International Nuclear Security Resources for the U.S. Advanced Reactor Industry

Katherine C. Holt
Program Director, U.S. DOE/NNSA
Office of International Nuclear Security (NA-211)

Global Material Security

INS International Nuclear Security
Reducing Risk of Nuclear Terrorism

Sandia National Laboratories is a multimission laboratory managed and operated by National Technology and Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525. SAND2021-11590 O

Policy Drivers:

- American leadership in nuclear technology + nonproliferation standards
- Enabling peaceful uses
- Meeting climate change goals

INS AR Nuclear Security Program

Partnering with U.S. nuclear reactor industry & embarking countries on nuclear security topics to:

- Improve security of future US exports
- Build nuclear security capacity in Newcomer countries
- Advance the global nuclear security regime

INS International Nuclear Security
Reducing Risk of Nuclear Terrorism

INS approach to support the secure international deployment of U.S. ARs

National Nuclear Security Administration

Objectives

Secure Exports	Responsible Newcomers	Strong Nuclear Security Regime

Implementation Approach

Develop security analysis/tools & support "security by design" technical partnerships with U.S. vendors	Work bilaterally to support strong nuclear security frameworks in future markets	Collaborate with the IAEA on technology inclusive guidance and infrastructure development

Early adoption of security into novel reactor designs (1/2)

WHY now? Early adoption of security principles enables efficient design, long-term cost savings, and a more secure world

- Integrated security/safety systems can make industry design more competitive and cost effective.
- Prevent a nuclear terrorism incident and help future buyers uphold international legal obligations (CPPNM/A)
- Passive safety design still requires independent security analysis, and generally does not consider sabotage

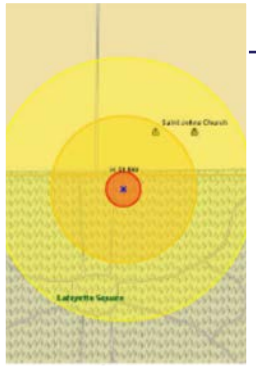
HOW to consider security? Technical partnerships/"Security by Design" early, frequently, continuously

- Extensive domestic and international experience in nuclear security systems design and evaluation using a performance-based approach to prevent theft or sabotage.
- Technical expertise, analysis, and modeling software available.

Early adoption of security into novel reactor designs(2/2)

National Nuclear Security Administration

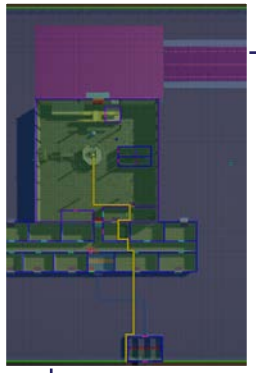
WHAT can NNSA/INS offer? Performance-based security evaluation and design validation assistance to support cost effective security systems in an evolving regulatory environment



Target Identification: material characterization; consequence assessment for sabotage to inform security system design

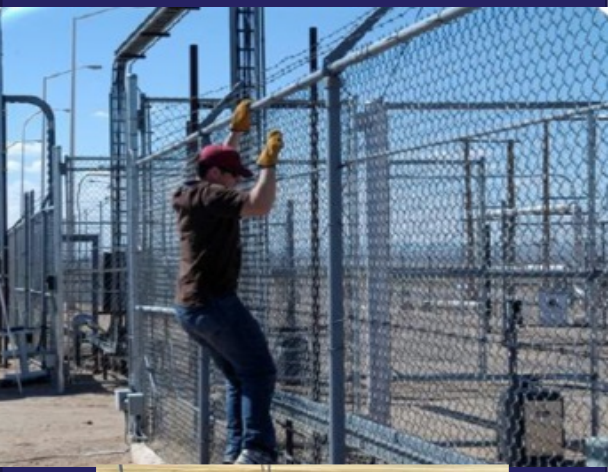
Integrated Systems Design and Visualization: Visualization of operational environment, interactions of NMAC for safeguards, cyber, and security systems

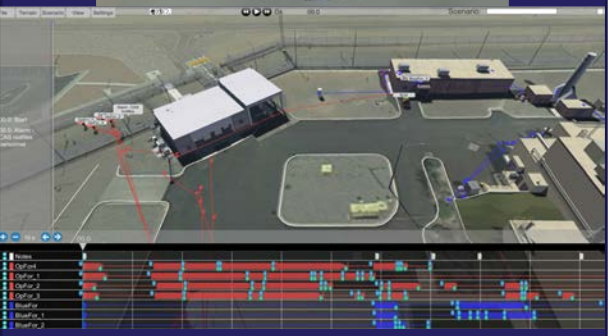
Risk & Cost informed Security System Design: detection, delay and response features for physical security + insider threat mitigation, cybersecurity



Validation: ongoing validation of design using vulnerability assessment (VA) approaches and software

INS International Nuclear Security
Reducing Risk of Nuclear Terrorism





AR Security Technical Studies & Tools

Security Economics

A tool that vendors and utilities can use to perform a cost-benefit analysis for design features which have the purpose of reducing O&M costs related to nuclear security

Advanced Reactor Target Sets

An approach which US-based companies can use to identify and evaluate advanced reactor theft/sabotage targets and vulnerabilities for a given protection strategy

Design and Evaluation Process Outline (DEPO) online training

Understanding of the DEPO methodology used to define, design, and evaluate physical protection systems for nuclear facilities

https://nstc.sandia.gov/training/smr-depo-course

PathTrace© and Scribe3D©

Intuitive, accessible, and highly visual security analysis software tools for rapid design evaluation of evolving, early phase, physical security system designs.

https://insetools.sandia.gov/

INS International Nuclear Security
Reducing Risk of Nuclear Terrorism

Finding ways to partner

Opportunities for Collaboration with NNSA on International Nuclear Security:

- **Outreach & Exchange:** Webinars, stakeholder meetings via GAIN/NEXUS, industry associations/NGOs events
- **Technical Cooperation:** INS-funded activities at DOE and NNSA Labs to support overall industry needs for secure global deployment
- **IAEA Guidance Contributions:** Providing experts to INS supported IAEA activities on international security guidance for AR/SMRs
- **International Market:** A network of existing global/regional partnerships, 20 years experience, and outreach to nuclear newcomers is starting to build strong NS infrastructure for 30+ embarking countries.

Nuclear Nexus website: www.anl.gov/nuclear-nexus

To develop a partnership with industry, the DOE National Labs can enter:

- *Nondisclosure Agreements* (NDAs) to have detailed discussions of technologies that can include proprietary information
- *Cooperative Research and Development Agreements* (CRADAs) to expand a company's proprietary capabilities or knowledge-set

Allison Johnston
Director
allison.johnston@nnsa.doe.gov
202-287-6986

Katherine C. Holt
Program Director
katherine.holt@nnsa.doe.gov
202-287-6841

Nuclear NEXUS Website:
www.anl.gov/nuclear-nexus

INS International Nuclear Security

Reducing Risk of Nuclear Terrorism