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Transparency in Nuclear Disarmament

Nuclear disarmament is one of the most important issues on the international security agenda. The commitment of nuclear-weapon states to pursue disarmament is an integral part of the international community's efforts to strengthen international security, prevent proliferation of nuclear weapons and confront the threat of nuclear terrorism. The vision of a nuclear-weapon-free world has been endorsed by the leadership of key nuclear-weapon states, led by the United States, and supported by many experts and politicians, and the public.

Nuclear-weapon states have made substantial progress in reducing their nuclear arsenals—it is estimated that the number of nuclear weapons has been reduced to about 18,000 from its peak of more than 70,000 warheads in 1986.¹ These reductions also brought significant advances in the openness of nuclear-weapon states about their nuclear arsenals. At the same time, it is clear that nuclear arsenals could be reduced even further and that progress in nuclear disarmament will be impossible without greater transparency and measures that will ensure verifiability and irreversibility of the reductions.

The “action plan on nuclear disarmament” adopted by the Nuclear Non-Proliferation Treaty (NPT) Review Conference in 2010 recognizes the importance of transparency in achieving deeper reductions in nuclear arsenals. The plan affirms that “nuclear disarmament and achieving the peace and security of a world without nuclear weapons will require openness and cooperation, and ... enhanced confidence through increased transparency and effective verification”.² Specific items of the 2010 NPT Action Plan call for cooperation aimed at “increasing confidence, improving transparency and developing efficient verification capabilities related to nuclear disarmament”.³

1 Robert S. Norris and Hans M. Kristensen, “Global nuclear weapons inventories, 1945–2010”, *Bulletin of the Atomic Scientists*, vol. 66, no. 4, 2010, pp. 77–83.

2 Final Document of the 2010 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, document NPT/CONF.2010/50 (Vol. I), 2010.

3 Ibid., action 19.

National governments have also emphasized the importance of transparency, effective verification and irreversibility in nuclear disarmament. The Russian Federation and the United States made a commitment to these principles in their negotiations that led to the conclusion of the New START Treaty in April 2010. France and the United Kingdom have released information about their nuclear arsenals and demonstrated their commitment to openness.⁴ Non-nuclear-weapon states have been persistently advocating transparency, verifiability and irreversibility in nuclear disarmament.⁵ Following the 2010 NPT Review Conference, a group of non-nuclear-weapon states developed a proposal on specific measures that nuclear-weapon states should take to implement the items of the Action Plan that call for regular reporting on the status of their nuclear forces.

Despite the advances in transparency that have been made in recent years, the international community is still facing the challenge of building a robust legal and institutional framework that would support verifiable and irreversible nuclear disarmament. As nuclear arsenals grow smaller, the task of eliminating nuclear weapons in a transparent and irreversible manner is becoming more difficult. However, the experience that has been gained in the nuclear disarmament process so far demonstrates that there are no fundamental technical or political reasons that would make progress towards comprehensive disarmament impossible.

This paper provides an overview of the transparency and verification measures that have been implemented so far in the context of nuclear disarmament and the procedures that have been developed to ensure irreversibility of the reductions of nuclear arsenals. Most of these procedures were created in the context of the bilateral US–Soviet/Russian arms control process that so far has been focused on elimination of strategic delivery systems. The paper then considers some transparency measures that would help Russia and the United States to move towards verifiable and irreversible elimination of nuclear warheads and the issues associated with this move. Finally, the paper outlines steps that would strengthen the nuclear disarmament process in all nuclear-weapon states.

Transparency, verifiability and irreversibility

Transparency is one of the basic conditions of a nuclear disarmament process. Making information available about the status of nuclear arsenals, policies that determine the role of nuclear forces in national security strategy, and plans for modernization or downsizing of the nuclear complex is a fundamental confidence-building measure that creates conditions for a stable international security environment. Transparency creates predictability and minimizes the opportunities for misunderstanding and overreaction.

As with most activities of a state, nuclear weapon programmes are always characterized by a certain degree of transparency. In democratic societies, transparency of the nuclear complex is a function of the openness of the national security decision-making process. Closed societies normally release very little, if any, information about their nuclear

4 French Ministry of Defence and French Ministry of Foreign and European Affairs, “Nuclear Disarmament: France’s Concrete Commitment”, <www.diplomatie.gouv.fr/en/IMG/pdf/desarmement_nucleaire_France.pdf>; “A World Free of Nuclear Weapons?”, remarks by Margaret Beckett, UK Secretary of State for Foreign and Commonwealth Affairs, Carnegie International Nonproliferation Conference, 25 June 2007.

5 Statement by Hirofumi Nakasone, Japanese Minister for Foreign Affairs, “Conditions towards Zero—11 Benchmarks for Global Nuclear Disarmament”, 27 April 2009, <www.mofa.go.jp/policy/un/disarmament/arms/state0904.html>.

programmes. However, even these programmes are open to a considerable degree, since their activities can be monitored by intelligence agencies and, increasingly, by independent observers. Recent technological advances have brought an unprecedented level of openness to areas that were closed to the outside world in the past.⁶

Although there are many ways in which openness contributes to the strengthening of national security of the state, transparency is often in direct conflict with government secrecy, especially in military affairs. The right balance between transparency and secrecy is difficult to achieve, especially on issues related to nuclear weapons, which have been traditionally among the most closely guarded government secrets. This tradition of secrecy is one of the factors that seriously limits transparency in nuclear disarmament.

There are other factors that limit the confidence-building value of transparency measures. First of all, such measures could rarely provide reliable insight into the intentions of a state regarding the potential use of nuclear weapons or into policies on the development plans for the nuclear weapon complex. Even though most nuclear-weapon states outline these policies in nuclear doctrines and make their long-term force development plans public, there is a degree of uncertainty in estimates of future intentions that transparency could not completely eliminate. Accordingly, transparency is at its most useful when it is used to describe the current status of the nuclear complex and the capabilities of nuclear forces.

When it comes to describing capabilities, the confidence-building value of information critically depends on the accuracy of the data involved. The ability of an outside observer—whether a party in a bilateral agreement or an agency acting on behalf of the international community—to ascertain the accuracy of information submitted by a government has to be a key element of any meaningful nuclear disarmament agreement or regime.

While verifiability is a very important concept, there is no single standard that would determine whether certain information or actions could be effectively verified. The effectiveness of verification measures depends on a number of factors that include the difficulty of deception and the consequences of an undetected violation.⁷ One commonly used definition of effective verification, which was developed in the context of the US–Soviet arms control process, is that there is the ability to detect significant violations in time to take corrective actions that would deny the advantage that could be obtained through the violations. With minor modifications, this definition could be used in a variety of situations, including assessing the effectiveness of verification measures that would be applied in future nuclear disarmament processes.

As the nuclear-weapon states move towards the elimination of nuclear weapons, transparency and verification arrangements will have to be expanded to ensure the irreversibility of nuclear disarmament. This would create a new set of challenges for the international community, since ensuring irreversibility would probably require the development of new transparency measures and of new verification procedures that

6 Rose Gottemoeller, “From the Manhattan Project to the Cloud: Arms Control in the Information Age”, Sidney Drell Lecture at Stanford University, 27 October 2011, <www.state.gov/t/avc/rls/176331.htm>.

7 Edward Ifft, “Political Dimensions of Determining ‘Effective’ Verification”, in Corey Hinderstein (ed.), *Cultivating Confidence*, Hoover Institution Press, 2010, p. 4.

would cover a wide range of activities.⁸ In addition to procedures that would verify the elimination of nuclear warheads and the disposition of weapon-usable materials, these measures would have to include close monitoring of production facilities and highly intrusive inspections. Despite the complexity of this task, most of the technical tools and procedures that would be required to complete it have been already developed and implemented in the context of the US–Russian disarmament process.

History of transparency in arms control

Arms control and disarmament efforts of Russia and the United States provide a good guide to the role of transparency and verification in nuclear disarmament. The two states also have valuable experience in dealing with the issue of irreversibility of nuclear reductions that illustrates the challenges of finding an approach that would reliably work in the case of deep nuclear cuts.

As the first nuclear-weapon states, the United States and the Soviet Union built their policies regarding transparency of their nuclear arsenals taking into account the need to balance two conflicting requirements—the need to demonstrate the strength of their nuclear deterrent and the need to avoid giving an adversary information that could undermine that deterrent. Also, it was understood very early in the nuclear age that the uncertainty introduced by the lack of transparency undermines stability and could lead to an arms race. For example, the lack of accurate information about the Soviet long-range bomber and intercontinental ballistic missile programmes in the 1950s created a perception of a “bomber gap” and then a “missile gap” in the United States, which contributed to a significant military build-up in the 1960s.⁹

With the development of national technical means of monitoring—primarily reconnaissance satellites—in the 1960s, the level of transparency of nuclear programmes became sufficiently high to allow the two states to have confidence in their knowledge of the existing capabilities of the other’s nuclear forces. While potentially there remained some room for uncertainty in the estimates of the number of deployed ballistic missiles, submarines and bombers, this could not seriously affect the judgment about the capabilities of the strategic forces. There were, however, other factors that were undermining stability of the US–Soviet strategic relationship—the lack of transparency regarding the nuclear force development plans and the potentially destabilizing consequences of missile defences that were under development by both states.

The two arms control treaties that were signed by the United States and the Soviet Union in 1972—the SALT Treaty and the ABM Treaty—helped to deal with this issue by establishing limits on the number of strategic ballistic missiles and on the deployment of missile defences.¹⁰ The conditions of these treaties introduced a degree of openness regarding the intentions of the two states towards the development of their strategic forces. From

8 David Cliff, Hassan Elbahtimy and Andreas Persbo, *Irreversibility in Nuclear Disarmament. Practical Steps Against Nuclear Rearmament*, VERTIC, 2011.

9 Joan Bird and John Bird (eds), “Penetrating the Iron Curtain: Resolving the Missile Gap Through Technology”, CIA Historical Collections Edition, 2011.

10 Interim Agreement on Certain Measures With Respect to the Limitation of Strategic Offensive Arms, 26 May 1972; Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems, 26 May 1972.

the point of view of transparency, the treaties introduced an important principle that established transparency as an essential element of the arms control and disarmament process. The United States and the Soviet Union agreed that neither side would interfere with national technical means of verification or use deliberate concealment measures to impede verification of the treaties.

The conclusion of the SALT Treaty and the ABM Treaty also became an important milestone in practical application of the principle of verifiability in the arms control process. Verification of the provisions of the treaties relied exclusively on national technical means, whose capabilities at the time were sufficient to detect developments that would constitute treaty violations. In the SALT Treaty, the key provision was the ban on construction of new silo launchers of intercontinental ballistic missiles (ICBMs) or launch tubes for submarine-launched ballistic missiles—both detectable without on-site inspections. Elements of missile defence systems restricted by the ABM Treaty, radars in particular, were also easily detectable by satellites, so the limits on their deployment were considered to be effectively verifiable. Overall, the combination of transparency provided by the prohibition on interference with national technical means and the technical capability to detect potential violations provided the two states with sufficient confidence of verifiability of the central limits of the SALT Treaty and the ABM Treaty.

The subsequent arms control negotiations demonstrated the limits of the partial transparency measures and of the reliance on national technical means for verification. As the United States and the Soviet Union tried to establish further constraints on the development of their strategic forces, they had to deal with a number of issues that posed a challenge for the approach that had worked in the past.

Specifically, the SALT II Treaty, which was supposed to replace the SALT Treaty, limited the number of ballistic missiles that carried multiple warheads (multiple independently targeted re-entry vehicles, or MIRV).¹¹ Since the number of warheads deployed on a missile cannot be verified remotely, the treaty introduced a limit on the maximum number of warheads that a MIRVed missile could carry. This approach, while limiting the total number of deployed warheads, introduced a significant uncertainty to the estimates of the size of nuclear arsenals.

Then, the verification procedures that relied on national technical means were not capable of reliable detection of land-based mobile ICBMs. The United States and the Soviet Union tried to address this problem by instituting a ban on the development of such missiles. The ban, however, was only temporary. The issue of land-based mobile ICBMs demonstrated the difficult choice between transparency and verifiability on the one hand and perceptions of security on the other. From the Soviet Union's point of view, it was essential that the United States not be able to detect land-mobile ICBMs, since the Soviet Union relied on their mobility to guarantee survivability and therefore their deterrent potential. As a result, the Soviet Union insisted on preserving its land-mobile ICBMs even though this could have potentially undermined the SALT II Treaty.

Another problem that the limited transparency and verifiability framework of the SALT treaties failed to resolve was the issue of the capabilities of the Soviet "Blackjack" Tu-

11 The Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Strategic Offensive Arms, 18 June 1979.

22M bomber. The United States argued that bombers of this type should be accounted for in the treaty, while the Soviet Union insisted, correctly, that they did not have an intercontinental range. However, the Soviet Union was not ready to disclose the data to support its point of view. The issue greatly complicated negotiations and in retrospect it seems likely that the Soviet Union would have benefited from greater transparency on this point.

The problems encountered during the SALT II treaty negotiations indicated that by the late 1970s nuclear arms control had reached the point at which national technical means alone could no longer provide effective verification. Indeed, the progress in nuclear disarmament that was achieved by the United States and the Soviet Union in the 1980s and early 1990s—the conclusion in 1987 of the Intermediate-Range Nuclear Forces (INF) Treaty, which eliminated the entire class of intermediate- and short-range missiles, and the START Treaty, which substantially reduced the number of strategic nuclear weapons, in 1991—would have been impossible without an agreement to include much more intrusive verification provisions.¹² In addition to national technical means, these treaties called for regular reporting on the number of delivery systems and their technical characteristics, access to the telemetry data from missile tests, on-site inspections, and continuous monitoring of missile production facilities.

It is instructive to see how the START Treaty resolved the issues that seemed intractable during the SALT II negotiations. To account for multiple warheads deployed on ballistic missiles, the treaty requires exchange of declarations on the number of warheads associated with missiles of each type. This information could then be verified by inspectors as well as by monitoring the telemetry during the flight tests of the missile. To facilitate verification the treaty set limits on encrypting the telemetry and established procedures for exchange of telemetric information. In effect, the treaty established a set of transparency measures that helped ensure that each side had access to the information about the capabilities of strategic delivery systems of its counterpart. To enable verification of the number of land-based mobile ICBMs, the START Treaty established a series of restrictions on movements of these missiles and made these movements transparent—the parties had to notify each other about most transfers of their mobile missiles. It has also set a procedure for continuous monitoring of the missile production facilities to ensure that all manufactured missiles were accounted for.

The extensive transparency and verification measures included in the INF and START treaties were made possible by the significant improvement in the relationship between the United States and the Soviet Union in the second half of the 1980s that eventually led to the end of the Cold War. On the other hand, the openness associated with the new arms control agreements was a significant factor in enabling the deep transformation of the US–Soviet relationship. It is important to emphasize that both sides concluded that the transparency and verification provisions did not undermine the deterrence potential of their nuclear forces. Indeed, as Russia and the United States proceeded with implementation of the INF and START treaties, they became increasingly confident in their ability to maintain credible deterrence with much smaller nuclear forces.

12 The Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Elimination of Their Intermediate-Range and Shorter-Range Missiles, 8 December 1987; The Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Reduction and Limitation of Strategic Offensive Arms, 31 July 1991.



In addition to introducing unprecedented transparency in nuclear arms control, the INF Treaty became the first nuclear disarmament agreement that required elimination of nuclear-capable systems and included provisions to ensure the irreversibility of nuclear reductions. The treaty prohibited Russia and the United States from having ballistic missiles with ranges from 500 to 5,000 km, as well as ground-launched cruise missiles. Accordingly, the INF Treaty included procedures for elimination of the missiles that the two states possessed at the time of treaty signature. The missiles were destroyed by an explosion, burning or disassembly, which ensured that they could not be brought back to service. To prevent production of new missiles, the parties had the right to monitor manufacturing facilities.

The key elimination procedures of the INF Treaty were also adopted in the START Treaty—missiles, submarines and bombers that were eliminated in the course of implementation of the treaty were destroyed in a manner that made their destruction irreversible.

While the INF and START treaties included provisions that ensured irreversibility of the reductions of nuclear forces, neither treaty dealt with elimination of nuclear warheads. The elimination procedures covered only delivery systems and their launchers—ballistic and cruise missiles, missile silos, missile launchers on strategic submarines, and bombers. There was no procedure that would account for or require elimination of the warheads that were carried by the eliminated delivery vehicles.

In the case of intermediate- and short-range missiles, the lack of a warhead elimination requirement did not present much of a problem, since the INF Treaty liquidated all missiles of these types. Even though both states were allowed to keep their nuclear warheads, no missiles were available to deliver them. This made the INF Treaty reductions effectively irreversible.

The situation with the START Treaty was different, since both states retained a number of delivery systems as well as warheads, so in some circumstances they had the capability to increase the number of deployed warheads relatively quickly. This could be done, for example, by redeploying the warheads that were removed from missiles in the course of implementation of the treaty. This capability, which is often referred to as “upload potential”, was especially prominent on the US side, which carried out large part of the START reductions by reducing the number of warheads deployed on its ballistic missiles, while leaving the missiles in service. Russia, on the other hand, implemented most of its reductions by eliminating launchers, which left it without the capability to increase the number of deployed warheads in the manner similar to that of the United States. This disparity would have grown even stronger in the START II Treaty, which Russia and the United States signed in 1993.

The problem of upload potential received significant attention since it demonstrated the complexity of making the reductions of nuclear forces truly irreversible. It also exposed differences in approaches to the issue of irreversibility between Russia and the United States. The United States was inclined to deal with the problem by moving towards explicitly including nuclear warheads in the scope of future arms control agreements. Russia, on its part, preferred measures that would eliminate delivery systems—as the INF Treaty has demonstrated, this was an effective way to make the reductions irreversible in practice. In 1997, the United States and Russia agreed to include “measures relating

to the transparency of strategic nuclear warhead inventories and the destruction of strategic nuclear warheads” in future disarmament negotiations.¹³ However, because of disagreements over missile defence and START II, Russia and the United States never began formal negotiations on transparency of their warhead inventories.

Russia and the United States made little progress on transparency of their nuclear arsenals in the 2000s, mostly because the START Treaty, which remained in force until December 2009, provided a reliable framework for reductions of strategic forces. In 2002, the two states signed the Strategic Offensive Reduction Treaty, also known as the Moscow Treaty, that called for reductions of strategic arsenals to the level of 2,200–2,500 operationally deployed nuclear warheads. However, that treaty did not include any new verification provisions, relying instead on the procedures established in START.¹⁴ Indeed, the Moscow Treaty did not provide a definition of “operationally deployed nuclear warhead”, which made it essentially unverifiable and unenforceable.¹⁵ The Moscow Treaty demonstrated that as long as the START Treaty was in force, it provided the two states with a sufficient level of transparency of their strategic arsenals. Indeed, both Russia and the United States believed that the START transparency, verification and inspection procedures were excessively intrusive and should be streamlined and simplified.

The New START Treaty between Russia and the United States, which was signed in April 2010 and entered into force in 2011, preserved the key elements of the START transparency and verification mechanisms, while reducing the number of notifications and inspections that were believed to be redundant and unnecessary. Since the treaty limits the number of operationally deployed strategic warheads, it introduced a new level of transparency by requiring the parties to exchange detailed data on the number of warheads that are actually deployed on their land-based and submarine-based missiles. To verify this information, the treaty includes provisions for on-site inspections that could examine individual missiles.¹⁶ This measure allows the two states to have fairly accurate information about the composition of strategic forces. The reduced uncertainty helps create conditions for deeper reductions of nuclear arsenals.

While expanding the scope of transparency and verification measures, New START did little to strengthen the mechanisms that ensure irreversibility of the nuclear disarmament process. The treaty does not require its parties to eliminate nuclear warheads that are removed from delivery systems. The procedures for elimination of strategic launchers—ballistic missiles, submarines and bombers—are also less stringent than those that were included in the START Treaty.¹⁷ As a result, while New START requires Russia and the United States to reduce the number of operationally deployed nuclear warheads to no more than 1,550 by 2012, both states will retain the capability to increase that number if they decide to do so. To constrain this capability, the New START Treaty limits the number of strategic launchers, deployed and non-deployed, to 800 for Russia and 700 for the

13 “Joint Statement On Parameters On Future Reductions In Nuclear Forces”, Helsinki, 21 March 1997.

14 Treaty Between the United States of America and the Russian Federation on Strategic Offensive Reductions, 24 May 2002.

15 Christopher E. Paine, “The Proposed ‘Moscow Treaty’ on Strategic Offensive Reductions”, testimony before the US Senate Foreign Relations Committee, 23 July 2002.

16 Protocol to the Treaty Between the United States of America and the Russian Federation on Measures for the Further Reduction and Limitation of Strategic Offensive Arms, Part Five—Inspection Activities, 8 April 2010.

17 *Ibid.*, Part Three—Conversion or Elimination Procedures.

United States, but this limit does not adequately solve the problem. According to one estimate, the United States would maintain the capability to deploy as many as 4,500 strategic nuclear warheads.¹⁸

The most serious problem of the New START Treaty is that it addresses only one category of nuclear weapons—operationally deployed strategic warheads—while leaving the rest of nuclear arsenals outside of its scope. As Russia and the United States reduce their strategic arsenals to the New START level of 1,550 warheads, their holdings of non-deployed warheads and non-strategic weapons are becoming increasingly difficult to ignore—the total number of nuclear warheads in the Russian and US arsenals is estimated to be about 10,000 and 5,000 warheads respectively.¹⁹ Another problem is that the US–Russian nuclear disarmament process does yet not provide a mechanism that would allow other nuclear-weapon states to join the New START process.

The New START Treaty has probably demonstrated the limits of the traditional approach to nuclear disarmament that was developed in the US–Soviet/Russian arms control process. Transparency and verification mechanisms have changed dramatically from the early days of arms control, when they relied exclusively on national technical means, to include highly intrusive on-site inspections and detailed information exchange. It is clear, however, that achieving deeper reductions of nuclear arsenals will require extending the scope of nuclear disarmament talks to cover non-strategic weapons and nuclear warheads in storage.

The limitations of the US–Soviet/Russian arms control notwithstanding, it provides some valuable lessons for bringing other nuclear-weapon states into this disarmament process and for building a foundation for irreversible elimination of nuclear warheads. Most importantly, the process has demonstrated that the transparency and verification measures associated with arms control do not undermine the deterrent potential of strategic forces. The experience of the two states suggests that while transparency itself is important, it is also an extremely valuable trust- and confidence-building measure. Even if limited in scope, transparency measures create favourable conditions for greater openness. Finally, Russia and the United States developed an elaborate legal and institutional framework of nuclear arms control that could serve as a foundation for future multilateral reductions of nuclear arsenals.

Transparency in nuclear reductions: next steps

Increasing the transparency of arsenals of all nuclear-weapon states is one of the first steps that would help to expand upon the bilateral reductions of Russian and US strategic nuclear weapons and move towards the irreversible elimination of nuclear weapons. There are two distinct goals that should be pursued in parallel. For Russia and the United States, the next step in their disarmament efforts should be to include non-strategic nuclear weapons in the scope of negotiations. This would most likely require extending transparency to the nuclear warheads that are currently in storage or in the

18 Hans Kristensen, “New START Treaty Has New Counting”, FAS Strategic Security Blog, 29 March 2010, <www.fas.org/blog/ssp/2010/03/newstart.php>.

19 Robert S. Norris and Hans M. Kristensen, “U.S. Nuclear Forces, 2010”, *Bulletin of the Atomic Scientists*, vol. 66, no. 3, 2010, pp. 57–71; Hans M. Kristensen and Robert S. Norris, “Russian nuclear forces, 2012”, *Bulletin of the Atomic Scientists*, vol. 68, no. 2, 2012, pp. 87–97.

dismantlement queue. Other nuclear-weapon states should join the US–Russian arms control and disarmament process by making declarations of their operationally deployed weapons in a manner that would be compatible with the data that Russia and the United States currently exchange under the terms of New START.

US–Russian reductions

The New START Treaty will probably be the last bilateral nuclear arms control agreement that deals only with strategic nuclear weapons and does not limit non-strategic forces and non-deployed weapons. At the time the treaty was signed, the US President stated that the United States will “pursue discussions with Russia on reducing both our strategic and tactical weapons, including non-deployed weapons”.²⁰ The 2010 Nuclear Posture Review also stated that the United States has to “address non-strategic nuclear weapons, together with the non-deployed nuclear weapons of both sides, in any post-New START negotiations with Russia”.²¹ The US administration since then confirmed that its proposal for the next stage of negotiations with Russia will include tactical and non-deployed weapons. In addition to addressing concerns about disparity, expressed by the US Senate, this proposal will address the issue of upload potential by ensuring that reductions are irreversible.²²

Verifiable reductions of tactical nuclear weapons would require much greater transparency than that which was developed for strategic nuclear arsenals. Unlike strategic launchers, most non-strategic delivery systems are able to carry both nuclear or conventional warheads, which makes it almost impossible to establish a limit on the number of warheads by limiting the number of launchers. Instead, the states would have to release information about their nuclear warheads and make them available for verification and inspection. This approach would most likely require exchange of detailed data on the types of warheads, the number of produced warheads, their operational status and storage locations.²³ This data exchange would have to cover all categories of weapons—strategic and non-strategic.

Reaching an agreement on such a comprehensive data exchange would be an extremely difficult task. So far, neither Russia nor the United States has disclosed detailed information about their nuclear arsenals. The only official statement that has been made so far is the US declaration, made in May 2010, that as of 30 September 2009 its nuclear stockpile consisted of 5,113 warheads. This number includes active warheads, whether operational or in storage, as well as inactive warheads that have been placed in long-term storage. It does not include “several thousand” additional warheads that are retired and awaiting dismantlement.²⁴ The data that was released by the US government also does not include

20 “Remarks by President Obama and President Medvedev of Russia at New START Treaty Signing Ceremony and Press Conference”, The White House, 8 April 2010, <www.whitehouse.gov/the-press-office/remarks-president-obama-and-president-medvedev-russia-new-start-treaty-signing-cere>.

21 *Nuclear Posture Review Report*, US Department of Defense, 2010, p. xi.

22 Rose Gottemoeller, “Interview With Judy Dempsey”, 19 January 2012, <www.state.gov/t/avc/rls/182708.htm>.

23 Rose Gottemoeller, “Eliminating Short-Range Nuclear Weapons Designed to Be Forward Deployed”, in George P. Shultz, Sidney D. Drell and James Goodby (eds), *Reykjavik Revisited: Steps Toward a World Free of Nuclear Weapons*, Hoover Institution, 2009.

24 “Increasing Transparency in the U.S. Nuclear Weapons Stockpile”, US Department of Defense, 3 May 2010, <www.defense.gov/news/d20100503stockpile.pdf>.

a breakdown by the categories of warheads. For example, there is no official information on the total number of tactical nuclear warheads. Unofficial estimates suggest that there are about 500 non-strategic warheads in the US arsenal, about 200 of them deployed in Europe, but this information has not been officially confirmed.²⁵

Russia has never released information about the size of its arsenal of nuclear warheads. It is believed to have about 4,500 active and non-active warheads and about 5,500 warheads awaiting dismantlement.²⁶ The uncertainty in the number of tactical warheads is quite large, but it is estimated that Russia has about 2,000 warheads assigned to its non-strategic forces.²⁷ Russia has repeatedly stated that all of its non-strategic weapons have been consolidated at centralized storage facilities, but there is little information about the status of these facilities and the number of weapons stored there.²⁸

Russia has not formally rejected the idea of providing information about its nuclear arsenal. However, since the US proposal is part of a plan to address the issue of tactical nuclear weapons, it would have to overcome Russia's opposition to negotiations on this subject before US nuclear weapons were removed from Europe.

Once the baseline for nuclear warhead arsenals are established, Russia and the United States will have to develop agreed procedures for verified elimination of nuclear warheads. These procedures would also have to include measures that would ensure that the nuclear material from disassembled warheads is removed from the military stock.

Russia and the United States have already done a substantial amount of work in this area. Most of this work was done under the US–Russia lab-to-lab programme during the second half of the 1990s. This work demonstrated that reliable verification of the dismantlement process is possible, although it would require implementation of measures that would track the movement of warheads from the deployment or storage areas to the dismantlement site.²⁹ Also, a joint project of Russia, the United States and the International Atomic Energy Agency (IAEA), known as Trilateral Initiative, demonstrated that the IAEA could effectively safeguard some nuclear weapon components before they enter the elimination queue.³⁰ Other programmes in which Russia and the United States worked together on issues related to nuclear warheads included the Mutual Reciprocal Inspections (MRI) and Limited Chain of Custody projects as well as work under the US–Russian Warhead Safety and Security Exchange (WSSX) agreement.³¹ The experience that

25 Robert S. Norris and Hans M. Kristensen, "U.S. Nuclear Forces, 2010", *Bulletin of the Atomic Scientists*, no. 66, vol. 3, 2010, pp. 57–71.

26 Hans M. Kristensen and Robert S. Norris, "Russian nuclear forces, 2012", *Bulletin of the Atomic Scientists*, vol. 68, no. 2, 2012, pp. 87–97.

27 Ibid.

28 "Russia has reduced by three quarters its tactical nuclear arsenals and concentrated them in central storage bases exclusively within its national territory"; Sergey B. Ivanov, First Deputy Prime Minister of the Russian Federation, speech at the 46th Munich Security Conference, 6 February 2010.

29 "Verified Warhead Dismantlement", in *Global Fissile Material Report 2009: A Path to Nuclear Disarmament*, International Panel on Fissile Materials, 2009, p. 67.

30 "Weapon-origin Fissile Material: The Trilateral Initiative", in *Global Fissile Material Report 2008: Scope and Verification of a Fissile Material (Cutoff) Treaty*, International Panel on Fissile Materials, 2008.

31 Oleg Bukharin and Kenneth Luongo, "U.S.-Russian Warhead Dismantlement Transparency: The Status, Problems, and Proposals", PU/CEES Report No. 314, 1999; James Fuller, "Going to Zero: Verifying Nuclear Warhead Dismantlement", in Corey Hinderstein (ed.), *Cultivating Confidence*, Hoover Institution Press, 2010.

was gained during these projects provides a strong technical foundation for future efforts on warhead dismantlement and elimination.

Building a foundation for multilateral nuclear arms control

Further progress in nuclear disarmament will be impossible without bringing all nuclear-weapon states into the US–Russian process. Even though Russia and the United States have about 95% of the world’s nuclear warheads, they are already expressing concerns about the lack of transparency and constraints on the much smaller nuclear arsenals of other states and indicating that these smaller arsenals should be included in future arms control negotiations.

In the United States, the 2010 Nuclear Posture Review proposed that the United States engage with the other nuclear-weapon states on improving transparency. The resolution of ratification of the New START Treaty passed by the US Senate contains a clause that stipulates that an “expansion of the strategic arsenal of any country not party to the New START Treaty” might justify US withdrawal from the treaty.³² Russian officials have also repeatedly stated that the next round of nuclear reductions should involve other nuclear states.³³ These positions suggest that for the United States and Russia to move forward with deeper reductions of their large nuclear arsenals, other nuclear-weapon states will have to accept some limits on their nuclear forces.

France and the United Kingdom have implemented significant reductions of their nuclear forces in recent years, but neither state has made a commitment to join formal disarmament negotiations. China insists that “countries with largest nuclear arsenals and special and primary responsibility for nuclear disarmament” should make “drastic and substantive reductions in their nuclear arsenals” before other nuclear-weapon states could join the process.³⁴ Nuclear-weapon states outside the NPT are even more reluctant to accept limits on their arsenals.

To make a meaningful contribution to nuclear disarmament, all nuclear-weapon states will have to accept legally binding obligations regarding reductions of their nuclear arsenals. However, the development of an effective multilateral nuclear disarmament agreement will take considerable time. In the meantime, all nuclear-weapon states should be encouraged to undertake a number of transparency measures that would demonstrate their commitment to the goal of nuclear disarmament and help build confidence and trust to help move multilateral disarmament forward. As a first step in that direction, nuclear-weapon states could disclose basic information about their strategic forces.

France and the United Kingdom have already made declarations regarding the size of their nuclear arsenals. As part of its 2010 Strategic Defence and Security Review, the United Kingdom pledged to reduce the number of “operationally available warheads” to no more than 120 and to reduce the “overall nuclear weapon stockpile” to no more than 180.³⁵

32 New START Treaty Resolution of Advice and Consent to Ratification as passed by the Senate on 22 December 2010, Declarations, (7).

33 Nikolay Makarov, Chief of the General Staff, press conference on the New START Treaty, Moscow, 12 April 2010.

34 Statement by Wang Qun, Head of the Chinese Delegation at the General Debate of the First Committee of the 65th Session of United Nations General Assembly, 7 October 2010.

35 *Securing Britain in an Age of Uncertainty: Strategic Defence and Security Review*, 2010, p. 38.

France announced that it reduced its arsenal to fewer than 300 warheads, “half of the maximum number of warheads [it] had during the Cold War”.³⁶ China has not published information about the size of its nuclear arsenal. However, in an official document that was released in April 2004, the Chinese government stated that “[a]mong the nuclear-weapon states, China ... possesses the smallest nuclear arsenal”.³⁷ This statement is consistent with independent estimates that China’s arsenal includes about 180 deployed weapons.³⁸

While these declarations provide a certain degree of transparency of nuclear arsenals, they are not well suited to support multilateral disarmament. Part of the problem is that these reports may use different definitions for warhead categories, which complicates direct comparison of data and may raise questions about their accuracy. Also, since these declarations are not issued on a regular basis, their value as an instrument of transparency and confidence-building is somewhat limited.

To address these problems, states could consider accepting the reporting procedures that were developed for the US–Russian New START Treaty. Specifically, they could regularly release the aggregate numbers of operationally deployed strategic warheads. These declarations would be made on a voluntary basis, but since they would comply with the definitions agreed on in the treaty, they could provide a common framework for reporting on the status of nuclear arsenals. Later, these declarations could be complemented by more detailed reports as specified in the treaty.

In addition to providing information on the status of nuclear arsenals, New START reporting would give all nuclear-weapon states an opportunity to take advantage of the consultation mechanism developed by the treaty to resolve the issues related to interpretation of its provisions. This mechanism could use the experience of the Bilateral Consultative Commission, established by New START.

Once nuclear-weapon states establish the practice of publishing reports on the status of their strategic arsenals, they could join the verification and inspection activities that are conducted by the United States and Russia as part of their New START obligations. This would further increase the value of the transparency measures and prepare conditions for extending the legally binding nuclear disarmament obligations to all nuclear-weapon states. The ultimate goal of this effort will be to build a legal and institutional framework for verifiable and irreversible elimination of all nuclear weapons.

36 Nicolas Sarkozy, President of the French Republic, speech at the presentation of SSBM *Le Terrible*, Cherbourg, 21 March 2008.

37 “Fact Sheet: China: Nuclear Disarmament and Reduction of [Nuclear Weapons]”, Ministry of Foreign Affairs of the People’s Republic of China, 27 April 2004, <www.fmprc.gov.cn/eng/wjb/zzjg/jks/cjjk/2622/t93539.htm>.

38 Hans M. Kristensen and Robert S. Norris, “Chinese nuclear forces, 2011”, *Bulletin of the Atomic Scientists*, vol. 67, no. 6, 2011, pp. 81–87.

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