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Title:	Los Alamos National Laboratory Weapons Program Overview to the Faculty and Cadets United States Military Academy West Point
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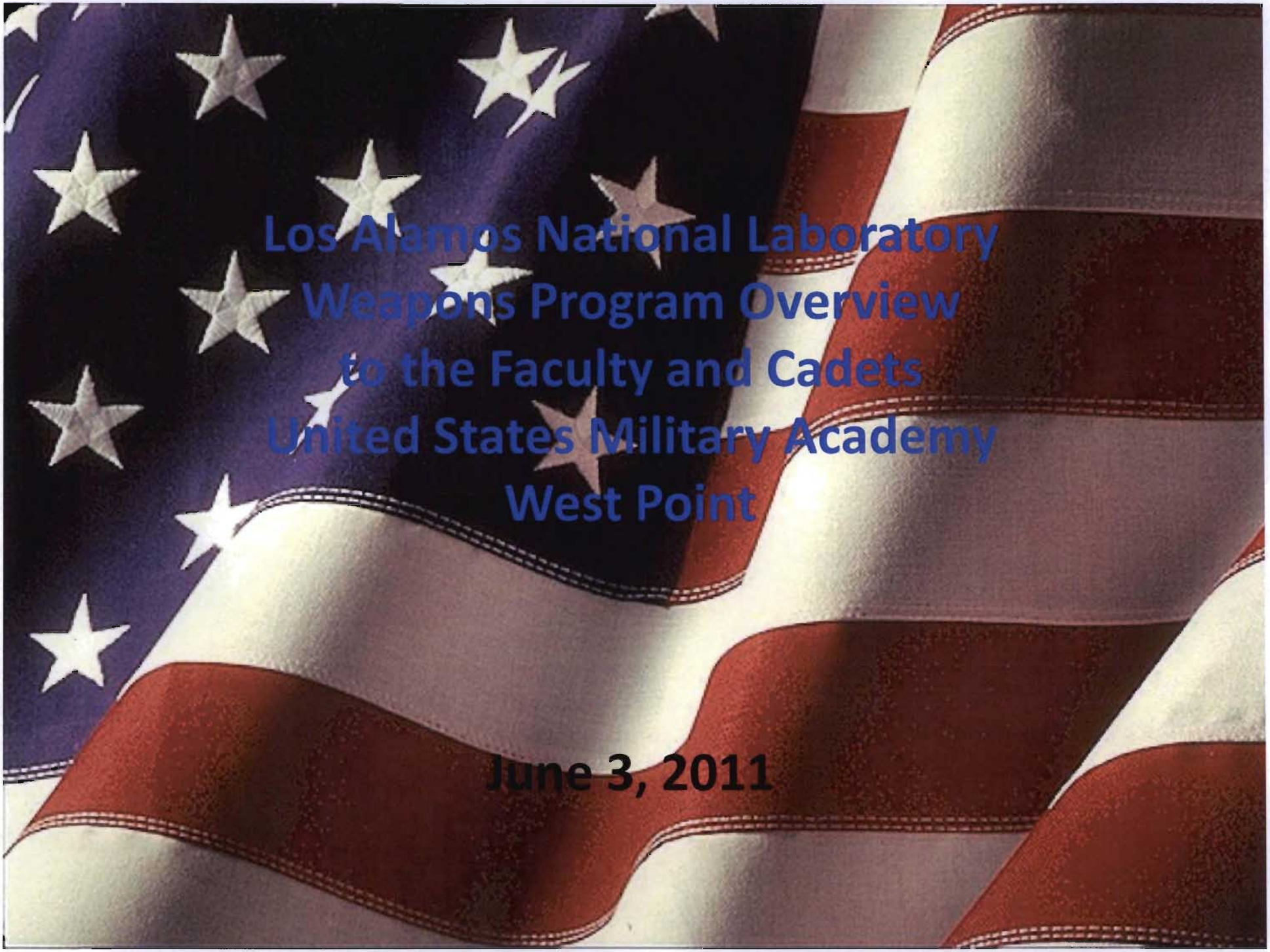
Intended for:	West Point Cadets and Faculty

Los Alamos
NATIONAL LABORATORY
EST. 1943

Form 836 (7/06)

The attached brief was prepared for delivery using other previously cleared materials including: LANL LA-UR 10-06707, LANL LA-UR 11-02474 and LANL LA-UR 11-02175. The brief provides the audience with a high level summary of activities and capabilities of Los Alamos in support of the Nation's nuclear deterrent.


Los Alamos National Laboratory
Weapons Program Overview
to the Faculty and Cadets
United States Military Academy
West Point
June 3, 2011

Today's Discussion Topics

- LANL and the Nuclear Enterprise
- Lab Organization Update
- FY11 Budget & outlook for FY12
- Warhead responsibilities
- Stockpile Stewardship
  - Experimental and computational capabilities
  - Annual assessment
- Improvised Explosive Device work

Oppenheimer and General Groves statutes dedicated Fuller Lodge May 17, 2011

LANL is part of the nuclear security enterprise that is delivering on its national security commitments

National Laboratories and Test Site

Los Alamos National Laboratory
Los Alamos, New Mexico
Nuclear design lab
(B61, W76, W78, W88

Lawrence Livermore National Laboratory
Livermore, California
Nuclear design lab
(W80, W87, B83)

Sandia National Laboratories
Systems engineering, neutron generators, and non-nuclear component

Nevada National Security Site
Nevada
Experimental site and
"subcritical" nuclear material tests

Production Complex

Pantex Plant
Amarillo, Texas
Weapons assembly/disassembly

Kansas City Plant
***Kansas** City, Missouri*
Nonnuclear manufacturing/
Procurement

Y-12 National Security Complex
Oak Ridge, Tennessee

Savannah River Site
Aiken, South Carolina
Tritium operations

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Terry Wallace
Principal Associate Director

Science, Technology & Engineering

Chemistry, Life, & Earth Sciences
Assoc. Director **Nan Sauer (Acting)**

- ADCLES
  - Biology
  - Chemistry
  - Earth & Environmental Sciences

Engineering & Engineering Sciences
Assoc. Director **Steve Girrens**

- ADE
  - Accelerator Operations & Technology
  - Applied Engineering & Technology
  - Prototype Fabrication

Experimental Physical Sciences
Assoc. Director **Susan Seestrom**

- ADEPS
  - Materials Physics & Applications
  - Materials Science & Technology
  - Los Alamos Neutron Science Center
  - Physics

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Assoc. Director **Carolyn Zerkle**

- ADIT
  - Departmental Computing Services
  - Network Infrastructure and Engineering
  - Software and Applications Engineering

Theory, Simulation, & Computation
Assoc. Director **Alan Bishop**

- ADTSC
  - Computer & Computational Sciences
  - High Performance Computing
  - Theoretical

- Laboratory-Directed Research & Development Program Office
  - Science Programs Office
- Science & Technology Base
  - Technology Transfer
  - LANL Institutes

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Principal Associate Director

Weapons Programs

Plutonium Science & Manufacturing
Assoc. Director **Tim George**

- ADPSM
  - Integrated Program Management
  - Nuclear Component Operations
  - Manufacturing Engineering and Technology
  - Nuclear Process Infrastructure

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  - Computational Physics
  - Theoretical Design
  - Weapons Experiments
  - Weapons Systems Engineering

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Principal Associate Director

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Threat Identification and Response
Assoc. Director **Scott Gibbs**

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  - Gention Applications
  - International & Applied Technology
  - International, Space, & Response
  - Nuclear Nonproliferation

Carl Beard
Principal Associate Director

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  - Acquisition Services
  - Central Training
  - Human Resources
  - Information Resource Management

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  - Industrial Hygiene and Safety
  - ISMS/Worker Safety Office
  - Occupational Medicine
  - Quality Assurance
  - Radiation Protection
  - Waste and Environmental Services
  - Environmental Safety Health Deployed Resources

Maintenance & Infrastructure Planning
Assoc. Director **Jay Johnson (Acting)**

- ADMSS
  - Infrastructure Planning
  - Maintenance & Site Services

Nuclear & High Hazard Operations
Assoc. Director **Robert McQuinn**

- ADNHHO
  - CMR Facility Operations
  - Engineering Services
  - Environmental & Waste Management Facility Operations
  - Fire Protection Division
  - Institutional Facilities & Central Services Operations
  - LANSCE Facility Operations
  - Operations Support
  - Safety Basis
  - Science & Technology Facility Operations
  - TA-21 Facility Operations
  - TA-55 Facility Operations
  - Utilities & Infrastructure Facility Operations
  - Weapons Facility Operations

Safeguards & Security
Assoc. Director **Michael Lansing**

- ADSS
  - Emergency Operations
  - Safeguards
  - Security

Paul Henry
Principal Associate Director

Capital Projects

Environmental Programs
Assoc. Director **Michael Graham**

- ADEP
  - Business & Project Services Division
  - Corrective Actions
  - Engineering & Technology
  - Regulatory Management
  - TA-21 Closure
  - TA-54 Closure
  - Waste Disposition

Project Management
Assoc. Director **John Bretzke (Acting)**

- ADPM
  - Site Projects

- CMR
  - Functions

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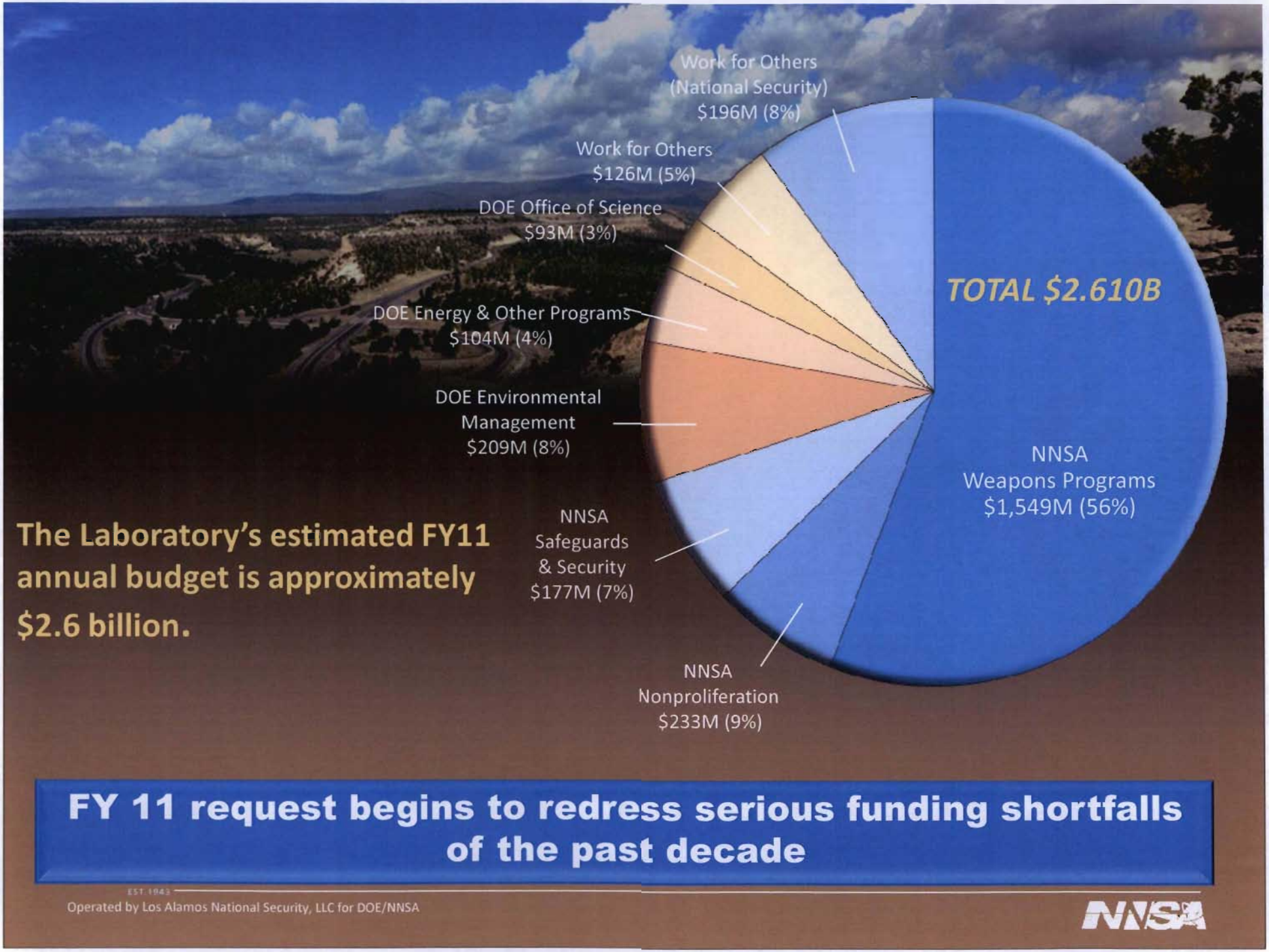

The Laboratory's estimated FY11 annual budget is approximately $2.6 billion.

FY 11 request begins to redress serious funding shortfalls of the past decade

LANL is the design laboratory for the majority of the Nation's deterrent

- LANL is the design laboratory for:
  - W76 SLBM
  - W88 SLBM
  - B61Gravity bomb
  - W78 ICBM
- Each Triad leg offers complimentary and reinforcing benefits

LANL is fully committed to meeting the 2017 First Production Unit (FPU) for B61-12

- Sustaining the air breathing leg (B61 and B83) of the nuclear Triad is critical.
  - LANL has made alts and mods to the system over its many decades of service

- Significant experimental (small scale and DARHT) computational (Cielo) and engineering capabilities (WETF and Sigma) are being devoted to this effort

- Novel technologies to improve B61

- LANL will complete design cost review in Sept. setting stage for Nuclear Weapons Council action in Nov.

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LANL maintains a carefully balanced three part weapons program to sustain the Nation's deterrent

- **Stockpile management**
  - B61 Life Extension Program (LEP)
  - Support to plants on W76 LEP
  - Complete build of W88 pits begin work on W87 pits
- **Science, technology and engineering investments**
  - Use science tools to generate data to support assessment and resolve stockpile issues
- **Infrastructure investments**
  - Create modern, state-of-the-art facilities to sustain laboratory capabilities
  - Hire and train next generation

LANL's unique science and engineering infrastructure a critical component of U.S. deterrent

Metropolis Center for Modeling & Simulation

High Explosive laboratories

Los Alamos Neutron Science Center

Plutonium Processing Facility

Chemistry and Metallurgy Building

Dual Axis Radiographic Hydrotest Facility

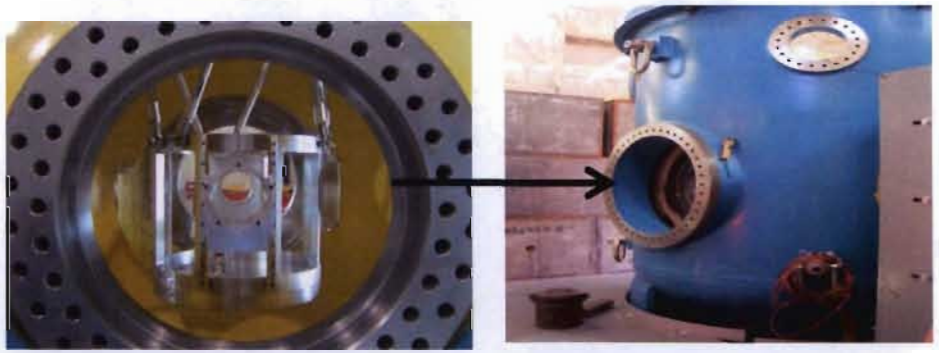
SIGMA Building

Chemistry & Metallurgy Research Replacement (RLUOB)

DARHT world class imaging in support of the deterrent

- World class X-ray radiography for non-nuclear hydrodynamic tests
- Axis 1 single image, operational since 1999
- Axis 2 up to four images operational 2009
- World's first dual axis experiment December 2009
- 4 large scale dual axis hydros 2010
- Experiments fully contained to reduce environmental impacts and increase shot rate

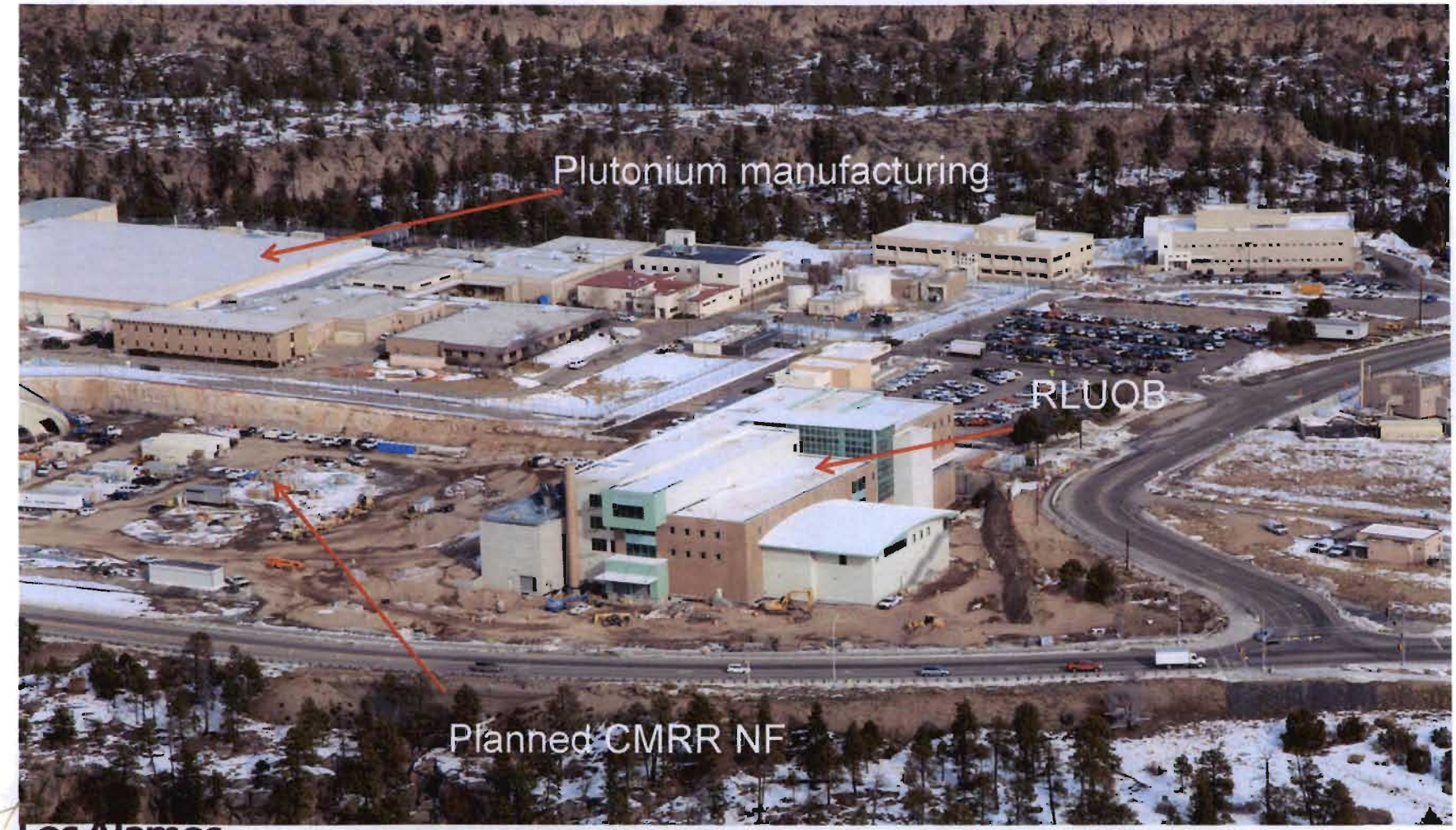
DARHT Containment System



Supercomputing critical to Stewardship and other scientific missions

- Stockpile challenges are increasingly complex as systems continue to age
- DARHT, LANSCE etc provide large data sets to resolve stockpile challenges
  - Data sets require ever more capable machines that can quickly process information
- Road Runner world's first machine to operate at 1.105 petaflops (million billion calculations per second)
- Cielo on line Feb 2011@ 1.03 petaflops now upgraded to 1.35

TA-55 the Nation's center of plutonium science and manufacturing



Annual Assessment– A statutory requirement and the highest priority of the Lab Director

- Detailed reports are prepared by lab staff on each warhead
- Lab Director briefed in detail by staff
- Lab Director issues letter to Secretaries of Defense & Energy and Chair of the NWC
- Lab Director briefs the Secretary of Energy
- STRATCOM prepares separate report and briefs the Secretary of Defense
- Secretaries of Defense & Energy brief the President
- President advises Congress

LANL's HE science capabilities are being applied to the IED problem

- LANL's HE expertise in the areas of:
  - Homemade explosives - explosives chemists
  - Improvised explosive devices - using HMEs in IED's or EFP's
  - Small scale testing - safety and sensitivity
  - Detection - properly identifying HMEs
  - HME database - information tool for our troops

Realistic training scenarios reinforce class room knowledge to troops

2011 weapons program is meeting key scientific and engineering deliverables to support national security

- **Barolo A and B Subcritical Experiments, and Plutonium Stepwedge Studies** executed at U1a on schedule yielding archival data and completing the Bacchus/Barolo Series
- **Cielo delivering on applications for all 3 labs; Cielo performance upgrade from 1.03 to 1.37 PF/s completed**
- **Critical Experiments Facility (CEF) Line Item Project** received CD-4 & Authorization to start nuclear operations in DAF
- **Complete build of WR 88 pits:** 1St FY 11 WR pit 11/4/10; 2nd pit 3/29/11; 3rd pit 4/29/11; 4th and final W88 WR pit August
- **Working with plants in support of W76-1**
- **W78** close long standing SFI using DARHT experiment data
- **16th Annual Assessment** process underway
- **B61-12** meeting milestones in support of FPU
- **CMRR/NF** supporting a number of independent reviews by Secretary of Energy, Bechtel, DoD, GAO. Lawsuit by Los Alamos Study Group to stop work on CMRR/NF ***denied*** by Federal Judge

2011 is a challenging year for the program

- **Build upon the technical/programmatic success of the last several years**
  - DARHT experiments
  - Cielo deployment and upgrade to 1.35 petaflops
  - B61 LEP
  - RLUOB and CMRR/NF
  - Provide innovative options for stockpile sustainment
- **Guide lab thru first significant management change since contract transition in 2006**
- **Enhance relationships with DoD and military service customers**
  - STRATCOM, Global Strike, USAF, USN, military academies
- **Sustain and expand Congressional support for Stockpile Stewardship program**
- **Manage budget challenges of FY12**