

Radiation Detection at Sandia

Overview and thoughts for the future
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Radiation Detection at Sandia

- **History**
- **Recent work**
 - **LDRD Investment**
 - **Characterization of threat sources**
 - **Standoff detection of Special Nuclear Material (SNM)**
- **Future thoughts**



History of Radiation Detection at Sandia

- **Sandia has always had responsibility for neutron initiators in nuclear weapons**
- **We have developed many detection systems for characterizing the neutron output of our neutron generators used in nuclear weapons**



Radiation Detection R&D at Sandia: LDRD

- **Sandia has invested strongly in radiation detection.**
- **From basic materials research to advanced detection concepts.**



Two national security problems in radiation detection

- **Threat characterization**
 - Is the acquired signal from a detector due to a threat or benign source?
 - Can we characterize the source?
- **Stand-off detection of Special Nuclear Material**



Threat Characterization

- **Is the measured signal from SNM or from a benign source**
- **If the source is SNM, what type? What configuration is it in?**



Analysis and characterization tools developed at Sandia

- **GADRAS**
 - **Pulse height spectrum simulation package**
 - **Uses effective detector response functions**
 - **Effectively simulates complex and shielded sources**



Standoff Detection of SNM

- **Is there a source of SNM in the vicinity?**
- **How can we increase the range at which reliably detect SNM?**
- **Can we detect heavily shielded Special Nuclear Material?**



Standoff detection solutions developed at Sandia- The Neutron Scatter Camera

- **Measures neutron (and gamma) signals and determines their direction**
- **Effectively senses some SNM sources out to maximum range.**



Future thoughts

- **We probably need a different design paradigm for arms control treaty verification in radiation detection.**
- **We need standards by which to measure progress in radiation detection for national security applications**