

Science, Technology, and Innovation for America's National Security

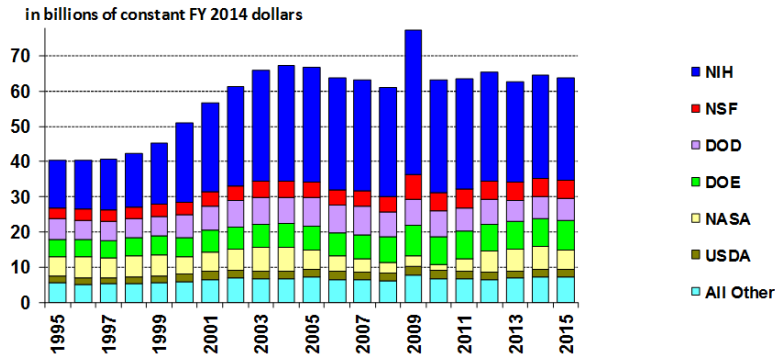


Hon. Patricia Falcone, Ph.D.
Associate Director

April 8, 2014

Two major responsibilities for OSTP

Federal Research by Agency, FY 1995-2015



FY 2009 figures include Recovery Act appropriations.
Research includes basic research and applied research.
FY 2015 figures exclude Opportunity, Growth, and Security Initiative proposals.

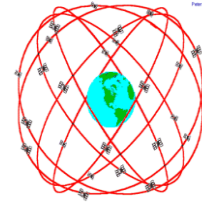
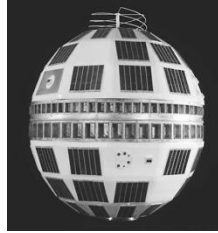
1. Policy for Science and Technology
 - Analysis, recommendations, and coordination with other White House offices on R&D budgets and related policies
 - S&T education and workforce issues
 - interagency S&T initiatives: spectrum, cyber, global health security, open government, ...

2. Science and Technology for Policy

Independent advice for the President about S&T germane to all policy issues with which he is concerned



A Track Record of Critical Contributions



20th Century

21st

- Nuclear weapons
- Radar
- Proximity fuse
- Sonar
- Jet engine
- LORAN

- Digital computer
- ICBM
- Transistor
- Laser technology
- Nuclear propulsion
- Digital comm.

- Satellite comm.
- Integrated circuits
- Phased-array radar
- Defense networks
- Airborne surv.
- MIRV

- Airborne GMTI/SAR
- Stealth
- Strategic CMs
- IR search and track
- Space track network
- C2 networks

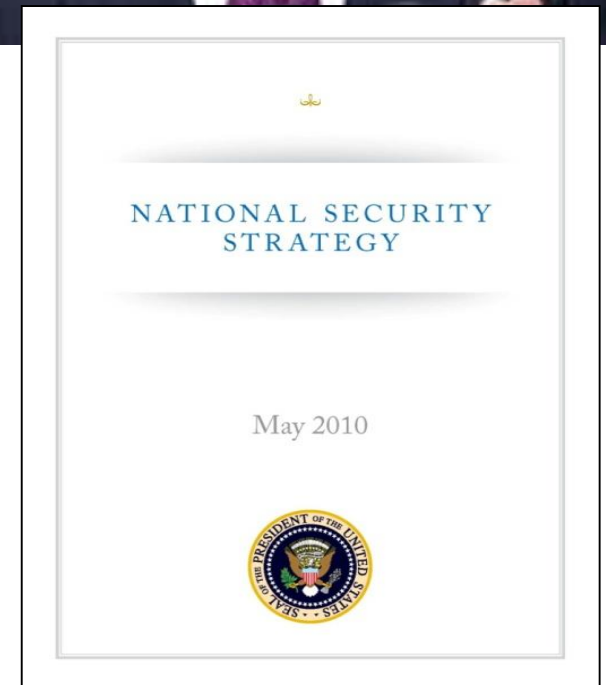
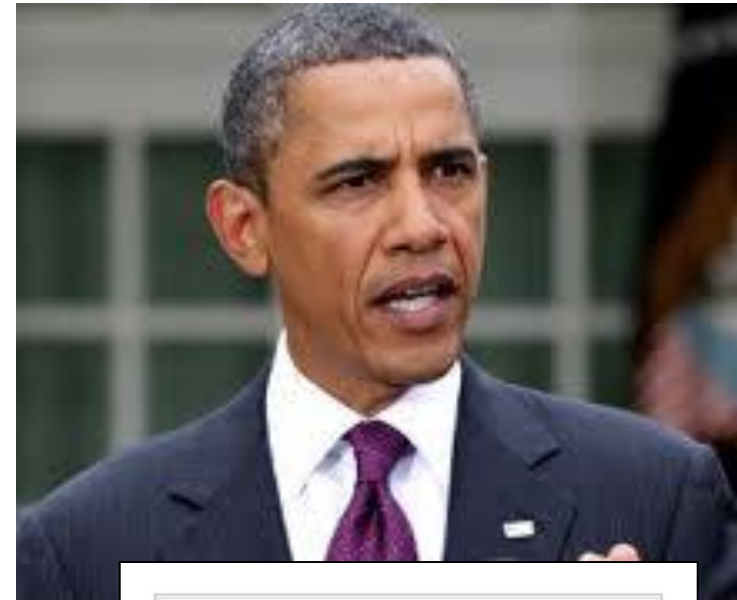
- GPS
- UAVs
- Night vision
- Personal computing
- Counter-stealth
- BMD hit-to-kill

- Wideband networks
- Web protocols
- Precision munitions
- Solid state radar
- Advanced robotics
- Speech recognition

- Nerve & Muscle interfaced artificial limbs
- Armed UAVs
- Optical SATCOM
- Data mining
- Advanced seekers
- Decision support

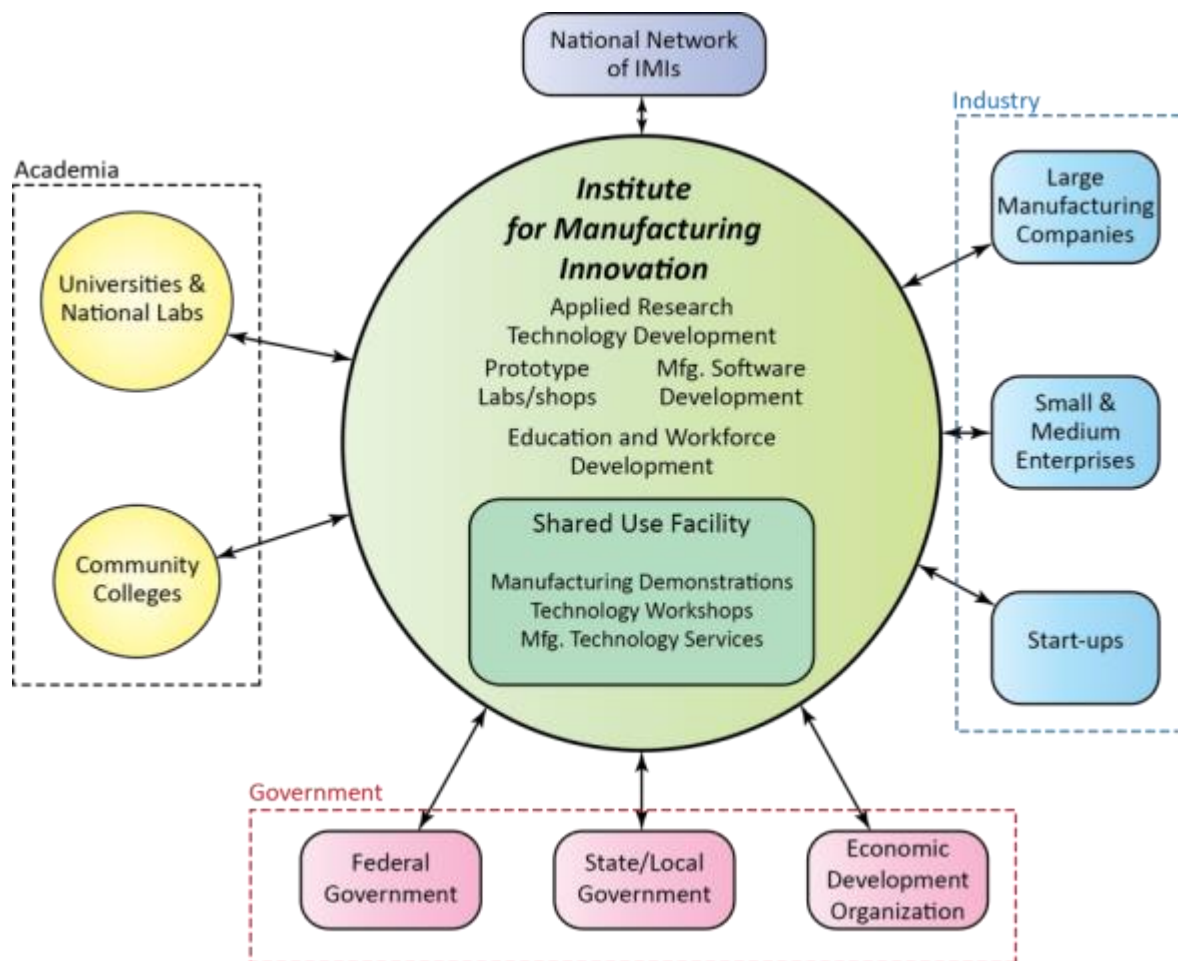
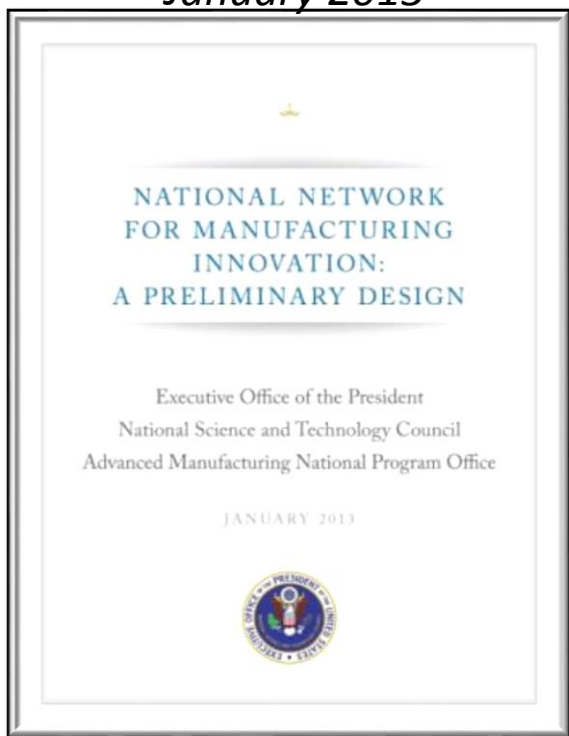
Innovation for national security

- Open government, open data, open access, open innovation
 - Presidential Innovation Fellows
 - Challenge.gov
- Presidential initiatives
 - Big Data
 - Manufacturing
 - BRAIN
- President's management agenda
 - Acquisition reform



National Network Manufacturing Institutes

White House Report
 NNMI Framework Design
 January 2013



March
2012

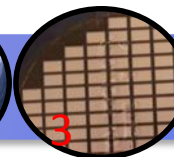


Additive Mfg Pilot

January
2013



Digital Mfg



Power Electronics



Lgt-weight Metals

Next Steps: #'s 5-9 in 2014/15

Photonics, ...

National Security Science and Technology Strategy

Derived from President's National Security Strategy, OSTP is developing the ***National Security Science and Technology Strategy***

- Provide an updated, unified national approach to ensure appropriate resource allocation, technological priorities and S&T policies to continue national security S&T superiority
- Will convene interagency groups with key stakeholders to guide development of strategy informed by:
 - An assessment of past and current S&T strategies
 - Scenario planning

<http://clinton4.nara.gov/WH/EOP/OSTP/nssts/html/nssts.html>

The White House

Washington

The National Security Science and Technology Strategy

As we move into the next century, our nation's security will depend upon our continued commitment to leadership and engagement in global affairs. The challenges that we face will be increasingly complex and our ability to meet those challenges will be greatly influenced by the wisdom of our investments in science and technology.

This *National Security Science and Technology Strategy* presents a comprehensive approach to bringing science and technology to the service of our nation's security and global stability. This strategy supports the goals of my Administration's *National Security Strategy of Engagement and Enlargement*. It highlights the importance of U.S. investments in science and technology to preventing conflict and maintaining the strength and capabilities of our Armed Forces.

Our nation's security derives from a combination of diplomatic leadership, economic strength and military might. Advances in science and technology underlie this strength, giving rise to the discoveries that lead to new industries and to the improvements that make our industries more efficient and environmentally sound. By engaging economies abroad, cooperation in science and technology integrates states into a larger economic and political order that acts against division and conflict.

Improving global stability also demands that we put scientific insights and technology to work to promote sustainable development. No country is isolated from the consequences of newly emerging diseases, environmental degradation, or other global threats—even if the roots of these problems lie in distant parts of the world. The tragedy of AIDS has made this clear. Cooperation in science and technology to prevent and mitigate threats to society moves us forward, toward a world of free citizens, instead of victims and combatants.

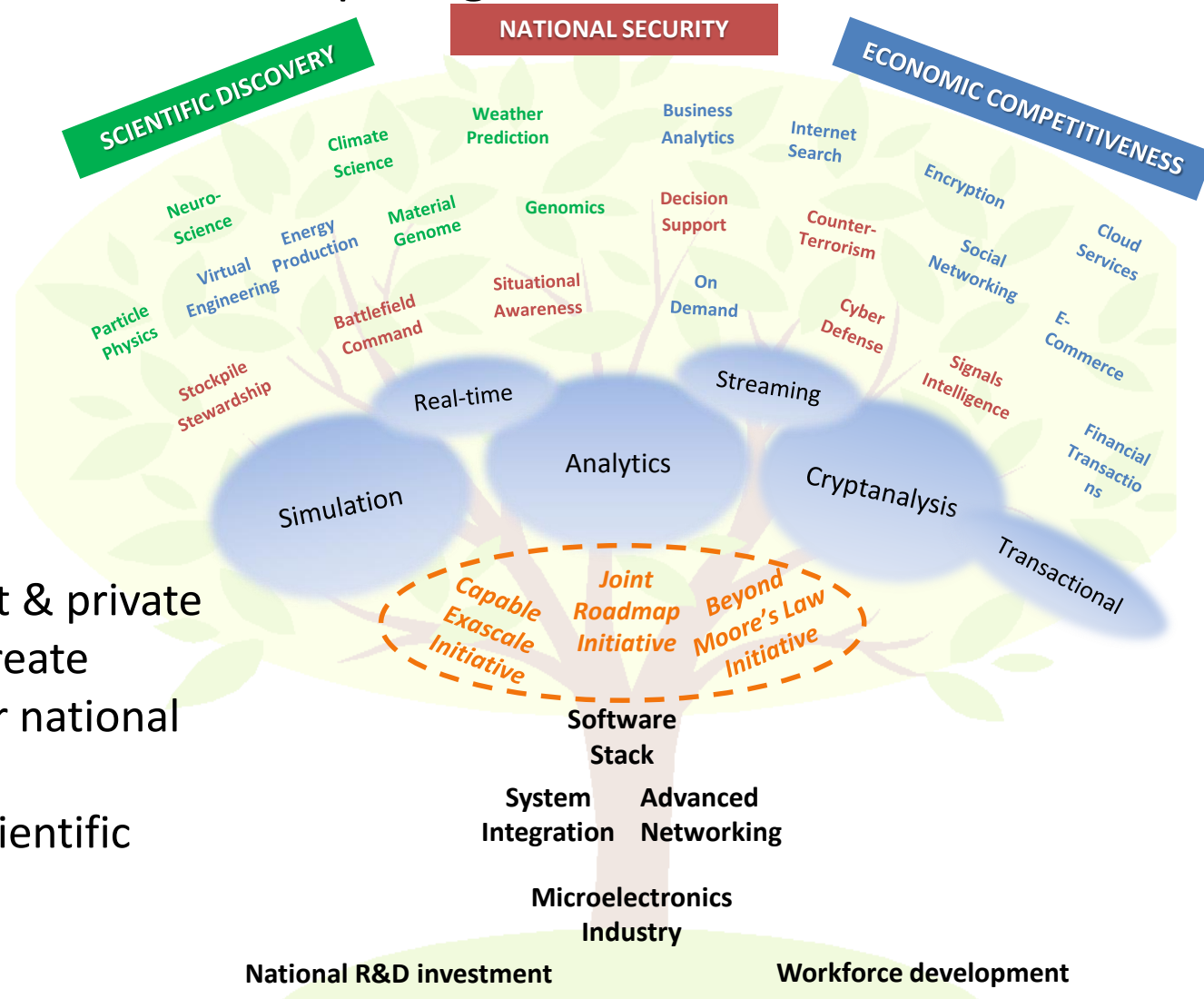
Investments in science and technology are critical to military preparedness, enabling us to stay at the cutting edge of new developments so that our Armed Forces remain the best trained, best equipped, and best prepared in the world. Advancing the technologies of monitoring, verification, and dismantlement allow us to pursue a vigorous program to control the proliferation of weapons of mass destruction, including a Comprehensive Test Ban, the extension of the Nuclear Nonproliferation Treaty, and strengthened Biological Weapons and Chemical Weapons Conventions, as well as control of fissile materials. We have made great progress in dismantling the arsenals of mass destruction that are a legacy of the Cold War. This report describes collaborative U.S.-Russia efforts to protect, control, and account for nuclear weapons materials, the most pressing nonproliferation challenge of the post-Soviet era. Yet much remains to be done. Mobility has increased the availability of the technology and essential ingredients of weapons of mass destruction.

Active national security policy issues

- Cybersecurity / big data / privacy
- Disaster response, resilience, crisis communications
- Biodefense and global health security
- Nuclear weapons, nuclear defense, nuclear energy, and nuclear waste
- National security space
- Defense technologies
- Arctic
- Energy and climate | Climate Action Plan

National Strategic Computing Initiative

Challenge: Creating actions for the federal government to sustain U.S. lead for High Performance Computing

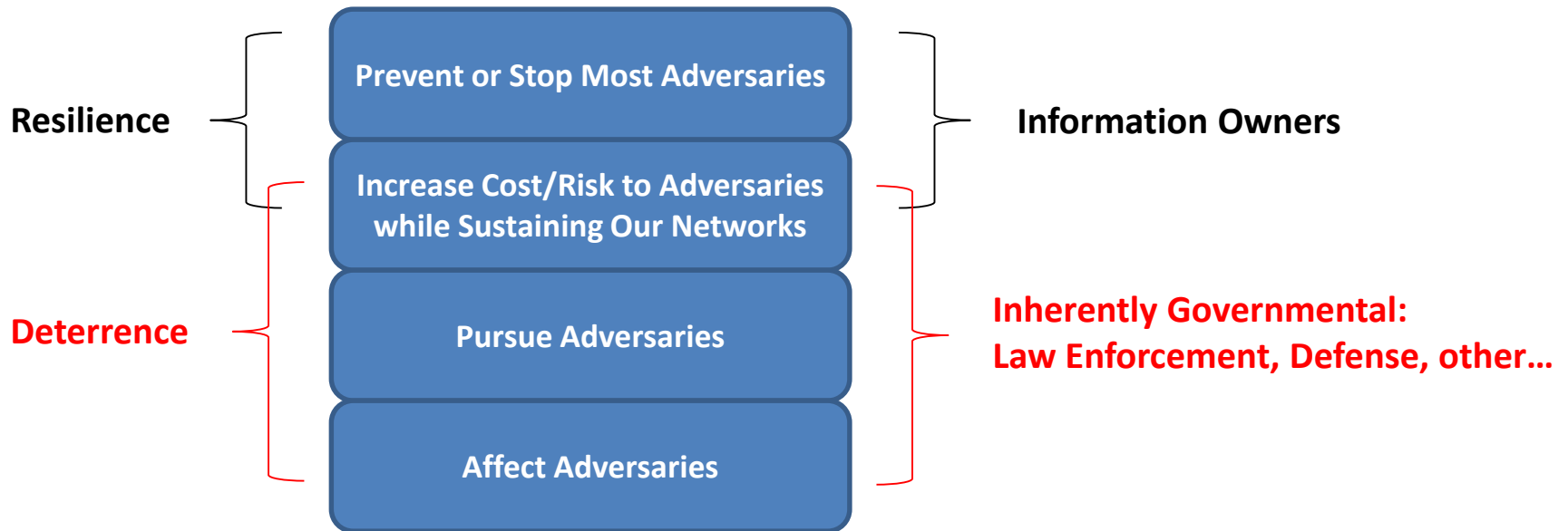


Developing government & private sector initiatives that create strategic advantages for national security, economic competitiveness and scientific discovery

National Cyberspace Resilience & Deterrence

Challenge: Information owners lack the tools & workforce to implement a resilience strategy that favors the defender.

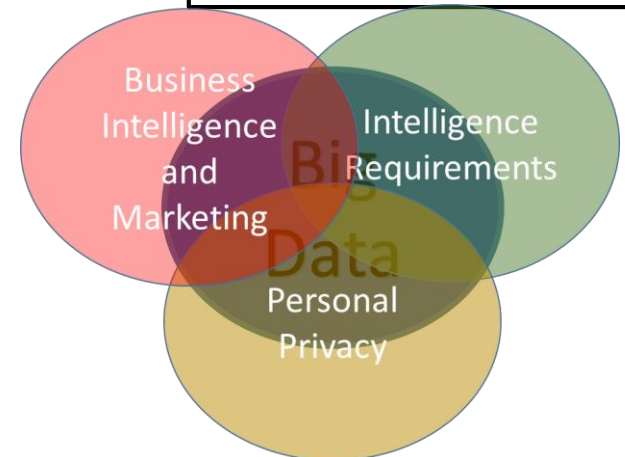
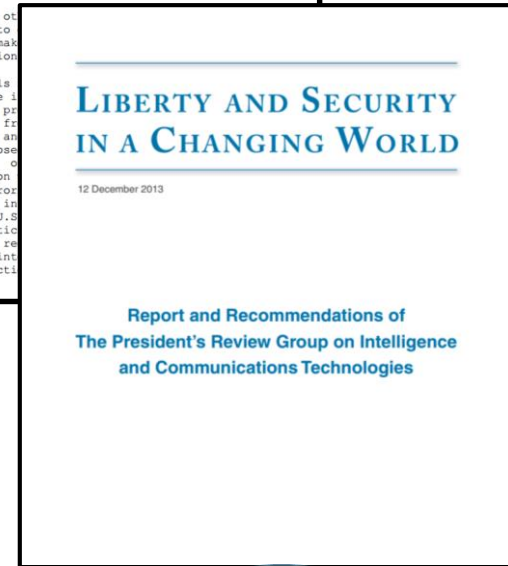
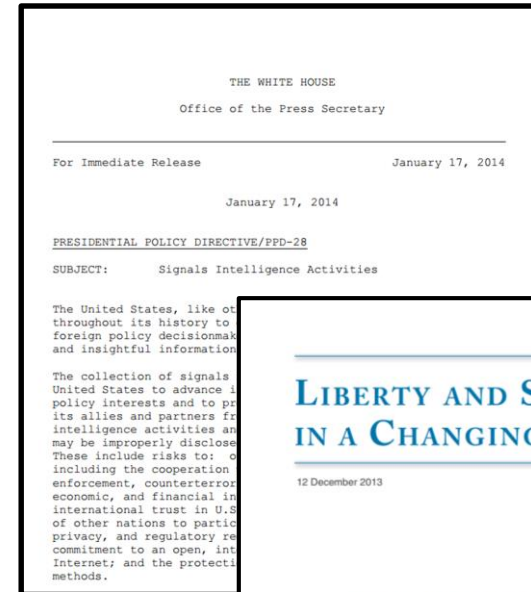
- Deterrence efforts are hampered by limitations in speed, scale, and attribution.



Leading the interagency to develop tools, techniques, national workforce & facilities to support a balanced strategy of resilience and deterrence enabling the U.S. to stop or deter adversaries much sooner

National Security - Big Data & Privacy

- Supporting ODNI and DOJ's efforts to define and implement reforms under PPD-28 *Signals Intelligence Activities*.
- Supporting 78 reform actions & initiatives from the *Report and Recommendations of The President's Review Group on Intelligence and Communications Technologies*
 - Includes review of big data and privacy led by Counselor Podesta
- Supporting current PCAST study to
 - Clarify current and future big-data technological capabilities
 - The associated challenges and opportunities relating to privacy and civil liberties.
- Co-lead with ODNI an Information Sharing and Access (ISA) Interagency Policy Committee on large-scale data processing challenges associated with intelligence & information that straddles the foreign and domestic divide.



Countering Biological and Chemical Threats

- Biological threats span a wide security spectrum
 - Natural outbreaks of infectious disease
 - Accidents involving dangerous pathogens
 - Deliberate acts of bioterrorism



- S&T Priorities
 - Combatting the rise in antibiotic-resistant bacteria
 - Strengthening infectious disease prediction and forecasting capabilities
 - Ensuring effective oversight of life sciences dual use research of concern
 - Highlighting the important role of S&T in advancing global health security



Nuclear – Treaty Verification and Monitoring

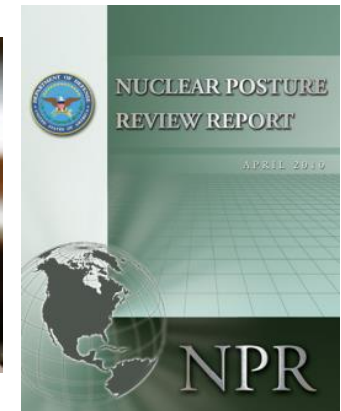
“...we must ensure that terrorists never acquire a nuclear weapon. This is the most immediate and extreme threat to global security. *Prague, April 2009*”



“Peace with justice means pursuing the security of a world without nuclear weapons -- no matter how distant that dream may be. “ *Berlin, June 2013*”



- Lead whole-of-government efforts in non-proliferation, detection, forensics, response and recovery
- Convene Stakeholders meeting to Encourage Reliable Supplies of Molybdenum-99 Produced without Highly Enriched Uranium
- Support Treaty regimes by offering technologic verification means, including the discovery class science required to advance monitoring capabilities



Current trends are adversely affecting the national security S&T enterprise

Globalization of science and technology

Mobility of workforce

Funding constraints

Growth in private sector research and innovation

National security inherently “national”

Security missions benefit from commitment

Challenges for R&D and the enterprise as a whole

Updated partnership models needed for public & private sector institutions

Initiatives for the national security S&T enterprise

- People
 - Next generation IPA
 - Career paths for military scientists
 - New PMF-STEM
- Places
 - Capability assessments and trade-offs
 - Third party financing
 - Multi-agency facility sharing
- Roles and Rules
 - FFRDC governance best practices
 - Pilot lab conversion study

FY14 NDAA Legislation – Management Innovation

§1107(a) – **Direct Hire** for all S&E candidates, by the Lab Director, with annual appointment limits

§1107(f) – Lab Director **appoint** & manage Senior Scientific Technical Managers to engage in S&E related research and management

§1107(h) – Exclusion from Personnel Limitations - Lab Director shall **manage** the lab workforce strength, structure, positions, & compensation with available budget



ROLES & RESPONSIBILITIES



Partnerships: Federal Security Labs, Academic, & Industry Partners



**LLNL & Sandia:
Livermore Open Valley Campus**



Army Research Laboratory

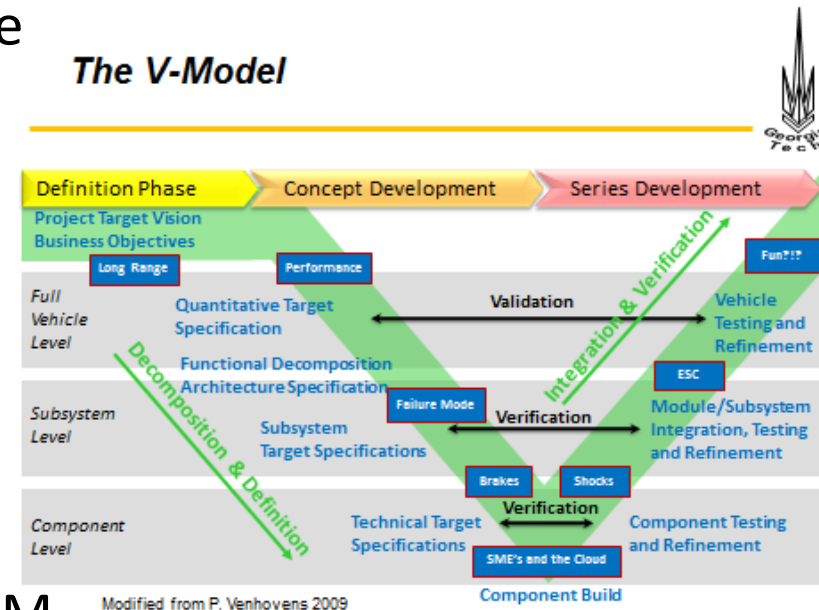
**Gates & high walls provide 20th century security,
but are barriers to 21st century innovation**

Prototyping for Defense:

Key study* recommendations

Create “skunk works” in the industrial base, universities and the DOD labs to undertake targeted, unconventional, potentially disruptive programs through **prototyping**

- Provide rotational assignments for individuals from government, the industrial base and the private sector
- Create a culture to nurture critical STEM skills within the DOD workforce as well as provide exciting, challenging and highly attractive opportunities for the STEM workforce



* *Assuring the U.S. Department of Defense a Strong Science, Technology, Engineering, and Mathematics (STEM) Workforce* (National Research Council , 2012)

Lab to Market

FY 2015 President's Management Agenda – [Lab-to-Market Cross-Agency Priority Goal](#) established to improve & accelerate technology transfer



GOAL ACTIONS

- (1) Optimize the management, discoverability, and ease-of-license of 100,000+ Federally-funded patents
- (2) Increase the utilization of Federally-funded research facilities by entrepreneurs and innovators
- (3) Ensure that relevant Federal institutions and employees are appropriately incentivized to prioritize R&D commercialization
- (4) Identify steps to develop human capital with technology transfer experience
- (5) Maximize the economic impact of the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs

STEM Education for Army Children –

Partnerships Between the Army, DODEA, Public Schools, Teachers and Students

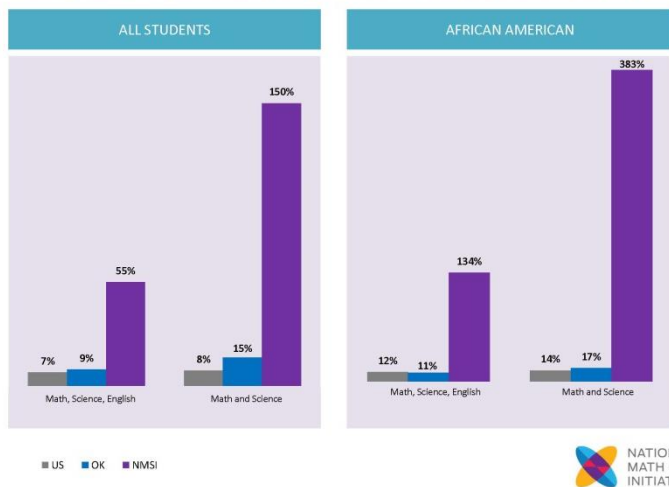


JOINING FORCES

TAKING ACTION TO SERVE
AMERICA'S MILITARY FAMILIES

Results from Lawton County, OK (Ft. Sill)

NMSI Makes a Dramatic Difference in One Year
Average First Year Increase in Passing AP scores for US, OK and NMSI OK Program Schools



Source: College Board



Aberdeen HS Celebration

STRENGTHENING OUR
MILITARY FAMILIES

Meeting America's Commitment

JANUARY 2011



Priority #2: Ensure excellence in military children's education and their development. –
Presidential Study Directive-9

POSSIBLE ACTIONS

- National Math & Science Initiative AP Program
- Internships at DOD Labs and Centers
- Fellowships for Army Children
- Mentorship Opportunities for Army Civilians
- ...

Program Expansion Possibilities:

Ft. Rucker (AL), Ft. Polk (LA), Ft. Bragg (NC), Ft. Drum (NY), others, ...

Strong support for innovation and the U.S. science and technology enterprise



- Science and technology will drive America's future: jobs, our economy, health, energy security, and national & homeland security
- The DoD S&T enterprise is a critical element of U.S. capabilities and strengths



