

munication, to changes and optimization of command and control using virtual reality and immersive environments, a wide array of emerging and maturing technologies are being adapted and deployed for the use of emergency and disaster personnel.

The US Department of Homeland Security's (DHS) science and technology is in the forefront of developing innovative technologies to provide emergency managers and operators a capability to effectively, economically, and rapidly verify and validate response tactics, plans, and procedures. These technologies also are used to conduct "what-if"-type analyses prior to an incident (preparedness, analysis, and training) and during/after an incident (operational, lessons learned). The science and technology approach to developing these technologies is to provide training and exercises (real time) and analysis of alternative response tactics (non-real time). As part of this research effort, DHS is developing a common framework to allow for the rapid integration of existing incident-related modeling and simulation tools and use of virtual worlds to enhance the user experience. This technology is intended to enhance the understanding of the impacts and consequences of complex incidents to improve planning and response for increased effectiveness of procured resources and reduce the loss of life and property.

Keywords: emergency; disaster; preparedness; response; science; technology

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Federated Modeling and Simulation Architecture to Enhance Preparedness and Response

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Increasingly, modeling and simulation technologies are proving to be a cost-effective method of improving preparedness at the incident response and the community level. Currently, there is a plethora of modeling and simulation technologies, methodologies, and techniques, each intended to support a specific capability. In regards to preparedness and response at the tactical and command control level, many of these models must be brought together to provide an integrated capability. The current challenges include managing interfaces, scalability, interoperability with commercial and government tools, and the use of gaming technologies. An innovative approach to solving this complex integration problem will be presented, and a prototype solution that addresses modeling and simulation interoperability and scalability will be showcased.

Keywords: modeling; preparedness; response; simulation

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Making Exercises More Useful and Relevant Through Application of Modeling and Simulation Technology

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The (US) National Exercise Simulation Center (NESC) is a Congressionally-mandated, state-of-the-art training and

exercise facility within the Federal Emergency Management Agency (FEMA) Headquarters. It is designed to be a state-of-the-art, scalable, flexible, simulation center to accommodate a wide range of services. The NESC also supports the all-hazards preparedness and response mission through employing a mix of live, virtual, and constructive simulations. The NESC is an important tool for elected officials and emergency support providers at all levels of government and supports NEP events involving partners from federal, state and local government, non-governmental organizations, and the private sector. The NESC is a forum for interagency planners to test their plans (e.g., annual hurricane plans, pandemic influenza plans) by providing realistic incident scenarios through which partners can identify gaps and determine courses of action. This presentation will describe NESC, its capabilities, use of technologies, and its use within FEMA as a key supporting element of the National Level Exercises in the upcoming years.

Keywords: exercises; modeling; National Exercise Simulation Center; simulation; technology

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International Cooperation in Bringing Technology Out of the Laboratory and into the Field

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CRISMART is a leading center of competence in the field of crisis management. CRISMART fosters knowledge about national and international crisis management and acts as a bridge between practitioner and researcher communities in an effort to strengthen Swedish and European crisis management capability. CRISMART's research activities target various societal sectors using a number of theoretical and analytical tools to shed light on preparedness and capacity to mitigate acute contingencies. CRISMART's research is headed by the staff in Stockholm, and conducted in collaboration with partners in Sweden and around the world. All of CRISMART's analytical support and educational activities are based on scientifically documented experiences of national and international crisis management. Since the mid 1990s, CRISMART has trained decision-makers at all levels and in a number of sectors in Sweden and abroad. This presentation will describe CRISMART and associated research that is applied to preparedness and response scenarios.

Keywords: cooperation; international; research; technology

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National Center for the Study of Preparedness and Catastrophic Event Response

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The mission of the (US) National Center for the Study of Preparedness and Catastrophic Event Response (PACER) is improve the nation's preparedness and the ability to respond in the event of a high-consequence disaster, and alleviate the effects of the event by developing and disse-

inating best scientific practices. The PACER is conducting several projects focused on five key areas of research: (1) preparedness theory and practice; (2) response networks; (3) analysis, modeling, and simulation; (4) science, technology, and engineering; and (5) education. In particular, the education research area has been tasked with developing an infrastructure to train disaster experts, from today's scientists to tomorrow's leaders in academia, health care, and public service. Furthermore, PACER has established eight principals around which research projects focus: (1) understanding high impact chemical, biological, radiological, nuclear, or explosive events; (2) conducting inquiries that serve the goals of the Department of Homeland Security and the National Response Plan; (3) providing relevance to first responders at all levels; (4) engaging all levels of government, public and private sectors for a fully integrated approach; (5) leveraging the diverse resources of partners to augment efforts; (6) developing educational programs and concepts for broad dissemination to train future leaders, experts, and scholars; (7) engaging appropriate efforts to achieve sustainability; and (8) maintaining flexibility, given the potential changing threats and the need to be prepared for all hazards.

This presentation will describe PACER's activities in furthering knowledge and understanding of high-consequence events and its ability to effectively deter and prepare for and respond to such events.

Keywords: disaster; preparedness

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Virtual Worlds and Modeling and Simulation Information Security in an Emergency Management Environment

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Recent technological advances in the gaming industry have now made it possible to leverage the Virtual World (VW) technology and use it as part of the modeling and simulation services in the preparedness and response training environments. Virtual World offers a slew of capabilities with the potential to solve aspects of information sharing, viewing, and collaboration across many jurisdictional boundaries. However, issues such as information security, specially in an emergency response environment, require attention. This presentation will discuss the VW capabilities and describes how such a capability may be used in a secured network environment to support preparedness and operations.

Keywords: emergency; emergency management; information; information security; modeling; simulation; Virtual World

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Military Aid in Civilian Disaster

How to Build a Mobile Field Hospital during Disasters: An Italian Model of Civilian and Military Cooperation and a Proposal for the Future

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During a disaster, local health services are overwhelmed, and damages to clinics and hospitals can render them useless. Damages to the healthcare infrastructure will further compromise the delivery of health services, therefore, many countries maintain mobile field hospitals in order to react during disasters. Lessons from past complex disasters (e.g., civil conflicts, wars, humanitarian emergencies) showed that field hospitals—civilian or military—play a significant response role during disasters.

The Italian Association of Alpini (ANA) model of mobile field hospital. It is a mobile, flexible hospital structure that provides self-contained, self-sufficient health care. The hospital can rapidly be deployed, expanded, or contracted, and can be engaged during a disaster to provide medical assistance. This field hospital supports the activities of civil protection in the national and international context, implements local emergency services, and enhances hospital bed surge capacity and treatment of mass casualties during disasters for a specific period of time.

The Hospital on Field of Alpines, was founded in 1976 and operates in Italy, with the aid of two major hospitals and civil protection in the national and international context. The hospital operates through the activity of volunteers that are experts and engaged in maxi-emergency and critical medicine, and are disaster specialists.

During disasters, there is a need for a rapid public health response for the treatment of victims and maintenance of a viable healthcare delivery system and for the prevention of new cases. Field hospitals (civilian or military) have been used successfully and now have a crucial role in supporting affected populations. In addition, it is suggested that a new form of civilian and military cooperation network for future medical response and preparedness be implemented in complex disasters.

Keywords: civilian; cooperation; disaster; Italian Association of Alpini; military; mobile field hospital; preparedness

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