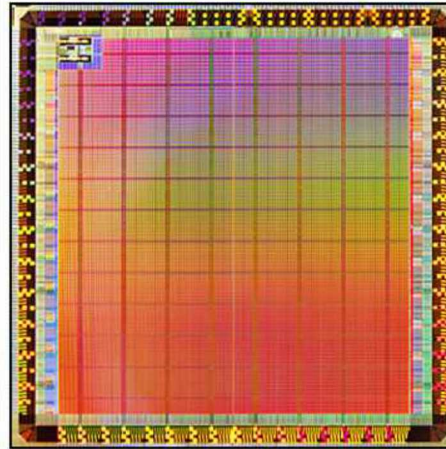


*Exceptional service in  
the national interest*



# Sandia National Laboratories: POST2019 Conference

Michael Burns, Associate Labs Director  
March 6, 2019



Sandia National Laboratories is a multimission laboratory managed and operated by National Technology & Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.

# Sandia is the Nation's Largest National Laboratory

- Established in 1949 to be the nation's nuclear ordnance laboratory after being part of Los Alamos during WWII
- A Federally Funded Research and Development Center (FFRDC)
- Our Purpose: Develop advanced technologies to ensure global peace.
- Operated for the DOE/NNSA by National Technical and Engineering Solutions of Sandia, LLC (NTESS), with partnership and oversight by the NNSA Sandia Field Office (SFO)

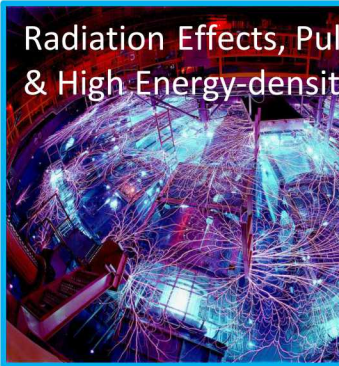


*...In my opinion you have here an opportunity to render an **exceptional service** in the national interest.*



# A Broad Science, Engineering, Facility, and Technology Base Enables our Core Programs

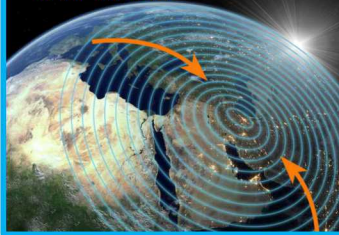
Radiation Effects, Pulsed Power,  
& High Energy-density



Dynamic Testing



Engineering Science  
Analysis, and Simulation  
**OFFENSE**



**DEFENSE**



Trusted, Radiation Hardened,  
Microelectronics Fab



Threat Analysis, Cyber  
& Intelligence Science



Hypersonics, Missile  
Defense, Strike Systems



# In a manner synergistic with core DOE/NNSA programs, SNL capabilities can be applied to the USINDOPACOM AoR

Core DOE/NNSA missions provide the capability foundation that can support Strategic Partnership Programs applicable to USINDOPACOM



Maintaining  
the Stockpile

Defense Nuclear  
Nonproliferation



Counterterrorism  
and  
Counterproliferation

Examples of capabilities for  
the USINDOPACOM AoR

- Threat Intelligence
- Missile Defense/Strike
- Military Systems Analytics
- Space
- Cyberspace
- Counter Weapons of Mass Destruction (WMD)
- Global Security and Cooperation



# Exemplar capabilities & accomplishments

## Threat Intelligence

- Sandia SCI-cleared staff
- Country-specific analyses
- Hi-fidelity threat representations
- Delivered >50 assessments
- Experiment and engineering test-based validations of assessment

## Missile Defense/Strike

- Navigation guidance and control
- Rocket assembly
- System engineering and integration
- Targets and countermeasures
- Kauai Test Facility (on PMRF)
- Conventional Prompt Strike Flight Experiment 1 (FE-1), October, 2019
- Autonomy for Hypersonics
- 4 FY18 MDA/Navy flights (2 Aegis)

## Military Systems Analytics

- Scrimmage Physics-Based simulation, analysis, and algorithms for mission and engagement
- Advanced Decision Analytics
  - System Trades
  - System-of-Systems
  - Capability Portfolio Analysis and Optimization
- Developed physics-based Scrimmage analysis

## Space

- Optical sensors
- Real-time Image, signal processing
- Ground stations and processing
- Ground system agile release cycle
- Delivered the 8<sup>th</sup> GBDIII payload
- Hyper-temporal sensor flight systems
- Large-area focal plane arrays (FPA)
- Flexible Reliable Operational Ground System (FROGS)

## Cyberspace

- Assessments and malware reverse engineering
- Supply chain management
- Emulytics™
- Quantum information systems
- Supervisory control and ICS
- Network defense - Tamizar
- Hardware Vulnerability Analysis

## Counter WMD

- Assess and monitor emerging threats
- Materials and critical assets protection
- Rapid WMD ident. and response
- Training to counter INDs & RDDs
- Cooperative Monitoring Center
- Operations Support
- Force protection & SNM control/trans
- Delivered new Rad. Detect. Equip.
- Delivered 6 new Communications System Monitor Software

# Global Security and Cooperation

We anticipate and characterize the global security environment; research, develop, and apply systems-based solutions; and build partnerships to strengthen nonproliferation and reduce global risks across the WMD spectrum.

## Capabilities

- Dynamic Modeling and Simulation
- Technology Deployment and Integration (smart sensors, trusted systems)
- Cooperative Monitoring Center
- Risk and Systems Studies; and Decision Analysis
- Standards, Policy, and Process Development
- Chem/Bio Risk Management

## Accomplishments

- Radiological Dispersal Device and Radiological Risk Workshop – Australia, US, UK, and Canada
- Participated in the 9th annual Nuclear Security Working Group meeting - Japan
- Physical Protection Modeling and Simulation Training – India
- China Center of Excellence for Nuclear Security
- Port Security Exercise - Taiwan
- Human capacity development and risk analysis efforts in Vietnam, India, and the Philippines



*Modeling and simulation training*



*Port Security Exercise*



*RDD Workshop*



*9<sup>th</sup> Annual Nuclear Security Working Group*