

Emergency Response Demonstration: MINER (Mobile Imager of Emergency Responders) Measurements



NST14-V-EmRespDemo-PD2Ka

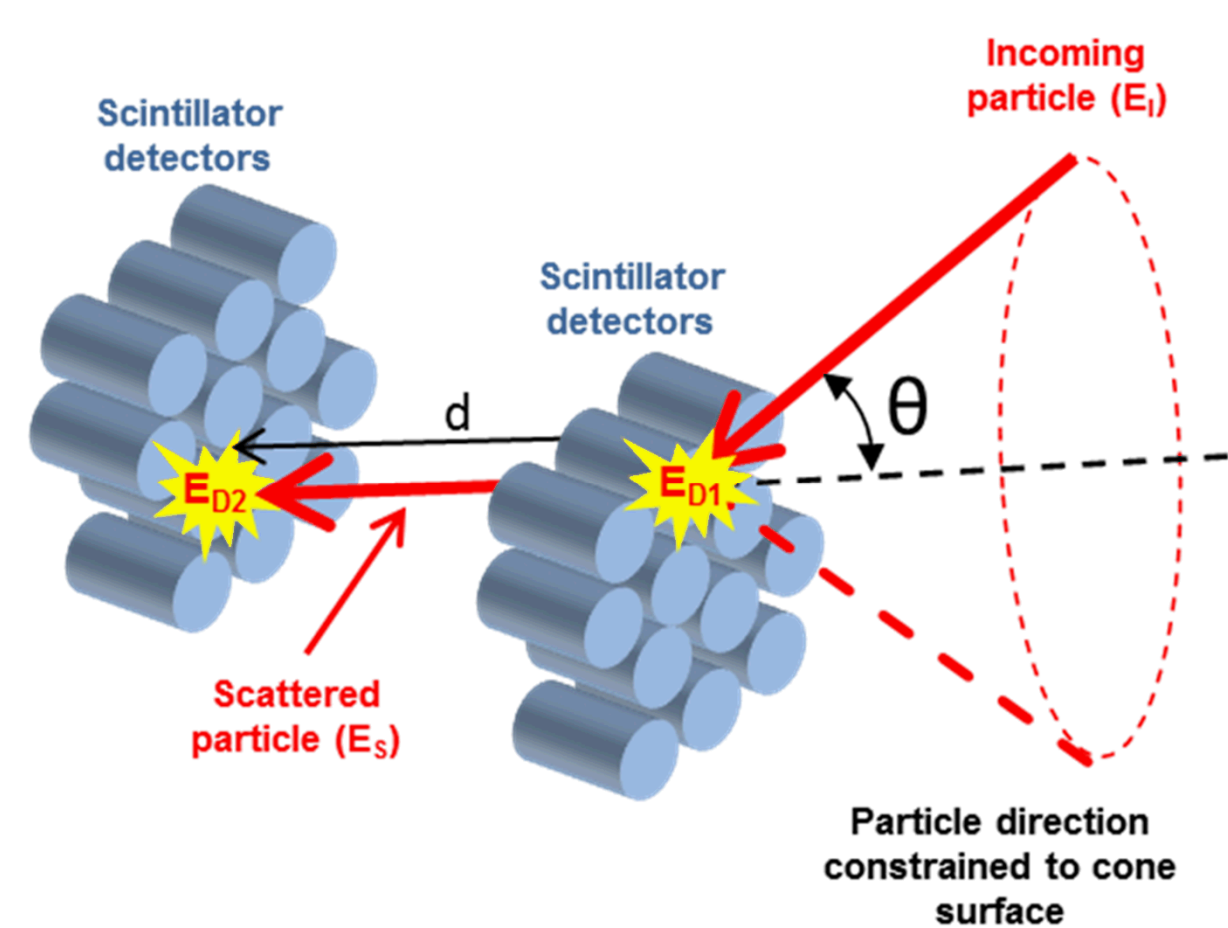
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Goals and Objectives

- ▶ Overall venture: demonstrate radiation-detection imaging systems in simulated emergency-response scenarios
- ▶ For Sandia: demonstrate neutron and gamma source localization with MINER (Mobile Imager of Neutrons for Emergency Responders)

Introduction

MINER is a compact (36" high, 15" diameter, ~100-pound) compact neutron scatter camera that provides omni-directional (4π) localization of neutron and (as a Compton camera) gamma sources. It can be operated using wallplug, battery, or generator power.

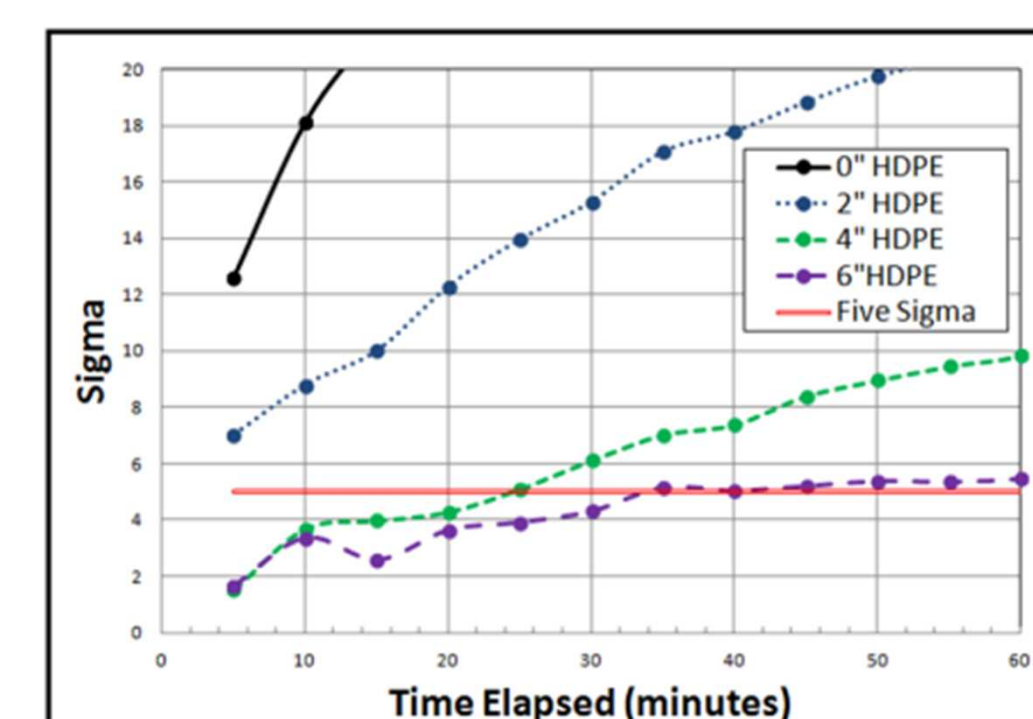
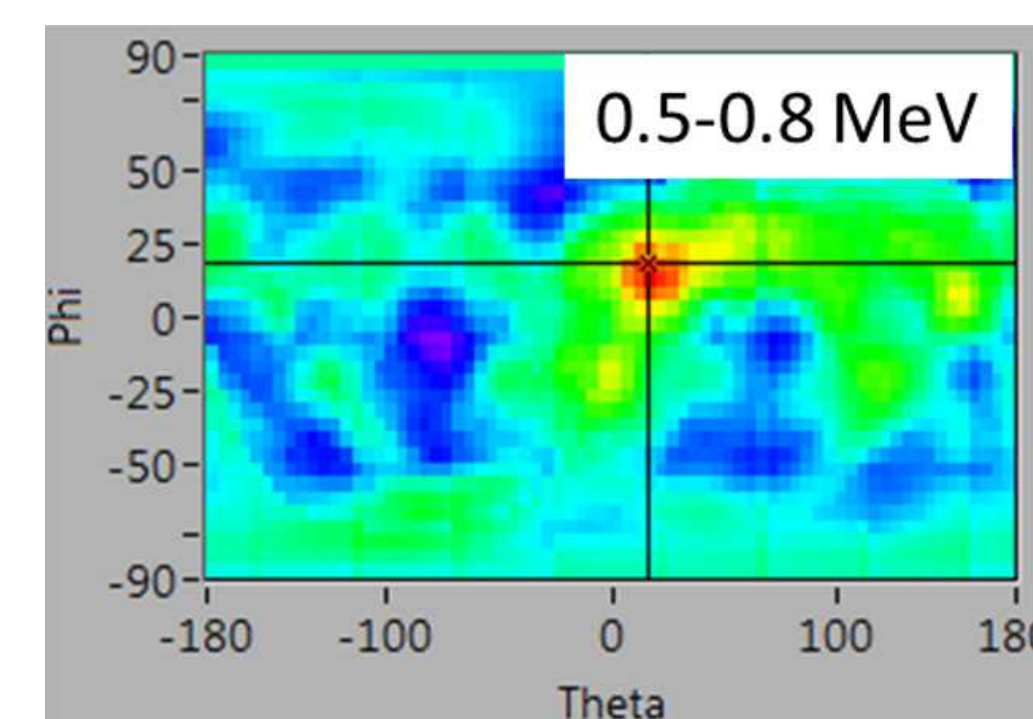
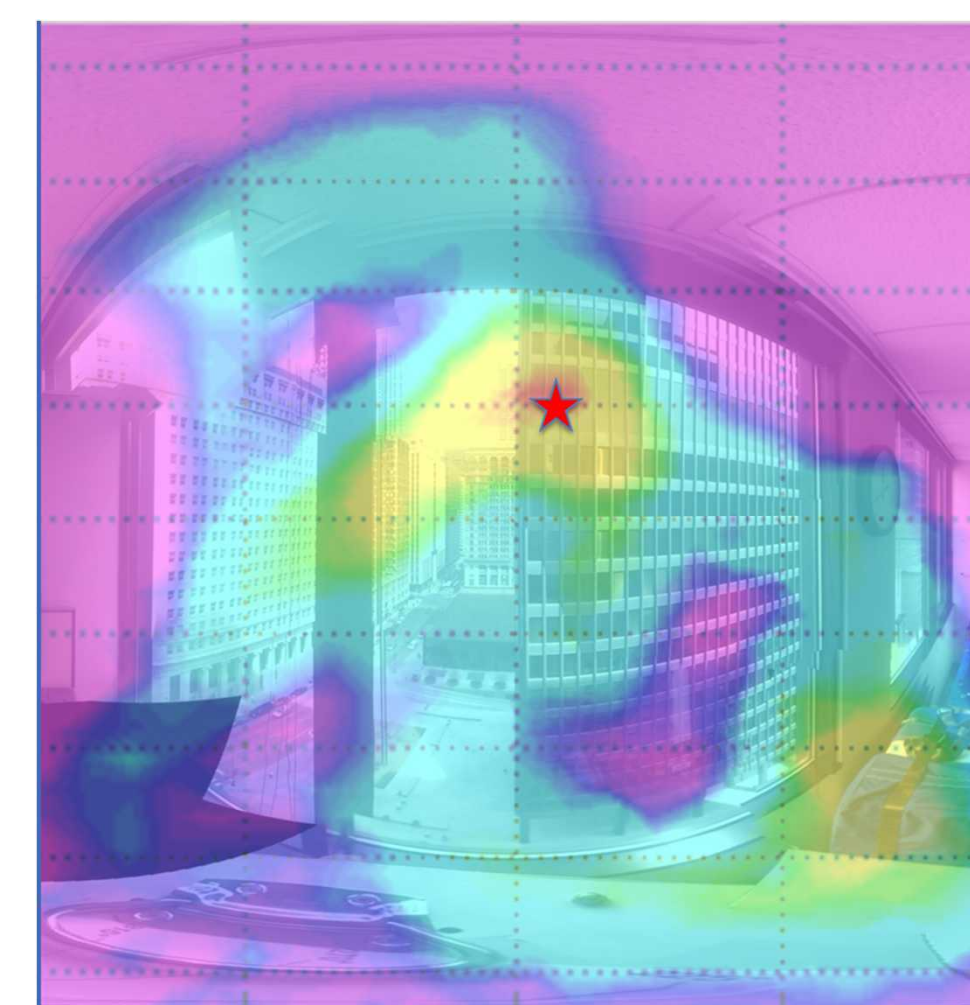


Methods

This venture, run by Remote Sensing Laboratory – Andrews, explores applications of neutron and gamma imagers for emergency responders through demonstrations simulating real-world scenarios.

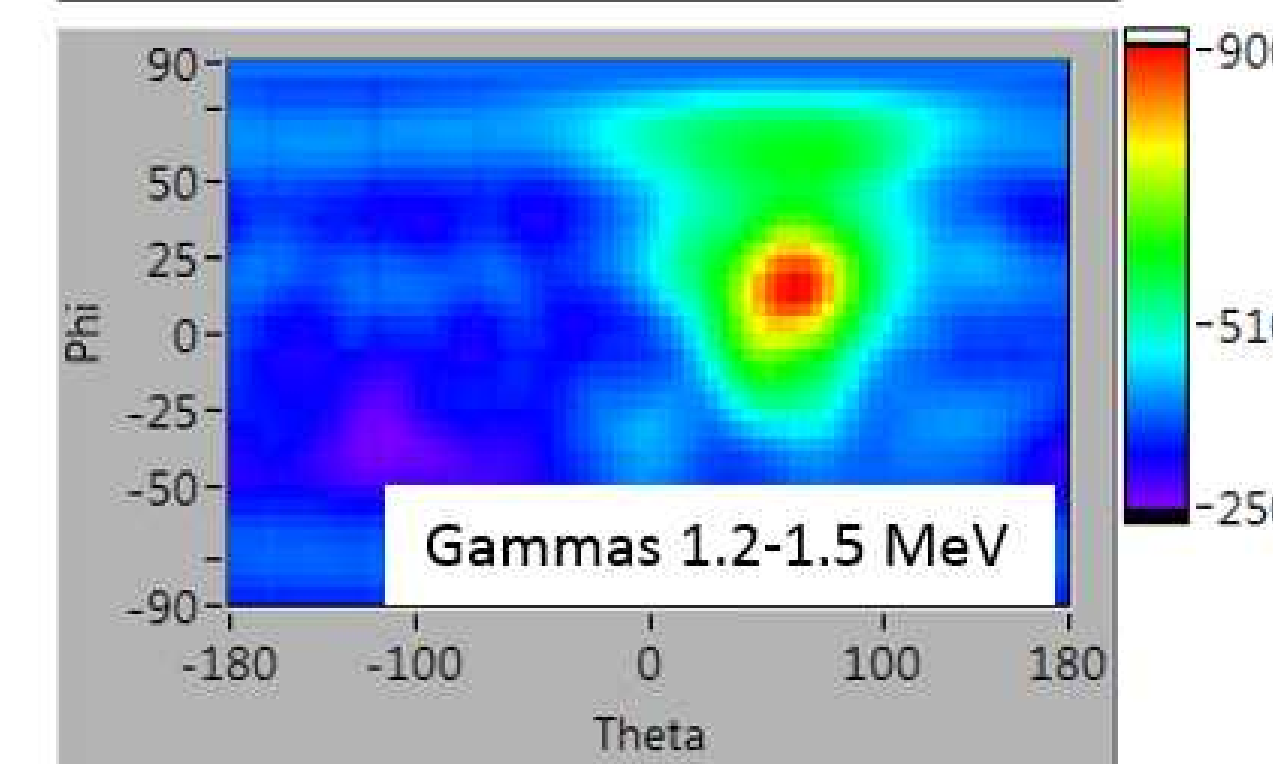
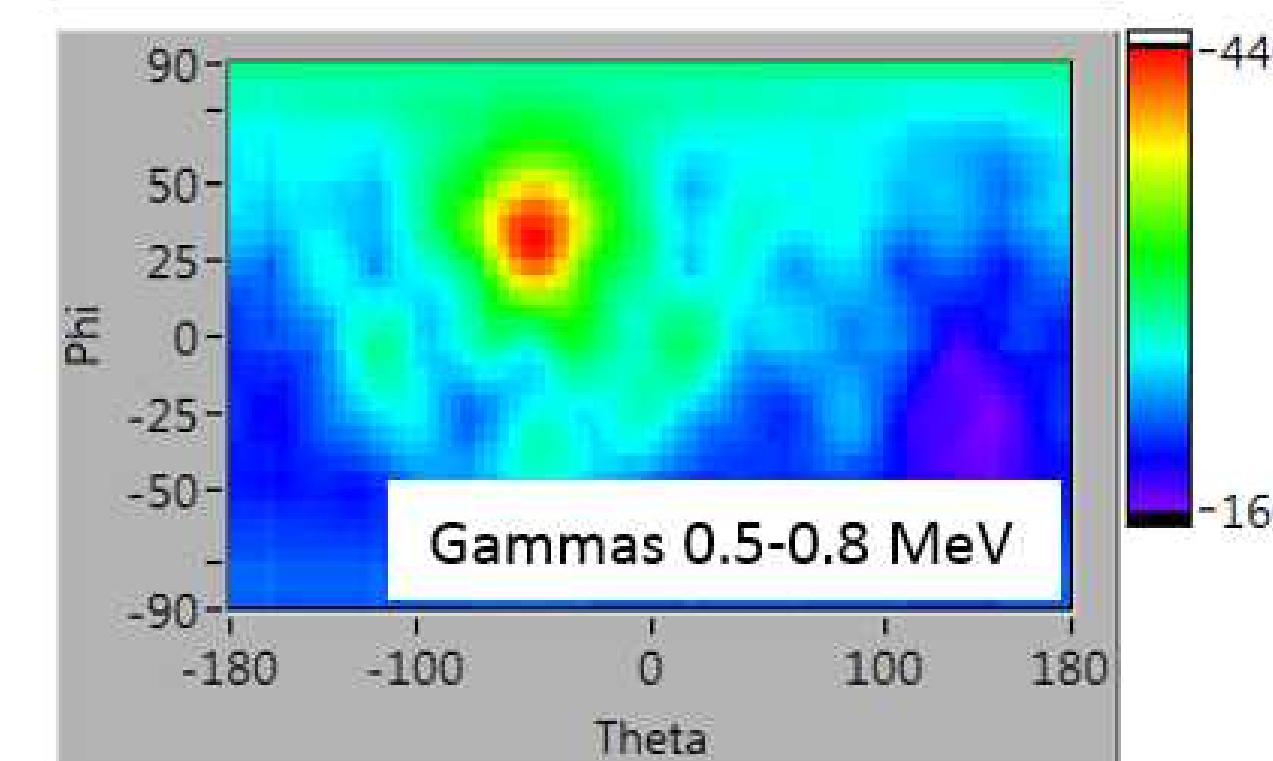
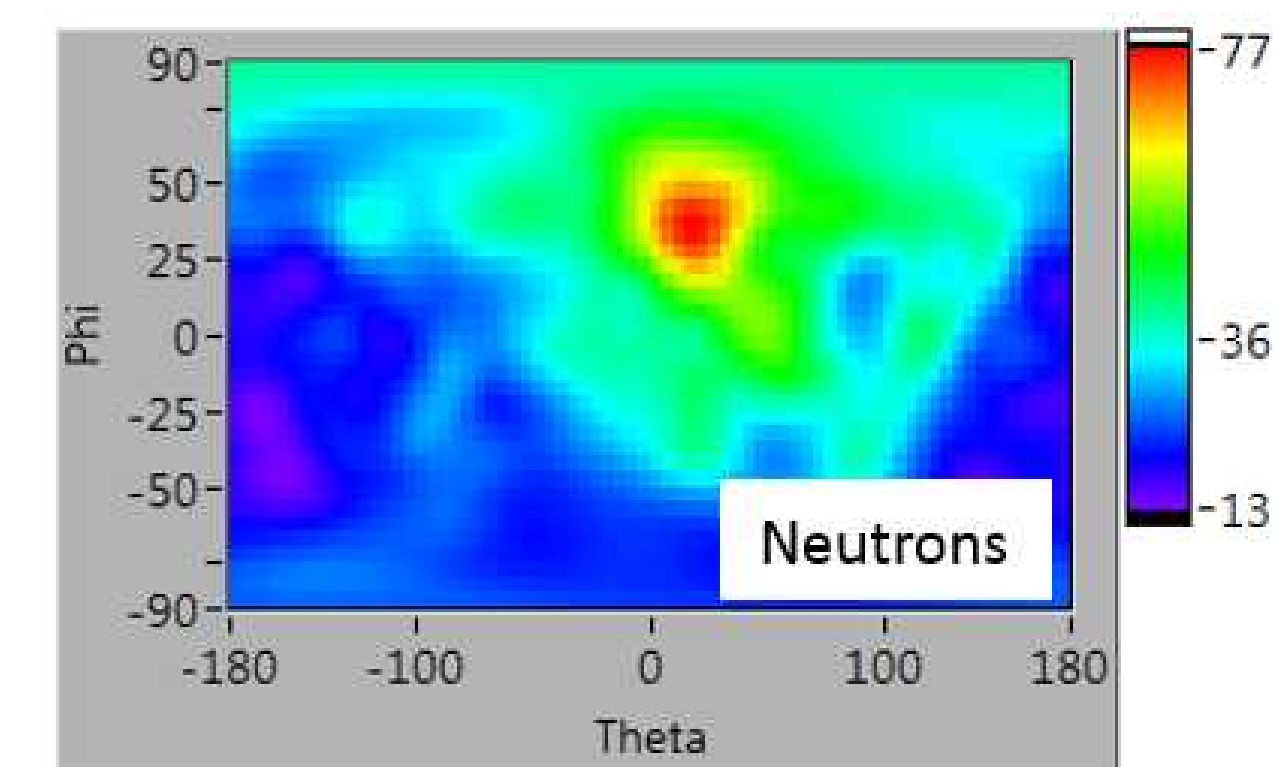
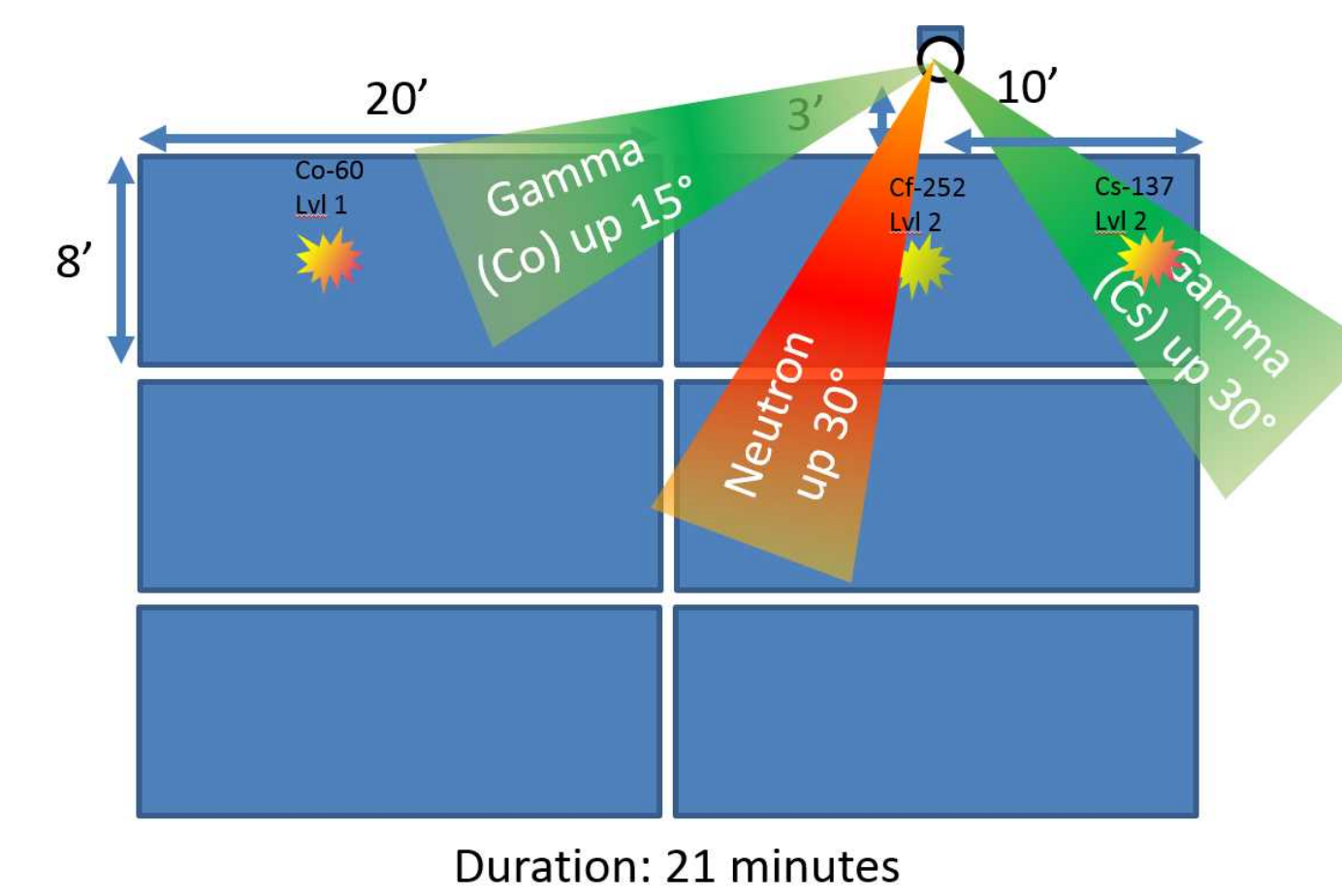
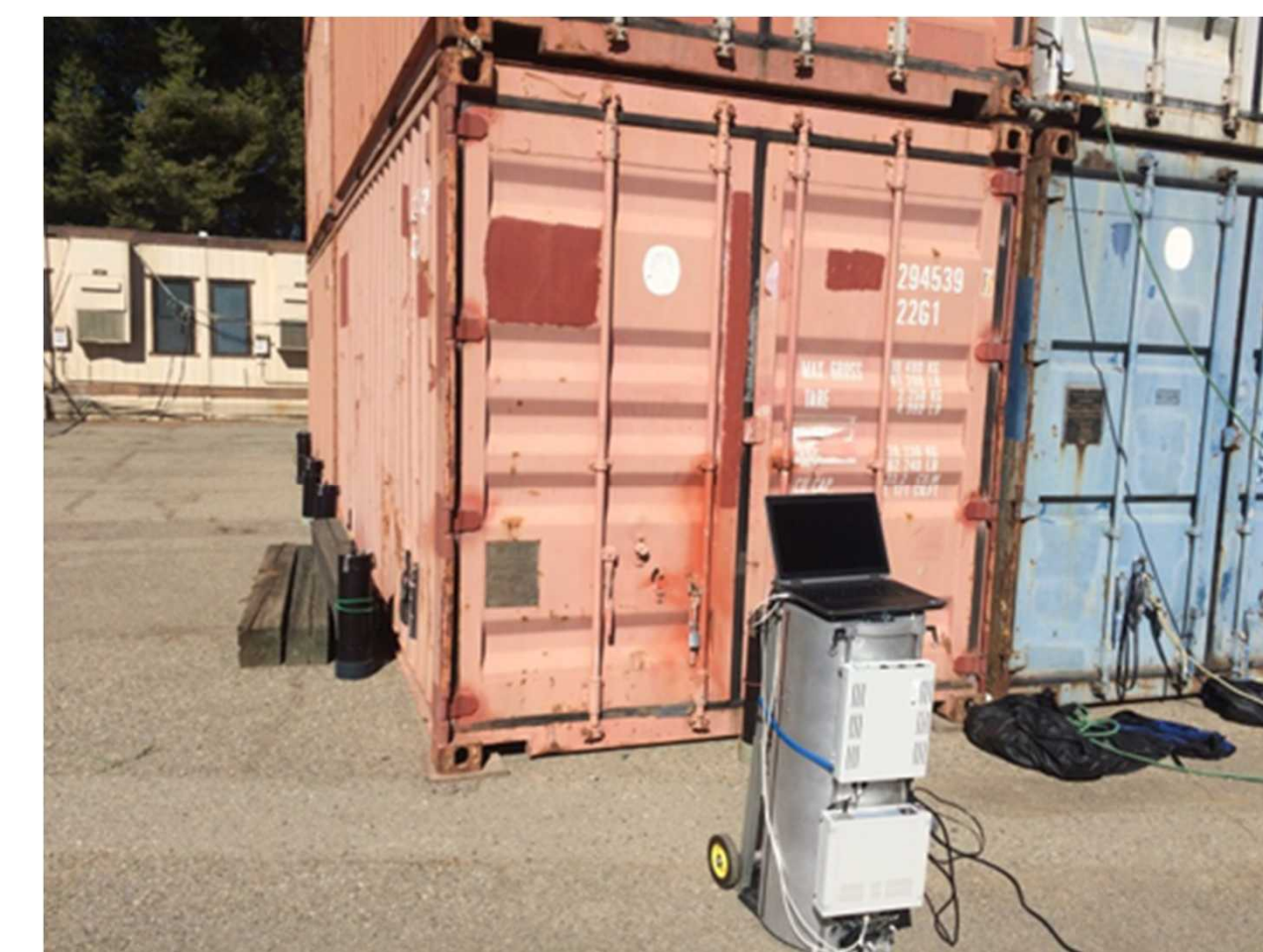
Results

High Rise to High Rise
28 m sources to detector



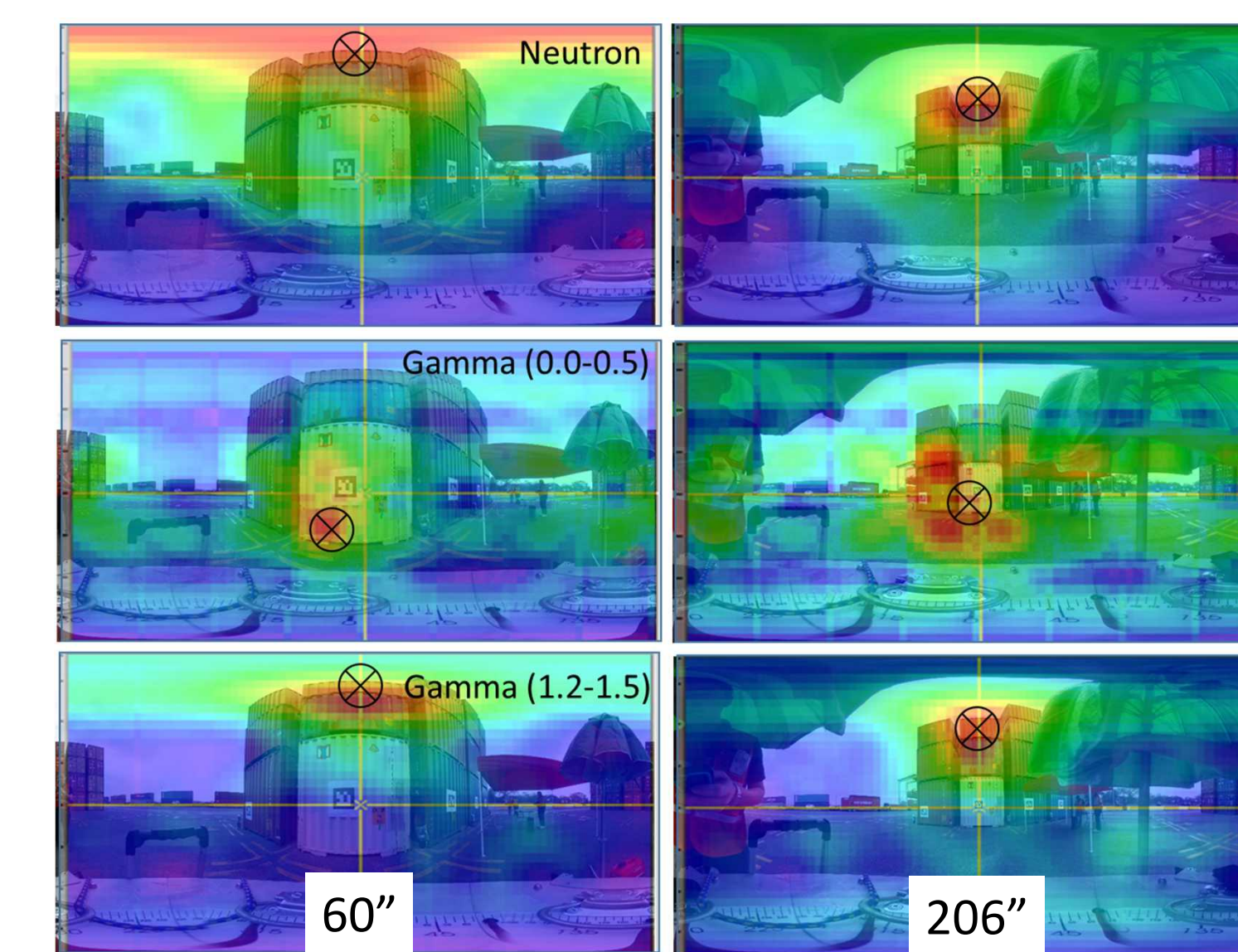
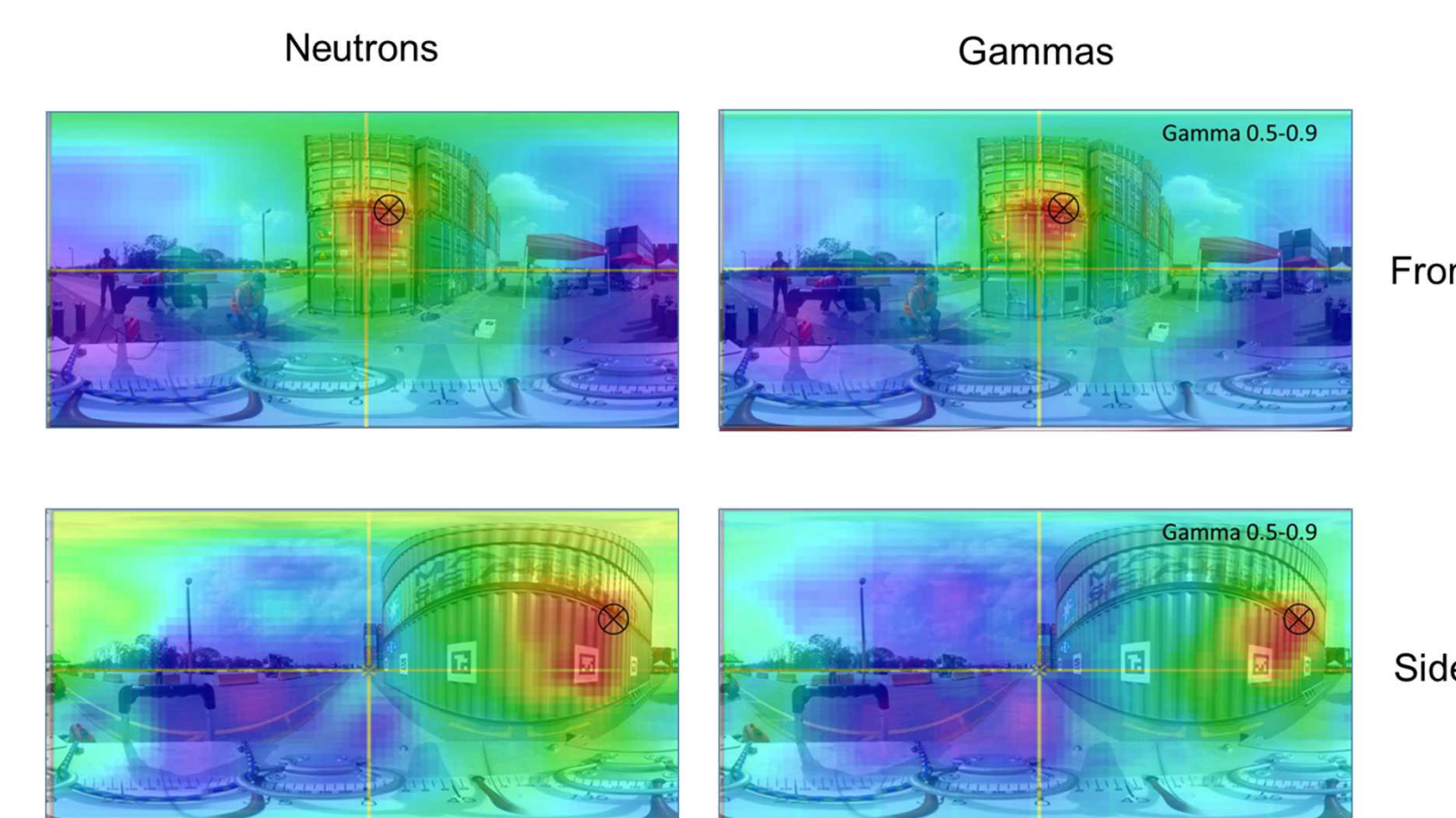
Results

LLNL Container Stack
"Dry run" for Savannah



Results

Port of Savannah
CBP container stack



Discussion, Next Steps

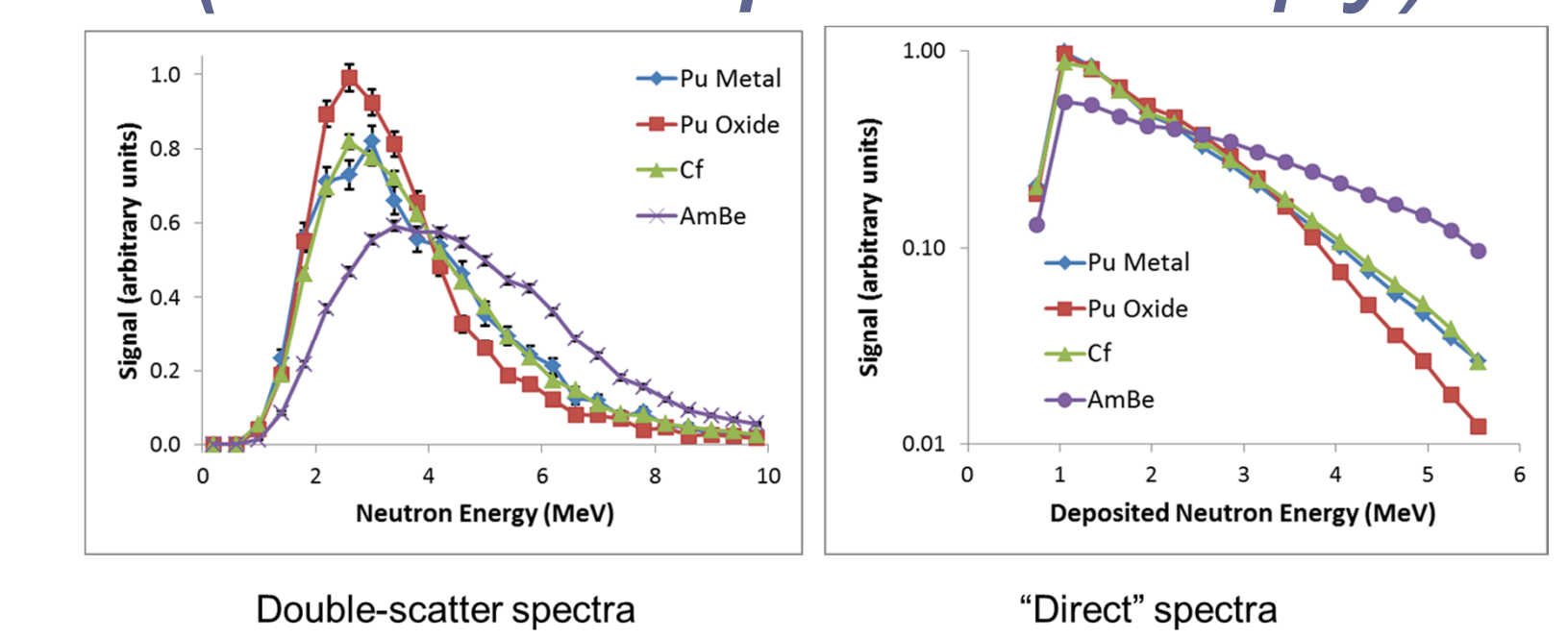
MINER successfully localized neutron and gamma sources during all three demonstrations. Future work will include reducing system size (replacing PMTs by SiPMs), and developing improved/quantitative imaging algorithms.

Conclusion and Relevance

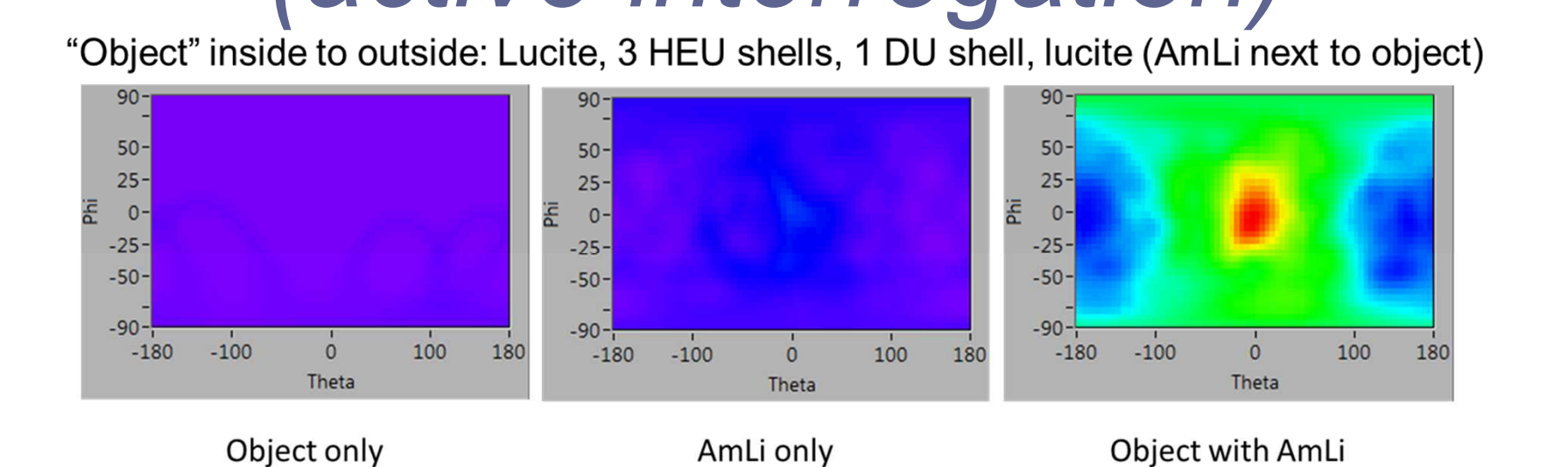
These demonstrations illustrate applications of MINER for emergency responders. Primary use: localization of neutron and gamma sources (long-dwell stand-off search). Additional diagnostic/characterization uses illustrated below.

Other Capabilities

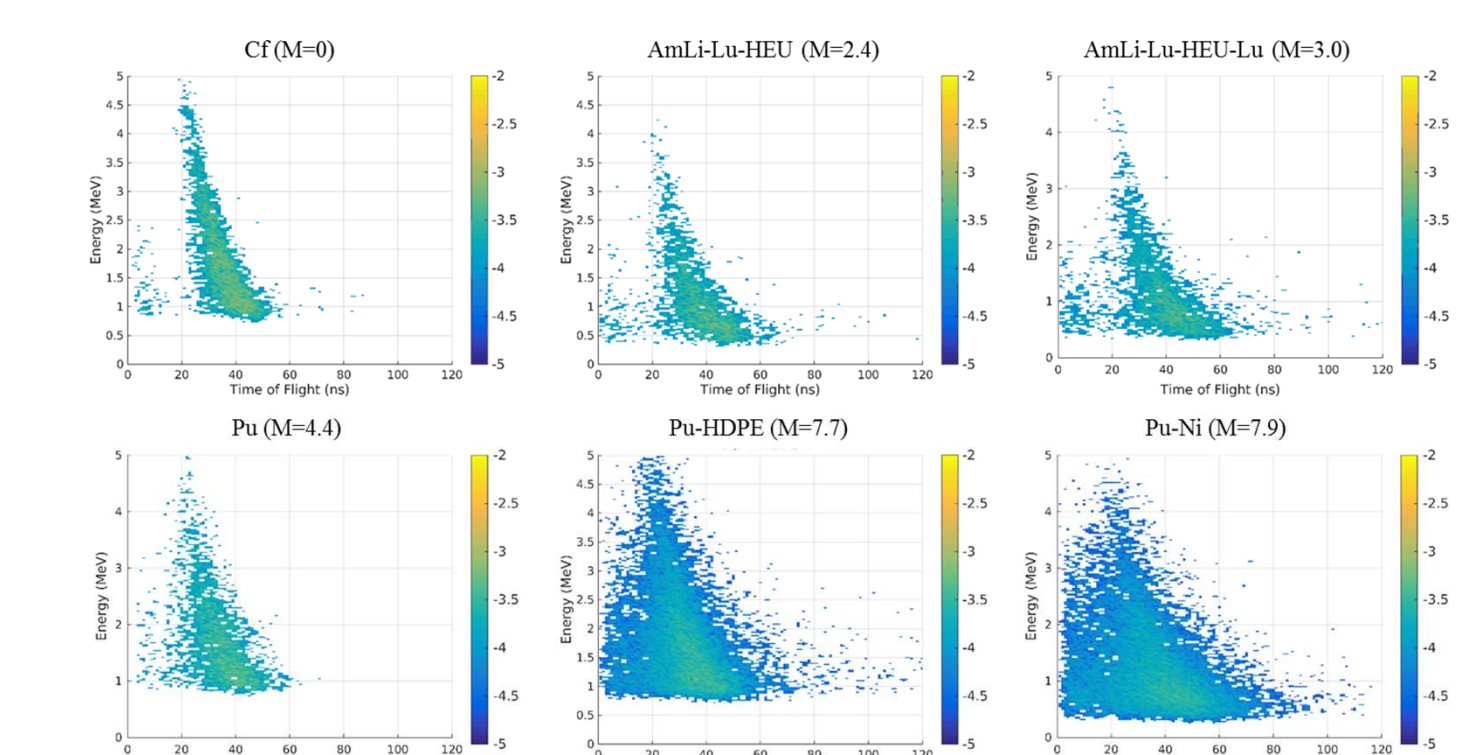
Material Identification (neutron spectroscopy)



HEU Detection (active interrogation)



Source Multiplication (gamma-neutron timing)



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