

Using Virtual Simulations to Avert Disaster

David Wentworth, Senior Analyst

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Company Background



Mission Support Alliance (MSA) is the cornerstone of a multi-contract structure at the Hanford Site, collaborating with the U.S. Department of Energy (DOE) and all Hanford Site contractors to move the mission forward. MSA provides quality infrastructure and site-wide services - always with a focus on implementing new technologies that reduce costs, reduce energy consumption, and safely and effectively satisfy the needs of the cleanup contractors.

Services MSA provides range from critical emergency services and training including the Hanford Fire Department and Hanford Patrol operations to infrastructure services like environmental integration and land management, fleet and road maintenance, water/electric and utilities and cyber security and information management. MSA also ensures cultural preservation of the site and its artifacts.

Furthermore, MSA conducts portfolio management affording DOE and contractors the ability to make informed decisions utilizing technical data for integrated planning that produces cost savings, project alternatives and offers realistic decisions that support DOE's path to meeting all milestones. MSA also manages Hanford Site public and B-Reactor tours, and coordinates the Hanford Speakers Bureau through its communications and external affairs programs.

Company At-a-Glance	
Headquarters	Richland, Washington
Year Founded	2005
Employees	1,750
Global Scale	U.S.
Stock Symbol or Private	Private
Web site	http://msa.hanford.gov/msa/

Incredibly diverse, MSA's scope of work encompasses a yearly workload that includes maintaining 500 miles of roadways, providing more than 200,000 megawatts of power, performing 68,000 chemical analyses, managing 2.7 million square feet of facilities, maintaining approximately 10,000 desktop computers, responding to 230 emergency response calls and putting out 25 wildfires.

Within MSA lies the Hazardous Materials Management and Emergency Response Training and Response Center, referred to as HAMMER. HAMMER's one hundred people are responsible for training for the entire Hanford site population. One important piece of that is the training of emergency responders – those people who are called upon whenever there is a disaster that involves U.S.-controlled energy interests.

This group is known as Emergency Support Function #12, or ESF #12. This group is intended to facilitate the restoration of damaged energy systems and components when activated by the Secretary of Homeland Security for incidents requiring a coordinated Federal response. Under Department of Energy (DOE) leadership, ESF #12 is an integral part of the larger DOE responsibility of maintaining continuous and reliable energy supplies for the United States through preventive measures and restoration and recovery actions.

Business Conditions

Traditionally, HAMMER delivered training to responders in a very hands-on way. Each year, HAMMER would assemble about one hundred DOE responders at four different FEMA sites around the country, with about twenty-five people at each site. These responders are primarily DOE employees who have other positions within the organization, but are called together for emergency situations. The training typically consisted of disaster simulations and scenarios that required the learners to work together to mitigate the issues brought on by a given disaster.

About four years ago, the HAMMER team determined that it was necessary to update the training that had been using for the previous eight years. There was a wealth of new technologies available that they were not taking advantage of. At the same time, travel budgets were all but eliminated, and it was no longer possible to send these responders to the FEMA sites for training. There was also a need to minimize the amount of time these responders were away from their original posts. HAMMER also wanted a way to deliver the more mundane - but necessary - administrative training that was required for responders in a more meaningful and engaging way.

The challenge became not so much about how to deliver the training – it obviously had to be done virtually – but rather how to do it in a way that replicated the effectiveness of the on-site experience for the responders. Teamwork is crucial to what they do, so the ability to train together was imperative.

Program Overview

Vivid Learning Systems was already an approved partner for the larger MSA organization, so the learning leaders for HAMMER approached them with their challenges. Taking into consideration the desire for more up-to-date training and the travel budget constraints, Vivid developed an innovative virtual program aimed at increasing realism while at the same time reducing costs. The Vivid team knew that HAMMER needed a virtual web conference experience that was as real as possible. The responders needed to be able to communicate and cooperate in real time and the instructor had to be able to throw in challenges on the fly.

Vivid created a multi-pronged approach for the training program. First, the responders were presented with some traditional on-line learning modules that basically recapped the lessons learned over the previous year. Then there was a module focused on skills and concepts necessary to perform their job. The last piece of the strategy was an immersive, synchronous exercise that mimicked the in-person events as closely as possible.

Figure 1: HAMMER Video:



Source: MSA, 2012.

To meet HAMMER's unique needs, Vivid built an immersive, virtual experience focused on closely replicating the circumstances surrounding a disaster. The first year the program was in place the program used a hurricane scenario. Vivid hired actors to portray newscasters broadcasting the devastation the hurricane had brought, complete with actual hurricane footage. Responders identified as team leads then had to perform their specific duties and were given other responders to direct in the virtual environment. They even created a virtual FEMA briefing room, complete with a mock FEMA official who would fire questions at the participants.

The responders were then presented with videos giving them some initial conditions which allowed them to make an assessment of the damage at the virtual facility. These tasks were all performed inside the virtual classroom. In fact, several virtual rooms were created, each named for a different response center. HAMMER moderators would deploy groups of people into these response centers where they could talk with one another, debrief and give instructions. They were also able to share important documents and data that they could edit in real time. Moderators would drop into the different response rooms and represent an official calling with new information or requesting information from the group. This allowed the moderators to move quickly from region to region as necessary.

Figure 2: HAMMER Simulation:



Source: MSA, 2012.

Throughout the entire exercise, a technician was on hand to handle any technical issues that might arise, such as log-ins, headsets, or audio problems. The goal was to make sure the technology did not get in the way of the learning. A “technical issues” chat room was created alongside the exercise chat rooms so the responders could easily jump in to help if learners had any issues. This allowed technical problems to be resolved one-on-one, rather than impeding the entire program.

The second year of the program was delivered in exactly the same way, only the disaster was an earthquake rather than a hurricane. For the third year of the program, it was decided that the training needed to focus on the more basic tasks the responders had not worked on since their initial training. Again, there was no budget to return the group to the classroom, but HAMMER did not want to simply transform the classroom curriculum into an online class that presented slides of materials and asked questions. Such administrative material can often be viewed as boring by participants, but it is vital for responders to successfully deploy quickly and correctly when a disaster strikes.

Building on the success of the full-blown simulations, the basic training was also designed to be delivered in an on-line simulation format. In this case the online simulation was asynchronous, and did not require all of the responders working together in real time. They decided to design a self-paced simulation with links to online resources for further information about the tasks being taught.

The simulation consisted of a virtual office with a computer screen in front of the learner, as well as a phone on the desk and a help button. The responders would receive emails and phone calls similar to those they would actually receive if they had been deployed and needed to respond to an emergency.

Figure 3: HAMMER Simulation:



Source: MSA, 2012.

The responders would use the virtual phone to contact each of the people necessary to start their deployment. For example, they had to get clearance from their supervisor in order to leave. They even had to call family members to make sure they were clear of commitments. Further steps included getting their travel orders and setting up their travel arrangements.

Delivering this type of material via self-directed PowerPoint slides would have been tedious, but by turning it into a scenario where the responders needed to execute against each of the procedural lessons made for a far more engaging experience. Each of the lessons was connected via video vignettes created with cartoon versions of the moderators. These videos would recap the previous module and set up the next one, and were done in a humorous way to keep the program entertaining.

Figure 4: HAMMER Video:



Source: MSA, 2012.

Business Impact

This program has been wildly successful for HAMMER. There was 100% positive feedback to the simulations according to Jon Juette, Senior Project Administrator for the HAMMER group. The respondents particularly enjoyed the cartoon moderators, as they were voiced by the actual HAMMER administrators. The learners said this really helped them connect with the training. The organization also won national awards for online training both years that the simulations were used.

As for practical impact, Juette states that during the two largest deployments in 2012, the problems that the training was designed to address were nearly non-existent. When challenges did arise, communication around solving the problems was greatly improved. HAMMER also found that the administrative training was just as effective. According to Nicole Zawadzki, Training Program Administrator with MSA, responders were now so in tune with the processes that they noticed when FEMA deviated from protocol and immediately asked questions, where previously they might not have known there was a deviation.

Among the drivers for the new program was cost savings. Juette calculates that the DOE saved approximately \$200,000 annually by not sending responders to FEMA sites for training. There was also additional cost savings for the DOE in terms of productivity. The responders no longer had to lose a day or two of work for travel, and the simulations were carried out over the course of one day, rather than two. Therefore the DOE was able to take advantage of two to three extra days of productivity from each of their responders.

Overall, all parties involved consider the program a resounding success. According to Juette, “groups were able to gather quickly, and bounce around to different regions and response centers just like they would in an actual response. It was probably more realistic in that sense than what we were able to do in the face-to-face training.”

Future Plans and Next Steps

Despite the successes of the virtual program, HAMMER is actually looking to get the responders back in the classroom next year since they realized that it simply makes sense to have these people meet face to face when they can to develop relationships between team members. If budget allows, the face-to-face meetings will take place; however, they will be combined with further simulations created in a similar manner as previous years.

The HAMMER group is looking forward to working with their partners to create even more in-depth realistic simulations. The team in charge of training the DOE responders has also shared their success stories with the HAMMER team at large, who provide all kinds of safety training to people doing clean-up work at the Hanford site. They are hoping to leverage their experience with Vivid’s on-line simulations across the entire organization.

Conclusion

The key takeaway from HAMMER's experience is that training that is traditionally done in-person can effectively be transitioned to a virtual environment, often with better results. Key points to remember include:

- The delivery must match the content. A synchronous simulation was effective for response training, but an asynchronous approach worked better for the administrative training.
- Make it engaging. If people are not going to be face to face, the virtual environment needs to be engaging and relatively immersive. HAMMER used entertaining cartoons to make the transitions from one module to the next, keeping the learners' attention.
- Incorporate multiple elements into the environment. By using videos, chat rooms, web conferencing, etc., HAMMER was able to create an immersive, collaborative environment.
- Don't let technology get in the way. Make sure the kinks are worked out with test runs and have a platform technician on hand if possible. Even small glitches can break the immersive nature of the program.

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