NASA, FEMA hold asteroid emergency planning exercise

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Artist's concept of a near-Earth object. Credit: NASA/JPL-Caltech

What would we do if we discovered a large asteroid on course to impact Earth? While highly unlikely, that was the high-consequence scenario discussed by attendees at an Oct. 25 NASA-FEMA tabletop exercise in El Segundo, California.

The third in a series of exercises hosted jointly by NASA and

FEMA—the Federal Emergency Management Agency—the simulation was designed to strengthen the collaboration between the two agencies, which have Administration direction to lead the U.S. response. "It's not a matter of if—but when—we will deal with such a situation," said Thomas Zurbuchen, Associate Administrator for NASA's Science Mission Directorate in Washington. "But unlike any other time in our history, we now have the ability to respond to an impact threat through continued observations, predictions, response planning and mitigation."

The exercise provided a forum for the planetary science community to show how it would collect, analyze and share data about a hypothetical asteroid predicted to impact Earth. Emergency managers discussed how that data would be used to consider some of the unique challenges an asteroid impact would present-for preparedness, response and public warning.

"It is critical to exercise these kinds of low-probability but high-consequence disaster scenarios," FEMA Administrator Craig Fugate said. "By working through our emergency response plans now, we will be better prepared if and when we need to respond to such an event."

Exercise attendees included representatives from NASA, FEMA, NASA's Jet Propulsion Laboratory, the Department of Energy's National Laboratories, the U.S. Air Force, and the California Governor's Office of Emergency Services.

The exercise simulated a possible impact four years from now—a fictitious asteroid imagined to have been discovered this fall with a 2 percent probability of impact with Earth on Sept. 20, 2020. The simulated asteroid was initially estimated to be between 300 and 800 feet (100 and 250 meters) in size, with a possibility of making impact anywhere along a long swath of Earth, including a narrow band of area that crossed the entire United States.

Representatives of NASA, FEMA, the Jet Propulsion Laboratory, the U.S. Department of Energy's national laboratories, the U.S. Air Force, and the California Governor's Office of Emergency Services gathered in El Segundo, California, on Oct. 25, 2016, for a tabletop exercise simulating a possible asteroid impact in 2020. The exercise provided a forum for the planetary science community to show emergency managers how it would collect, analyze and share data about such an event. Credit: The Aerospace Corporation

In the fictitious scenario, observers continued to track the asteroid for three months using ground-based telescope observations, and the probability of impact climbed to 65 percent. Then the next observations had to wait until four months later, due to the asteroid's position relative to the sun. Once observations could resume in May of 2017, the impact

probability jumped to 100 percent. By November of 2017, it was simulated that the predicted impact would occur somewhere in a narrow band across Southern California or just off the coast in the Pacific Ocean.

While mounting a deflection mission to move the asteroid off its collision course had been simulated in previous tabletop exercises, this particular exercise was designed so that the time to impact was too short for a deflection mission to be feasible—to pose a great future challenge to emergency managers faced with a mass evacuation of the metropolitan Los Angeles area.

Scientists from JPL, Lawrence Livermore National Laboratory, Sandia National Laboratories, and The Aerospace Corporation presented predicted impact footprint models, population displacement estimates, information on infrastructure that would be affected, as well as other data that could realistically be known at various points throughout the exercise scenario.

"The high degree of initial uncertainty coupled with the relatively long impact warning time made this scenario unique and especially challenging for emergency managers," said FEMA National Response Coordination Branch Chief Leviticus A. Lewis. "It's quite different from preparing for an event with a much shorter timeline, such as a hurricane."

Attendees considered ways to provide accurate, timely and useful information to the public, while also addressing how to refute rumors and false information that could emerge in the years leading up to the hypothetical impact.

"These exercises are invaluable for those of us in the asteroid science community responsible for engaging with FEMA on this natural hazard,"

said NASA Planetary Defense Officer Lindley Johnson. "We receive valuable feedback from emergency managers at these exercises about what information is critical for their decision making, and we take that into account when we exercise how we would provide information to FEMA about a predicted impact."

NASA provides expert input to FEMA about the asteroid impact hazard through the Planetary Defense Coordination Office. NASA and FEMA will continue to conduct asteroid impact exercises and intend to expand participation in future exercises to include additional representatives from local and state emergency management agencies and the private sector.

Provided by Jet Propulsion Laboratory