

Nonproliferation and Arms Control

Exceptional Service in the National Interest

"In coming years, we must give top priority to discouraging additional countries from acquiring nuclear weapons capabilities and stopping terrorist groups from acquiring nuclear bombs or the materials to build them. At the same time, we must continue to maintain stable strategic relationships with Russia and China and counter threats posed by any emerging nuclear-armed states, thereby protecting the United States and our allies and partners against nuclear threats or intimidation, and reducing any incentives they might have to seek their own nuclear deterrents." – 2010 Nuclear Posture Review (NPR)

Meeting the Nation's Nonproliferation and Arms Control Challenges



The national security reality that U.S. leaders face today is very different from the bipolar environment of the Cold War era. In the diplomatic arena, today's leadership must engage multiple nuclear powers. On the defense front, the U.S. must meet the challenges posed by alienated nation states and migratory terrorist networks across a broad range of exposure points.

U.S. policy – articulated in a number of documents including the NPR, the 2010 National Security Strategy, and Quadrennial Defense Review – has evolved to recognize the growing complexity of today's nuclear threat environment. Sandia National Laboratories has worked for decades implementing national policy and developing technical options to respond to evolving nonproliferation and arms control challenges.

The technical capabilities and expertise that Sandia National Laboratories applies to creating effective nonproliferation and arms control solutions grew and been sustained because of its unique role as the non-nuclear component engineering design laboratory and systems integrator for the US Nuclear Weapons Complex.

Often acting in partnership with other national laboratories and the private sector, Sandia played a critical role in the development of national space and ground systems to monitoring nuclear explosions, pioneered the systematic analysis and design of physical

protection systems for both civilian and military nuclear facilities, developed the concept of portal perimeter monitoring for arms control, and enabled international partnerships to secure nuclear materials around the world.

Implementing National Nonproliferation Programs

Sandia's strategy in supporting the US government's nonproliferation and cooperative threat reduction activities employs a systems approach - combining science, technology, and operational expertise to both inform and implement policy. This includes performing work such as:

- Developing technologies and systems to enhance national capabilities to assess, analyze, detect, and respond to nonproliferation threats,
- Supporting the US government negotiation and implementation of treaties and agreements; and
- Designing and implementing cooperative nonproliferation programs with global partners.

Enhancing National Capabilities

Sandia's Nuclear Nonproliferation Detection Systems Program develops technologies that operate in space, on airborne



platforms, and in ground-based systems. Sandia contributed important components of the U.S. Nuclear Detonation Detection System, Sandia sensors fly aboard key defense satellites, and researchers have developed multiple atmospheric monitoring technologies.

Technical Solutions for Treaty Monitoring and Verification



Sandia develops a range of methods and technologies to fulfill the nation's treaty monitoring needs with an emphasis on unique identifiers for tagging, tamper-indicating devices, detection equipment, and data security. For example, Sandia developed the radiation detection equipment was used for monitoring in the INF and START treaties and the same devices have been deployed to support New START. Future treaties, however, will likely demand new generations of technologies.

Cooperative Nuclear Nonproliferation and Threat Reduction

Cooperative programs have been a cornerstone of Sandia's global nuclear nonproliferation activities since the early 1990s, and include policy analysis, training, individual engagement, and security implementations. Through the Global Threat Reduction Initiative Sandia works both domestically and internationally to assist organizations and governments secure dangerous materials. Sandia's Cooperative Monitoring Center has become a global model for engagement and collaboration on regional security issues.



The Challenges Ahead

Going forward, Sandia sees significant challenges and opportunities for nonproliferation and arms control activities.

The US will continue

to engage with Russia on reducing nuclear stockpiles and the emphasis in verification will shift from verifying delivery vehicles to monitoring warheads. Verifying such an agreement will likely require novel technical approaches. The US now has the opportunity to begin developing the next generation of tools needed to address the terms of future treaty obligations.

The growing relevance of China to US national security will require strengthening strategic dialogues and innovative new frameworks for engagement. China is one of many countries with which the US will need to engage to meet its nonproliferation and arms control objectives. Technical and scientific cooperation are proven and powerful platforms for addressing common security concerns while strengthening relationships.

The growing threat posed by alienated nation states and terrorist networks compels the international community as a whole to apply more robust approaches to nuclear defense. This will include enhanced protection of nuclear materials as agreed at the 2010 Nuclear Security Summit. However, it will also require that the US invest in the exploration and development of innovative detection capabilities and develop greater agility in adapting to new world challenges.

These challenges exist in an environment in which multiple Departments and Agencies with overlapping responsibilities face severely constrained budgets. Thus, integrating capabilities across multiple programs and setting priorities for the path forward in the face of a constantly evolving threat adds complexity to this critical national security problem.



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