

Exceptional service in the national interest

A stylized world map graphic composed of a grid of dots, rendered in shades of gray, positioned on the left side of the slide.

Sandia National Laboratories Strategic Futures Overview

Federal Foresight Community of Interest

January 27, 2017

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Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000. SAND NO. 2017-0859PE

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Mission

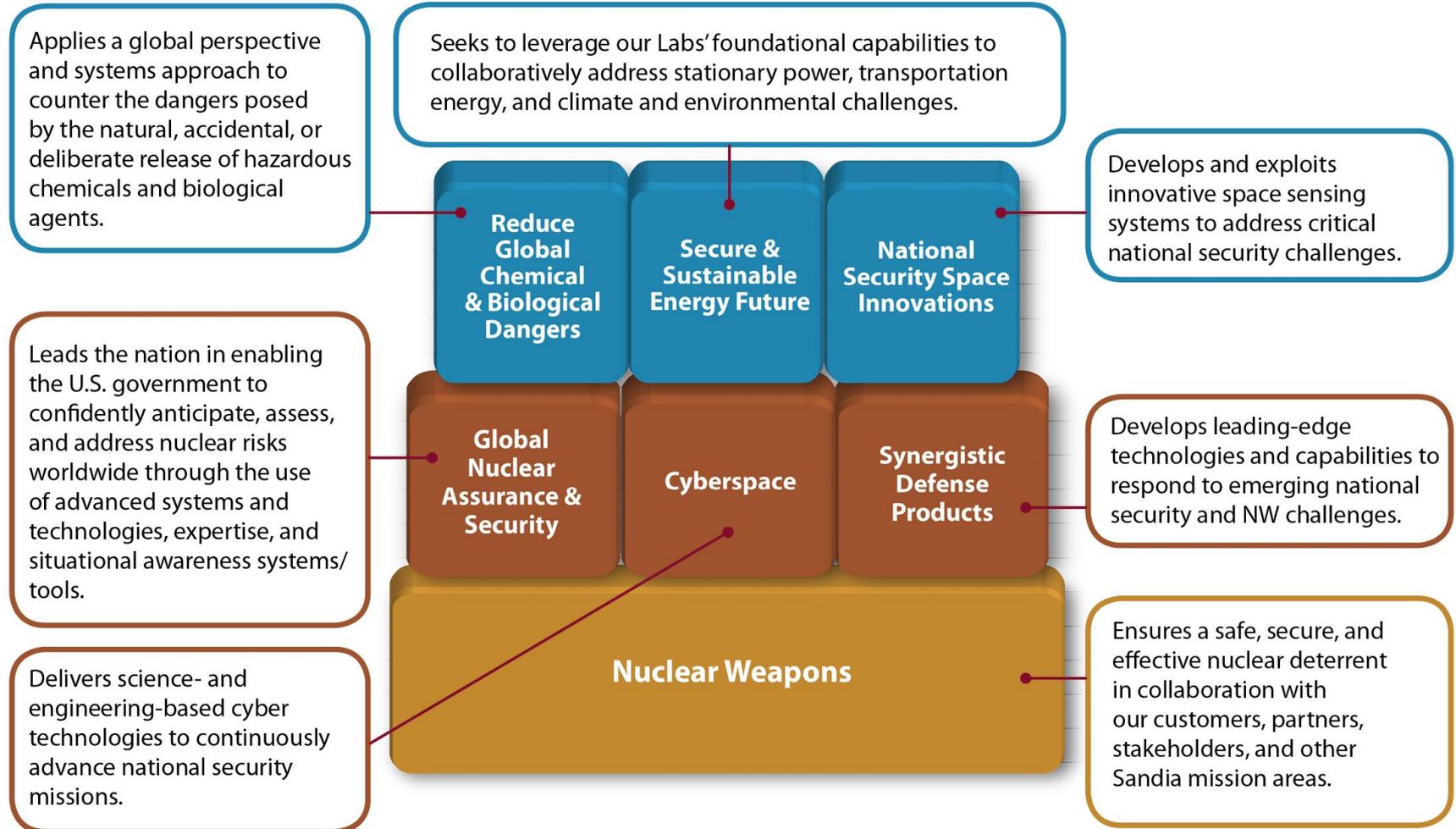
Our unique mission responsibilities in the nuclear weapons (NW) program create a foundation from which we leverage capabilities, enabling us to solve complex national security problems.

As a multidisciplinary national laboratory and federally funded research and development center (FFRDC), Sandia accomplishes tasks that are integral to the mission and operation of our sponsoring agencies by

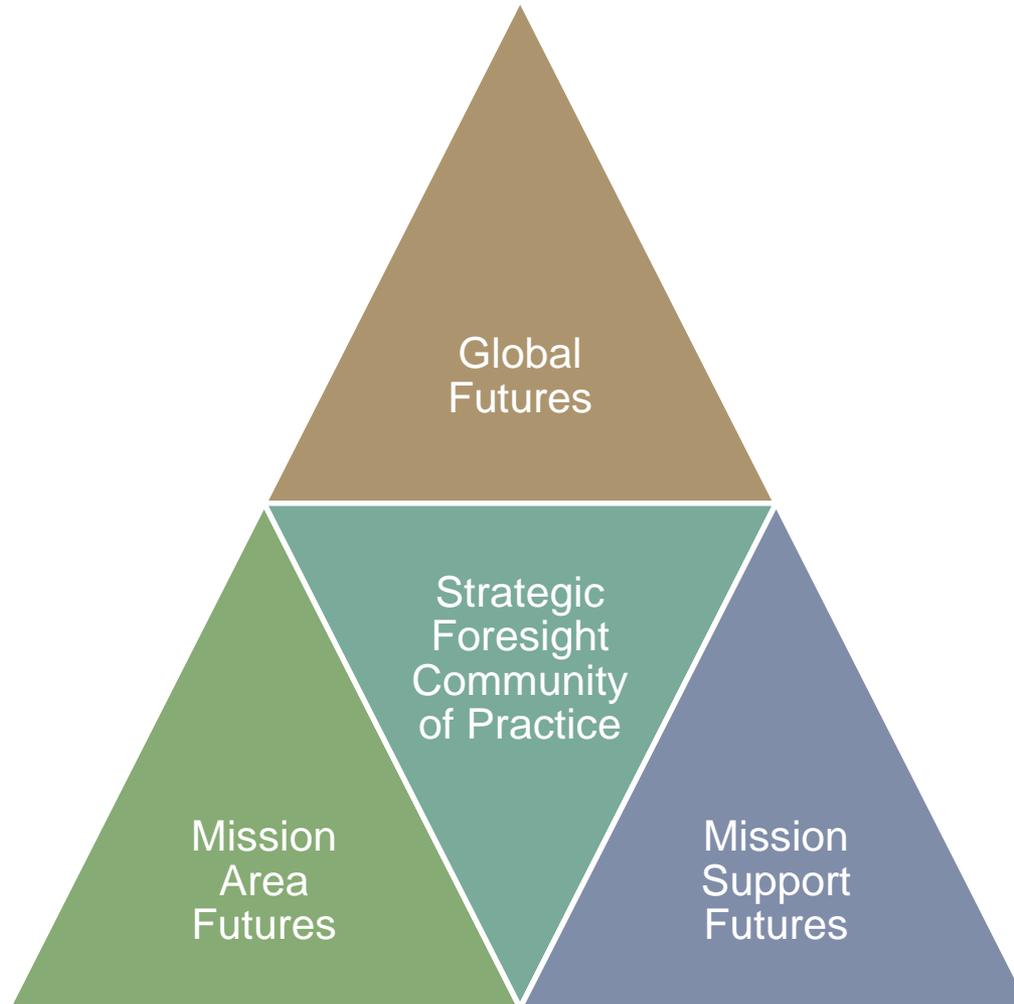
- anticipating and resolving emerging national security challenges
- innovating and discovering new technologies to strengthen the nation's technological superiority
- creating value through products and services that solve important national security challenges
- informing the national debate where technology policy is critical to preserving security and freedom throughout our world

As an FFRDC for the National Nuclear Security Administration (NNSA), we have a long-term relationship with our sponsor. This creates an environment that supports our fields of expertise, enables us to maintain our objectivity and independence, and allows us to be familiar with our sponsor's mission. We bring the FFRDC culture to all our federal sponsors to provide long-term support, solutions to existing problems and emerging threats, and quick-response capabilities. As an objective, independent, and trusted advisor, we draw from our deep science and engineering experience to anticipate, innovate, create, and inform the policy debate for decision makers.

National Security Mission Areas



Overview



Global Futures Briefings



Arctic Security



Demographic &
Economic Divergence



Urbanization



Nonrenewable Resources



Technology Empowerment



Governance Dynamics

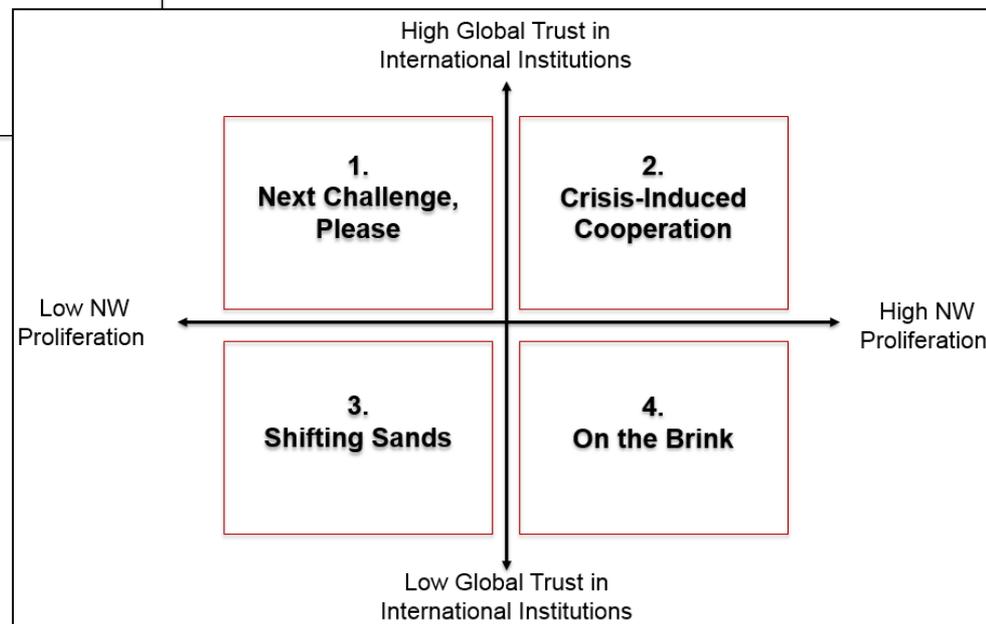
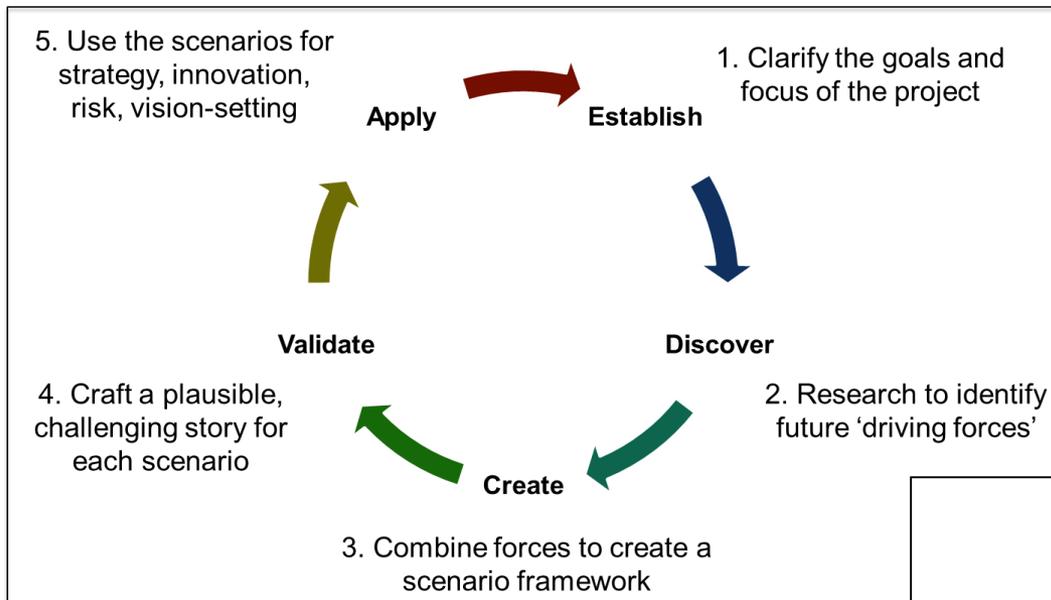


Biotechnology

Strategic Foresight Community of Practice

- The SFCoP is a cross-Labs forum for scientists and strategic planners working to integrate futures thinking into strategic planning and decisions.
 - Meetings 6x per year plus special events
 - Internal Website/Document Library
 - Monthly Newsletter

Nuclear Security Scenario Workshops



Questions?

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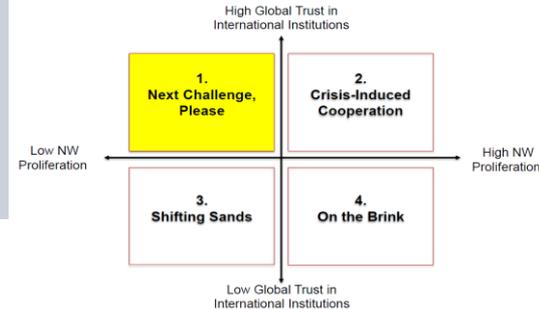
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Back-Up

Scenario 1

Next Challenge, Please



- Nuclear energy is widespread, but multilateral fuel banks have reduced the number of enrichment facilities worldwide. The fuel banks reflect an NPT reinvigorated by the verification of reduced stockpiles in the U.S., Russia and China and the symbolic transfer of nuclear modernization budgets into the Global Fund for Disaster Preparedness and Response.
- Rogue state and non-state actors remain interested in the acquisition of nuclear weapons, but cyber and bioweapons have become more attractive due to the cost, accessibility and impact
- Overall, nuclear issues recede into the background as other threats (cyber, bio, climate) demand global attention. Decreased funding and strategic attention pose challenges for avoiding complacency about continued nuclear risks.
- The U.S. is still a critical player, but not the dominant leader, in shaping international rules and agreements. Emerging powers and non-state actors (including corporations and foundations) play a much larger role.

Next Challenge, Please



FUEL BANK EXPLOSION DELAYS H12N9 SUMMIT

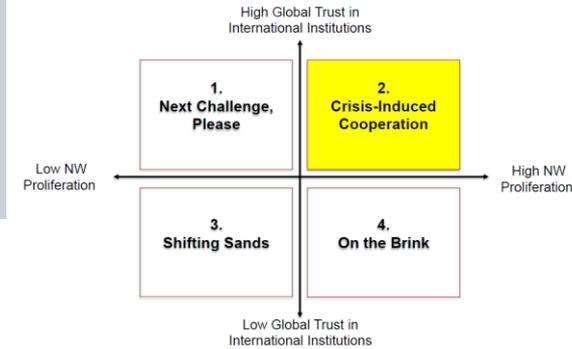
(May 15, 2035, Singapore, Singapore) The explosion early yesterday morning at Singapore’s Multilateral Fuel Bank has caused global leaders to postpone the global H12N9 Summit scheduled for Singapore this week.

Officials have released few details on the attack, but have noted that the explosion appears to have been generated by an insider attack. The perpetrators are believed to be a husband and wife team, who have worked at the bank since it was established 12 years ago. The husband worked in materials safety and the wife led a team in cyber safeguards for the bank.

Motivations remain unclear. One prominent blogger has speculated that the damage may be the result of disgruntled employees, while a source close to the investigation suggests that the couple may have been communicating through NextAp with members of the transnational terrorist network XYZ. No statement has been issued taking credit for the event. The three other multilateral fuel banks, in Brazil, Kazakhstan and South Africa, have all been placed on high alert.

The attack comes as Singapore was preparing to host world leaders from countries, companies and global networks to develop a coordinated response to the H12N9 epidemic that has devastated regions in North Asia and continues to spread worldwide. Officials have postponed the summit to allow emergency responders and security teams in Singapore to focus on incident response. Given the severity of the epidemic and growing urgency for coordinated response, the summit will likely take place in Sydney, Australia next week.

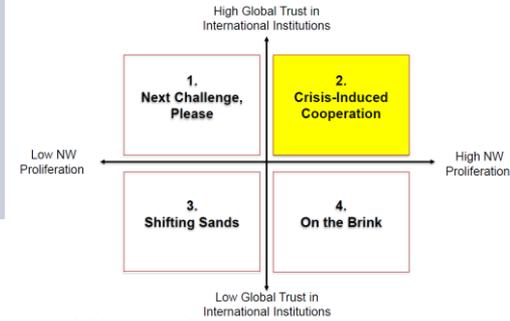
Crisis-Induced Cooperation



- Following severe accidental detonation, countries rally quickly with cooperation commitments, but the details of arms reductions and verification take time to negotiate as most nuclear weapon countries look to reduce, but not eliminate, their stockpile
- Multiple countries with varying security cultures and capabilities look to the U.S. for guidance and assistance in disarmament
- Rogue states and non-state actors seek to exploit the transition to gain access to materials, expertise and weapons
- Activist communities in multiple countries create global network demanding nuclear disarmament
- Risk of additional accidents remains high

Scenario 2

Crisis-Induced Cooperation



Nuclear Security Summit Marks Fifth Anniversary of Jammu Disaster

(February 17, 2035, Karachi, Pakistan) World leaders convene today in Delhi to mark the five-year anniversary of the nuclear accident that rocked the world. The summit is designed to review progress on communication protocols, safety and security collaboration and disarmament commitments.

Five years ago today, the explosion destroyed Jammu, the capital city of Kashmir and nearly set off a heated exchange between India and Pakistan. The disaster, which remains the most heavily documented historical event in history, killed an estimate 400,000 people in the initial explosion and more than 20,000 in subsequent days due to panicked evacuations and riots. India's Ministry of Health and Family Welfare estimates there are roughly one million survivors with physical injuries from the blast and countless more suffering with psychological impacts.

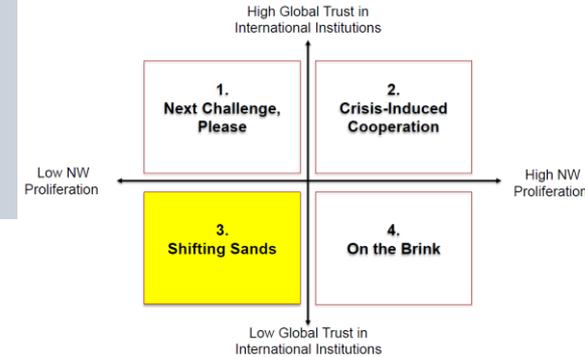
The official International Atomic Energy Agency (IAEA) incident report blames the explosion on the failure of safety hardware during transport and credits decades of communication-building between India and Pakistan, and coordinated diplomatic intervention by the United States, Russia and China, for avoiding a catastrophic war between the neighboring countries.

Over the course of this week, the state and non-state actors gathered in Delhi will review progress on the communication protocols put in place in 2031 and review progress on the safety and security collaboration. The most challenging piece of the summit will be the disarmament negotiations initiated in 2034. Thus far, three countries have already eliminated their nuclear weapons programs and three more are committed to complete disarmament. The other 11 have committed to significant reductions, but targets and timelines remain vague.

Protesters pushing for accelerated disarmament have gathered in Delhi and in capitals around the world to honor the victims of the Jammu disaster and demand quicker and bolder action.

Note: The inspiration for this scenario is drawn from a similar scenario that appears in in NSquare's [Crossroads](#).

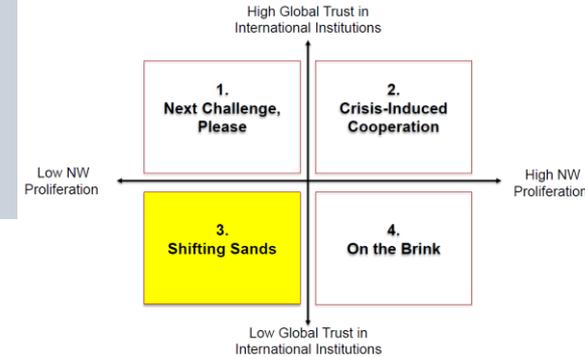
Shifting Sands



- Nuclear weapons states jockey for alliances as the credibility of U.S. security commitments are questioned
- As NPT dissolves, threshold states debate whether new alliances or NW programs will provide benefits that exceed the costs
- Widespread nuclear energy contributes to latent NW capability worldwide
- Powerful states attempt to control proliferation with military force leading to regional instabilities
- Countries that have nuclear weapons continue to focus on deterrence, though policy has not kept pace with the changing geopolitical dynamics (e.g., multitude of players, dynamism of alliances and escalating arms race).

Scenario 3

Shifting Sands



US Attempts to Reassure Allies with Weapons Deployment

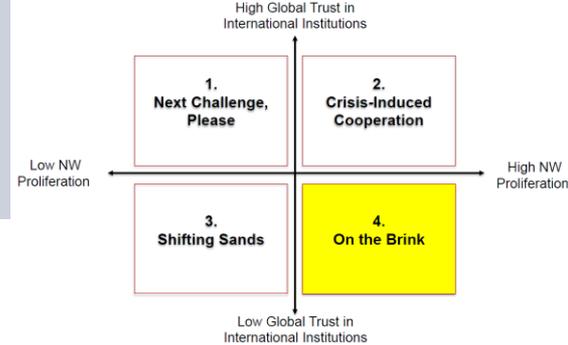
(November 9, 2035, Washington, D.C.) Following yesterday's underground nuclear detonation by the Islamic State, the US has reiterated its commitment to working with allies in the region to "make Raqqa understand the costs of its provocations." Security experts expect the US will continue to leverage a range of mechanisms against the Islamic State, including economic and cyber tools, to demonstrate commitment to allies in the region.

Bloggers citing Leakapedia also anticipate the US will seek to deter further aggression by the Islamic State and maintain alliances with Saudi Arabia and Egypt by shifting some number of nuclear weapons to the region. The hope is to maintain stability while reassuring allies that they do not need to develop their own weapons programs. US talks with Iran on the broader regional implications of the arrangement are ongoing.

It remains unclear which countries would be receptive to hosting US nuclear weapons, and whether the US would want to concentrate the weapons in one area or spread them in a perimeter around the Islamic State. Nearly surrounded by the Islamic State, positioning weapons in Saudi Arabia would send a loud message, but could potentially create a backlash against the monarchy. Countries on the fringes on the Islamic State, such as Andalusia and South Nigeria, would be more receptive, but are further from Raqqa. Even further afield, the Philippines has asked for a greater US presence in deterring Islamic State's expansion, but Chinese opposition could rule out that option.

Top security advisors are divided on the redeployment approach. While some urge redeployment as a critical step for maintaining allies in the region, there is also a strong reluctance from many who question the security readiness and manpower availability for this type of mission.

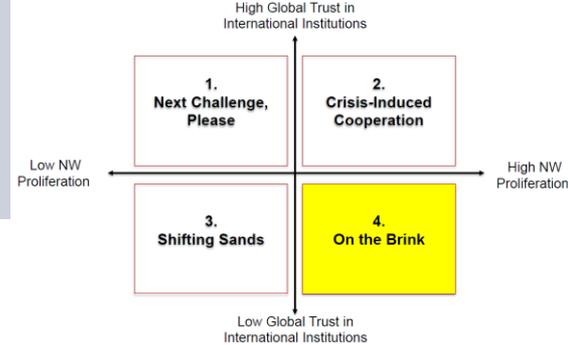
On the Brink



- Nuclear weapons are now a tool in the toolkit of many countries. Heavy proliferation and the advancement of tools leads to increased tactical use and a global black market for NW
- Full-scale interstate wars become rare, but devastating
- High risk of safety and security incidents; lack of cooperation reduces resilience
- Lack of access and communication places emphasis on unilateral monitoring and incident response

Scenario 4

On the Brink



PLUTONIUM DETECTED IN PARAGUAY EXPLOSION

(January 11, 2035, Asuncion, Paraguay) Officials in Asunción confirmed today that trace amounts of plutonium were detected following the January 4th explosion that leveled a garage in the upscale Villa Morra neighborhood of Paraguay’s capital city. In the days following the bombing, social media postings from scientists from the Universidad Nacional de Asunción have fueled rumors that radioactive materials were scattered in the explosion.

Nuclear analysts have speculated that the presence of plutonium would be a strong indicator that the warehouse was being used to smuggle nuclear materials, and possibly nuclear weapons, through Paraguay. Over the past several years, the US administration has publicly encouraged Paraguay to contain the sophisticated drug, weapon, and human smuggling operations that have been concentrating in Ciudad del Este, a city long known for its ties to smuggling across its border with Brazil and neighboring Argentina. US pleas for cooperation have usually been ignored, and occasionally rebuked by Paraguayan officials.

Earlier in the week, officials in Asunción confirmed that the destroyed property was under an ongoing antiterrorism investigation for its role in a network to smuggle arms to Africa. Officials accused “outside powers” of causing the explosion and disrupting their investigation. In comments today, the official blamed the unnamed “outside powers” for the plutonium dispersal, which they say could potentially put at risk the health of its citizens.

The official refused to pin blame for the dispersal on Brazil and Argentina, the two new South American nuclear powers whose programs seemed the most likely source of the plutonium. “With the rapid increase in nuclear armed countries over the past several years, there are many potential sources that we will investigate,” the official explained. The official alleged that this misplaced blame arose from “neocolonialist ambitions” angry at South America for developing its own nuclear capabilities.

Although Paraguay refuses to blame Brazil or Argentina, well-placed sources in both countries are accusing each other of cooperating with terrorist smuggling networks. The undercurrent of blame underscores a growing schism between Brasilia and Buenos Aires since the initial demonstration last year of their co-developed nuclear weapon in an undersea test off the Argentine coast in July of last year.