PDRD Program Overview

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Briefing to
LDRD Symposium

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Agenda

- PDRD Program authorization
- PDRD compared to LDRD
- PDRD FY08 program costs
- NNSA Production Sites

PDRD Authorization

2001 National Defense Authorization (PL106-398, Section 3256) authorized NNSA to establish engineering and manufacturing research, development and demonstration programs at the nuclear weapons production facilities to support innovative or high-risk design and manufacturing concepts and technologies with potential for high payoff for the nuclear weapons complex.

PDRD vs LDRD

LDRD

- Pursues new and innovative scientific and technological ideas;
- Enhances the scientific and technological vitality of the institution;
- Manages strategic direction; and
- Develops and retains new workforce capabilities.

PDRD

- Replacement of obsolete or aging design and manufacturing technologies;
- Development of innovative agile manufacturing techniques and processes;
- Training, recruitment, or retention of essential personnel in critical engineering and manufacturing disciplines

PDRD Program FY 2008 Costs

Section 309 of H.R. 2764, Consolidated Appropriations Act, 2008, Public Law 110-161 enabled the Secretary of Energy to authorize an amount not to exceed 4% for PDRD. The maximum funding level for LDRD is 8 %.

	LDRD	PDRD		Total
Total # of Projects	1,707	145		1852
Value of Projects* ($M)	$508.6	$23.6		$532.2

* Administrative costs not included

PDRD is little sister of LDRD. 5% as many projects and funding as LDRD.

NNSA Production Sites

Bill Faubion

Pantex Plant

Pantex Plant's Mission

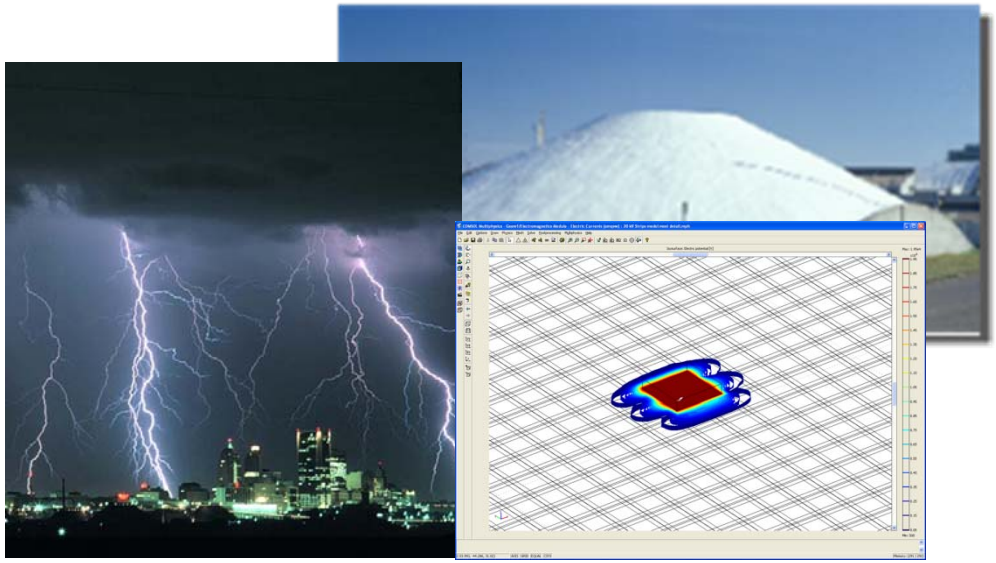
Pantex is charged with maintaining the safety, security, reliability and operational readiness of the nation's nuclear deterrent

Pantex Plant's Mission

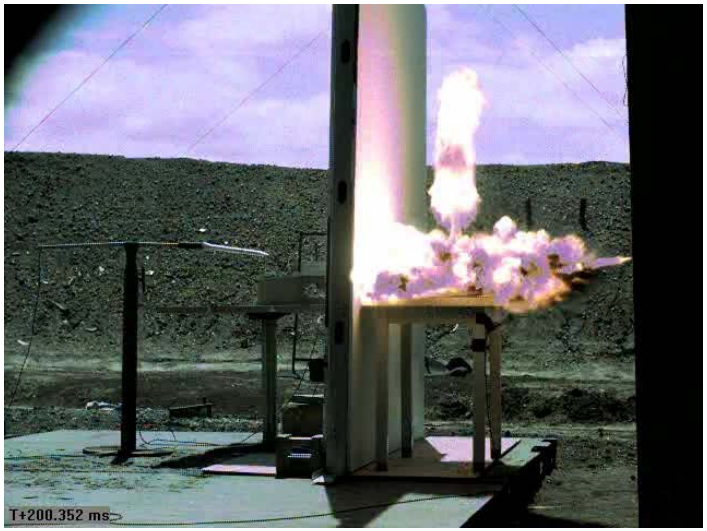
- Nuclear weapons stockpile maintenance
- Special nuclear materials stewardship
- High-explosives manufacturing, fabrication and testing

Modeling and Small Scale testing for nuclear explosive safety

The results of previous and current work funded by the PDRD Program have provided benefits to the NNSA and the nation.



Modeling of lightning waveforms and power distribution system quantifies lightning and electrical transients in nuclear explosive facilities at Pantex Plant



Explosive testing of standard commercial grade steel stud construction bounds typical laboratory operations.

Results to other high-risk facilities.

NNSA Production Sites

James F Mahoney

Kansas City Plant

B&W Pantex

Kansas City Plant
National Security Asset

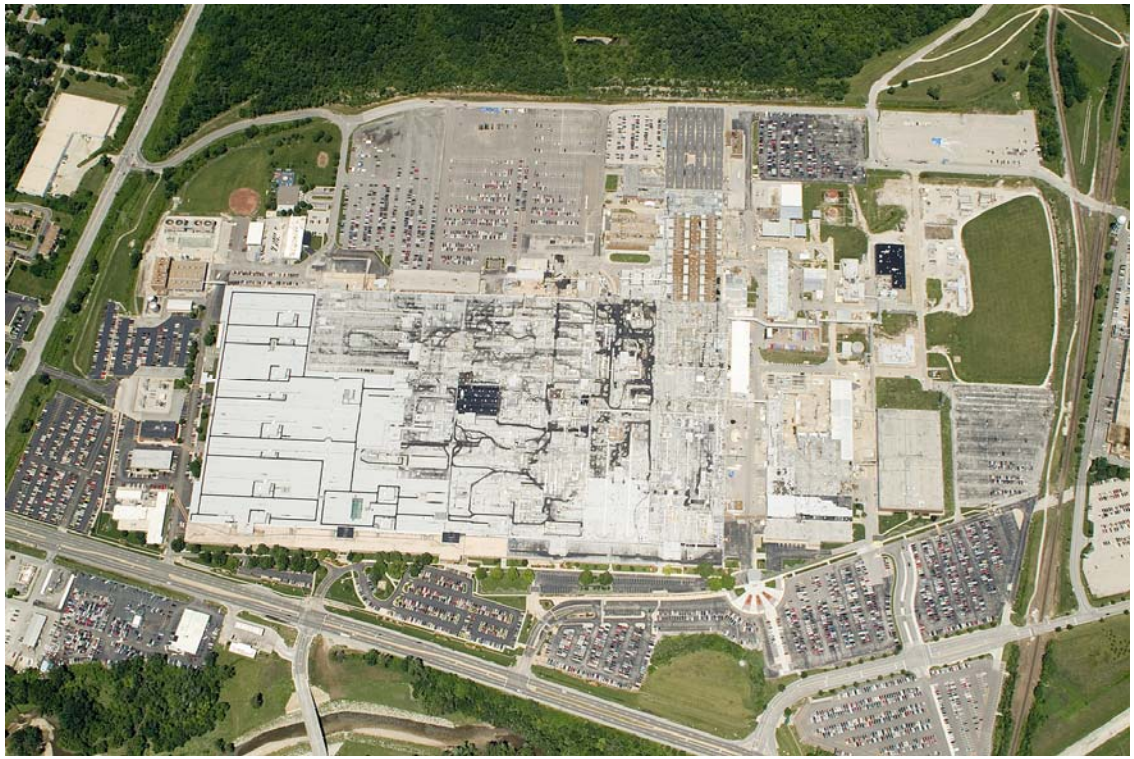
SRS
savannah river site

Y-12
National Security Complex

Kansas City Plant's Mission

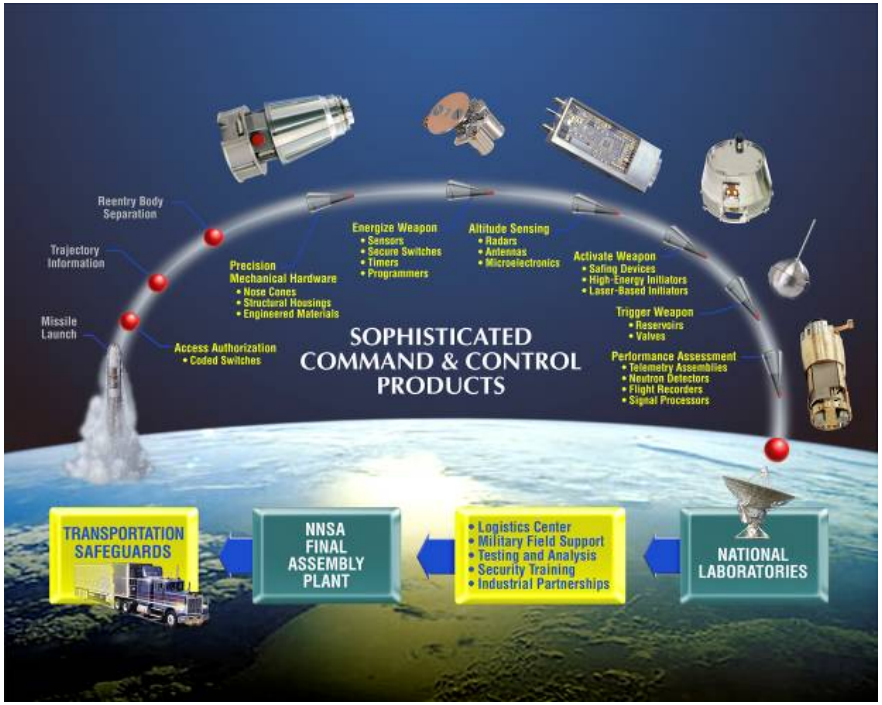
National Nuclear Security Administration

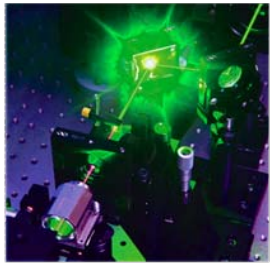
KCP is critical to both production and transformation

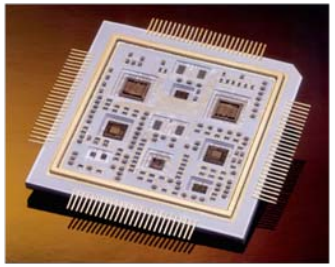


Kansas City Plant's Mission

- **One-of-a-kind facility for integrating mechanical, electronic and engineered materials production**
- **Support 40 technically demanding product families**







Perimeter Security in Public Access Zones Outside of Security Screening Portals

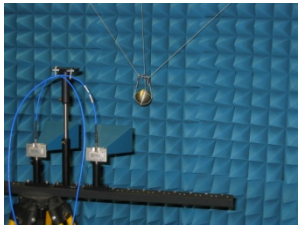
Security in open public areas has become a formidable task as terrorists commonly blend into the unsuspecting scenery.

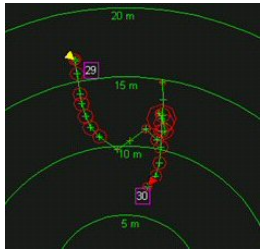
Protection of high value assets during transport

Airport areas outside of screening

Stereo Imagery

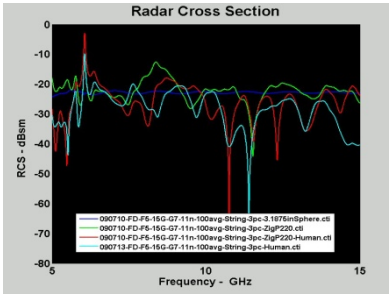
Resonant Radar

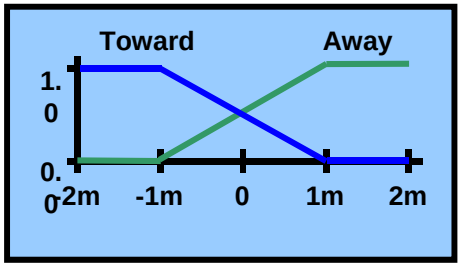




3D Tracking

Signatures





Threat Assessment

Expose, track, and neutralize hidden terrorist threats in public access zones.

NNSA Production Sites

Robert Rabun

Savannah River Site

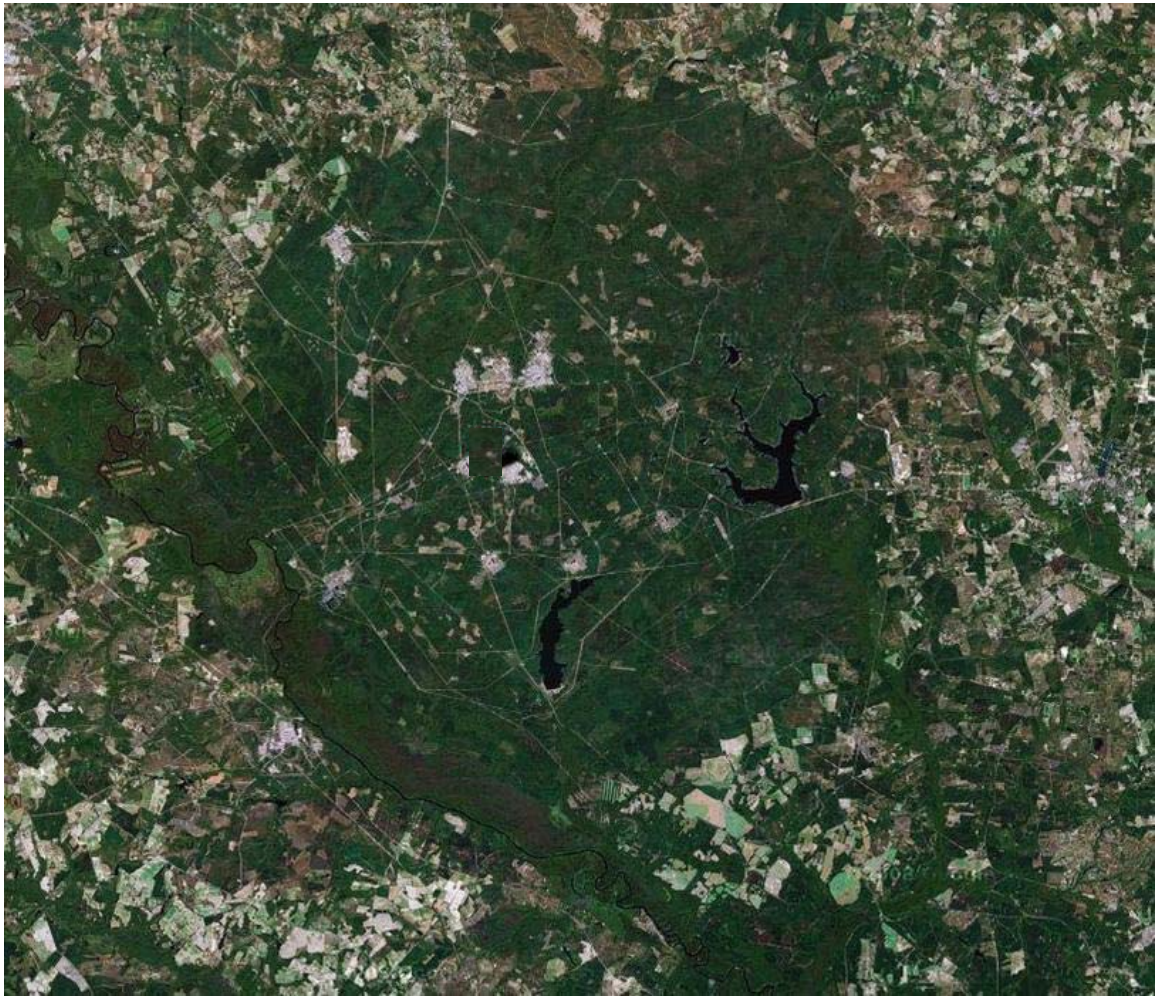
B&W Pantex

Kansas City Plant
National Security Asset

SRS savannah river site

Y-12 National Security Complex

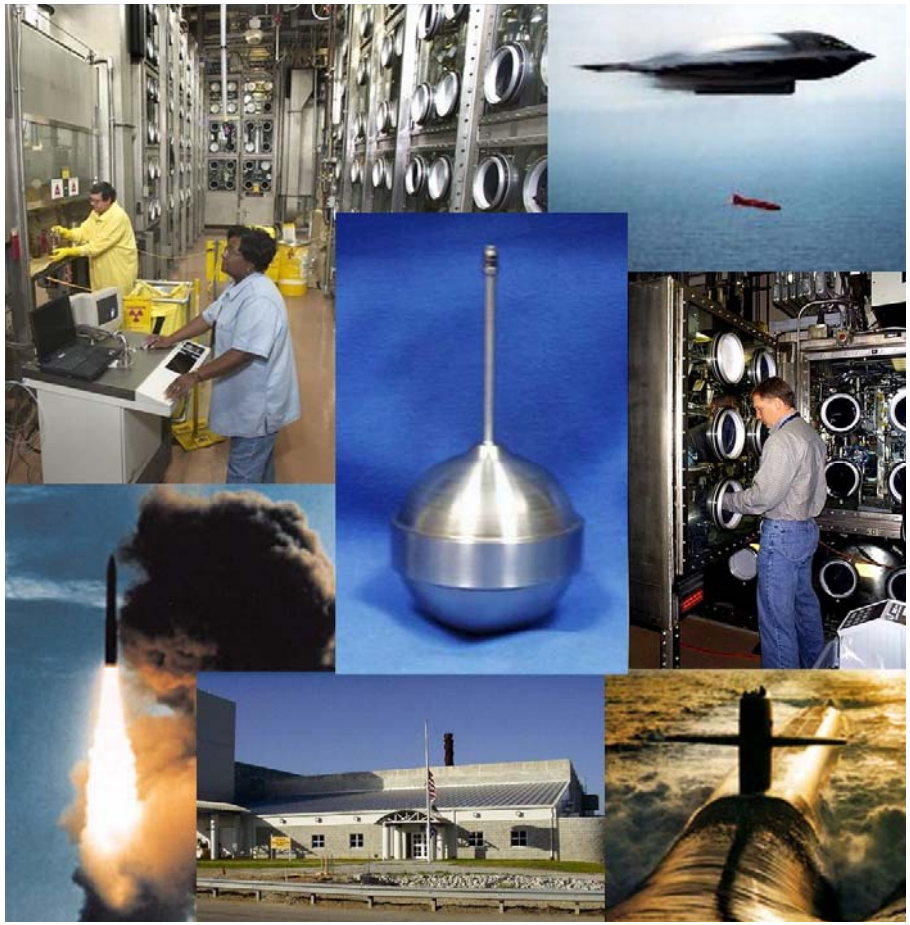
Savannah River Site



SRS at over 300 Square Miles is one of the world's largest nuclear facilities

Savannah River Site – Defense Mission

- Tritium supply
- Gas transfer system evaluation
- Stockpile maintenance (Tritium recycle)
- Helium-3 supply
- Tritium R&D



Wireless Sensor Networks for Nuclear Facilities and Radiation Monitoring

- Within NNSA secure facilities, wireless sensors will transmit classified data and connect to red networks – this presently requires NSA approved Type I (or equivalent) Encryption Devices.

- SRNL and the NSA have developed a specification to procure a new RF platform (non-Type I) that will meet NSA requirements for classified wireless transmissions up to the Secret level in NNSA secure facilities.

- Initial deployment of this technology will enable rapid installation and evaluation of an improved Tritium Air Monitor System developed with previous PDRD funding.

Collaboration on a common problem leverages resources and drives results

NNSA Production Sites

Pamela Moor

Y-12

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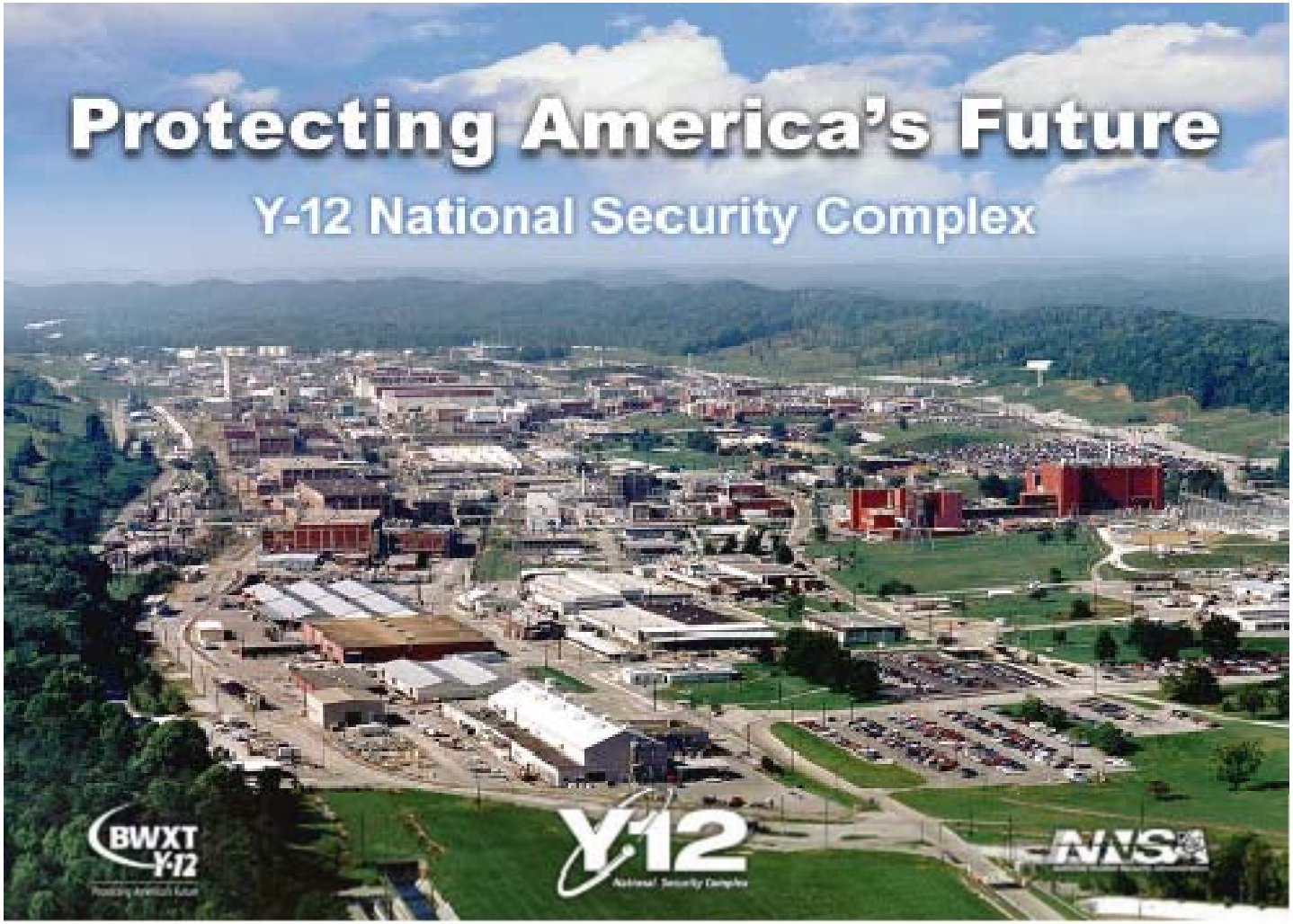
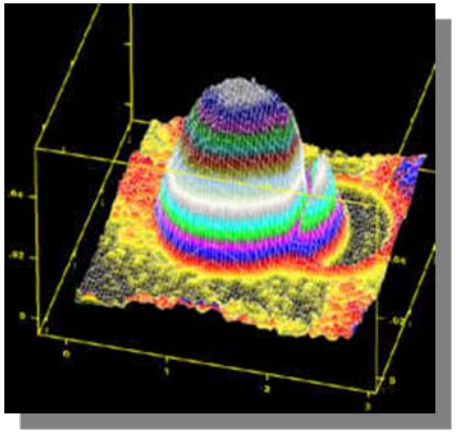
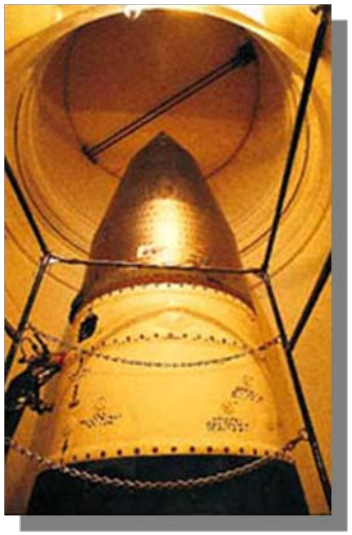
Y-12's Missions



Y-12's Missions

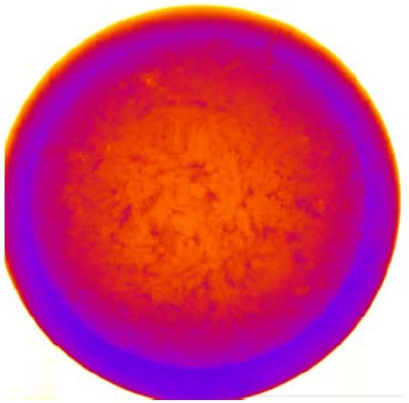
- Sustain a U.S. Nuclear Deterrent
- Reduce the Threat from Weapons of Mass Destruction
- Supply Nuclear Material to the Naval Reactors Program
- Provide Solutions to Other Emerging National Security Challenges





HEU Equivalent Spheres Fabrication

A highly enriched uranium (HEU) test object was fabricated to demonstrate the feasibility of creating an object with the gamma ray spectroscopy signature of a 2.5 kg sphere of 90% U-235 and 10% U-238, but using a much smaller amount of U-235 than that which is in a solid sphere of the material. This test object can then be used for comparative analysis and establishing detection and identification limits for radiation portal monitors, automatic spectroscopic portals, radioisotope identification devices, and similar devices for Homeland Security.



X-ray image of
Al-U alloy

An aluminum-uranium alloy has been developed that allows spectroscopy portals to be tested with minimal SNM vulnerability and at very low cost.