Chicago Nuclear Attack

Prepare, Respond, and Recover: Engineers' Involvement with Local Disasters

October 19, 2006

Introduction

- Highlight issues, not specific actions to initiate
- Describe consequence of a detonation
- Use scenario to present material
- Use a mapping program for illustration
- Consider first responder issues, structural vulnerabilities and decontamination

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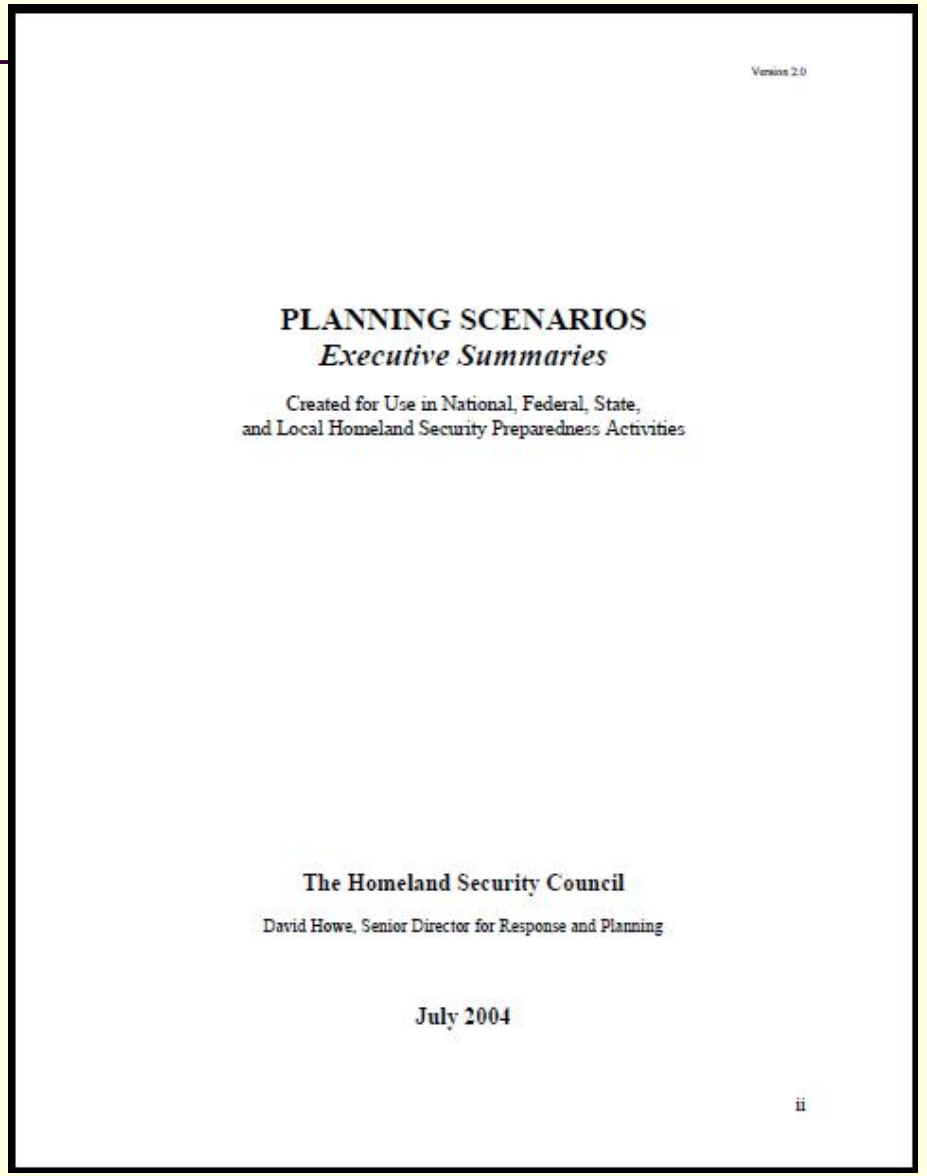
Nuclear Detonation

- *Planning Scenarios* developed by the HSC in partnership with DHS
- Scenario 1 of 15 is a 10-kT nuclear device



Nuclear Detonation

- Rucksack Bombs: Smaller. ½ Kiloton, 70 lbs carrying weight
- Suitcase bomb: Small Atomic Demolition Munitions (SADM)
  - Explosive yield: 1 kT; Size, 24x16x8 inches
  - Detonation Process: 1 person, 20-30 minutes
  - Accountability questions in former Soviet states

Nuclear Detonation Scenario

- Terrorist members assemble a gun-type nuclear device using highly enriched uranium (HEU) stolen from a nuclear facility located in the former Soviet Union
- Components are smuggled into the USA and assembled in Chicago suburb
- Using a delivery van, terrorists transport and detonate the device downtown

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Nuclear Detonation Scenario

- Most buildings within 1,000 meters are severely damaged
- Injuries from flying debris may occur out to 6 kilometers
- Electromagnetic Pulse (EMP) damages electronic devices within about 5 kilometers
- A mushroom cloud rises above the city and begins to drift with prevailing winds

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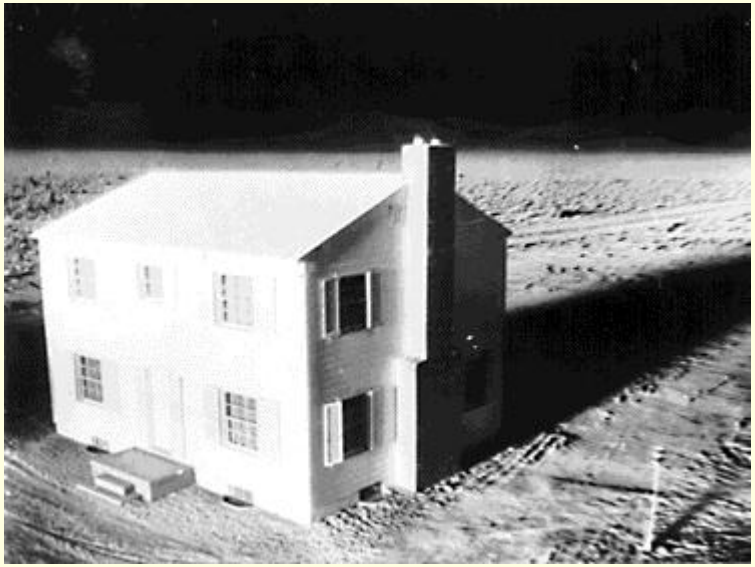
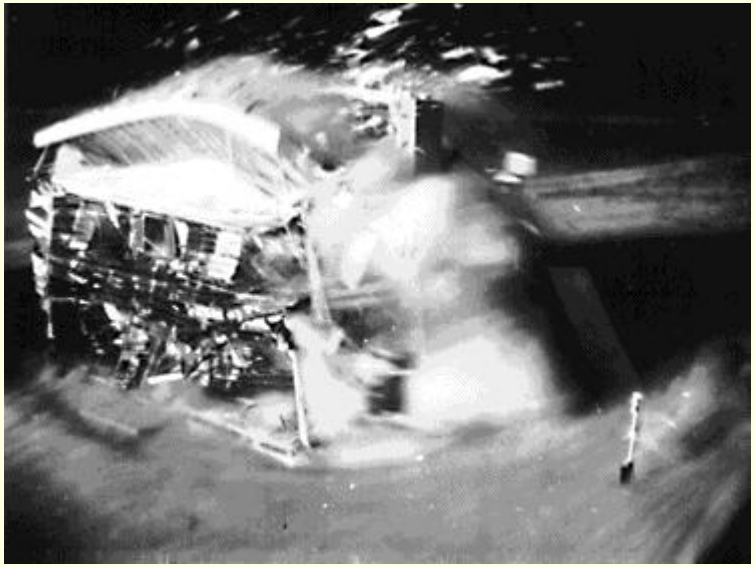
Likely Results

- Blast
- Heat - numerous fires located throughout the immediate blast zone
- Fallout





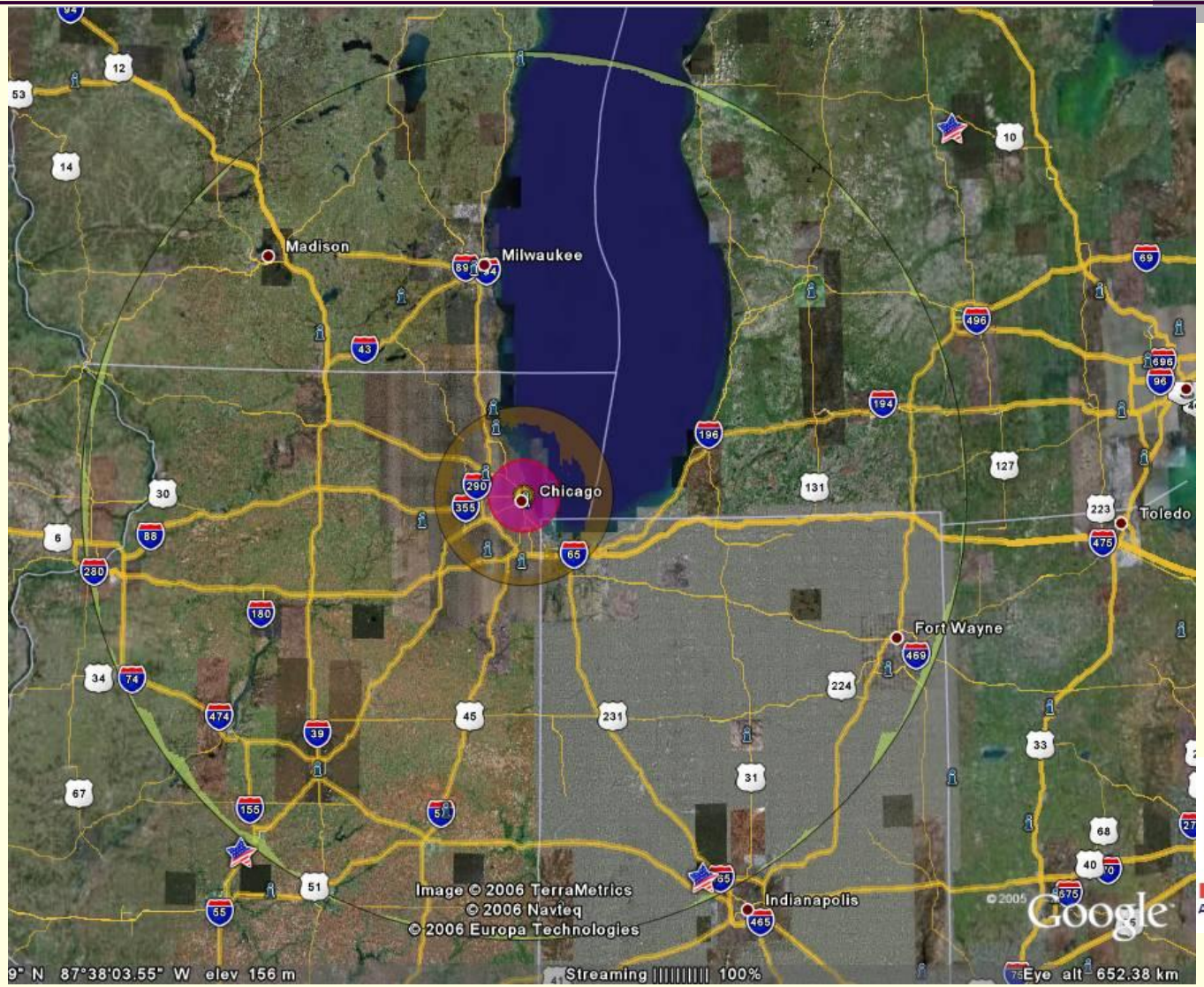
Likely Results

- Blast

Scenario

- GIS Demonstration of area
  - Highlight area effected immediately
  - Highlight spread of contamination

250 km - Moderate to Low Acute Radiation Exposure Injuries



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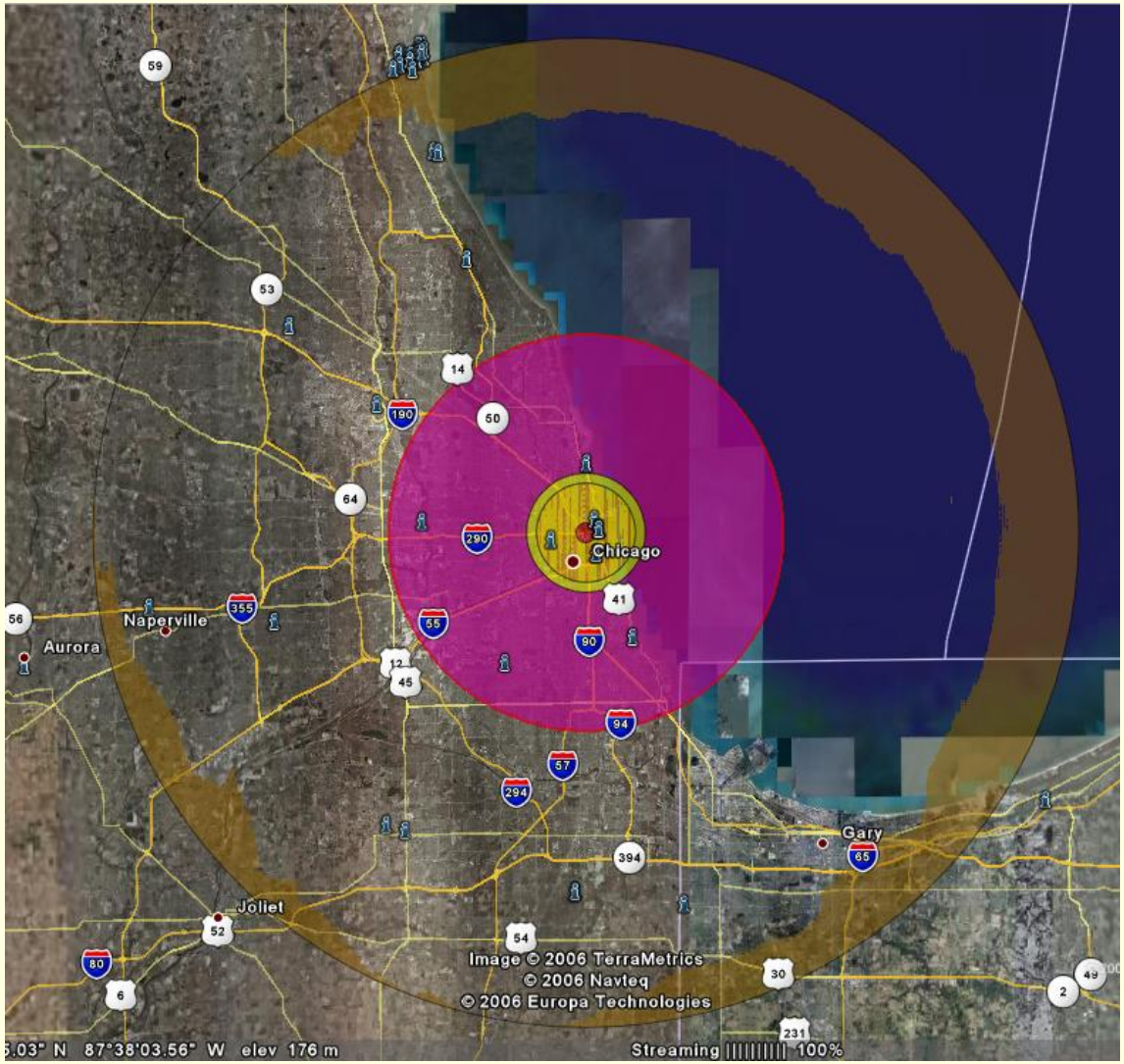
8000 sq. km Potential Decontamination Area



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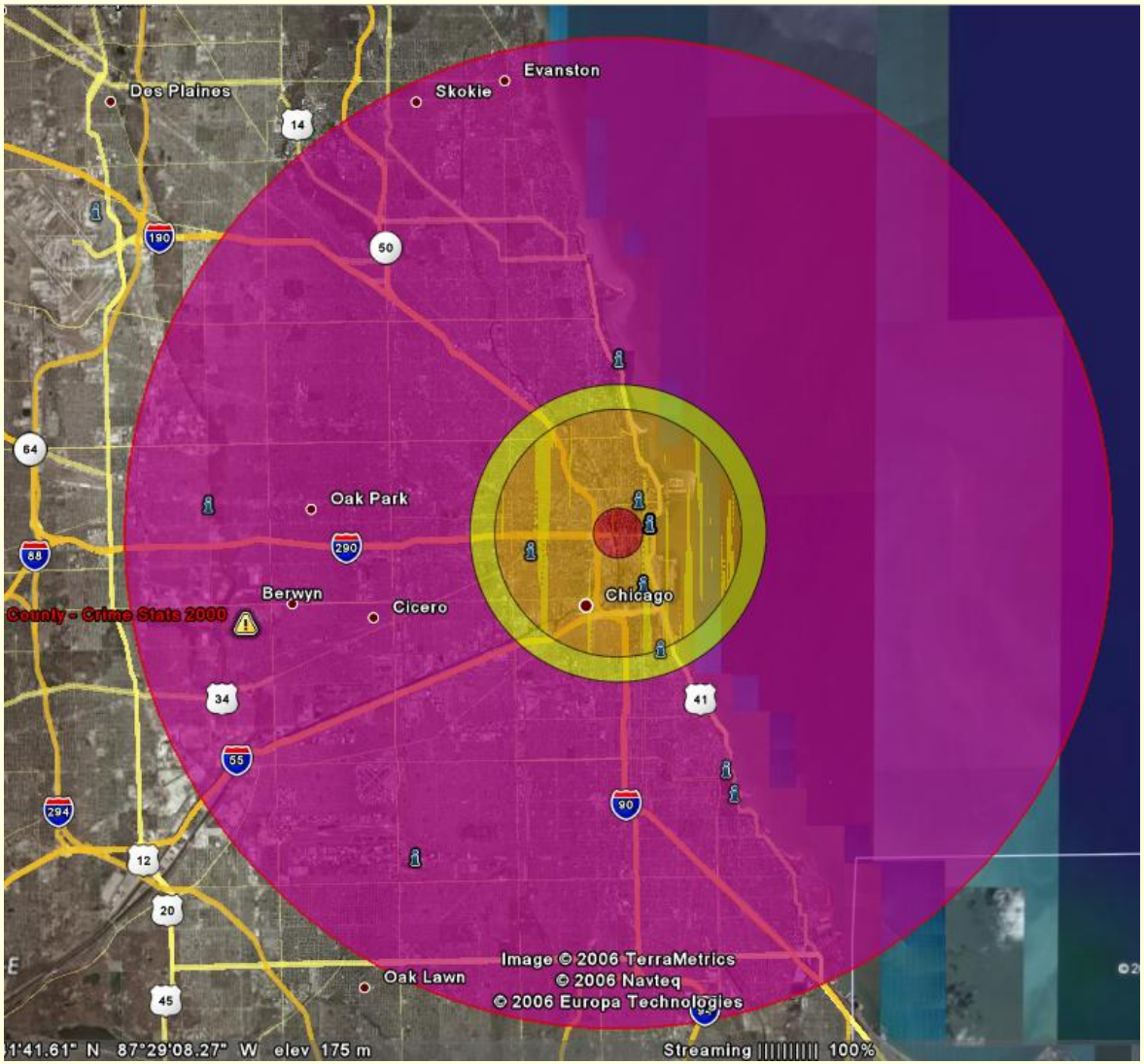
20km Moderate to Low Acute Radiation Exposure Injuries



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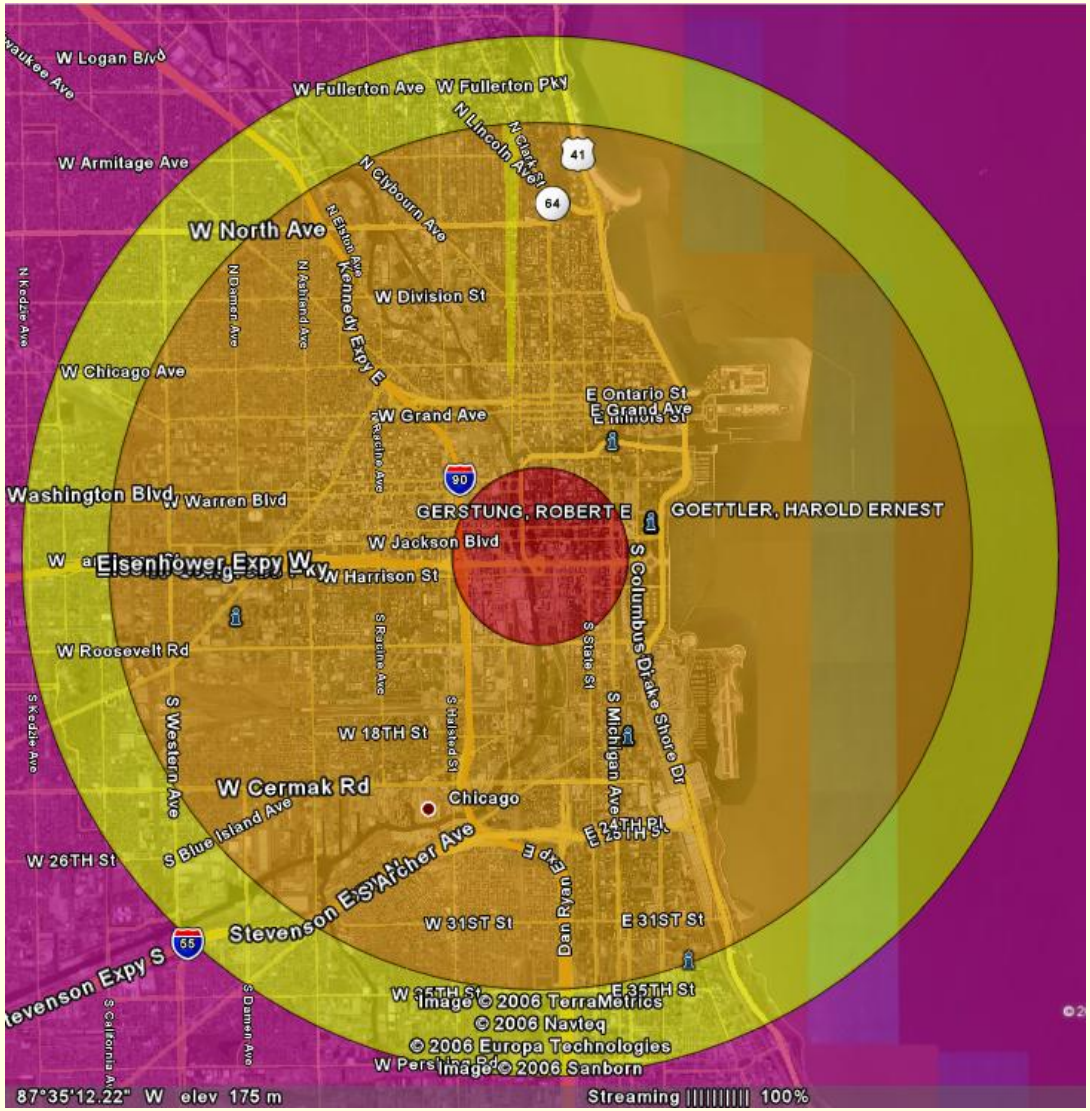
5km EMP Damage
6km Missile Debris Injuries & Damage



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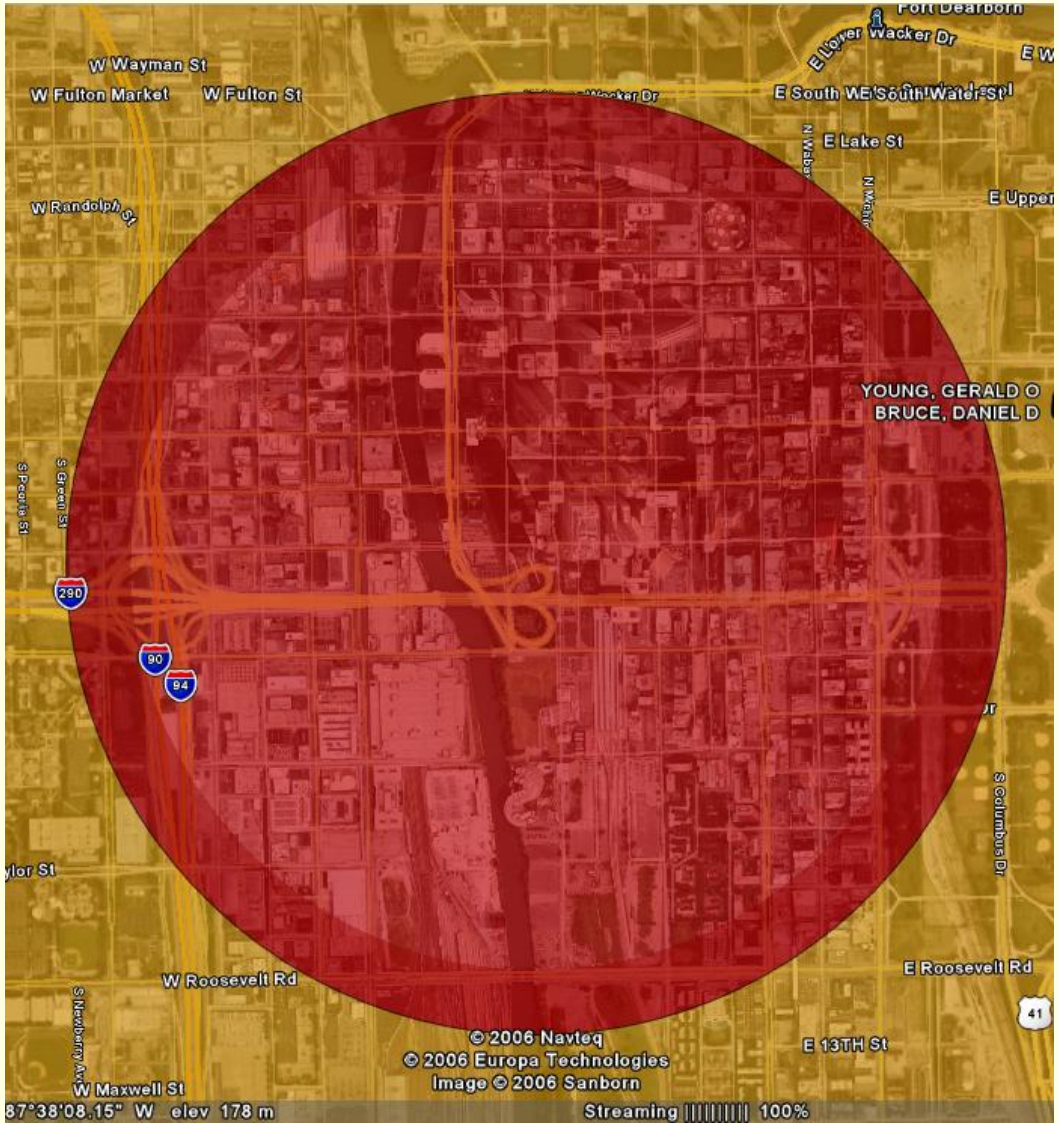
1KM
Direct Infrastructure Severe Damage



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1KM
Direct Infrastructure Severe Damage

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First Response

- Establishing the nature of the event
  - High explosive?
  - Chemical attack?
  - Nuclear detonation?
- Defining the Contamination Zone—the Hot Zone
  - Will it migrate?

First Response

- Police: Establish perimeter, protect crime scene
- Fire, Hazmat, Emergency Services: Rescue survivors
- Are contemporary response protocols adequate?

Gaining access to survivors

- Can first responders enter the zone?
  - Contamination
  - Structural damage and instability
  - Engineering expertise required to assess damage

Protecting Hot Zone

- Keeping people out and keeping people in
- Use of Force Protocols
- Use of Rapidly Deployed Fence
- Vehicle Decontamination to Allow Exit

Nuclear Detonation

- Decontamination
  - Environment so survivors may be accessed
  - People so survivors do not introduce contamination to treatment areas
  - Debris so discarded materials may be removed safely
  - Protecting the Crime Scene

New Response Protocols

- Determining nature of the event
- Monitoring movement of hot zone
- Establishing a perimeter to keep people from entering the hot zone
- Collaboration with technical community
  - Radiation exposure
  - Structural and infrastructure damage
  - Decontamination
  - Search, Rescue

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Civil Engineer Role

- Structural Analysis
- Decontamination
- Debris Removal

Nuclear Detonation

- Concluding Remarks

Michael R. Chritton
mchritto@ch2m.com

Sal DePasquale
sdepasq@ch2m.com

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