



# Progress Under the International Partnership for Nuclear Disarmament Verification<sup>1</sup>

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## Abstract

The International Partnership for Nuclear Disarmament Verification (IPNDV) is a unique and innovative multinational partnership between the Nuclear Threat Initiative (NTI), the U.S. State Department, and more than 25 other countries and the European Union. The IPNDV explores the challenges associated with monitoring and verification of nuclear disarmament across the nuclear weapons lifecycle and identifies potential technical solutions to those challenges. In addition, the Partnership works to build global capacity among states both with and without

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nuclear weapons. In its current phase, the IPNDV is focused on the numerous and complex challenges associated with monitoring the dismantlement of a nuclear warhead, in particular the need to protect proliferation-sensitive and national security related information while still providing confidence that a warhead has been dismantled. This paper will detail the IPNDV's progress since its launch in December 2014, drawing on the work done by the government officials and technical experts that compose the project's three working groups and the IPNDV plenaries that have been held so far in the United States, Norway, Japan and the United Arab Emirates.

## History

Verification measures are implemented around the world each day to monitor commitments related to nuclear and chemical weapons, nuclear safeguards and agreements such as the Joint Comprehensive Plan of Action. However, although a lot of expertise has been gained thanks to the IAEA's safeguards experience, arms control initiatives between the United States and the former Soviet Union and Russia, as well as the US-UK Program on Nonproliferation and Arms Control Technology and the UK-Norway Initiative on Nuclear Warhead Dismantlement Verification, there are currently no procedures to verify and monitor nuclear warhead dismantlement or the destruction of weapon components.

Launched in December 2014, the Partnership sets into motion a key recommendation from the Nuclear Threat Initiative's (NTI) Verification Pilot Project and its *Innovating Verification* series, released in July 2014. That report proposed that "States should come together now to begin an international process to assess verification gaps, develop collaborative technical work streams and contribute to overall global nuclear threat reduction".<sup>5</sup>

As a result, the International Partnership for Nuclear Disarmament Verification (IPNDV), a unique and innovative collaborative effort between the Nuclear Threat Initiative, the U.S. State Department, and more than 25 other nuclear and non-nuclear-weapon states, was established to study and develop the procedures, concepts and technologies necessary to monitor and verify nuclear disarmament, and in particular the dismantlement of a nuclear weapon. In addition, the IPNDV seeks to diversify existing, and build new, international capacity and expertise needed for the verification and monitoring of nuclear weapon disarmament in the future, both in states with and without nuclear weapons.

From the very beginning of the Partnership, participants agreed that the IPNDV would be a constant, multi-year project, and that it would focus on developing technical and procedural solutions for disarmament. The IPNDV is not a treaty-negotiating forum and it defers political debates and questions related to disarmament to its member states and other forums.

## Structure

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<sup>5</sup> Nuclear Threat Initiative, "Innovating Verification: New Tools & New Actors to Reduce Nuclear Risks – Overview," accessed online June 9, 2017, [http://www.nti.org/media/pdfs/VPP\\_Overview\\_FINAL.pdf?\\_=1405445582](http://www.nti.org/media/pdfs/VPP_Overview_FINAL.pdf?_=1405445582)

The states that form the IPNDV meet regularly. One or two plenary sessions are held each year, during which senior government officials and government-selected technical experts discuss challenges related to nuclear disarmament verification, progress made in the partnership, and establish work tasks moving ahead. So far plenaries have been held in the United States, Norway, Japan, and the United Arab Emirates. A fifth plenary will be held in Argentina at the end of 2017.

At the November 2015 plenary session held in Oslo, Norway, participant states agreed that to lay a robust foundation for further reductions in the global numbers of nuclear weapons and advance the disarmament goals of the Treaty on the Non-Proliferation of Nuclear Weapons, the IPNDV should assess monitoring and verification issues across the entire nuclear weapon lifecycle. However, participants also decided in Oslo that for the first phase of work of the Partnership, which will finish at the end of 2017, the IPNDV would focus on the most complex and challenging topic related to future arms control reductions: monitoring and verifying activities associated with the physical dismantlement of one nuclear warhead and the storage of the nuclear material and high explosives resulting from the dismantlement, which is just one element of a broader disarmament process.

Participants also agreed to structure the work of the Partnership around three working groups with different but complimentary expertise and scope of work. The IPNDV working groups are the main engines of the Partnership. The first working group focuses on monitoring and verification objectives and is co-chaired by The Netherlands and the United Kingdom. The second working group works on issues related to on-site inspections and is co-chaired by Australia and Poland, while the third group works on technical challenges and solutions associated with the dismantlement of a nuclear warhead, and is co-chaired by Sweden and the United States.

The three working groups each work according to terms of reference, and are tasked with the production of ten deliverables to cap the first phase of IPNDV work. The deliverables below are to be finalized by the November 2017 plenary to be held in Buenos Aires, Argentina:

- A framework document with terms and definitions, principles and good practices, and a broad flowchart showing possible monitoring and verification activities for key disarmament steps across the nuclear weapons lifecycle;
- A detailed assessment of potential monitoring and verification requirements for monitoring the dismantlement of nuclear warheads, including what information might be needed to satisfy those requirements, and an assessment of the kind of assurance that states would likely seek from verification;
- A capacity mapping document that outlines existing skills and areas of expertise applicable to key monitoring and verification activities, and identifies possible gaps; and a needs an planning document to fill gaps and identify priorities for future collaborative efforts;

- A document outlining the key elements of OSI for verification of nuclear disarmament undertakings, potential new inspection activities & techniques that could effectively verify compliance with future agreements as well as options for managed access and their applicability at different facilities/sites;
- A “best practices” document highlighting skills, training requirements, and lessons learned from inspectors and facility operators who have OSI experience;
- Proposed approaches and topics for future development of OSI for verification of nuclear disarmament;
- A series of presentations, workshops or seminars on key activities and lessons learned from the U.S.-UK, UKNI and other relevant activities;
- An assessment of existing approaches for warhead authentication, including the systems that support attribute measurements and templates, and an outline of other techniques that could increase confidence that something is in fact a nuclear warhead;
- The development of a chain of custody paper, presentation or demonstration involving unique identification and tamper indicating devices in a specific environment, such as a mock warhead storage area; and
- A mapping of existing and potential technical capabilities necessary to enable monitoring and verification at different stages of a nuclear weapon dismantlement process, and the level of confidence that technology brings to monitoring the dismantlement process, with a list that identifies capability gaps and weaknesses to inform future research.

Officials and technical experts from participating states come together during recurring working group meetings to work collaboratively and make progress on the deliverables outlined above. They also meet regularly during plenary meetings.

## **Existing Capacity in the Partnership**

As outlined above, the working group on Monitoring and Verification Objectives (working group 1) of the IPNDV was asked to produce “a capacity mapping document that outlines existing skills and areas of expertise applicable to key monitoring and verification activities, and identifies possible gaps”. To support this deliverable the Nuclear Threat Initiative, in collaboration with Partnership states, prepared a capacity mapping questionnaire and circulated it among participants. The responses received provide a representative sample of the Partnership and its diverse capabilities with respect to nuclear disarmament verification, and also helps draw a clearer picture of existing gaps in the states that currently form the IPNDV.

The highlights that can be gathered from the responses to the questionnaire are that most countries participating in the IPNDV have institutions dedicated to research and development that could be used for monitoring and verification activities associated with nuclear disarmament. They are organizations associated with national defense, governmental nuclear

laboratories and nuclear regulators, and also research centers and universities. Most participating countries also have nuclear material characterization and testing capability.

In addition, most IPNDV states have at least some ready-to-deploy technologies to support monitoring and verification activities at different stages of the nuclear weapon dismantlement effort, particularly at the stage of materials production and after warhead disassembly. However, there is a lack of ready-to-deploy technologies to support monitoring and verification activities associated with nuclear weapons in storage or to authenticate an item declared to be a nuclear warhead. Furthermore, there is a general gap in technologies associated with tags and seals, open source research and geospatial analysis, statistical analysis, and sample planning.

Looking at existing training programs for the field of nuclear disarmament, most countries in the Partnership offer technical training courses specifically designed to train current or future inspectors of the IAEA, the OPCW or other international verification bodies or efforts. Most Partners have research centers and academic programs that can be used to develop verification capacity within the IPNDV, but also with the broader international community. However, outside of nuclear-weapon states, few IPNDV Partners offer policy courses that can be used to further develop verification capacity.

While many IPNDV states have verification capabilities, both technical and institutional, related to their obligations and support for IAEA safeguards, nuclear disarmament verification remains a niche issue, particularly outside of nuclear-weapon states. Moving forward, new cooperation projects should be established between nuclear-weapon states and non-nuclear-weapon states on specific aspects of disarmament verification. States should build on the institutional and technical capabilities they already have for nuclear safeguards and for national security, and expand those resources and experience to nuclear disarmament verification. In particular, cooperation mechanisms domestically and internationally should be established to further collaboration, identify R&D priorities, and share talent and technologies. It will be especially important to form partnerships with nuclear-weapon states, as they have more experience and technical abilities for nuclear disarmament verification. Finally, more efforts should be made to establish nuclear disarmament and verification policy training courses.

## **Moving Forward**

As outlined above, a great deal of work has been done as part of the International Partnership for Nuclear Disarmament Verification. Working groups have been established and their terms of reference defined. The Partnership is currently hard at work completing the ten deliverables of the working groups and multiple plenary and working groups meetings have helped move the work forward. Existing capabilities and gaps within the IPNDV have been highlighted. In

addition, a Monitoring and Verification Resource Collection of over 200 articles, some of them recently declassified and not previously released, have been posted on NTI's website<sup>6</sup>.

Ahead of the completion of Phase 1 of the IPNDV at the end of 2017, the Nuclear Threat Initiative is also building a new standalone website for the Partnership, as well as an interactive infographic that will reside on the new website and which will illustrate the integrated thinking of all three working groups around the verification of the basic dismantlement scenario of a nuclear warhead. The IPNDV is doing, and will continue to do, very important work to move forward nuclear disarmament goals, and its participants look forward to sharing the results of their efforts with the public. These new communication products will help the Partnership share its Phase 1 work with the public, as well as publicize the scope of work it will agree to for Phase 2.

## References

[1] "Innovating Verification: New Tools & New Actors to Reduce Nuclear Risks – Overview," Nuclear Threat Initiative, 2014. [Online]. Available: [http://www.nti.org/media/pdfs/VPP\\_Overview\\_FINAL.pdf?\\_=1405445582](http://www.nti.org/media/pdfs/VPP_Overview_FINAL.pdf?_=1405445582) [Accessed 9 June 2017]

[2] "Monitoring and Verification Resource Collection," Nuclear Threat Initiative, 2015. [Online]. Available: <http://www.nti.org/analysis/reports/verification-resource-collection/> [Accessed 9 June 2017]

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<sup>6</sup> Nuclear Threat Initiative, "Monitoring and Verification Resource Collection," accessed online June 9, 2017, <http://www.nti.org/analysis/reports/verification-resource-collection/>

## About the Authors

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## About the Nuclear Threat Initiative

The Nuclear Threat Initiative works to protect our lives, environment, and quality of life now and for future generations. We work to prevent catastrophic attacks with weapons of mass destruction and disruption (WMDD)—nuclear, biological, radiological, chemical, and cyber. Founded in 2001 by former U.S. Senator Sam Nunn and philanthropist Ted Turner who continue to serve as co-chairman, NTI is guided by a prestigious, international board of directors. Ernest J. Moniz serves as chief executive officer and co-chairman; Des Browne is vice chairman; and Joan Rohlfing serves as president.