

Contractor	Contract Name	Description
ATK	SLANCA Neutron Detection System	Develop an innovative solid-state, neutron sensor array that is extremely sensitive to low energy neutrons; immune to high-levels of gamma-ray radiation; inexpensive to fabricate and assemble; and adaptable to all sizes and shapes.
CalTech	Room Temperature Compton Imager	Develop a compact, low power, modular, room temperature radiation imager.
Canberra	SDD Alternative to PMTs for LaBr Scintallators	Prove that arrays of Silicon Drift Detectors can be developed as replacements for photomultiplier tubes for scintillating detector materials.
EIC	Layered Semiconductors for Radiation Detectors	Gallium selenide (GaSe) and gallium telluride (GaTe) binary, wide-bandgap, layered-semiconductor growth development for gamma-ray detection.
EML	Neutron Energy Spectra Measurements on Container Ships	Neutron energy spectra measurements on container ships. Associated with SNL project titled Experimental Limits for In-Transit Detection of Radiological Material.
FIT	Detection of heavily shielded nuclear contraband through muon radiography with advanced micro-pattern detectors	Develop a muon tomography proof of concept prototype that utilizes a Gas Electron Multiplier (GEM) detector. The GEM detector is a novel type of gas avalanche micro-pattern particle detector.
GE	High Quality Low Cost CZT Crystals and Detectors	Develop a high quality, low cost, high fabrication throughput CZT-growth development using high-pressure hydrothermal processes for gamma-ray detection.
GE	Large Area X-ray Detector for Cargo Inspection	Develop a large area x-ray detector (LAXD) for x-ray radiography systems. Through its large area and small pixel size, a LAXD provides a greatly improved signal-to-noise ratio (SNR) while maintaining high resolution; it enables volumetric imaging of containers; and it enables object imaging without motion.
INL	Actively-Induced, Prompt Radiation Emission Characterization	Investigate the detection and inspection-related utilization of prompt radiation emissions (i.e., gamma-rays and neutrons) that are actively induced by electron accelerators (both pulsed and CW-operations). For this effort, prompt is defined as during an accelerator pulse/(photo)fission event and/or immediately after ($< 1 \mu\text{s}$).

LANL	Nanocomposite Gamma-ray Detectors	Incorporate optical properties of nanophosphors and quantum dots with extant processing technology makes possible fabrication of nanocomposite scintillators with expected energy resolution <1% FWHM (662-keV γ)
LANL	Directed-Beams for Active-Interrogation Near Coastal Cities	Conduct end-to-end system analyses of both Compton back-scattering (CBS) directed-beams of gammas and directed-muon techniques to enable selection of appropriate components and concepts.
LANL	Multi-Particle Interrogation Source	Demonstrate the design of an intense dual neutron and gamma-ray source for an HEU detection system.
LANL	Physics and Algorithm Enhancements for a Validated MCNP/X Monte Carlo Simulation Tool	Develop and implement several key physics and algorithm enhancements, improvements in evaluated data and benchmark measurements for the MCNP/MCNPX Monte Carlo codes for active and passive detection systems
LBNL	High-Throughput Discovery of Scintillation Materials	Search for new scintillation materials through: Automation of synthesis and characterization procedures for high-throughput screening, use of available information and first-principles calculations of electronic structure properties to select families of candidate compounds, explore experimentally the scintillation properties of those families, and acquire samples of the most promising candidates and test them as scintillator radiation detectors.
LLNL	New Materials: High-Resolution Scintillator Materials and Detectors	Identify and test prospective scintillator materials for high light yield and proportional energy response. Consider both oxide transparent ceramics and halide single crystals.
LLNL	Scalable Compton Imaging Module for Search and Surveillance	Build and demonstrate a scalable, high-resolution Compton imaging system that provides unsurpassed energy and spatial resolution
LLNL	Passive Detection of Shielded SNM	Develop a system of algorithms, intermediate-scale neutron and gamma-ray counters, and performance metrics to passively identify the presence of SNM by neutron-induced nuclear fission reactions that create bursts of many neutrons and gamma rays.
LLNL	Detection of Small Quantities of Shielded SNM Using Low-Dose 60-keV Neutron Interrogation	Develop a proof-of-concept prototype to demonstrate the capabilities of 60-keV neutron interrogation to detect small quantities of SNM in loaded cargo containers.

LLNL	Relocatable High-Penetration Neutron Interrogation System to Resolve Alarms	Develop a system to detect SNM in shielded configurations using a high-energy (3-7 MeV) collimated neutron beam that would penetrate the thickest cargo and induce fission in SNM that may be present.
LLNL	Mapping Isotopic Distributions in Cargo (FINDER) to Detect SNM and Its Configuration	Demonstrate isotope-specific imaging using nuclear resonance fluorescence (NRF) via tunable quasi-monochromatic (Thomson) photon sources, while at the same time providing a conventional radiograph of the bulk matter distribution.
LLNL	Contextually-Aware Expert-System for Automated Threat Assessment	Combine gamma and neutron measurements with non-radiation and contextual information to vastly improve threat/non-threat discrimination and radiation alarm resolution. Develop Decision Analysis Expert System (DAES), supported by an Information Architecture (IA), developed specifically for this application.
LLNL	Physics-Based Simulation Tools for Development and Evaluation of Detection Systems	Add several physics processes to an open source core software library with interfaces to commonly used detector simulation tools.
LLNL	Assessment of Long-Dwell, In-Transit Detection System for Cargo Ships	Establish a team and approach for undertaking physics-based phenomenology studies by modeling the natural and operational environment that emerging technologies will face as well as detailed characterization of the technology itself. On long-dwell in-transit detection in large container ships
NRL	SoftWare for Optimization of Radiation Detectors (SWORD)	Employ a set of existing tools to assess and compare the operational performance of new radiation detection systems using Monte Carlo simulation of radiation interactions in complex detector geometries.
ORNL	Transparent Polycrystalline Ceramic Scintillators	Develop synthesis techniques for producing inorganic scintillators at a substantially reduced cost and an increased rate of production as compared to current single crystal growth techniques.
ORNL	Integrating Portal Monitors with Individual Source Identification, Tracking	Integrated video and radiation imaging system
Passport	Isotopic 3-D imaging system using nuclear resonance fluorescence	Design an isotopic 3-D imaging system using nuclear resonance fluorescence, absorption and an effective-Z measurement approach - may be used for all contraband of interest (explosives, drugs, chemicals, etc.)

PNNL	Viability Study for In-Transit Monitoring of Maritime Cargo	Assess the viability of long-dwell, in-transit monitoring of cargo on large container ships using a combination of 1) modeling, 2) measurements and 3) a sensitivity study to identify parameters have the greatest impact on system performance.
POC	Dirty Bomb Gamma-Ray Identification (DOGID) System	Develop an all-optical gamma-ray detector based on change in refractive index.
Rapiscan	Portal System for X-ray Inspection and Automated Detection	Development of a Portal System for X-ray Inspection and Automated Detection of High-Z Materials in Vehicles and Cargo
Rapiscan	Data Fusion for Nuclear Threat Detection	Evaluate the feasibility of using "data fusion" to enhance the performance of existing nuclear threat detection techniques and integrated systems. Physics-based decision algorithms will be evaluated that could be applied to a wide range of nuclear threat detection systems.
RMD	High Sensitivity, High Resolution Radioisotopic Detection	Thallium bromide (TlBr) semiconductor growth development for high resolution gamma detectors.
RPI	A Novel Portable Battery Operated Neutron Source	Develop a portable, battery operated DT neutron source using pyroelectric materials.
SAIC	Highly Penetrating Source of Monochromatic Gamma Rays	Develop monochromatic gamma-ray source consisting of a compact electron-cooled storage ring (CESR) combined with an innovative gas target to exploit relevant nuclear resonances and generate mono-energetic gamma rays.
SNL	Fabrication of Large-Volume, Low-Cost Ceramic Lanthanum Halide Scintillators for Gamma Ray Detection	Use advanced ceramic processes to fabricate large, optical-quality polycrystalline lanthanum halide scintillators to replace small single crystals produced by the conventional Bridgman growth method.
SNL	Fission Neutron Detection Using Heteroepitaxial Chemical Vapor Deposition (CVD) Diamonds	Utilize new techniques to grow single crystalline diamond and evaluate its detection capabilities as a spectroscopic-grade neutron detector.
SNL	Mobile Dual Neutron/Gamma Source Interrogation System	Car portable proton-based neutron and gamma-ray interrogation system.
SNL	Experimental Limits for In-Transit Detection of Radiological Materials	Use the collection of data from a large sampling of cargo in container ships while at sea to estimate PD and FAR for three different detection schemes: 1) attachment of detection systems to each cargo container, 2) shipment of special detector containers amongst cargo containers, and 3) instrumentation of the ship itself. GADRAS, will be used to simulate both the threat sources and detection system performance.

SPAWAR	A Microwave-Based Gamma-Ray Spectrometer	An optical, semiconductor-based gamma radiation spectrometer using a detector employing AC resonance rather than DC electric fields to detect gamma-ray interactions within a semiconductor and does not require charge transport and collection.
SUNY	Semiconductor high-energy radiation detector with excellent isotope identification and directional capability	Develop a new scintillator that will offer better energy resolution for isotopic and location identification in a more compact and inexpensive detector. Their scintillator converts high-energy radiation to pulses of light that can convey both the location and the energy of the intercepted ray.
U of Mich	Silicon-based 3D position-sensitive scatter detector with integrated amplification	Enhance the directional resolution of semiconductor detectors by imaging the electron-hole cloud that is created from the passage of radiation through the semiconductor.
UNL	Tunable, monoenergetic gamma-ray source for identification of embedded SNM	Develop an all-laser driven, high average-brightness, quasi mono-energetic, and tunable Compton radiation source. This source uses Wakefield acceleration to generate the high energy electrons needed for the Compton scattering.
Wash U	Development of Nuclear Solid-State Dual-Anode Calorimeters	Develop CZT crystals with a dual anode design that gives the 3D location of the radiation interaction. The 3D locations can be used to obtain information about the direction from which the incident radiation comes and correct the anode signals for the location of the interaction and to compensate for material inhomogeneities.
Westinghouse	Pulsed Photonuclear Inspection (PPNI) for Shielded SNM in Cargo	Develop a fast prompt silicon carbide neutron detector for use in pulsed neutron and photon interrogation systems..