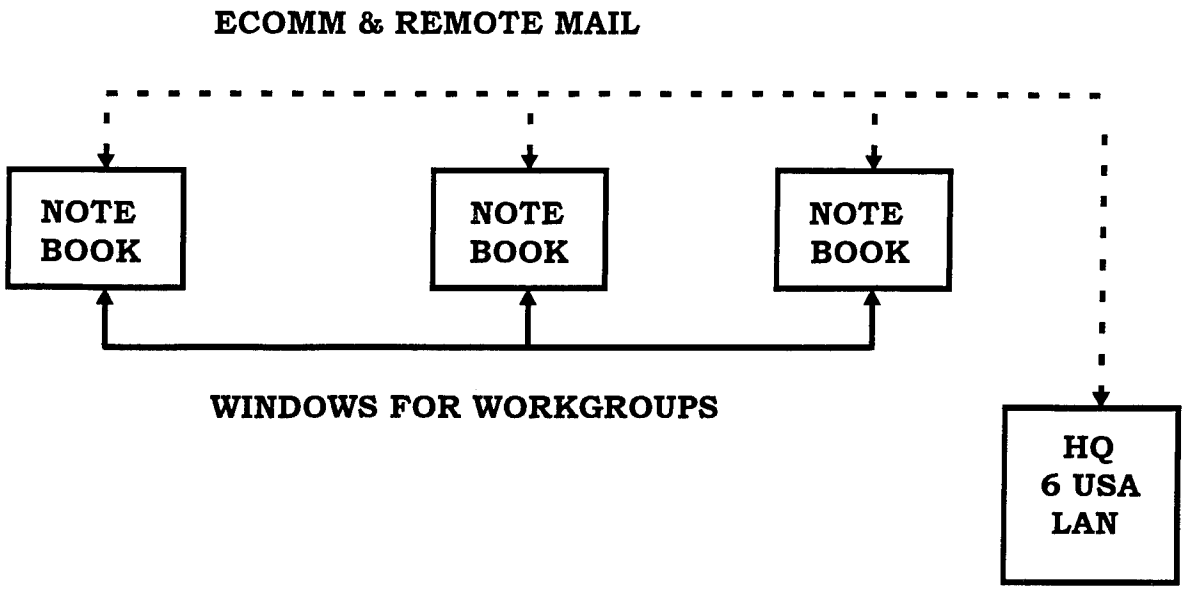

Figure 5
Equipment Configuration for the DCE at a Remote Site

That concept works well when the number of computers does not substantially exceed five. EIS on a standalone notebook computer was tested and used successfully during CRISEX 93-5 at Camp Roberts, CA in February 1993. The concept of linking Sixth U.S. Army's notebook computers using Windows for Workgroups is still being explored. The concept provides for the desired network connectivity without having to take an entire server to the field. From a technical perspective, it appears entirely feasible.[21]

Training. A thorough training program turned out to be one of the key elements in ensuring the success of the system. About thirty percent of our entire effort was spent on training. We designed a concise in-house training program for CAOs. The program focused on teaching, testing and certifying the necessary LAN, EIS and CAT Operations skills. Once CAOs have demonstrated the required proficiency by passing the test, we planned to sustain

their skills through conducting monthly crisis exercises. As of January 1994, thirty-six CAOs had successfully completed the Sixth U.S. Army Crisis Action Officer Certification Program.[22]

Information Content of the System. We did not have the time and people needed to assemble an extensive data base. But we did develop and publish a data dictionary that supplemented the one furnished by the vendor. Using both normal methods to type data as well as the data import module furnished by EIS, we were able to populate the data base with generated and imported data:

- Resource Data: over 14,000 DoD resource records from FEMA regions VIII, IX and X.
- Nineteen Point-of-Contact data files
- Plans, SOPs and Emergency Action Measures (EAMs).
- Geographic data consisting of maps and map overlays.
- Event and action log templates to be opened for each exercise or crisis response.

3. LESSONS LEARNED.

Hardware Platform. The Sixth U.S. Army project could not have been successful without the installed computer equipment base and the local area network. A telephonic survey, in February 1993, of what automated equipment was available in the EOCs of the other three CONUSAs showed that one headquarters had practically no computer equipment, and the other two had only just begun to operate a local area network. Without an adequate number of computers, without the local area network, and without users who had at least some basic familiarity with computers through their network training, the project would have been that much more complex and would have taken much longer to implement.

Method of Analysis. An information engineering approach would have been beneficial even in the development of a project that used commercial, off-the-shelf software and hardware. The primary benefit that the information engineering approach would have contributed is maintaining a continuous focus on data while giving due attention to process identification

and development. The Sixth U.S. Army project succeeded in spite of weaknesses in identification and development of the data. It succeeded because it brought automation to a previously manual procedure and because it used adequate, although somewhat dated, methods of systems analysis and project management. By its existence, the project helped the Crisis Action Team focus on its procedures and refine them where necessary. This turned out to be an unexpected side benefit not unlike the "Hawthorne" effect where the interest shown by others stimulated the enthusiasm, learning, and productivity of the Crisis Action Team members.[23] Last but not least, was the considerable effort devoted to training, testing, and certifying the Crisis Action Officers' skills.

Skills. Many of the skills needed for the execution of the project were already present at Sixth U.S. Army. This was a clear benefit. The CAOs were already expert in their respective functional areas and had an excellent grasp of what resources were available to them and how to allocate them for the MSCA function. Sixth U.S. Army had standardized its network operations by removing a separate Novell network from the EOC and expanding the existing Banyan Virtual Network System (VINES) to cover the entire headquarters. Therefore, the CAOs were already familiar with the new Local Area Network and most of them had received training in how to use it. A vigorous training and certification program gave them the requisite skills to operate the EIS. Outside training in skills oriented on system maintenance had to be procured for the two Emergency Response Coordinators. The Information Systems Division of the DCSIM provided the skills needed for the technical integration of the EIS into the Banyan VINES network.

System Information Content. The complexities involved in crisis management are significant. The project at Headquarters, Sixth U.S. Army only scratched the surface. But it was pursued with considerable energy and enthusiasm, and automating this important function proceeded further there than at the other CONUSAs. For this reason, I recommend export of the system to the other Armies, but only after the data are better defined, data sources

are found, and data integrity can be maintained. The methods and techniques of information engineering, coupled with use of an appropriate computer-aided systems engineering (CASE) tool are one way that can help solve them. Implementing the other suggestions in Part III of this paper will also improve the system's usefulness.

PROJECT SUMMARY. The system provided excellent support for all major functions needed for MSCA at a very reasonable cost. It came on line very quickly; its first use as a briefing tool came during the flooding caused by the Gila River in Arizona in February 1993 and only five months elapsed from installation to participation in RESPONSE 93. The software demonstrated its capability to provide information from even the limited data we loaded into it. Unfortunately, personnel resources proved insufficient for obtaining and maintaining the desired data. This was the project's most significant shortfall. The ability to exchange information with other EIS users at local, State and Federal government level was a significant advantage in all stages of the project.

PART III: WHAT MORE CAN WE DO?

All this will not be finished in the first one hundred days.
Nor will it be finished in the first one thousand days,
nor in the life of this Administration,
nor even perhaps in our lifetime on this planet.
But let us begin.

John Fitzgerald Kennedy 1917-1963[24]

While the preceding section shows that significant improvements can be achieved even with relatively few resources and COTS, there is still much more that should be done to improve, through automation, our ability to accomplish our MSCA mission. As successful as the Sixth U.S. Army project was, it still needs improvement, especially in the system data. First, resource data need to be collected and made more useful, and existing data need to be maintained. These tasks require trained, permanent employees, but manpower spaces are especially scarce during the current draw down. The Sixth U.S. Army has taken the project about as far as it can within its own limited dollar and personnel resources. It needs help with those resources from its higher headquarters. Secondly, to achieve synergism through systems compatibility, only guidance and direction to the entire disaster response community from FEMA can help.

Act Now. The experience of the Sixth U.S. Army project clearly demonstrates that commercial, off-the-shelf software can do the job. It helps the crisis action team to prepare ahead of time by providing a focal, single repository system for plans, procedures, resources, contacts, and geographic information. Moreover, as part of an integrated system consisting of people, equipment and procedures the software system makes a significant synergistic contribution to the MSCA effort. In emergency response, it is vital that the right information gets put out to the right people and places quickly. EIS is a tool to get that done, and we should equip our crisis action teams with it so they can better respond to people in need.

In October 1992, Congress allocated ten million dollars for "disaster relief planning and studies of the Department of Defense as they relate to Department of Defense Installa-

tions worldwide."[25] The United States Army Space and Strategic Defense Command has undertaken this study, called the Program for Disaster Relief Planning and Studies (DRPS). The objectives of the study are to improve disaster relief planning and preparedness measures, including activities and planning at DoD installation level. The study will culminate in an Integrated Disaster Planning Package to be completed by September 1994.[26] The approach taken in the study is thorough and well integrated, and, in accordance with Congress' direction, concerns itself with disaster response down to installation level. Prompt and adequate response at installation level is valuable, especially at those installations that are designated as base support installations because of a disaster in their proximity. However, direct operational responsibility for providing MSCA in their respective areas resides with the CONUSAs and CINCPAC. Except for Sixth U.S. Army, the other four headquarters do not yet have an integral automation support system for their MSCA responsibility. Yet for only about one million dollars, a similar system could be installed and operated at all four headquarters for a whole year![27] And after the initial hardware and software purchases, costs for personnel and maintenance would go down to about $400,000 per year.[28]

It is conceivable that the EIS will not meet each and every requirement identified in the DRPS study exactly. However, purchasing a system that closely meets our needs, that is cheaper and probably better documented than one that is developed in-house, and that is available immediately and will produce immediate performance benefits, is preferable to waiting for a perfect fit that may never materialize.[29] EIS' performance, as demonstrated at Sixth U.S. Army meets the process needs very closely. It is an excellent match, in fact, considering the relatively reasonable costs. Therefore, for the short term, perhaps five years or so, EIS could significantly improve automation support of the MSCA function. As a maturing software enterprise,[30] the vendor already has mechanisms in place for responding to customer requests for change;[31] it is very possible that the system will grow to meet DoD's

specifications and needs in the future as well. And even if it does not, and is replaced in five years, it will have provided a worthwhile and valuable service during those five years.

To be of immediate benefit to those headquarters in DoD charged with the responsibility for actually carrying out the MSCA mission, EIS only needs to be installed at the three other CONUSAs and at HQ, CINCPAC. The intermediate headquarters at FORSCOM and ACOM, and at DOMS would benefit from an installation (with fewer copies) as well. This would allow for electronic transmittal of situation reports and briefings with concise geographic information.

Promote Interoperability. Lack of interoperability among systems is a problem in the entire crisis management community. It was a problem in coordinating emergency response capabilities of civil agencies in support of DoD during Desert Shield and Desert Storm operations. One of the recommendations made in a report that evaluated civil agency support for those operations was that "FEMA assume the lead in ... ensure[ing] timely information exchange and coordination between the civil agencies and DoD in a crisis."[32] Achieving information exchange and close coordination is made even more difficult when the automation assets used in the various agencies are not compatible with one another. In another example, the after action report for the RESPONSE 93 exercise mentions the proliferation of equipment that the participating organizations brought to the exercise. Predictably, very little of it was compatible. The report pointed out that "DOD, USACE, and FEMA all use different computer systems to support response operations. . . . there is no overall plan for system and software to be used, leading to serious availability and interoperability problems when responders from many different departments and agencies arrive on scene."[33] The report goes on to recommend that "FEMA should develop and designate a "standard suite" of computer resources for a Federal response operation and provide guidance on the use of computer systems and programs in support of field operations." Which is precisely the point of this paper.

When selecting a system it is important to consider its ability to share information with others. At Sixth U.S. Army, we have on many occasions received assistance from other EIS users. The Concord Naval Weapons Station gave us all the electronic maps we needed for California. During the Gila River floods, the Arizona State Office of Emergency Management gave us copies of their maps for Arizona. Ray Tingstrom provided status information to FEMA. None of this would have been possible as readily without all of us having the same software system. Considering the installed user base for EIS, consisting of over 3000 copies sold to over 1000 customers worldwide, including the emergency management offices at 22 States and more than 50 Air Force Bases plus 18 Air Guard units,[34] it has established itself as the *de facto* standard graphical information system (GIS) for disaster response, if not formally, then at least by weight of sheer numbers and market penetration.

Another consideration related to interoperability is ease of use. A user-friendly system like EIS is more likely to be accepted widely than one that is more difficult to master. Tom Mohall, the project manager for FEMA's Recovery Information Systems at the Miami Disaster Recovery Office recognized this when he said, "One of the most important things is to pick up not only equipment but also programs that are readily available and portable. You don't move into an area with a RISC [System/] 6000 that has a huge learning curve."[35]

The more participants who have compatible systems, the more readily data can be shared, joint exercises conducted, coordination effected and practiced. Compatibility of systems is a key prerequisite to information exchange. Ray Tingstrom put it plainly: "The use of EIS by the involved agencies is a good, bottom-line example of how effective emergency management can be if everyone shares the same system. And, if there were more of us, all connected by modem, it would have been even more effective."[36]

Consolidate Data. DoD Directive Number 3025.1 also stipulated establishment and maintenance of a Department of Defense Resources Data Base (DoDRDB). The directive prescribed

that the DoDRDB was to "include essential information on resources routinely held by the DoD Components and directly applicable to lifesaving, survival, and immediate recovery aspects of MSCA."[37] Responsibility for the DoDRDB was assigned to FORSCOM. Unfortunately, the data base update process relies on information submitted from subordinate bases and posts; some do it well, but many do not. The update cycle is at least one year, and has been longer on occasion. The information it contains is therefore not entirely reliable or current. Although the Sixth U.S. Army loaded some 14,000 records from this data base into the EIS data base, during RESPONSE 93 "gaps in the DoDRDB prevented Emergency Preparedness Liaison Officers (EPLOs) from providing the DCO with critical resource availability information."[38] Nevertheless, the DoDRDB represents an area of cooperation between the services that should continue. Following the redesignation of FORSCOM and ACOM, the Commander, ACOM delegated operational responsibility for this function to FORSCOM to ensure continued uniformity of input and support from the services.[39] In addition, a revitalization of this effort, perhaps even a redesign, should be considered by the Disaster Relief Planning and Studies Team from the U.S. Army Space and Strategic Defense Command.

Modern data base programs show great flexibility in freely accepting and exchanging data between one another. Rigid data standards are therefore not as necessary as they used to be. However, the worst time to attempt data conversion is under the stress induced by a catastrophe. A basic set of data standards in the form of a data dictionary, coordinated as necessary, and published by FEMA would be helpful to organizations at all levels in the disaster response community towards improving compatibility and expedient data transfer during exercises and real situations.

There is a wealth of information that is already captured in electronic form. Many data bases that contain resource information already exist in the DoD and throughout the Federal, State and local governments. Consolidating the salient items from each of these data bases for crisis response is a formidable task, but its feasibility should be exploited, nonetheless.

The vendor, EIS, International is doing precisely that by incorporating public domain data bases available from the Federal government containing, for example, information about all hospitals in the United States.[40] Perhaps FEMA and the DoDRDB could benefit from this approach as well.

Appoint A Leader. The tasks suggested here on a National basis are formidable, and they do require central direction to be successful. It is FEMA that should be assigned these missions of consolidating data standards, finding what is useful in existing data bases, and establishing a basic automation support package -- like the "standard suite" mentioned earlier, but expanded to include software and data standards. FEMA's responsibility is to accomplish the coordination among the various agencies. In addition, FEMA is the lead agency for ESF #5, Information and Planning. It is therefore in the best position to establish overarching standards with help from the supporting agencies.

This will not be an easy task for FEMA or anyone else. Although its fixed and mobile information and telecommunications capabilities have been implemented successfully, according to a report by a panel of the National Academy of Public Administration (NAPA), FEMA's information management structure for both day-to-day operations and disaster recovery was fragmented and uncoordinated.[41] The report recommends that FEMA establish a central office with the responsibility for internal and external information resource management. Such and office, if it were adequately supported with staff, training and resources, would be in an excellent organizational place for taking on the policy leadership role for disaster response automation. And lastly, it would help if the head of FEMA were elevated to cabinet level.

Include Mobilization Planning. The functions described in Part II above are very similar to the functions an Army headquarters performs during mobilization of reserve forces. Mobilization processes also follow preexisting plans and standard operating procedures, track the ac-

complishment of these plans, maintain resource and equipment status information and keep information that can usefully be displayed graphically about the location of units in various stages of the mobilization process or while enroute to a Mobilization Station. During demobilization, many of the same processes reoccur in reverse . To accomplish integration of the mobilization function, plans and SOPs as well as unit and resource data need to be entered into the system. Since these are similar functions, EIS could be used in that capacity as well; at Sixth U.S. Army, we had plans to incorporate the mobilization function on completion of the MSCA implementation.

Ride the Information Superhighway. The purpose of the National Information Infrastructure (NII) is to promote economic growth and maintain world-wide competitiveness. There are nine goals set for the NII, but none address National Security/Emergency Preparedness (NS/EP) directly.[42] Concerning disaster response, there already exists close cooperation between Government agencies and the civil telecommunications sector. Since the NII is an enlargement in terms of capability and accessibility of existing assets, it is important that those in the Government concerned with NS/EP be represented on the various task forces and teams that are working to enhance the NII. The National Performance Review Information Technology (NPRIT) Team recommended just that when it suggested "that the President expand the work on the Government's Information Infrastructure Task Force (IITF) to include a Government Information Technology Services (GITS) Working Group. ... The role of the working group would be to develop a strategic vision and an implementation plan for using government information resources both across and within agencies, and to develop measures to improve the ways in which information and services are provided to the public."[43]

Two groups working within the National Communications System (NCS) are looking at this issue. One of these, from the civilian sector, is an NII Task force established by the National Security Telecommunications Advisory Committee (NSTAC). The purpose of the task force is to look into "applications that can be used for both commercial and national secu-

rity/emergency preparedness purposes. . . . They will address issues including security, resiliency, interoperability, standards, and radio frequency spectrum availability." The Office of the Manager, National Communications System (NCS) has chartered the other group, called a Major Focus Area (MFA) Team. The purpose of this team is "to see that the capabilities are in place to ensure the NII can support the conduct of NS/EP activities of Federal, State, and local governments and supporting organizations." Since both teams function within the auspices of the NCS, they "have agreed to coordinate their activities and to share information."[44]

Besides ensuring representation of NS/EP concerns during the shaping of the NII, we should ensure that the National Information Infrastructure includes provisions to make the Information Superhighway as reliable and disaster-proof as possible. Recent experience with disasters shows that the telecommunications system is likely to suffer damage. The restoration of telecommunications services and the allocation of priorities is accomplished through the Telecommunications Service Priority (TSP) System. Using Hurricanes Andrew and Iniki as examples, "by facilitating the provisioning and restoration of telecommunications services to Federal, State, and local authorities following these disasters, the TSP System played a critical role in disaster and recovery efforts."[45] Nonetheless, some damage is usually not avoidable; for this reason, RESPONSE 93 incorporated lack of telephone communications for four hours into the first day of the exercise in order to make the exercise play more realistic.[46] Perhaps a strengthened, enhanced NII could cut such down times significantly.

What an enhanced information superhighway could mean to someone like Ray Tingstrom is that not only could he transmit and receive immediately needed emergency information, but he could also share and exchange data and graphic information with other organizations on a routine basis during quiet times in order to facilitate preparedness. He can do this now, but he is limited by the relatively slow and inefficient modem transmission process. At information superhighway speeds, he and all the others involved in disaster response and

preparedness would have a better chance of overcoming the deficiencies with integration and coordination that have hampered past efforts.

Train and Exercise. Whatever changes and improvements are made, the people expected to implement them must be trained in their use. Training has a functional aspect (how to use a system) as well as a technical aspect (how to maintain the system on its platform). Both types of training must be accomplished and planned for. Functional training should not be limited only to learning the software system, however. CAOs need to learn and practice crisis response procedures as well. This lesson was also learned during RESPONSE 93 which found a lack of understanding -- due to a lack of training -- in the basics of the Federal Response Plan (FRP).[47]

An excellent method of training while at the same time shaking problems out of the total system is conducting exercises. Sixth U.S. Army conducted one such exercise with its Crisis Action Team each month. Conducting more and realistic exercises was one prescription for improvement that Hutzler recommended in her study on civil agency support of the DoD. In order to ensure that civil agencies, especially those that are not normally involved in the crisis response process maintain the skill and knowledge required for adequate response, she urged that "FEMA assume the lead in ... explor[ing] options for improving and/or expanding civil agency and DoD exercising of crisis response coordination mechanisms."[48]

SUMMARY: KNOWLEDGE IS POWER

In a time of turbulence and change,
it is more true than ever that knowledge is power

John Fitzgerald Kennedy 1917-1963[49]

The disaster response community needs central direction of the type that FEMA can best provide. The Army can act only for DoD, but if the Army goes its own way, and the other agencies do likewise, a significant opportunity to improve and streamline disaster response on behalf of our citizens will be lost.

The automation tools we need are available from commercial sources today, and they are certainly adequate for the near term and perhaps in the long term, also. EIS International has already done the systems analysis and design related to disaster response processes. The Sixth U.S. Army project has demonstrated its usefulness and applicability. The DoD and other Government agencies should capitalize on that analysis and design investment rather than delaying fielding a much needed tool by conducting yet another study.

The disaster response community has come a long way already in improving its service to citizens in need. To maintain this momentum, to preserve what we have learned so far, and to enhance future capabilities, long term planning for ESF #5 from a central office at FEMA is essential. There are some encouraging signs of progress. Having learned to appreciate the value of interactive data communications, FEMA established its own data link using the EIS software in attempting to provide real-time disaster response during the Northridge Earthquake in California.[50]

The mission of providing support to civil authorities in times of crisis is an important one. A timely response can prevent loss of property and save lives. Morally and politically, as we have seen during Hurricane Andrew, an inadequate or delayed response is not acceptable. It is vital that agencies responsible for crisis response like the Sixth U.S. Army are prepared

to respond immediately whenever the next disaster strikes. Automated systems like the Emergency Information System, that can respond with the speed of a computer to disseminate vital information, are indeed a valuable tool in such a critical mission.

Endnotes

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