## CONCURRENT SESSION 7 – HAZARD RESPONSE

### Repurposing Commercial-Off-the-Shelf (COTS) 3D Game Engines to Improve the Effectiveness and Efficiency of EPA's Response Efforts

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The ability to implement full-scale disaster response exercises with minimal resources and maximum control and realism is of great interest to the emergency response community. The significance of disaster response training and exercise activities on emergency personnel are well documented throughout literature. They encourage teamwork, increase training and equipment adequacy, and develop realistic perceptions of job risk. Emergency responder expertise is the cumulative result of actual response experience as well as periodic training and exercise. The impacts of the latter activities are bolstered with increasing realism.

Currently, the U.S. Environmental Protection Agency (EPA) needs to improve the ability to test, train, and evaluate strategic approaches to CBRN response and cleanup scenarios outside of large-scale demonstrations or real-world incidents. In place of in-person exercises, simulated training amplifies real-world experiences, providing a means to evaluate problem-solving and decision-making skills, technical and functional expertise, and communication and team-based competencies. This means there is a significant need for developing a simulator capable of visually depicting hypothetical CBRN disaster response and recovery scenarios and using these simulations to train federal and state responders/decision makers. The potential application and impact of this simulation tool would be far reaching. In addition to training personnel, response procedures could be reviewed prior to being implemented in the field, computer-assisted strategies could be developed with the use of artificial intelligence, and personnel could be trained on the use of EPA modeling and decision support tools in simulated environments.

In support of improving simulated training, EPA is evaluating the use of three-dimensional commercial-off-the-shelf (3D COTS) game engines for facilitating modeling, training, and exercise efforts for CBRN incidents. Today's 3D COTS game engines rival (if not exceed) the capabilities of traditional research modeling platforms. These engines are capable of modeling physical systems and conditions in real time, such as entity collision, fluid, particle, and light dynamics. The modification of these engines to simulate dispersion, fate and transport, explosive models, and radiation attenuation could offer significant cost savings in the development of future decision support systems, environmental modeling tools, and training platforms.

This presentation will summarize: 1) EPA's efforts to evaluate the use of 3D COTS game engines as potential modeling platforms; 2) their application in training emergency response personnel; and 3) the development of a next-generation modeling platform for holistically simulating large-scale contamination incidents and subsequent cleanup efforts.