

## PREPAREDNESS FOR THE NUCLEAR DETONATION HAZARD

In addition to the destructive blast and resulting damage to buildings and infrastructure, a nuclear detonation would cause initial radiation, fires, and radioactive fallout. Because the impacts would be wide-spread and catastrophic, it is critical to provide first responders with tools, knowledge, and training to understand the effects of a nuclear detonation and the response strategies that will allow them to save lives, stabilize infrastructure, minimize exposure to radiation, and provide for basic human needs.

Over the last twenty years, the federal government has developed planning guidance to support responders' understanding of these hazards and what actions they can take to protect themselves and the public. This includes, the ["Planning Guidance for Response to a Nuclear Detonation,"](#) 3<sup>rd</sup> Edition (2022), as well as the more operationally focused, ["72-Hour Nuclear Response Guidance"](#) (2023), which outlines actions first responders and emergency managers should take during the initial hours and days of the response.

## ENHANCING RESPONDER UNDERSTANDING WITH VISUALIZATIONS

To support the understanding of critical concepts outlined in these guidance documents and other tools, the Radiological and Nuclear Response and Recovery Research and Development project of the Department of Homeland Security's Science and Technology Directorate (DHS S&T) [National Urban Security Technology Laboratory \(NUSTL\)](#) is developing science-based visualizations in partnership with the Department of Energy's Lawrence Livermore National Laboratory (LLNL).

The Nuclear Detonation Visualizations will depict nuclear detonation effects in a computer-generated but realistic city to help first responders understand the size, scale, and expected impacts of a nuclear explosion.

The series of approximately nine short videos will address the following key concepts for nuclear detonation planning and response:

- Initial radiation, fires, and fallout
- Blast effects and zone-based response strategies
- Public warning and shelter-in-place considerations
- Developing a common operating picture
- Priorities for impacted and supporting jurisdictions

The visualizations will also demonstrate response tactics, protective actions, and other planning considerations that will help responders save lives.

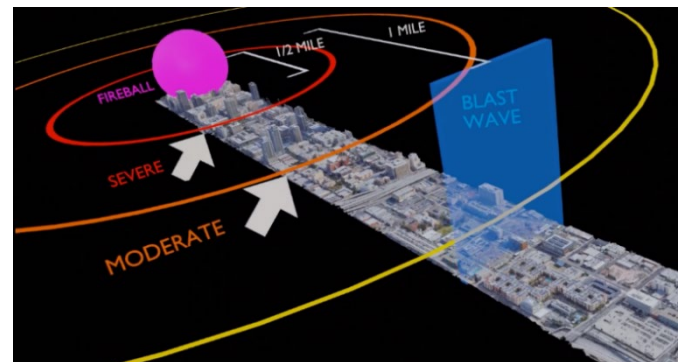


Figure 1. A computer-generated visualization of the blast zones produced by a nuclear detonation.

## CONTINUOUSLY IMPROVING INFORMATION-SHARING FOR PLANNING RESPONSE

This work builds on a previous DHS S&T NUSTL-funded effort with LLNL that created a Radiological Dispersal Device Studio, a virtual platform that can be used to simulate hazards and the realistic radiation readings that would accompany them. This resulted in the publication of [eleven radiological dispersal device videos](#) that have been widely used by the first responder community for understanding radiological hazards and planning response operations.

Nuclear Detonation Visualizations are expected to be completed in Fall 2023 and will be available through S&T's website and YouTube channel.