

START-up - The new Strategic Arms Reduction Treaty

Key Points

- The US and [Russia](#) have concluded a new Strategic Arms Reduction Treaty, reducing the limit for deployed **nuclear** warheads from 2,200 to 1,550.
- Owing to the treaty's new counting rules, the actual arms reductions that [Russia](#) and the US will need to make to comply with the new limits will be quite modest.
- Nevertheless, the new treaty establishes a strong verification and inspection regime that could be the basis of further bilateral disarmament agreements in future.

[Russia](#) and the United States have finalised the conditions for a new round of bilateral **nuclear** arms reduction, which is hoped will lead to further disarmament. *Pavel Podvig* examines the terms of the treaty and its impact on the two **nuclear** powers' strategic forces.

This is shaping up to be a landmark year in **nuclear** non-proliferation and arms control policy. Clearly a high priority on the foreign policy agenda of US President Barack Obama, recent months have borne witness to the release of the US **Nuclear** Posture Review and the US-led international conference on **nuclear** security, both in April, as well as the **Nuclear** Non-Proliferation Review Conference in May. In addition, in early May the United States declared the size of its **nuclear** arsenal (including both active and inactive warheads) to be 5,113 warheads, marking the first time it had ever disclosed a figure.

Contributing to this momentum, the conclusion of a new Strategic Arms Reduction Treaty (START) between the world's two largest **nuclear** weapons states marked a key milestone in **nuclear** disarmament agreements. Signed by Russian President Dmitry Medvedev and US President Obama in Prague on 8 April, the treaty follows on from the arms reduction established under the original 1991 START treaty (which expired in December 2009), and will replace the 2002 Moscow Treaty when it is ratified.

Under the terms of the new treaty, the US and [Russia](#) have committed to about a 30 per cent reduction in deployed **nuclear** warheads (reducing their strategic **nuclear** arsenals to a limit of 1,550 warheads from the 2,200 limit imposed by the Moscow Treaty). The new START treaty will need to be approved by both the Russian Duma and the US Senate, and reductions must be achieved within seven years of the treaty entering into force.

This amounts to only a modest step in the direction of **nuclear** disarmament, especially given that neither side is expected to make significant changes to its current **nuclear** weapons programmes. However, the more significant aspect of the agreement is that it confirms Russian and US commitment to **nuclear** disarmament generally and

creates a legal framework that could support further reductions in future, strengthening the level of accountability and transparency between the two military powers.

US arsenal

A review of existing Russian and US arsenals and their modernisation plans, coupled with the new counting rules introduced under the 2010 START treaty, reveals that actual warhead and delivery system reductions will be quite modest.

[Russia](#) and the US currently have about 2,600 and 2,000 operationally deployed strategic **nuclear** warheads respectively. The US declaration in May listed deployed warheads as numbering 1,968 out of the total arsenal of 5,113 warheads. [Russia](#) has not disclosed similar numbers.

Both countries have preserved the traditional structure of strategic forces, with each element of their **nuclear** triad - land-based intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs) and strategic bombers - constituting a substantial part of the force. Both Russia and the US have made plans for the modernisation of their strategic arsenal, although at this stage only [Russia](#) has new systems - the RS-24 ICBM and the Bulava SLBM - which could be considered in active development.

The land-based component of the US strategic triad consists of 450 Minuteman III ICBMs. Most of these missiles are currently deployed with a single warhead, although some ICBMs carry a multiple independently targeted re-entry vehicle (MIRV) with up to three warheads each. As such, the total number of US **nuclear** warheads deployed on land-based missiles presently amounts to about 550.

The US SLBM force includes 14 Ohio-class submarines, each of which carries 24 Trident II missiles. Two of the 14 submarines are normally in overhaul, so only 288 SLBMs are operational at any given time. Each Trident II missile can be deployed with eight **nuclear** warheads, but they are currently deployed with fewer than four warheads on average, making the total number of operationally deployed US SLBM warheads about 1,100.

The US strategic bomber fleet includes older B-52 bombers that can be equipped with air-launched cruise missiles and B-2 bombers that can carry gravity bombs. Of the total fleet of US bombers, only 44 B-52 and 16 B-2 aircraft are certified for **nuclear** missions, and probably have some 350 **nuclear** warheads assigned to them. Overall, if only operationally deployed delivery systems are counted, the US's 1,968 total strategic warheads are deployed on 798 operational launchers.

As part of its strategic modernisation programme, the US has undertaken a number of life extension programmes that should enable it to keep the Minuteman III missiles in service until at least 2030, when a new ICBM is expected to be ready for deployment. Life-extended variants of the Trident II D5 missile are expected to arm strategic submarines until about 2042, while long-term plans call for the construction of a fleet of 12 ballistic missile submarines of a new class. Preliminary design work is underway and construction of the first new-class submarine is expected to be authorised in 2019. It is also possible that the US will initiate development of a new long-range bomber and air-launched cruise missile (ALCM), although these decisions have not yet been made.

In addition to the modernisation of its fleet of strategic delivery systems, the US pays close attention to the maintenance of its arsenal of **nuclear** warheads. A number of life extension programmes are underway and the US has made plans to maintain a reserve of **nuclear** warheads.

Russian arsenal

In Russia, the Strategic Rocket Forces, which operates land-based ICBMs, remains the key component of the **nuclear** triad. It deploys missiles of four different types, three of which are relatively old and are being withdrawn from active service: 70 RS-18 Mod 2 (NATO designation: SS-19) missiles with six warheads each, 59 RS-20 (SS-18) missiles with 10 warheads, and 171 single-warhead road-mobile Topol (SS-25) missiles. The new Topol-M (SS-27) missile, which has been deployed in the last 10 years, exists in two versions - silo-based and road-mobile. The 68 missiles of this type have so far been deployed with a single warhead. Overall, the Russian Strategic Rocket Forces have an estimated 367 operationally deployed missiles that carry a total of about 1,249 warheads - almost half of all Russia's active strategic arsenal.

The Russian strategic submarine force includes five older Delta III-class submarines that carry an estimated total of 64 R-29R (SS-N-18) SLBMs and 192 warheads. The four operational strategic submarines of the Delta IV class can carry about 64 R-29RM (SS-N-23) missiles and 256 warheads in total (two more submarines of this class are presently in overhaul and are not counted as operational). Overall, Russia's strategic submarines can contribute about 128 SLBMs and 448 warheads to the operational force.

Finally, the Russian strategic triad includes bombers of two types - 63 aircraft of the Tu-95MS type and 13 Tu-160 bombers. The actual number of **nuclear** warheads assigned to these bombers is unknown, but they can carry up to 844 **nuclear** air-launched cruise missiles of the Kh-55 type. Taking this into account, the size of the Russian strategic force can be estimated as 571 launchers carrying about 2,541 warheads.

Russia's strategic modernisation programme is more active than that of the US. This is largely due to the older age of its force, the limited life extension potential of most systems, and the traditional structure of the Russian defence industry, which encourages new development as opposed to life extension. The Russian Strategic Rocket Forces is planning to continue the deployment of the Topol-M ICBM, which is expected to become the primary system of Russia's land-based **nuclear** force, replacing the SS-19 and SS-18 missiles at the end of their service life in 2018-2020. In 2010-2011, [Russia](#) is expected to begin deployment of a MIRV-capable version of the Topol-M missile, known as the RS-24, which is likely to carry three **nuclear** warheads. The combined production rate of the Topol-M and RS-24 is likely to remain at the current level of about 10 missiles per year. [Russia](#) is also considering a plan to develop a new heavy multiple-warhead ICBM, although as of May 2010 no firm decision has yet been made.

In its strategic fleet modernisation programme, [Russia](#) continues to proceed with two projects simultaneously. The first one is an overhaul of the Delta III-class submarines and production of new missiles of the proven R-29RM type. This programme will be completed in or just after 2011, with the submarines expected to remain in service until approximately 2025. The second project is the construction of a series of new Borey-class submarines, which will carry Bulava missiles. The first submarine of this class began sea trials in mid-2009 and three more boats are currently under construction.

The Bulava programme has encountered significant difficulties - only four out of 12 flight tests conducted between 2005 and 2009 were considered successful. Nevertheless, the programme remains active and it appears likely that

the missile will eventually enter into service, although the initial plan to build eight Borey-class submarines by 2015 will almost certainly be reconsidered.

Finally, [Russia](#) has been taking steps to upgrade and extend the service life of its strategic bombers. The overhaul programme currently underway will result in moderate upgrades to both types of bomber aircraft currently in service, the Tu-95MS and the Tu-160. There has also been some discussion about the possible development of a new Russian long-range bomber, but this appears to be an extremely distant prospect.

Estimated nuclear arsenal in 2010: US and Russia		
	United States	Russia
Land-based Warheads	550	1,249
Sea-based Warheads	1,100	448
Strategic Bomber Warheads	350	Up to 844
Total Warheads	2,000	2,541
Note: This figure includes only active warheads, excluding those in storage and active reserve.		

START limitations

The new START treaty signed by the US and [Russia](#) will not lead to any significant changes in the composition of their strategic arsenals or vast alterations in their current modernisation plans.

The central provisions of the treaty, outlined in Article II.1, commit the two parties to limits that must be achieved within seven years of the treaty entering into force. The first limit is of 1,550 **nuclear** warheads each, including all warheads on deployed ICBMs and SLBMs, with each deployed nuclear-ready heavy bomber counting as one warhead. In addition, the treaty restricts state parties to 700 deployed strategic **nuclear** delivery vehicles - ICBMs, SLBMs and nuclear-ready heavy bombers. Finally, 800 deployed and non-deployed launchers and bombers are permitted, including ICBM launchers, SLBM launchers, and nuclear-ready heavy bombers.

For the purposes of the treaty, deployed **nuclear** delivery vehicles are defined as missiles that are installed in or on their launchers, or in the case of bombers, are equipped to carry **nuclear** weapons. When this definition is applied to

current force levels, the US can be said to have 798 deployed missiles and bombers, while [Russia](#) is already under the treaty limit of 700, with only 571.

The limit on the total number of deployed and non-deployed launchers and bombers includes all launchers capable of holding a missile. This means that, for example, empty ICBM silos or submarine launch tubes undergoing overhaul will also count towards the 800 limit. Presently, the US and [Russia](#) each has about 100 empty ICBM silos. The number of submarines currently in overhaul also adds about 48 non-deployed SLBM launchers to the overall count on each side, bringing the total number of missile launchers (deployed and non-deployed) and bombers to about 946 for the US and 714 for [Russia](#). These numbers exclude launchers that have been converted to other uses, such as the four US ballistic missile submarines converted to carry submarine-launched cruise missiles and the B-1B bombers that no longer carry **nuclear** weapons.

In order to bring the total number of its nuclear-capable launchers under the new treaty limit of 800, the US will most likely look to convert existing launchers to non-nuclear missions. Jane's assesses that some additional B-52 bombers and probably two more ballistic missile submarines will be converted by the end of the seven-year period specified in the treaty. In addition, the US will probably eliminate its empty ICBM silos, taking advantage of the simplified elimination procedures under the new treaty. [Russia](#) is already in compliance with this aspect of the treaty's requirements, although it may need to take some steps to ensure that those launchers already deactivated - namely old submarines and empty ICBM silos - have been eliminated in accordance with the treaty's provisions.

New counting rules

The actual reductions in the number of warheads are also expected to be fairly modest. At 1,550, the ceiling on the number of operationally deployed **nuclear** warheads established by the new START treaty is about 30 per cent lower than that of the preceding 2002 Moscow Treaty, which limited each party to 2,200 warheads. However, most of this reduction can already be accounted for through changes in the 'counting rules'.

Under the new treaty, each deployed missile, whether ICBM or SLBM, is counted with the number of **nuclear** warheads that are installed on the missile. However, each bomber is counted as carrying only one warhead, regardless of the actual number of bombs or air-launched cruise missiles deployed on the aircraft. The application of this counting rule immediately removes more than 400 warheads from the US arsenal total and almost 800 warheads from the Russian total. Using this new counting method (in which each bomber counts as one warhead), the US presently has about 1,760 warheads and [Russia](#) has about 1,770. Therefore, in order to bring their **nuclear** forces in line with the new START treaty limit of 1,550 warheads, [Russia](#) and the US will need to remove just over 200 warheads from their operationally deployed forces.

Neither side is expected to have difficulty implementing this reduction in **nuclear** warheads. [Russia](#) is eliminating all MIRV-capable ICBMs currently deployed, so even if it is successful in replacing them with newer multiple-warhead missiles, such as the RS-24, the overall number of Russian warheads is expected to decline. Assuming its modernisation programme proceeds as planned, [Russia](#) is likely to reduce its operationally deployed warheads to about 1,300 (using the new START treaty's counting rules) by 2020.

However, the US will need to take active steps towards reducing its number of deployed **nuclear** warheads, although these should be relatively straightforward. The US has already committed to de-MIRVing its ICBM force (which will reduce its deployed warheads by about 100) and to converting additional B-52 bombers for conventional missions. To

comply with all three treaty limits under the new agreement, the US will probably consider eliminating up to 100 ICBMs and/or converting two more ballistic missile submarines to carry cruise missiles. As of May 2010, the US is yet to commit to an option.

Verification regime

While the numerical reductions required by the new START treaty are fairly modest, the agreement successfully establishes a robust transparency and verification framework that could form the basis of deeper nuclear arms reduction requirements in future. While the verification mechanism under the 2010 START treaty is not as detailed as that of the earlier 1991 START treaty, the new arrangements provide the flexibility that was lacking in the previous regime. In fact, the new verification regime is, in some instances, more accurate and comprehensive than its predecessor.

The key elements of the new verification mechanism are data exchange, notifications, inspections and continuous consultations.

Like the treaty it replaced, the new START agreement requires the US and [Russia](#) to periodically exchange information about their strategic forces. For both forces, this will include information on the number of strategic delivery systems and launchers, their locations and technical characteristics, and the actual number of warheads deployed on missiles. To facilitate verification, all missiles and bombers will be tagged with unique identifiers. This information will be included in the data exchange to provide a more robust verification mechanism.

The new verification mechanism also includes a range of required notifications - including those regarding the elimination or conversion of missiles, launchers, bombers and various facilities, as well as regarding missile transfers. For example, while the START verification regime no longer requires continuous monitoring of production facilities, it does require parties to provide a notification about any new missile leaving the facility at least 48 hours in advance. One significant change from the notification regime that existed under the 1991 START treaty is that neither country has to provide notifications for the regular patrol movements of its mobile missiles.

The inspection regime under the new verification measures has also been simplified and strengthened. The new START treaty provides for two kinds of inspections, namely those conducted at ICBM, SLBM and bomber bases to confirm the accuracy of information on operationally deployed delivery vehicles and those conducted at facilities that may contain non-deployed launchers and missiles.

In general, the new agreement will enable the US and [Russia](#) to verify the information received during data exchanges and confirm the elimination or conversion of various systems and facilities. In addition, provisions are made for the two parties to use their national technical means to verify compliance with the treaty. Crucially, these verification and transparency mechanisms could potentially support much deeper strategic arms reductions, as their procedures could be applied to situations in which the number of actually deployed nuclear warheads is very small.

Among the transparency procedures that caused some controversy during negotiations in 2009 and 2010, and may raise some questions during the process of ratification, is the exchange of telemetric information during missile flight tests. On this point, Russian and US interests diverge, primarily because only [Russia](#) has an active missile development programme. Accordingly, [Russia](#) objected to introducing transparency measures into the missile testing process. However, ultimately an agreement was reached whereby the two parties will provide telemetric information

from no more than five test launches annually. The list of launches for which telemetry will be provided is to be discussed in the Bilateral Consultative Commission. While this provision may appear to be a step back from the telemetry exchange agreed to under the early START framework, in practice the former procedures allowed the US and [Russia](#) to conduct up to 11 tests per year without sharing telemetric information. The new consultation mechanism established under the 2010 START treaty is expected to bring greater openness to the process.

Tactical nuclear weapons

Continuing in the broad tradition of arms control established during the Cold War, the new START treaty directly addresses only a narrow set of issues related to strategic offensive weapons. This, on the one hand, made the agreement easier to achieve, but at the same time, raised legitimate questions about whether the Cold War arms control framework is an adequate means of addressing new security challenges. Among the issues excluded from the scope of the new treaty are tactical nuclear weapons, the growing role of conventional weapons capabilities, missile defence, the irreversibility of reductions, the arsenals of other nuclear weapons states and nuclear proliferation.

At the levels specified in the new agreement, tactical nuclear weapons became extremely difficult to ignore. The US has approximately 500 tactical nuclear warheads in its arsenal, about 200 of which are deployed in Europe. The Russian arsenal of tactical nuclear weapons is probably even larger, with approximately 2,000 weapons associated with various non-strategic delivery systems. At the beginning of the new START negotiating process, it was often assumed that the achieved agreement would be quickly followed by a second treaty that would take all nuclear warheads, tactical as well as strategic, into account. While this option remains possible in theory, the 2010 START negotiations showed that achieving a comprehensive agreement along these lines would likely prove a difficult task.

At the same time, developments in [Russia](#) and the US indicate that a different approach might be possible. Shortly before the conclusion of the recent START negotiations, both countries completed a review of their nuclear policies - [Russia](#) adopted a new military doctrine in February and the US completed the Nuclear Posture Review (NPR) process in April.

Although neither document disavowed tactical nuclear weapons, they both strongly indicate that tactical nuclear weapons are no longer seen to have any significant military value. While Russia usually maintains that it needs its tactical nuclear arsenal to compensate for the relative weakness of its conventional forces, the new doctrine does not outline a plausible role for tactical nuclear weapons. The pattern of deployment of these weapons also reflects the legacy of the Cold War more than any considerations of their military utility. Most of the warheads have already been consolidated at storage facilities and are not routinely deployed with their delivery systems.

Similarly, the US NPR concluded that the primary mission of its tactical weapons is to provide political assurances to allies. While the NPR did not make any specific recommendation about removing US tactical weapons from Europe, deferring instead to the NATO decision-making process, it recommended eliminating nuclear-capable, sea-launched cruise missiles, which were once considered a vital element of Washington's extended deterrence strategy. At the same time, a number of NATO countries - such as [Belgium](#), Luxembourg, [Germany](#), [Norway](#) and the [Netherlands](#) - have expressed an interest in achieving an agreement with [Russia](#) that would include the withdrawal of US weapons from Europe in exchange for further consolidation of weapons in [Russia](#). The positive momentum created by the new START treaty may help to create an environment in which such an agreement is possible.

Missile defence

Another contentious issue that the new START treaty may help to resolve is the placement of US missile defence systems in Eastern Europe. [Russia](#) has been extremely vocal in its opposition to US missile defence plans, and insisted on including a clause about the relationship between strategic offensive and defensive arms in the treaty preamble, noting that "this inter-relationship will become more important as strategic **nuclear** arms are reduced". In addition, [Russia](#) made a statement in which it expressed its intent to withdraw from the new START treaty should US missile defences pose a serious threat to its strategic forces.

While Russia's position at first appears to undermine the new agreement, it may in fact play a positive role. By allowing [Russia](#) to formalise its opposition to current US missile defence plans, the new START treaty may ultimately help to depoliticise the issue and make [Russia](#) more amenable to a dialogue on missile threats and ways to counter them. Both Russia and the US expressed their interest in working together in this area and there are reasons to believe that this dialogue may prove productive.

The new START treaty also demonstrated the value of a formal negotiating process in other areas. Through the process of negotiations, the US and [Russia](#) found a way to address a set of problems related to the irreversibility of reductions and the growing role of conventional forces. The limits on non-deployed launchers and transparency of conversion procedures will naturally limit the ability of the US to quickly reconstitute its forces (known as the 'upload potential' problem) and should provide a greater degree of predictability with regards to those forces capable of conventional global strike missions. Although the new treaty does not limit this kind of capability, the agreed transparency provisions appear to have alleviated the concerns [Russia](#) held about them.

Other nuclear weapon states

Once achieved, the levels of launchers and warheads specified in the new START would still leave the US and [Russia](#) as the two largest **nuclear** powers, with arsenals vastly larger than those of other **nuclear** weapons states. [France](#) has declared that its total number of **nuclear** warheads, both deployed and in reserve, is fewer than 300. China's **nuclear** force is believed to include fewer than 180 warheads. The UK has fewer than 160 warheads, of which only about 18 are operationally deployed at any given time. Each of the non-NPT **nuclear** weapon states - [Israel](#) (undeclared), [India](#) and [Pakistan](#) - is estimated to have fewer than 100 warheads. Finally, [North Korea](#) probably has fissile material for a few **nuclear** warheads, although it is unclear whether it has deliverable weapons.

It is usually assumed that the smaller **nuclear** weapon states will not consider joining the **nuclear** disarmament process unless [Russia](#) and the US reduce their arsenals to the level of 1,000 warheads or even fewer. However, at some point the lack of constraints on the smaller arsenals would probably complicate the US-Russian disarmament effort, if it has not done so already. While the [UK](#) and [France](#) have in essence ruled out increasing their arsenals, [China](#) has been carrying out an active strategic modernisation programme that could potentially lead to an expansion of its **nuclear** force.

Most of China's **nuclear** warheads are deployed on its medium and intercontinental range ballistic missiles. It has a total of about 120 missiles, of which only 20 older DF-5A and fewer than 10 newer DF-31A have intercontinental range. About 50 warheads are believed to be assigned to China's bomber force. In addition, [China](#) has built a small fleet of strategic submarines, although none of them has been deployed with ballistic missiles. Three submarines

have been identified so far. One of them, an older Xia-class, has never been fully operational, while the two recently constructed others, of the Jin class with 12 launch tubes each, appear to be in preparation for deployment.

China's strategic modernisation programme appears to concentrate on deployment of the new solid-propellant missiles - the intercontinental DF-31A and its medium-range counterpart DF-31 - and the Jin-class submarines with solid-propellant missiles. The scale of this development is difficult to estimate. The US projects that [China](#) could build up to five ballistic missile submarines, but it is unclear whether there is an actual plan to do so. None of the new missiles appear to carry multiple warheads, even though [China](#) is most likely to employ this capability. In addition to the obvious difficulties of developing and deploying new strategic systems, [China](#) is constrained by the limited amount of fissile materials available for its weapons programme, as unless it restarts its plutonium production programme, [China](#) does not appear to have the material for more than about 500-1,000 warheads.

Overall, it is unlikely that [China](#) would be able to reach the level of [Russia](#) and the US even if it accelerates its modernisation programme. At the same time, the uncertainty about China's plans would be more difficult to ignore at the next stages of **nuclear** disarmament negotiations. This means that [Russia](#) and the US could consider developing a mechanism that would allow them to include [China](#) as well as [France](#) and the [UK](#), and potentially other states, into the disarmament process. One way of doing so would be to encourage these countries to voluntarily and gradually join the transparency and verification mechanism of the new START treaty.

CONCLUSION

Despite the limited actual reductions required under the agreement, the treaty's new verification regime creates the conditions for transparency and openness necessary for further disarmament between the **nuclear** powers.

While the treaty itself does not guarantee that the US and [Russia](#) will be able to move beyond this new stage of **nuclear** reductions, it may prove monumental in terms of the groundwork laid, as further reductions in future would most likely take advantage of the strong legal and institutional framework it establishes.

The conclusion of the new START agreement just weeks ahead of the Non-Proliferation Treaty Review Conference signals US and Russian dedication to fulfilling their NPT obligation to work towards **nuclear** disarmament, placing both countries in a strong position to encourage the containment of Iranian and North Korean **nuclear** ambitions.

Should the two powers continue down the path of further arms reductions, future negotiations in the medium term will need to tackle issues of undeployed and tactical **nuclear** warheads, while long-term consideration is likely to be given to including other **nuclear** weapons states in the negotiations.