

# Emerging Nuclear Detection Technologies in the Department of Defense

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# Overview

- Mission and Strategy Summary
  - Method and Approach
- High Impact Projects
  - Tactical Assault Kit (TAK)
  - MERLIN / VIPER
- Questions





# DTRA Mission

The Defense Threat Reduction Agency enables the Department of Defense and the United States Government to prepare for and combat weapons of mass destruction and improvised threats, and to ensure nuclear deterrence.

## DTRA's Strategic R&D Objectives

- Understand the Environment, Threats, and Vulnerabilities
- Control, Defeat, Disable, and/or Dispose of Threats
- Safeguard the Force and Manage Consequences



# NTD Mission and Strategy Summary

## *Strategic Mission*

Develop advanced technologies for US Forces and their allies and partners for nuclear threat and hazard detection, awareness and avoidance.

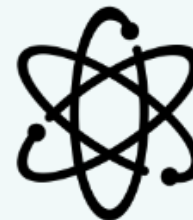
### ***Alternative Signatures***

Develop and exploit non-radiation signatures to expand nuclear detection capabilities in time and space.



### ***Radiation Detection***

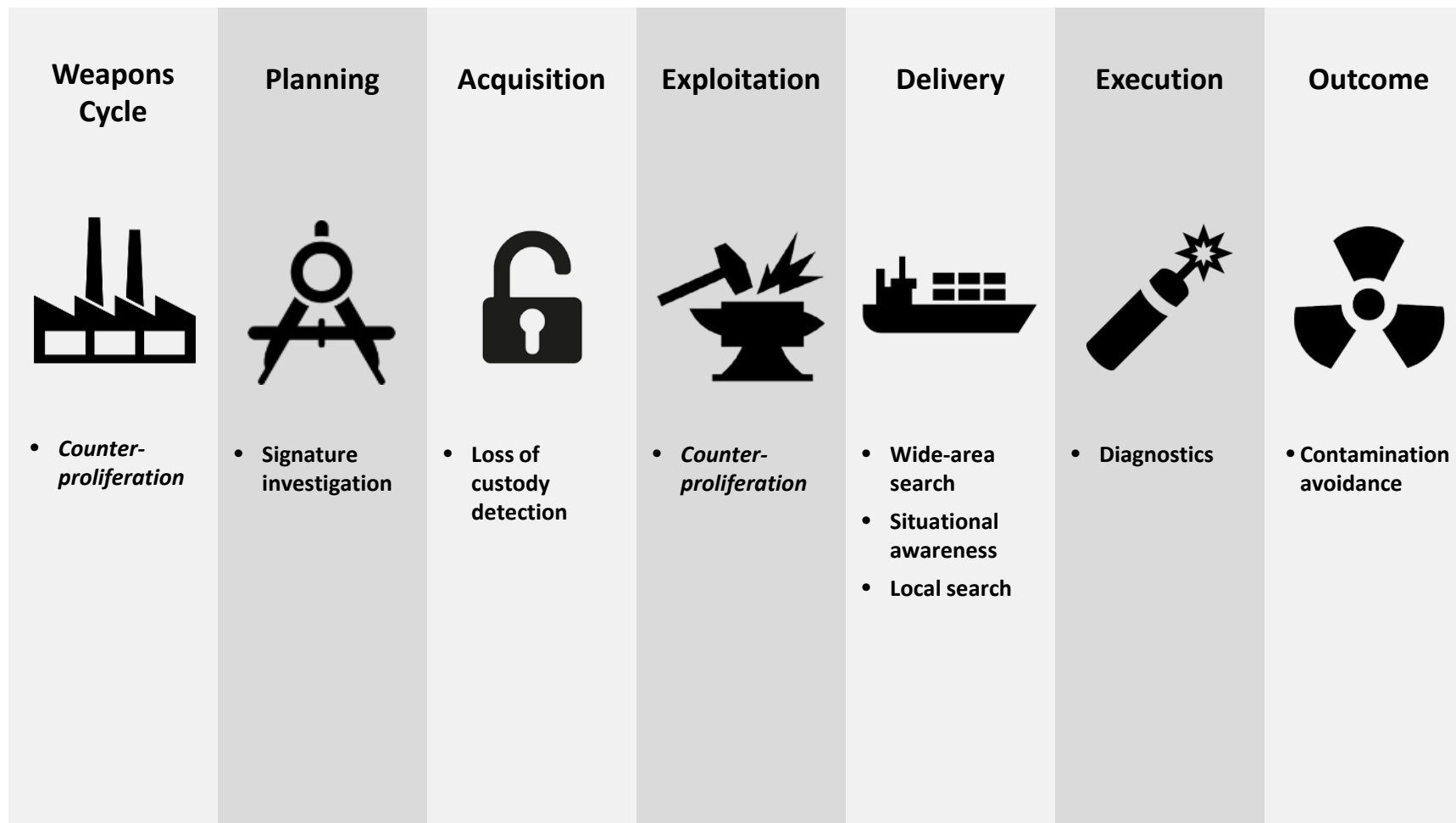
Develop cutting edge radiation detection equipment for local-area search, diagnostics, and contamination avoidance.



*Our technologies provide decision space to national leadership, increase odds of friendly mission accomplishment, and reduce overall risk.*

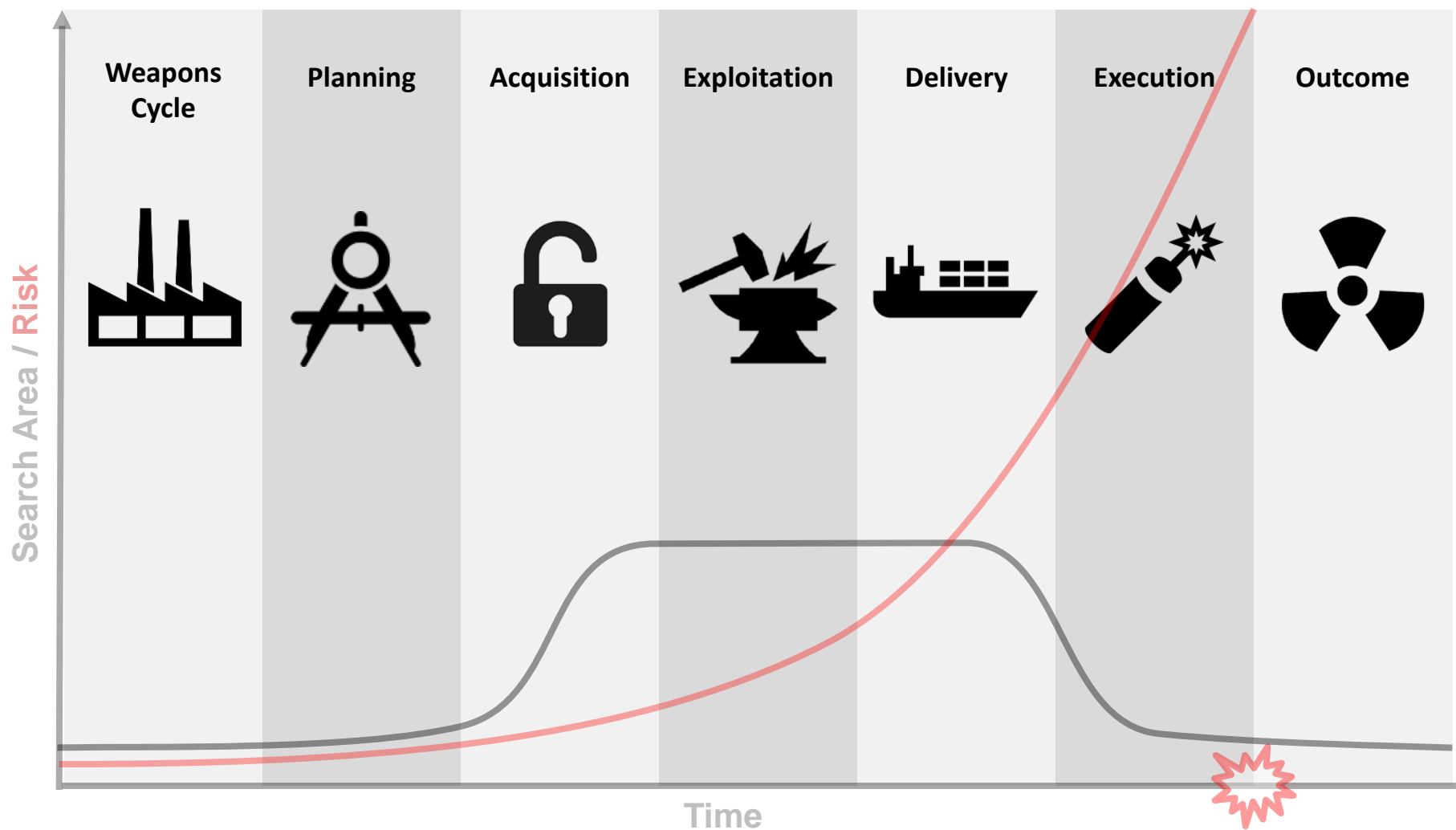


# Nuclear Threat Timeline





# Nuclear Threat Timeline





# High Impact Projects

## Mobile Field Kit / TAK RN Plugin

- RN Situational Awareness
- Common User interface
- Common Sensor interface



## MERLIN / VIPER

- Vehicle mounted sensors
- Contamination Avoidance
- Hazard Detection
- Rapid Development



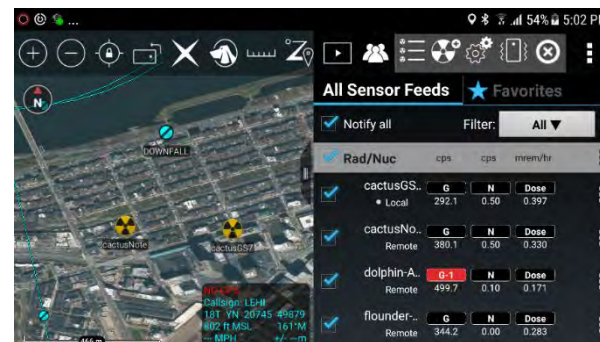
# TAK Radiation/Nuclear (RN) Plugin

Provides a unified platform within TAK for RN sensor integration providing:

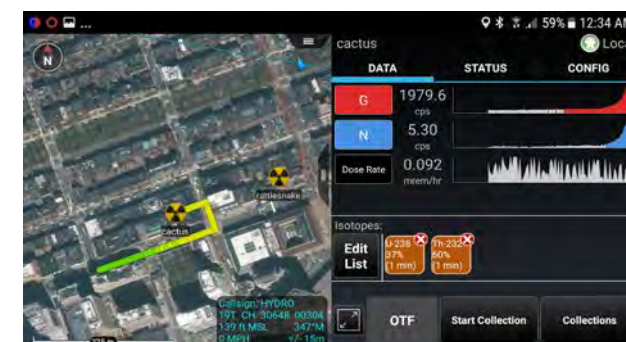
- Real-time data monitoring
- Spectrum collection and analysis
- Remote collaboration

## Growing Suite of Supported Sensors

- 12 sensors currently integrated
- “DTRA” N42.42 sensor input for streamlined integration with newly developed sensors



Sensor Feeds



Sensor Dashboard



Image Heatmap (Polaris 2.1)



Spectrum View

TAK RN plugin, ongoing development since 2013

WinTAK RN plugin, initial release Nov 2017

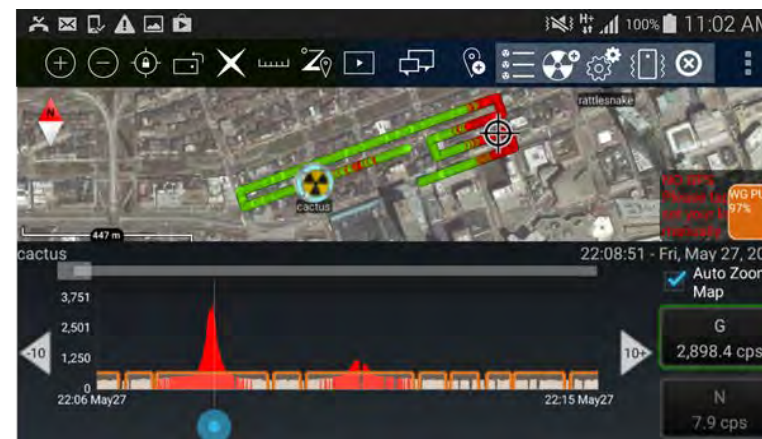




# TAK Radiation/Nuclear (RN) Plugin

## Timeline View

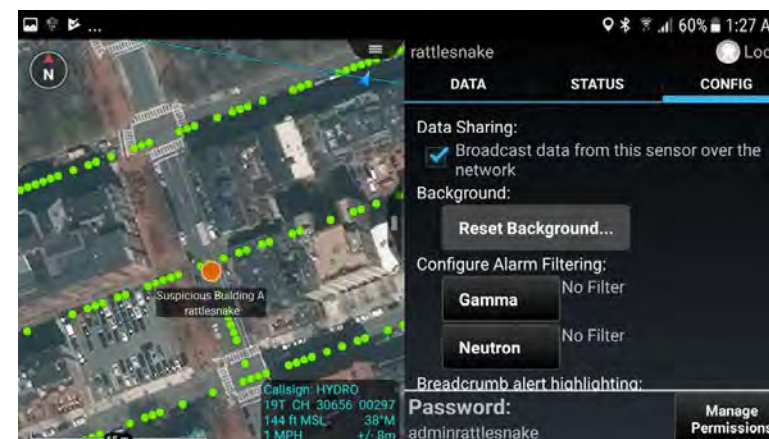
- History of all data collected for a particular sensor
- Synchronized timeline and map view
- Display optimized for performance over multi-hour (or multi-day) collections
- Selectable points of interest



Timeline View

## Permissions and Sharing

- Password-enabled configuration for viewing data
- Remote control for spectrum collection
- Enable/disable sensor data sharing and syncing to manage bandwidth use



Permissions and Sharing



# MERLIN VIPER – BLUF

- MERLIN VIPER – DTRA’s innovative radiation detection system
  - Leverages decades of radiation detection R&D
  - Applies knowledge to contamination avoidance and hazard mapping
  - Revolutionizes how the military fights on a nuclear battlefield
- Concept started in Fall 2016 with JPEO-CBD
  - First Field Test on NBC Stryker, 27 Nov - 1 Dec 2017
- Transition in Fall 2018



**Vehicle Integrated Platform Enhanced Radiac (VIPER)**



MERLIN-I (Imager)  
MERLIN-A (Applique) Directional

MERLIN-BOSS (Control)



**Mounted Enhanced Radiac Long-range Imaging Networkable (MERLIN)**

*Enabling Warfighters to Survive, Fight and Win on a Nuclear/Radiological Battlefield*



# Current **“Legacy”** R/N Recon

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- **“Cold War Technology”**
  - **At best a point detector – “Best Guess”**
  - **Analog ISR products in a digital world**
  - **Slow manual process – delays reporting**
  - **Increasing risk to Soldiers on today’s battlefield**



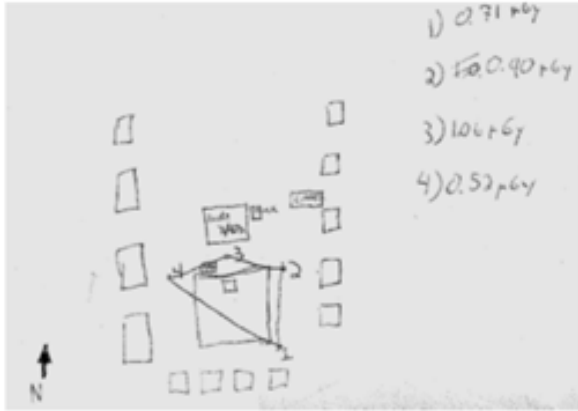
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# MERLIN/VIPER – Putting the “Nuclear” back in NBC

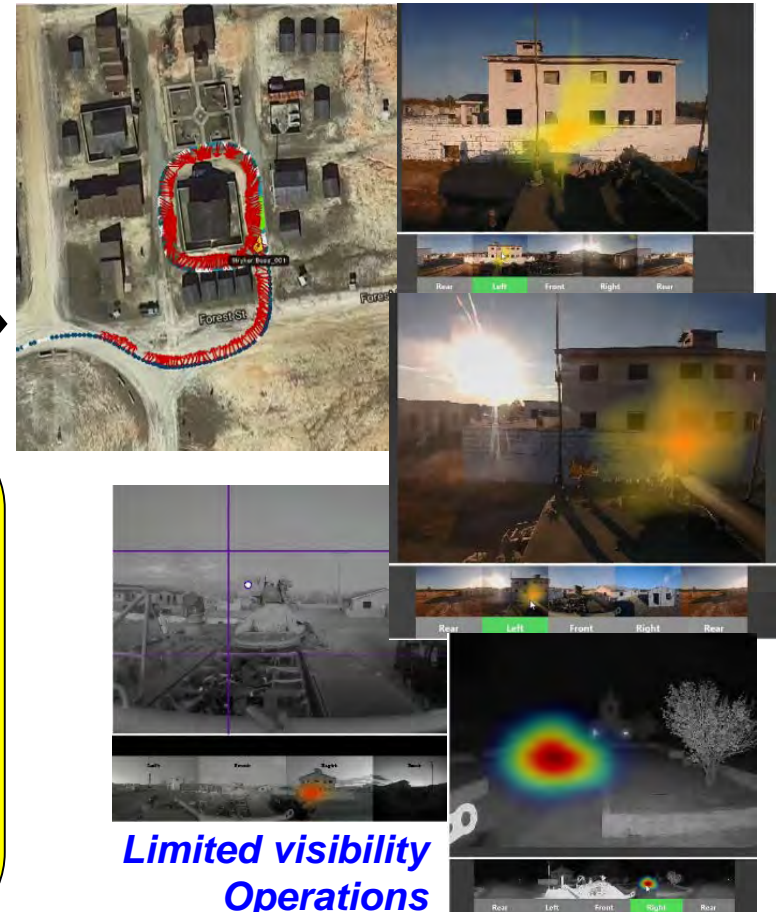
*Designed for armored vehicles to detect on the move*

*Revolutionary ISR products for the users and leaders faster, and more accurate than current methods and equipment to enhance mission command*

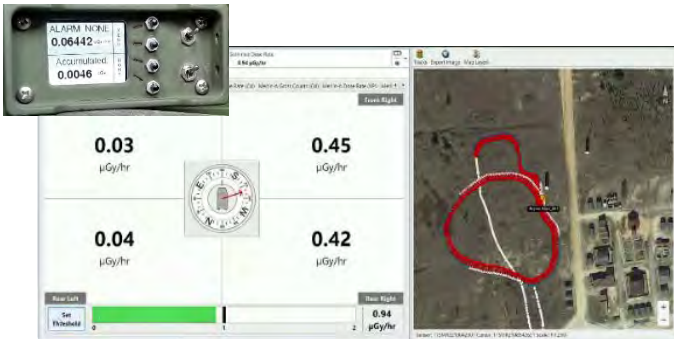


Using VDR-2  
30 minute  
“Best Guess”

ISR capability  
after 5 minutes



*Enhanced Crew Dosimeter*



*New MFK/TAK interface provides ease of operation by users*

- *Minimized radiation exposure/hazard avoidance through stand-off detection capability*
- *Reduced decontamination requirements*
- *Increase/maintain tactical maneuver*
- *Increased R/N battlefield awareness*
- *Maintain formations' capabilities to continue the fight on a R/N battlefield*
- *New CONOPs, including: Hazard ID, point-source detection, survey, fall-out field navigation, route clearance, etc.*

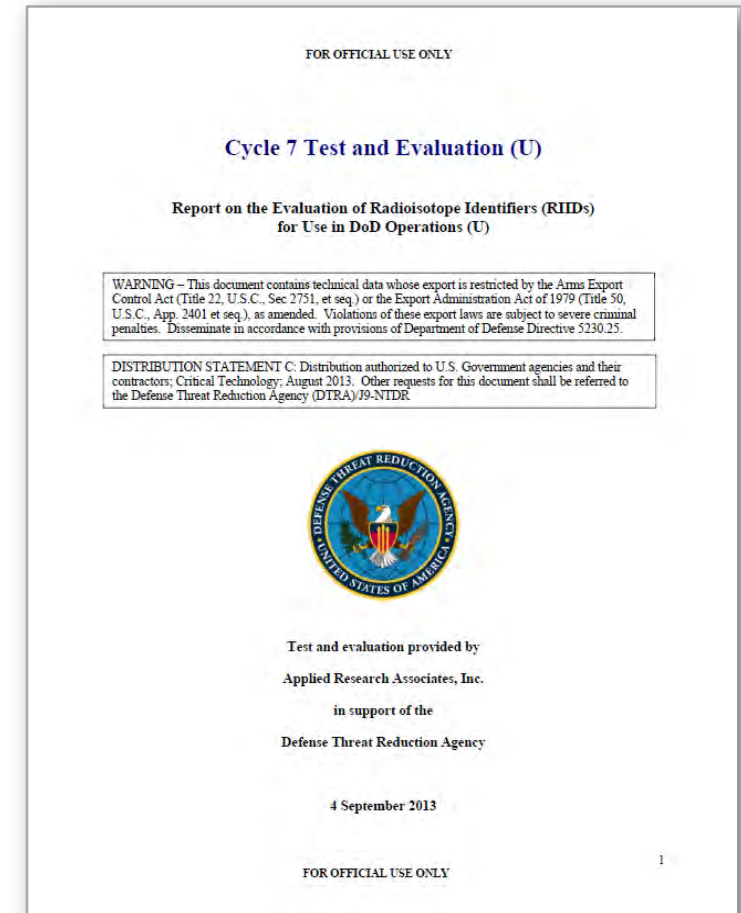
*Limited visibility Operations*



# Radiological Test and Evaluation

- Support RD Nuclear Technologies research, development, and DOD acquisition process by performing rigorous technical assessments of mission related technologies as they are developed, deployed and transitioned.
- Test detection systems against special nuclear materials, in significant quantities and in realistic configurations.
- Perform evaluations for commercial and government off-the-shelf (COTS) technologies as well as for technologies under development.

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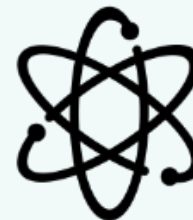
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# Questions



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