Precision Strike Annual Review
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Los Alamos: A National Security Laboratory
(2013 NDAA)

- Physics & Nuclear Engineering
- Sensors & Detection Technology
- Unique Testing & Experimentation Facilities
- HPC, Modeling, Simulation & Big Data Analytics
- Bio & Biosecurity
- Materials
- Explosives
- Chemistry
Los Alamos Global Security Directorate —
All Things Nuclear & Emerging Threats

US Nuclear Deterrent

Protecting against the Nuclear Threat

Emerging Threats & Energy Security

Science, Technology & Engineering Capabilities
Free Electron Laser (FEL)

Los Alamos is developing a Megawatt-class FEL for ship-board defense against ballistic missiles and “swarmed threats”

Requirements:
- High-quality laser beam that can be propagated over long distances
- All-electric laser requiring only electricity and water (no chemicals)
- FEL light wavelengths tuned to match transmission bands in the atmosphere
- Power that can be dialed to match other applications (e.g., power beaming, LADAR)

Status: Navy FY12-16 FEL program is in “MW Technology Maturation Development.” Navy will engage industry in FY16-17 for multi-year MW FEL demo if sufficient technical progress is demonstrated.
Cube Satellites & Constellations

Prototype System
4 Satellites Launched December 2010

Features:
- Secure, encrypted communications
- Hi-performance SW programmable radios
- 8 satellite constellation

Missions:
- C3
- TTL

Benefits:
- Rapid development time
  - System is designed to the mission
- Low cost
  - Leverages COTS technology
  - Leverages affordable, high performance hardware, tested for space requirements
- Simple to use
  - User owns/operates/tasks system
  - Constellation Design
- Foundation for future missions

2nd Generation System
8 Satellites Launched November 2013
Protecting Against the Nuclear Threat

Los Alamos Supports All National Nuclear Counterproliferation Lines of Operations

- Identification & Prediction
- Monitor & Detection
- Upstream Defeat
- WMD Defeat
- Attribution

Los Alamos also Supports National Nuclear Non-proliferation Efforts
“Loose Nuke” Project —
Applying LANL Expertise to Grand National Security Challenges

An internal Los Alamos effort to assess technology effectiveness against the “Loose Nuke” threat

Built an analytical framework that generates the adversary “Loose Nuke” CONOPS space and measures the relative effectiveness of any given technology employed as a loose nuke countermeasure.
Los Alamos – National Security Laboratory

Science-based Capabilities National Security Applications