

# ***DTRA Test Science and Technology Department***

## ***Programs and Enabling Capabilities***

***Department Chief***

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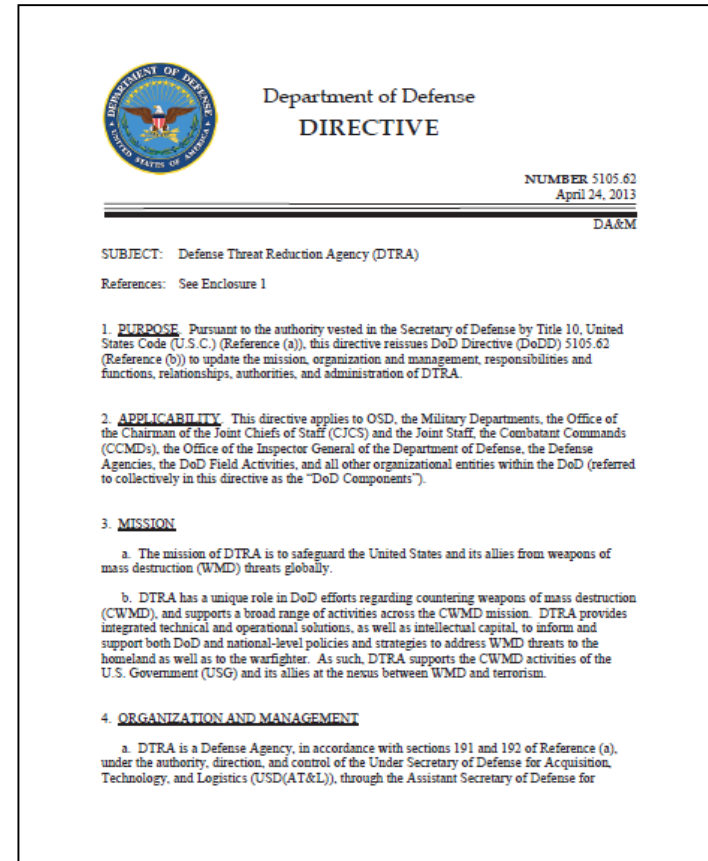




# DTRA RDT&E – OSD Mandate

## DoDD 5105.62 – DTRA Director:

- Manages and oversees *DTRA research, development, test, and evaluation (RDT&E)* and acquisition needed to support DoD mission areas in support of DoDD 2060.02 (DoD Combating Weapons of Mass Destruction (WMD) Policy), which states the ATSD(NCB), under the USD(AT&L), shall oversee DTRA in the management of *RDT&E needed to counter the threat and use of WMD...*
- Researches and develops technologies to *maintain readiness* to conduct effects experiments, including those needed if *underground nuclear weapons testing* is resumed
- Researches, develops, and *evaluates advanced weapons* and their *lethal or collateral effects*, including *analysis of delivery options* and *weapon/target interaction*, against the spectrum of *WMD-related targets*





# DTRA J9 Strategic Plan: J9TS Tasks

- DTRA J9 provides a **unique National testing capability** for simulated WMD facility characterization, weapon-target interactions, WMD facility defeat, and asymmetric threat defeat
  - Conduct **operationally-relevant test and evaluation** supporting development of CWMD capabilities and technologies, including detection, tracking, and defeat systems and weapons, as well as tactics, techniques and procedures
  - Provide **end-to-end test and construction** program management, oversee construction and fielding activities, plan and direct test execution events, and ensure the collection and reporting of critical test data
  - Provide **state-of-the-art instrumentation** support, including engineering expertise for instrumentation plans and diagnostics tools
  - Provide research, studies, and **test science** support for RDT&E of CWMD systems and technologies, special weapons effects, survivable structures and systems, and treaty verification technologies
  - Use **robust processes** to provide test event planning, management, and execution, data analyses, and testbed/test article management that supports test objectives for DTRA and other DoD and U.S. Government agency customers.



# J9TS Test Beds Kirtland AFB

**Chestnut Site**  
up to a 2000lb NEW



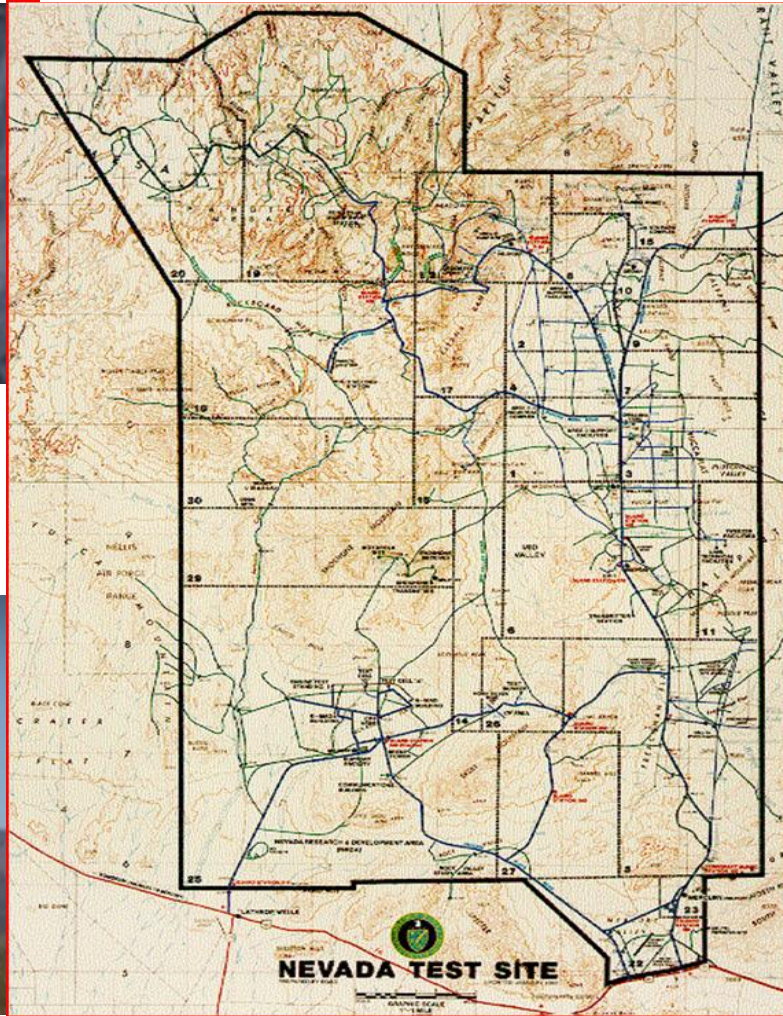
**GRABS Site**  
up to 900lb NEW





# J9TS Test Beds Nevada National Security Site

<https://www.nnss.gov/pages/resources/library/Media.html>

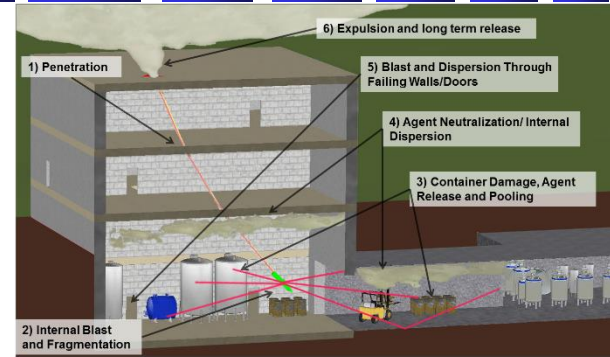




# J9TS Programs

## Purpose of Establishing Programs:

- Efficiently meet customer test objectives:
  - Minimum test bed infrastructure to address mission needs
  - Low cost, “best value” testing
- Develop capabilities to meet evolving CWMD testing needs
- Partner with DTRA program managers to develop and start transition of test diagnostics to operational capabilities

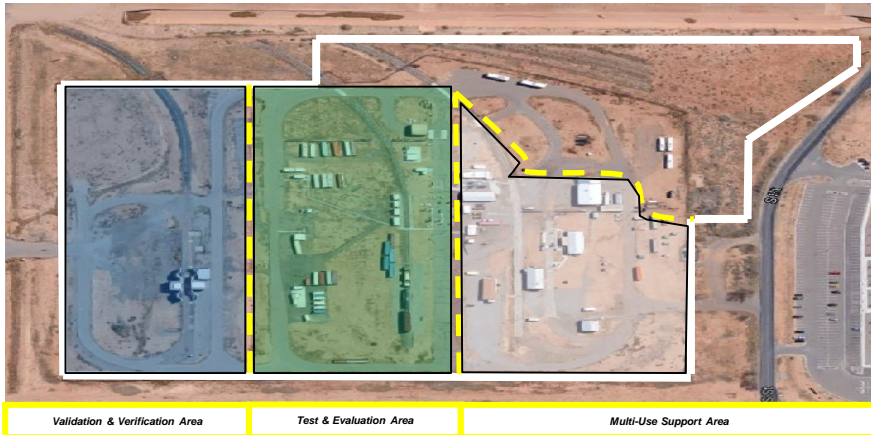


## Chemical/Biological Testing Program

*United States Nuclear Tests, July 1945 through September 1992, DOE/NV-209 (Rev. 14), December 1994*



## Nuclear Event Characterization Testing Program

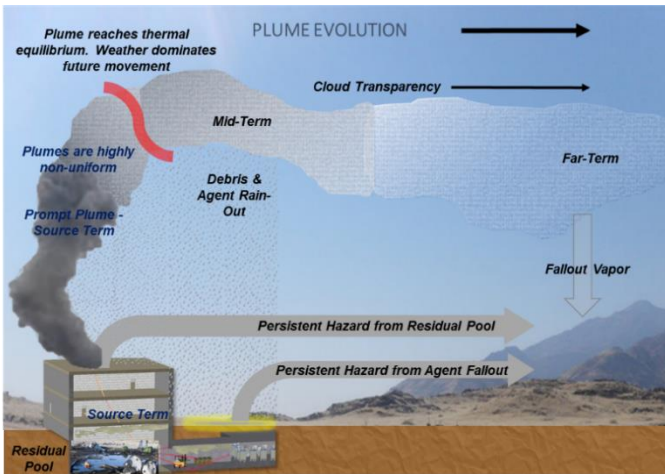
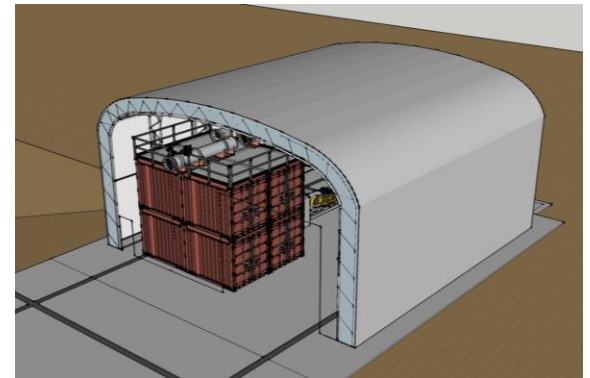
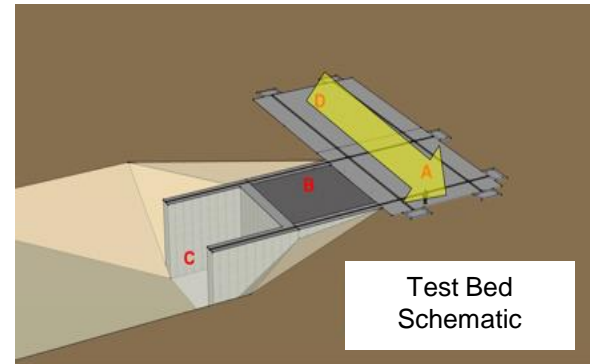


## Radiological/Nuclear Materials Detection Testing Program



# Chemical/Biological Testing Program

- Program Goals:
  - Provide test validation to enhance CCDR confidence in pre-strike modeling and simulation tools for potential agent release
  - Develop and transition stand-off sensor capabilities to provide robust characterization of chem/bio plumes
  - Identify signatures and determine effectiveness of improvised devices containing chem/bio agents
  - Provide high-confidence, repeatable assessments of weapon performance for agent defeat effectiveness
  - Support TTP development for first responders/investigators
- Partners/Customers: DTRA, FBI, ECBC, JPEO-CBD, Others



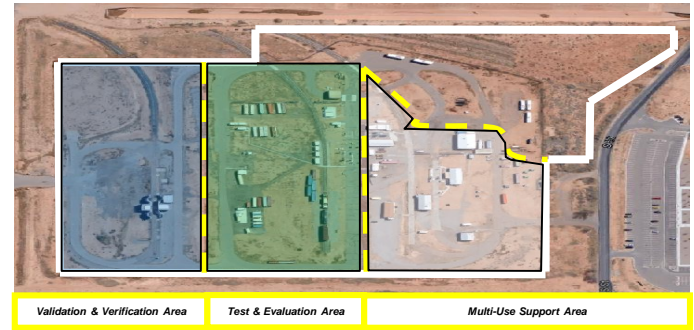


# Radiological/Nuclear Materials Detection Testing Program

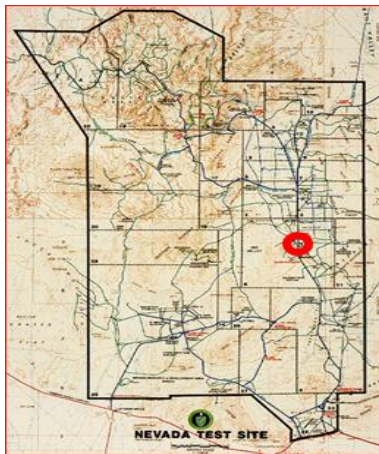
**Objective:** To provide world-class venues for the test and evaluation of developmental sensors and detection technologies, and the TTPs to use them, in a realistic environment with realistic sources

Partners/Customers: DTRA J9NTD, DNDO, NNSA, others

Technical Evaluation Assessment Monitor Site (TEAMS)



Nevada National Security Site



Sources



Container Stack







# J9TS Enabling Capabilities

## 1. Mobile Instrumentation Integration

- *Objective:* Support WMD testing anywhere in the world with State-of-the-art diagnostics capabilities

## 2. Remote Sensing Test Diagnostics

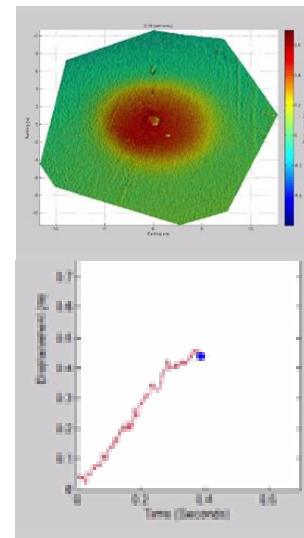
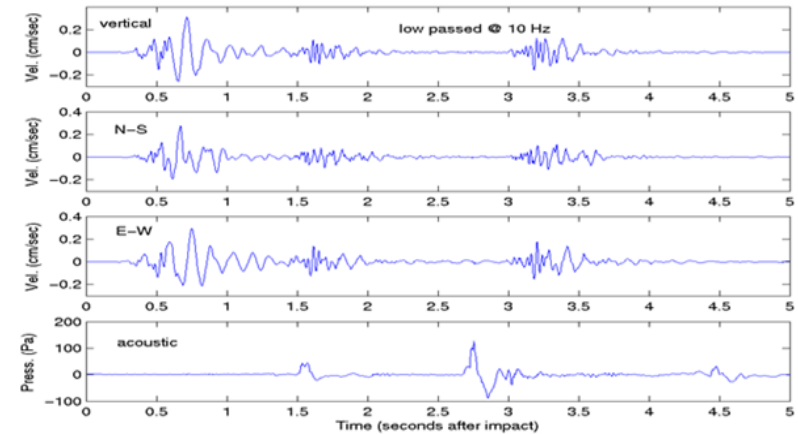
- *Objective:* Develop & transition novel test diagnostics for further development & potential OPS
- *Elements:* seismo-acoustic arrays, photogrammetry, RF characterization, optical/MSI/HSI sensors, integrated NTM

## 3. Explosives Expertise

- *Objective:* Ability to produce desired source uniformity at any yield, and partner with IHEODTD for adapting IED designs & employing HME
- *Customers:* J9CB, J9CX, J9NT, JIDO, FBI

## 4. UAS, UGS, and Autonomous Systems

- *Objective:* Be a key DoD player in the T&E of autonomous systems & enable their integration as diagnostics in CWMD test events
- *Elements:* Photogrammetry, Rad/Nuke Materials Detection/Characterization, Chem/Bio plume analysis





# Autonomous Systems & UAS Development Path

## 1. Dynamic Digital Photogrammetry

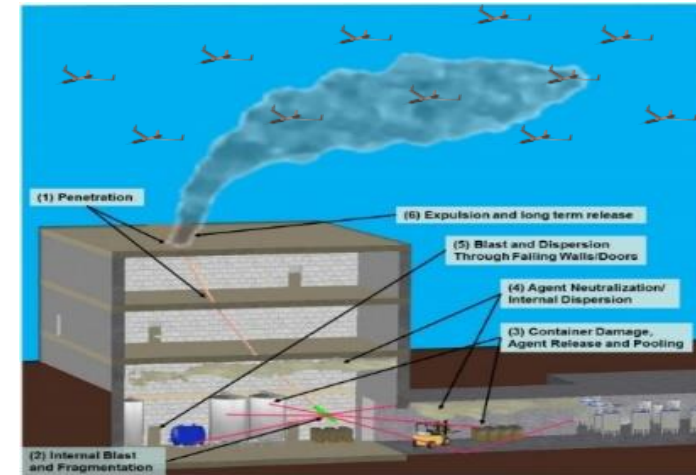
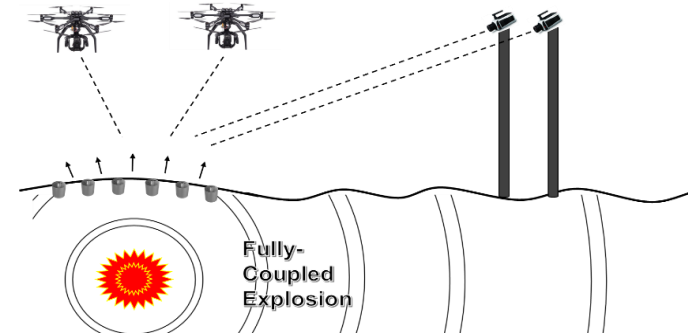
- 2<sup>nd</sup> UAS autonomously maintains appropriate altitude relative to piloted vehicle
- Potential for adaptive jitter correction

## 2. Rad/Nuke Materials Detection in realistic environment

- DTRA swarm for mapping area of interest: 3-D map generated in real-time
- DTRA UAS with integrated DTRA radiation/SNM detector for source location, identification, and characterization
- TEAMS Test events:
  - Initial event: Sources hidden in container stack
  - Culmination event: Sources above/below ground structures

## 3. Chem/Bio plume characterization

- UAS-based LIDAR to characterize plume boundary and micro-wind field
- On-board modeling to adapt swarm to evolving plume
- UAS-based HSI to characterize plume constituents, and aerosol/vapor fractions
- Individual UAS plume sampling with on-board analysis capability



Increasing Complexity





# QUESTIONS?

**WWII "Manhattan Project" -- Cold War -- Gulf War I -- Terror Attacks -- Gulf War II -- Today**



1942



1947



1959



1971



1996



1998

**Nuclear Weapons – Simulated Nuclear Weapon Air Blast – AT/FP/CT – CP/AD/CWMD – HTD**

