

## **“SOMETHING OUT OF SOMETHING”: IMPROVISATIONAL TRAINING FOR EMERGENCY MANAGERS**

September 2007

Every day, emergencies occur that threaten our lives and well-being. On rare occasions, emergencies occur that are so large in scale and so severe that local responders may not have the resources—people, equipment, expertise, funds—to effectively and safely respond. In such events, responders come in from other cities, counties, and states, as well as from federal agencies, to assist those with local responsibility. One characteristic of these large, rare, dynamic events is the rapidly evolving complexity that faces individuals trying to effectively manage all of the organizations, equipment, communications, and the safety and health of all involved. Frequently, an unexpected aspect of such an event can stress, or may even overwhelm, one element of a response.

Recognition of the complexities inherent in a multi-organizational response effort have led to a concerted effort in recent years to institute a standard, nationwide framework -- the National Incident Management System (NIMS) -- for emergency management and response in all jurisdictions and agencies. However, the response failures following Hurricane Katrina and other events point to a variety of systemic problems that remain unresolved. In particular, *ad hoc* disaster management coalitions comprised of disparate teams are prone to a number of problems, particularly with respect to communication, coordination, clear lines of authority and responsibility, and resource allocation.

At times, FEMA, state, and local officials seemed unaware of local capacities and vulnerabilities. On the one hand, one local official stated, “FEMA's deference was frustrating. Rather than initiate relief efforts—buses, food, troops, diesel fuel, rescue boats—the agency waited for specific requests from state and local officials.” On the other hand, communication failures left local officials unaware of the full extent of assistance required. As this state official commented, “If you do not know what your needs are, I can't request to FEMA what I need.” (Wachtendorf & Kendra, 2006)

Many feel that these problems are due to inadequate or inconsistent training among the participants. This is no doubt true, as far as it goes; at a more fundamental level, however, what seems to be lacking in many organizations is the agility and flexibility to adapt to non-routine emergency situations in a timely manner. In other words, what is lacking is the ability to *improvise*.

[...] what we saw were failures to collectively make sense of the disaster and what was necessary to respond to it. Sense-making, a concept developed most comprehensively by Weick, is concerned with how people and organizations, constructing meaning in their environment, “construct what they construct, why, and with what effects.” It is a concept that

is closely connected to the *ability to improvise*, or to rework knowledge in novel ways under tight time constraints. (Wachtendorf & Kendra, 2006)<sup>1</sup>

Despite what the popular usage of the term implies, improvisation is not “something out of nothing”, nor is it simply “acting without planning”. Rather, improvisation is characterized by the ability to recombine previously existing knowledge, skills, and other resources into novel combinations in response to the moment. Within the context of disaster management and response, improvisational skills do *not* replace existing emergency planning and preparedness processes or response protocols, but expand them in the face of rare, unexpected events. Research suggests that the ability to improvise may be centrally related to overall improvement in disaster management and response efforts.

If firefighters were trained to become more skilled at improvising, then they might see the danger in an escalating fire sooner and disengage or reposition themselves or change their suppression tactics more quickly. The reason their situation awareness might improve is that when people increase their capability to improvise, they should increase the size of their response repertoire. The repertoire should get bigger because greater skill at improvisation makes it easier for people to recombine old skills and knowledge in new ways to deal with the unexpected. (Weike, 2001)

Not only must the improviser determine whether or not pre-existing plans exist to account for various aspects of the disaster, they must also determine whether or not those plans can be carried out and whether or not they are appropriate given emerging needs. (Wachtendorf & Kendra, 2006)

The ability to improvise successfully is dependent not only upon practice in the act of improvisation, but, at a more basic level, upon the training and the proficiency of the improviser. Jazz “jam sessions”, perhaps the most famous example of organizational improvisation in the world, requires that the musicians practice their musical skills and their repertoire constantly. From this perspective, the shortcomings of current emergency management training practice, with respect to large scale response, become apparent. Much of the training in emergency management consists of online classes and limited classroom instruction that may not be enough to adequately prepare emergency managers for real world situations. This problem is exacerbated by the fact that some of the necessary skills and knowledge required for large-scale incident response are called upon fairly rarely, so that even disaster managers and responders with much experience in local, day-to-day emergencies may not be as proficient at managing a more complex, multi-jurisdictional, multi-organizational event. Large, full scale exercises to simulate such events, while invaluable and necessary, are time-consuming and costly, as well as difficult to coordinate among the different relevant agencies, and hence are conducted

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<sup>1</sup> Emphasis added by the authors of this white paper.

relatively rarely. As a result, the only way to get any proficiency in the skills required in major events is to have actually participated in several major event – “trial by fire”, as it were. Such experience is not as common as may be believed.

A great deal has been made of California’s “experience” with disaster. This experience is believed to translate into real operational effectiveness. However, while dedicated and competent professionals remain, this experience is fading quickly – the Central Valley floods occurred 7 years ago, the Northridge Earthquake, 11, and Loma Prieta, 15. Experience is a perishable as it is invaluable. (Godley, 2005)

What is needed is an easily available, inexpensive form of training that provides emergency managers and personnel who staff an Emergency Operations Center (EOC) with a venue to develop and practice those aspects of large-scale response that are less frequently called upon during response to routine emergency events. Examples of such skills include:

- Coordination with people outside of local teams in order to accomplish goals
- Making sense of, and acting upon, noisy incomplete data
- Dealing with resource shortcomings

All of the above skills can be considered improvisational skills that expand upon the basic skills and training that are called upon in response to routine emergencies.

### **Current Disaster Management Exercises**

Currently, disaster management and response exercises are generally one of the following types (CCSF, 2005; Weinstein, 1995; EPA, n.d.; MSU, n.d.):

*A tabletop exercise* is a structured discussion among decision makers or responders, based on a scenario or set of conditions for potential emergency response situations. Its purpose is to promote preparedness by testing policies and plans and by training personnel. The emphasis is on slow-paced problem solving, in a low-stress environment, rather than on rapid, spontaneous decision-making.

*A functional exercise* is an activity that is designed to test or evaluate the capability of one or multiple functions, or activities within a function. This exercise is more complex than a tabletop exercise in that activities are usually under some type of time constraint with the evaluation/critique coming at the end of the exercise. It typically takes place in the EOC in conjunction with selected Department Operational Centers<sup>2</sup> (DOCs) and may include the State OEC, Federal Government agencies and/or neighboring county EOCs.

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<sup>2</sup> In large scale events, any individual city or county department (as well as any non-governmental agencies that provide crucial services, such as utilities) that has a role in the response will open a Departmental Operations Center (DOC) from which that department’s

Tabletop and functional exercises can be conducted by “pencil and paper”, or with the aid of software simulation tools.

A *full-scale exercise* involves an actual deployment of personnel and equipment throughout a geographic area. It will typically involve the activation of the EOC, multiple DOCs and the establishment of field command posts. This type of exercise includes mobilization of personnel and resources, the actual movement of emergency personnel and resources and the actual movement of emergency workers, equipment and resources required to demonstrate coordination and response capability.

The exercises discussed above occur relatively infrequently — on the order of once a year for full-scale, once a quarter for functional or tabletop (CCSF, 2005). This is due in part to the fact that they are time consuming to create, and in part because they are very difficult to coordinate. Emergency managers, and most of the people who would staff an EOC or DOC in the event of a real situation, are people with other day to day responsibilities, and large scale training exercises often represent a significant time commitment.

More significantly for this discussion, exercises as described above would seem to be most valuable as tools for evaluating and refining existing disaster plans and procedures, and practicing their application. With the exception of tabletops, current exercises are less valuable as actual *training* – that is, as a forum for novice disaster managers to develop new skills (as discussed further, below). This is a critical shortcoming: according to the most recent survey of State Directors of Emergency Management by the National Emergency Management Association, two thirds of state-level Directors of Emergency Management have been in their position for three or fewer years, and approximately one third of them have fewer than twelve years experience in the emergency management profession<sup>3,4</sup> (NEMA, 2007).

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response operations are managed. Many aspects of the training discussed here are applicable to DOC personnel, as well

<sup>3</sup> Forty-nine states, the District of Columbia and four U.S. territories completed the NEMA survey, for a total of 54 responses.

<sup>4</sup> In a recent survey of emergency management professionals conducted by the authors (found at [www.terrorismpsychology.net](http://www.terrorismpsychology.net)), 45 of 101 respondents reported being with their current agency five or fewer years; and 56 of 101 respondents reported having had some sort of command authority at three or fewer major disasters (for comparison, 53 of 101 reported having been deployed to more than five major disasters in some capacity). (Statistics current as of September 20, 2007).

## Training, not just Exercising

Large scale disasters are relatively rare events, and hence disaster management skills consistent with large scale events are often infrequently exercised in a real situation. As a result, immersive, high fidelity training exercises as described above are necessary, in order to provide trainees with valuable experience in a realistic environment that they may observe relatively infrequently in real life. From the perspective of training, however, such exercises have a certain element of “sink or swim” for novice disaster managers; research indicates that such an unguided approach to training is often ineffective, because trainees are not given adequate guidance on how to effectively solve problems within the given domain, nor are they given specific feedback on how to correct errors or shortcomings in their performance (Clark, 2004; Lussier and Shadrick, 2003). Hence, without the proper learning framework, there is no evidence that high fidelity exercises are in and of themselves effective at *instruction* of the skills required for high performance. This is particularly true of the so-called “soft” skills, such as improvisational flexibility, task-prioritization, or interpersonal communication, that are often just as critical to successful real-world performance as procedural knowledge (Lussier and Shadrick, 2003).

However, except for tabletop exercises, there exists little training for emergency managers beyond classroom instruction. What is needed is an easily available, inexpensive form of training to provide hands-on, focused, readily available learning and development of those specific disaster management skills required during large-scale, multi-organizational incidents. The availability of such training would greatly increase the value that participants would get from functional or full-scale exercises, as the participants would then be practicing known skills, rather than trying to learn them in an unguided manner.

As much as possible, such a training system should embody the aspects of *deliberate practice*: extended periods of intense training and preparation with the goal of achieving expert performance (Lussier and Shadrick, 2003). Some of the characteristics of deliberate practice are detailed in Table 1.

### **Characteristics of Deliberate Practice**

**Repetition.** Task performance occurs repetitively rather than at its naturally occurring frequency. A goal of deliberate practice is to develop habits that operate expertly and automatically.

**Focused feedback.** Task performance is evaluated by the coach or learner during performance.

**Stop and start.** Because of the repetition and feedback, deliberate practice is typically seen as a series of short performances rather than a continuous flow.

**Emphasis on difficult aspects.** Deliberate practice will focus on more difficult aspects. For example, in deliberate practice flight simulators, a large portion of the time will be involved in landings and takeoffs and relatively little in steady level flight, even though landing and takeoff represents a very small percentage of overall flight time.

**Focus on areas of weakness.** Deliberate practice can be tailored to the individual and focused on

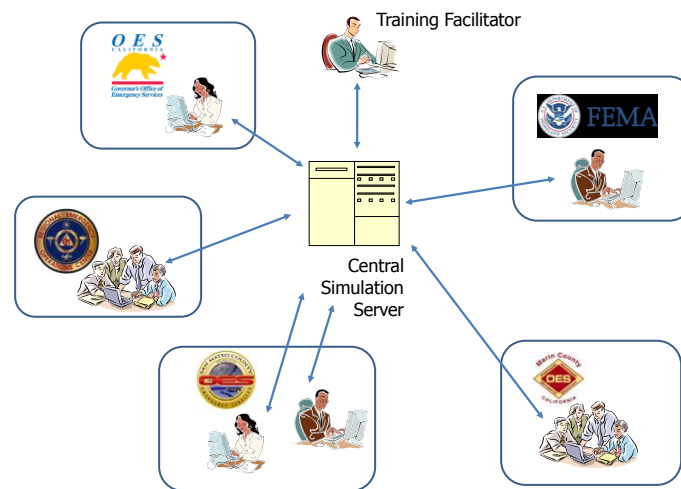
areas of weakness. During immersive, high-fidelity performances, the individual will *avoid situations in which he knows he is weak*, and rightly so as there is a desire to do one's best.

**Conscious focus.** Expert behavior is characterized by many behaviors being performed simultaneously with little conscious effort. In deliberate practice the learner may consciously attend to isolated elements because improving performance at the task is more important than performing one's best. After a number of repetitions attending to the element to assure that it is performed as desired, the learner resumes performing without consciously attending to the element.

**Active coaching.** Typically a coach must be very active during deliberate practice, monitoring performance, assessing adequacy, and controlling the structure of training.

**Table 1: Characteristics of Deliberate Practice. Adapted from (Lussier and Shadrick, 2003).**

Figure 1 illustrates how such a system might be instantiated. To help embody the characteristics discussed in Table 1, brief simulations, perhaps spanning the activity of one or two operational periods during a response, are run by a training facilitator. The facilitator monitors the progress of the players, and can inject additional events into the simulated world, for the purpose of further evaluation of participant performance, or to guide them to exercise some specific set of skills. The participants can interact with the simulation, and with each other. The actions of the participants, and of the facilitator, will be recorded, for playback during an after-action analysis, so that participants can analyze the results of their strategies and actions, and identify skill areas that need improvement.



**Figure 1: Participants from remote sites can interact with the scenario and each other through a central server. A Facilitator also monitors the session, and interacts with the scenario.**

Providing the trainer with the ability to inject events into the simulation in real time enables him or her to tailor a given scenario to the strengths and weaknesses of the specific set of players. It also enables a single scenario to be replayed several times, with

gradually increased complexity, thus providing players with more opportunities to practice develop and improve improvisational skills.

## Distributed Simulation Software for Improvisational Training

Researchers from Quimba Software and from the National Center for the Psychology of Terrorism, together with researchers from Wright State University, are working to develop the training software described above<sup>5</sup>. In keeping with the objectives of low cost and ready availability, the software will be in the form of a distributed software system that delivers simulated emergency scenarios to the training participants. This system can be used not only to train the personnel within a single EOC, but will also enable training games with remote participants. This will encourage and facilitate more frequent training exercises, especially larger scale, multi-organizational exercises that involve state and federal agencies, as well as local participants.

Our initial prototype scenario presents a large earthquake in the San Francisco Bay area, which affects multiple counties and cities in the region. This prototype emphasizes the issues around the logistics, and resource management of a Bay Area-wide disaster, as well as some of the issues around operational aspects of such a situation, as well.

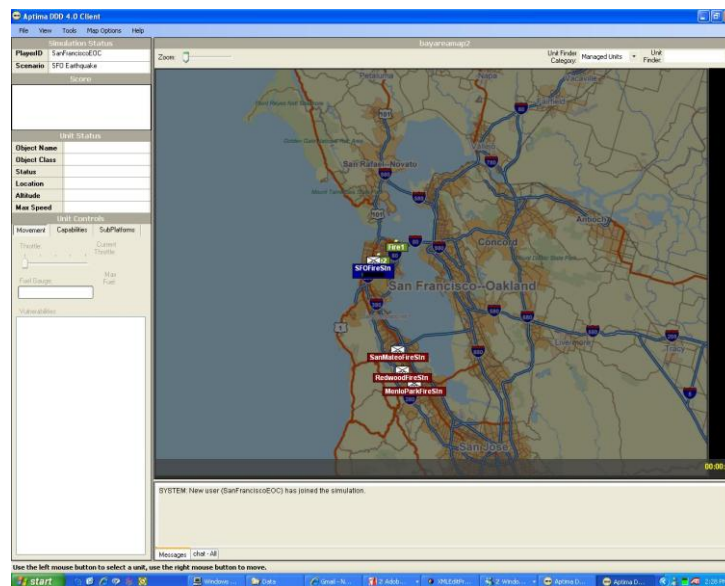


Figure 2: Opening Screen of Earthquake Scenario

Future versions will in addition emphasize issues around Incident Action Planning, and communication.

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## Impact

No community, no matter how well prepared, can completely anticipate every possible emergency situation that can occur. The training software discussed above will improve the ability of communities to cope with unexpected, large scale, highly complex disasters. It will give them the ability to evaluate the scope of the community's preparedness plans, and to develop and improve the improvisational and other response skills of their emergency managers, and EOC personnel, in advance of real events, in a more time- and cost-efficient manner. In addition, it will facilitate training exercises across organizational boundaries, further improving the national disaster preparedness.

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