Propagation and Detection of Signals Before, During, and After a Building Collapse

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50-word overview:

In this multimedia presentation, we summarize experiments NIST conducted during building implosions where signals from transmitters operating near public safety bands were measured before, during, and after building collapse. These experiments have yielded valuable data on propagation effects in collapsed building scenarios and have enabled assessment of various location schemes.

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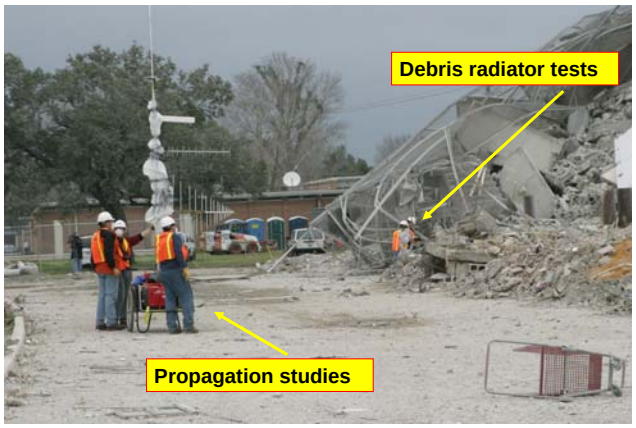
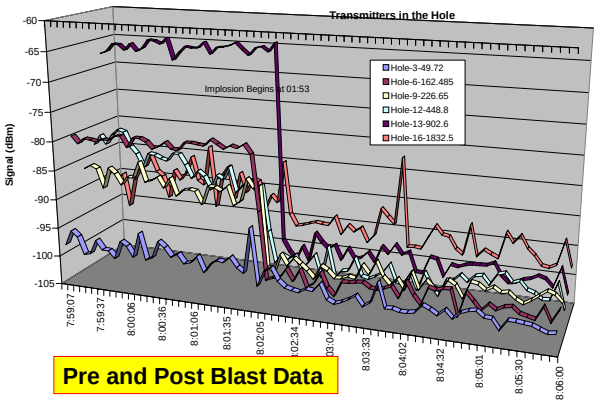
The National Institute of Standards and Technology (NIST) is carrying out a project investigating communications problems for first-responders in collapsed buildings and other weak-signal environments. We are investigating various schemes for locating first responders and civilians who may have portable radios or cell phones and are trapped in voids of collapsed buildings. Part of this work utilizes buildings that are scheduled to be imploded as laboratories. We place RF transmitters in various locations in the building. The transmitters operate at frequencies near public safety and cell phone bands (approximately 50 MHz, 150 MHz, 250 MHz, 400 MHz, 900 MHz, and 2 GHz). We measure the received signals, before, during, and after the building is imploded to gain valuable data on propagation effects in collapsed building scenarios. Once the building is down, we assess various location schemes which involve searching with directional antennas and connecting instruments to some of the metallic debris located on the perimeter of the collapsed building.

We have performed two such experiments: in a 13-story apartment complex in New Orleans, and at Veteran's Stadium in Philadelphia. In this presentation, we summarize these experiments. This will be a multi-media presentation where we show photos, videos, and news clips. We also show primary results of the data we have collected and discuss some of the interesting propagation effects we observed.