

# White Paper

## Reducing Nuclear Risks: Six Practical Options

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### Introduction

This paper outlines six practical options that non-nuclear weapon states could pursue to reduce nuclear risks amid heightened geopolitical tensions. The options were developed based on interviews with nuclear policy experts from around the world. They reflect priority areas where government investment could have the most near- to medium-term impact, as well as the tools and channels through which these efforts could be advanced.

Assessment of the strategic environment emphasized three main themes.

**The strategic environment is increasingly complex and unpredictable.**

Russia's ongoing war in Ukraine, China's nuclear expansion, and rising major-power competition are reshaping the strategic environment. At the same time, uncertainty surrounding alliance commitments, emerging technologies, and the shifting role of "middle powers" are reshaping global security dynamics.

**The global nuclear order is under growing strain.**

Countries remain divided over core nuclear issues, including nuclear testing verification, the modernization of nuclear armed states' arsenals, and the threat of horizontal proliferation. Meanwhile, the institutions and treaties designed to manage these challenges are weakening, and emerging technologies make the threat landscape more complex.

**Multilateral risk reduction efforts continue to play a critical role.**

Initiatives on fissile material control, nuclear materials security, and other practical measures continue to help build trust, transparency, and accountability among states while reducing the risks associated with nuclear weapons.

### Practical Options for Nuclear Risk Reduction

Drawing on insights from interviewees, NTI identified six practical options for reducing nuclear risks. These are all subject to further review and vetting.

## Nuclear Testing

The norm against nuclear testing is increasingly under strain. The United States has alleged that China is conducting low-yield testing activities and has in the past raised concerns that Russian activities may also be inconsistent with its testing moratorium. U.S. President Donald Trump has instructed the Pentagon “to start testing U.S. Nuclear Weapons on an equal basis” in response to other countries’ activities. It is unclear, however, what this means or how it will be implemented in practice.

### Option 1: Improving Detection of Low-Yield Nuclear Tests

**Concept and Scope:** Establish a small, informal coalition of technologically capable states to advance the detection and verification of low-yield nuclear tests. Activities could include controlled field trials of next generation monitoring equipment and joint exercises using simulated scenarios. The goal would be to refine detection, improve data integration and reduce uncertainty in low-yield scenarios. Improved detection capabilities could also help clarify compliance concerns and reduce incentives for renewed testing by increasing confidence that even low-yield tests would be detected.

**Implementation:** Technically advanced governments could lead the initiative. Participating countries could jointly deploy prototype sensors, conduct “blind” detection exercises using non-nuclear explosions, and/or integrate seismic, radionuclide, and satellite data into unified analytical platforms. Lessons learned could be shared with the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO).

### Option 2: Voluntary Nuclear Test Site Transparency

**Concept and Scope:** Initiate a process aimed at developing voluntary, non-binding transparency standards among the P5 countries related to activities at nuclear test sites. More transparency can help reduce misperceptions and reinforce the norm against nuclear testing without revealing sensitive information.

**Implementation:** Governments would lead an effort to initiate discussions on standardized reporting practices related to test site activities. These could include annual or periodic declarations on the general types of activities conducted, significant changes in test site activities, and high-level descriptions that demonstrate consistency with testing moratoria. Periodic technical workshops and expert exchanges would be convened to build shared understanding of what constitutes compliance activity while protecting sensitive information. Over time, the initiative could evolve into a set of best practices and common reporting formats, strengthening confidence in the global moratorium on nuclear testing without creating binding obligations.

## Horizontal Proliferation and the NPT

Geopolitical tensions and technological change are increasing concerns about horizontal proliferation while challenging the effectiveness of traditional nonproliferation tools. As civilian nuclear capabilities spread, the technical barriers between nuclear- and non-nuclear weapon states will narrow, increasing the importance of robust safeguards, monitoring, and verification tools. Bolstering existing tools, such as nuclear-weapon-free zones (NWFZ), and developing new ones will sustain nonproliferation in a world with more capable nuclear energy states.

### **Option 3: Stress-Testing NWFZ**

**Concept and Scope:** Launch a Track 1.5 effort to stress-test NWFZs against evolving geopolitical, institutional, and technological pressures. Through scenario-based discussions with member states, regional agencies (e.g., OPANAL, AFCONE), and civil society, the effort would identify key pressure points and develop practical steps to ensure the zones remain durable in a challenging geopolitical environment.

**Implementation:** Interested governments would partner with an NGO to convene in-person, scenario-based exercises with zone stakeholders to assess zone durability and produce action plans to close institutional and technological gaps. Assessments could begin with individual zones, then inform cross-zonal dialogue, sharing of best practices, and collaboration across the zones.

### **Option 4: Working Group on the Future of Nuclear Nonproliferation**

**Concept and Scope:** Convene a UN-mandated Working Group (or informal coalition in a different forum) on sustaining nonproliferation in a complex strategic environment. The group would focus on reinforcing confidence and restraint among advanced non-nuclear weapon states, strengthening existing safeguards and monitoring with emerging technologies, and identifying practical fuel-cycle or supply arrangements that reduce incentives for sensitive capabilities. The objective would be to deliver a concise set of policy options and pilot ideas and widely communicate them to build support.

**Implementation:** The group would consist of officials from nuclear weapon states and states with significant civil nuclear capabilities, IAEA officials, and technical experts. It would have a technical sub-group working to identify pilot safeguards innovations and develop implementation pathways for testing them.

### **Emerging Technologies and Strategic Stability**

Artificial intelligence (AI), cyber capabilities, and other emerging technologies will increasingly affect how nuclear armed states assess threats, make decisions, and operate nuclear forces. While these technologies may offer potential benefits for situational awareness, early warning, and system resilience, they also introduce new risks of misunderstanding, disruption, and escalation. New modalities and processes are needed to help governments and industry understand these risks and find useful and implementable solutions.

### **Option 5: Strengthening Diplomatic Capacity on Emerging Technologies**

**Concept and Scope:** Develop targeted training programs to equip diplomats with a practical understanding of AI and other emerging technologies as they increasingly intersect with nuclear systems and strategic stability. This issue is increasingly being discussed by countries, but many diplomats face constraints in technical expertise, resources, and shared vocabularies. Better-equipped diplomats would be more capable of evaluating proposals, participating in technical negotiations, and identifying practical risk-reduction opportunities.

**Implementation:** Governments would partner with leading NGOs, think tanks, and/or academic institutions to create concise, policy-oriented training modules tailored to non-technical diplomats. These programs would be offered in hybrid formats and aligned with existing multilateral processes to maximize reach and participation.

## Option 6: Promoting Transparency on Nuclear Risk Management

**Concept and Scope:** Encourage nuclear armed states, starting with the P5, to increase transparency around the processes and governance mechanisms they use to assess and mitigate nuclear risks arising from emerging technologies. Greater transparency into the processes used to assess and manage risks would build confidence and establish baseline expectations for responsible oversight.

**Implementation:** Governments would begin by commissioning an NGO to produce a baseline analysis of publicly available information on how nuclear armed states manage potential risks of emerging technologies to nuclear weapon systems. This information could be used to develop a voluntary reporting template focused on process-focused disclosures. Nuclear armed states, starting with the P5, would then be encouraged to provide voluntary updates through briefings, side events at NPT and/or UN First Committee meetings, and informal dialogues.

## Conclusion

The current strategic environment presents significant challenges for nuclear risk reduction. Growing geopolitical competition and pressure on existing nonproliferation institutions are contributing to a more uncertain landscape. Meanwhile, the rapid integration of emerging technologies into military systems increases risks and uncertainty.

Despite these challenges, there are practical opportunities for progress. The six options outlined in this paper offer near- to medium-term ideas that could help strengthen transparency, build accountability, improve technical understanding, or reinforce existing nonproliferation and risk reduction frameworks. Together with ongoing initiatives, they can help reduce uncertainty, strengthen cooperation, and reduce the risk of nuclear weapons use.

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