Center for Security Studies

STRATEGIC TRENDS 2016

Key Developments in Global Affairs

Editors: Oliver Thränert, Martin Zapfe

Series Editor: Andreas Wenger

Authors: Severin Fischer, Daniel Keohane, Prem Mahadevan, Oliver Thränert, Lisa Watanabe

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STRATEGIC TRENDS 2016 is also electronically available at:
www.css.ethz.ch/publications/strategic-trends

Editors STRATEGIC TRENDS 2016: Oliver Thränert, Martin Zapfe

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Contact:
Center for Security Studies
ETH Zurich
Haldeneggsteig 4, IFW
CH-8092 Zurich
Switzerland

ISSN 1664-0667
ISBN 978-3-905696-53-0

CHAPTER 4

A Nuclear World Out of (Arms) Control

Oliver Thränert

The relevance of nuclear weapons in world affairs is increasing, not decreasing. All nuclear powers modernize their arsenals. This may result in destabilizing effects on nuclear deterrence constellations. At the same time, the discrepancy between the importance of arms control as a necessary supplement to nuclear deterrence on the one hand and its actual, limited role in international affairs on the other hand is constantly growing. In order to avoid future nuclear wars and to create strategic stability, a renaissance of arms control is urgently needed.

A man takes a selfie in front of a shell which is the replica of the biggest detonated Soviet nuclear bomb AN-602 (Tsar-Bomb), in Moscow, Russia, 31 August 2015. The shell is part of an exhibition organized by the state nuclear corporation Rosatom.

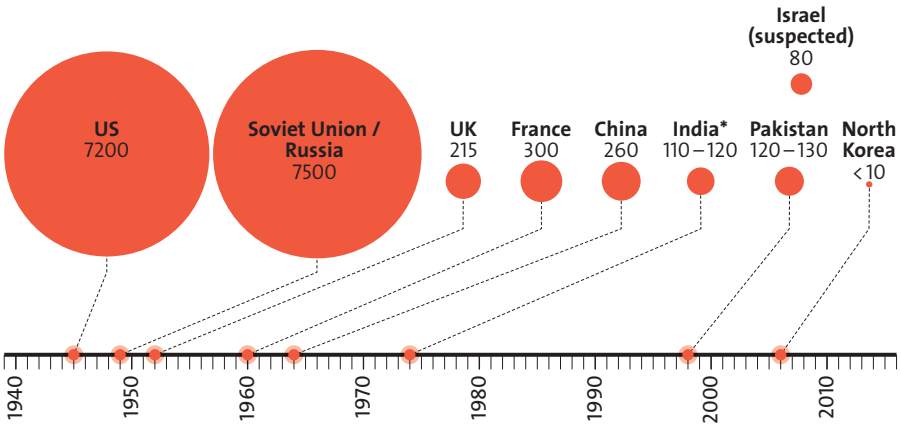
At this juncture, more than 16,000 nuclear weapons exist, owned by nine countries. Depending on their detonation yield and the circumstances of their use, every single one of these weapons could kill hundreds, if not thousands of people – not to mention the long-term effects such as radioactive contamination. In order to avoid such a disaster, and because nuclear deterrence does not generate stability by itself, a renaissance of the currently almost entirely neglected concept of nuclear arms control is urgently needed. However, other than during the Cold War, more nuclear powers than just the US and Russia have to engage.

There are many reasons to believe that the use of nuclear weapons is becoming more likely, not less. First of all, conflicts involving nuclear powers persist or are even escalating. Examples include the relationship between the West and Russia; the nuclear triangle of China, India, and Pakistan; and the Middle East. Secondly, the proliferation of certain capabilities that had been the exclusive preserve of the US (as well as France and the UK) and the Soviet Union or Russia will have quite a destabilizing effect on nuclear deterrence constellations for a long time. Among these capabilities are multiple warhead technology, sea-based nuclear deterrence components, and missile defense.

Already at the beginning of the nuclear age, arms control was developed with a view to mitigate nuclear risks and to avoid nuclear war. The point of departure of this new and innovative concept was the perception that in the atomic age, it is no longer sufficient to pursue national security unilaterally. Instead, in order to avoid mutual destruction, notwithstanding existing political conflicts, the security interests of other states must always be taken into account. The fathers of nuclear arms control, such as Thomas Schelling, argued that not only might political conflicts result in wars but the nuclear arms themselves might become a cause of war. Therefore, nuclear stability would include, among other things, secured nuclear second strike capabilities, as well as safe and secure command and control systems and crisis communication options. In a crisis, nuclear powers should not be pressured to use their nuclear weapons first.

Nuclear disarmament may be helpful, but cannot be seen as an end in itself. As is consensus among arms control experts, complete nuclear disarmament, as increasingly demanded by a growing number of states and non-governmental organizations, would only be acceptable if it served the overall purpose of strategic stability. As arms control proponents such

First nuclear tests and estimated total size of nuclear arsenal in 2015



* Test in 1974 declared a peaceful nuclear explosion; first official nuclear weapons test in 1998

Source: Federation of American Scientists

as Jerome B. Wiesner, member of the John F. Kennedy administration, argued, a comprehensive and reliable inspection system would be needed to make sure that clandestine nuclear rearmament will not occur. Alternatively, a 'world government' would have control over a remaining number of nuclear weapons to deter any illegal nuclear programs. As long as these requirements are not met, arms control concentrates on the less ambitious yet essential aim of avoiding nuclear war.

However, during the Cold War, nuclear arms control had only limited success. After the fortunate resolution of the Cuban Missile Crisis in 1962, crisis management and crisis communications systems were established. There is much to suggest that the Nuclear Nonproliferation Treaty (NPT), which entered into force in 1970, helped to keep the number of nuclear weapons states relatively small. Moreover, the nuclear dynamic was confined by imposing limitations on heavy intercontinental nuclear missiles and on the number of multiple independently targetable re-entry vehicles (MIRVs) carried by these weapons systems. This has improved stability during crises, because missiles with multiple warheads constitute rewarding targets for a nuclear first strike. The Anti-Ballistic Missile (ABM) Treaty of 1972 has helped prevent an arms race for defensive systems. Toward the end of the Cold War, the Intermediate-Range Nuclear

Forces (INF) Treaty even went so far as to ban the entire weapons category of intermediate-range nuclear missiles of the US and the Soviet Union. When the Soviet Union fell apart in 1991, arms control agreements were available to facilitate the handover of all nuclear weapons based on the territories of the former Soviet republics of Ukraine, Belarus, and Kazakhstan to Russia. Finally, joint verification of agreements helped to achieve a certain degree of transparency. The most important factor, however, may have been the continuous dialog about nuclear weapons, which promoted mutual trust and better insight into the other side's way of thinking on nuclear matters. Even though we cannot ultimately judge why nuclear war between East and West did not occur, there is much to suggest that arms control was at least partly responsible for this fortunate outcome.

Today, the culture of jointly managing the dangers of the nuclear age has become a thing of the past. Not only are Russians and Americans no longer negotiating on their nuclear weapons; they are accusing each other of having violated the INF Treaty. Apart from the INF Treaty, the 'New START' Treaty on limiting Russian and US strategic nuclear weapons, which came into force in 2011, is the only agreement to stipulate limitations concerning the respective nuclear arsenals. The treaty expires in 2021, although it can be extended once for five years. A new treaty could replace the New START agreement, but no negotiations are being held to that end, nor is it possible to anticipate whether, and if, US and Russian negotiators will meet again.

Nuclear weapons did not lose relevance for most of those countries that possess them. Only for Washington did nuclear weapons become less and less important. With the US far superior to all other contenders at the conventional level, Washington's policies have for many years sought to reduce the salience of nuclear weapons for its own deterrence strategy. Hence the US interest in nuclear arms control and nuclear reductions, as pointed out by President Barack Obama in his April 2009 Prague speech on a Global Zero for nuclear weapons.

For Russia, the salience of nuclear weapons is growing both politically and militarily. Moscow is therefore not interested in putting them on the negotiating table. But even if Washington and Moscow were to make a common arms control effort, this would hardly suffice. While both countries together still hold around 90 percent of the global nuclear arsenal, their conflict no longer dominates world affairs as it did during the Cold War.

However, nuclear powers with smaller nuclear arsenals, including France and Great Britain, still demand that Washington and Moscow take the lead when it comes to nuclear arms control. Moreover, other nuclear armed states have additional reasons for abstaining from nuclear arms control.

China is afraid of improved transparency that comes with nuclear arms control. In Beijing's view, this might threaten the survival of its relatively small nuclear force. India wishes to be recognized as a responsible nuclear actor, but will not agree to any nuclear restrictions as long as its nuclear neighbor China does not. Pakistan is not interested in arms control as long as New Delhi makes no efforts to do so. Israel regards its undeclared nuclear arsenal as a life insurance in a hostile environment. If at all, it would only negotiate on its nuclear weapons in the context of comprehensive talks about security in the Middle East. North Korea, for its part, would certainly love to be recognized as a nuclear actor in the context of arms control, but that is precisely what all the other nuclear powers are determined to deny Pyongyang.

While nuclear arms control is practically dead, there is an increasing danger of conflicts between nuclear armed states escalating past the nuclear threshold. In other words, the discrepancy between the importance of arms control as a necessary supplement to nuclear deterrence on the one hand and its actual limited role in international affairs on the other hand is constantly growing. This trend will be illustrated in the following sections using the examples of relations between the US/NATO and Russia; the nuclear situation in Asia; and nuclear developments in the Middle East.

The US and Russia: No longer nuclear friends

Even after the end of the Cold War, the US and Russia continued to develop nuclear planning and doctrine based on the concept of an assumed standoff situation. Launch-on-warning concepts were maintained. Both sides still base their nuclear doctrines on nuclear first use. Russia is apparently pursuing this course due to the conventional superiority of the West, but possibly also in order to be able to use nuclear weapons preemptively. Despite his Global Zero rhetoric concerning nuclear weapons, US President Barack Obama has not ruled out the first use of nuclear weapons. Apparently, the Obama administration, after talking to allies, arrived at the conclusion that a 'no first use' strategy would weaken the credibility of extended nuclear deterrence, in particular in the eyes of the US' Asian

partners. In its absence, they might one day be encouraged to seek to safeguard their national security with a nuclear deterrent capability of their own.

At the same time, Russia and the US have been neglecting arms control. Effective from June 2002, then-US President George W. Bush even went so far as to abrogate the ABM Treaty. This move signaled that the US perceived new threats such as missile and WMD programs in countries like North Korea or Iran as taking precedence over arms control with Russia. Or, as former US Defense Secretary Donald Rumsfeld put it: "Arms control is not for friends".

Apparently, the US and Russia are no longer friends now. At least since Russia's annexation of Crimea and its military interference in eastern Ukraine, if not before, US relations with Russia may once more be described as confrontational. This has also made the issue of their nuclear weapons virulent again. On various occasions, Russia's President Vladimir Putin has noted that no country dares challenge Russia to a major conflict because it is one of the greatest nuclear powers on earth. Russia has stepped up nuclear exercises and repeatedly practiced the use of its nuclear weapons, including against major Western cities, as part of its military maneuvers. These maneuvers have created the impression that Moscow is increasingly integrating its conventional and nuclear warfare options. Moreover, President Putin has stated that he was willing to place Russia's nuclear forces on alert if the annexation of Crimea had met with strong resistance.

The US and Russia are in the process of comprehensive modernizations of their respective nuclear forces. Plans to this effect are fraught with political, technical, and financial uncertainty on both sides. Nevertheless, these modernizations could have a destabilizing effect at the strategic level. Russia is equipping its new generation of land-based strategic intercontinental missiles (ICBM) with multiple warheads, which will enhance their value as targets. Conversely, US nuclear weapons will be more accurate in the future while having lower detonation yields, aggravating the destabilizing effect even further.

What is most worrying, however, is the increasing importance that Moscow apparently attributes to tactical nuclear weapons on land, at sea, and in the air. Moscow possesses considerably more tactical nuclear weapons than NATO and wishes to keep it that way, thus balancing NATO's conventional superiority while also building a deterrent against China's growing

conventional capabilities. Moreover, Western analysts fear that Moscow sees its tactical nuclear weapons as having more than just a deterrent role. In any case, high-ranking officials at the Russian Defense Ministry appear to have considered preventive nuclear strikes as an element of Russian nuclear doctrine. Despite Western concerns, however, these deliberations were not included in the Russian military doctrine published in December 2014, which is fairly moderate. It anticipates Russian use of nuclear weapons in two cases: if nuclear weapons or other weapons of mass destruction are used against Russia or its allies; or if conventional weapons are used against Russia to an extent that threatens the country's very existence. However, in Western circles there are doubts whether the unofficial part of the Russian military doctrine might not include preemptive nuclear strikes after all.

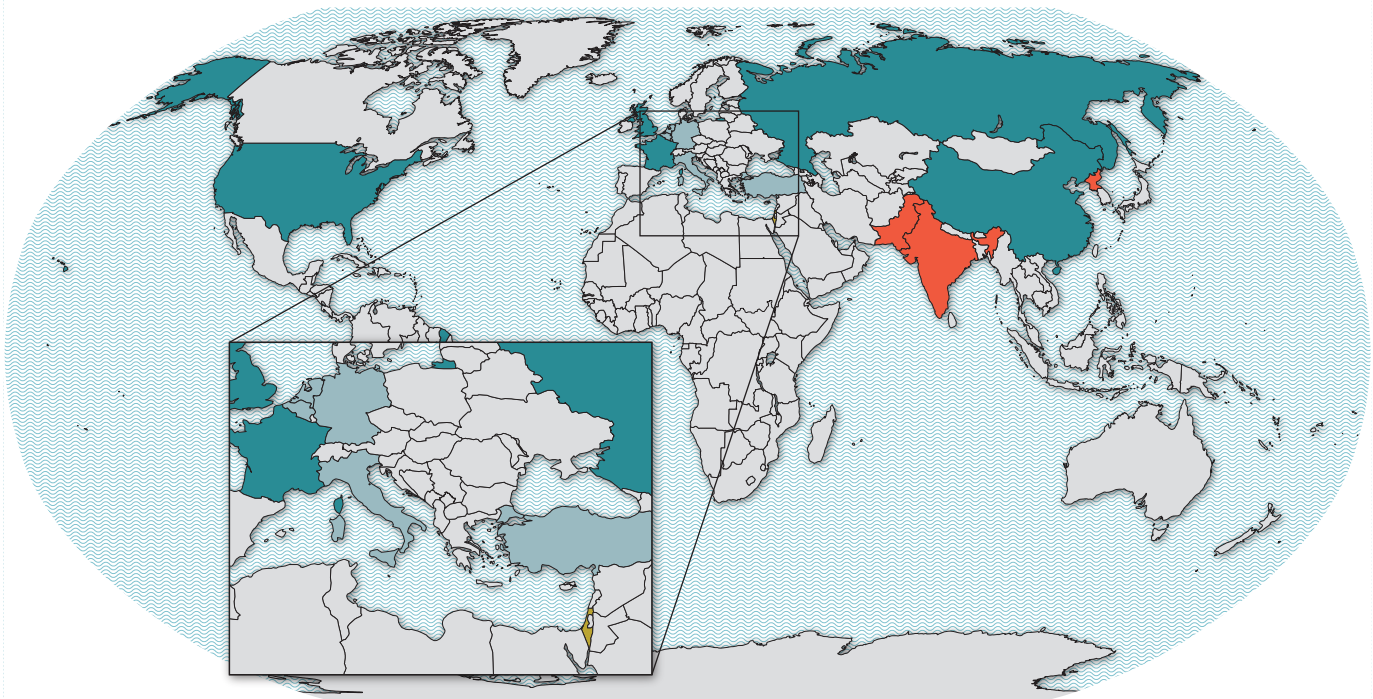
Indeed, observers in the West fear that Russian nuclear weapons could be used in the course of military interventions. They refer to internal Russian debates over "de-escalation through escalation". One scenario is of particular concern to Western military planners: The Russian military, possibly after a period of hybrid warfare, could occupy parts of Estonia or Latvia using conventional means on the pretext of protecting Russian-speaking minorities there. In such a case, NATO would have to mobilize conventional forces and deploy them in the east in order to prevent further Russian expansion and, in the best-case scenario, reverse potential Russian gains in the Baltic. In such a situation, however, Moscow might threaten the use of tactical nuclear arms to defend its newly annexed territory and thereby deter the deployment of NATO reinforcements. In other words: The threat of nuclear first use might become part of Russian anti-access/area denial strategies. Should this scenario indeed ever materialize, it would mean the end of NATO's *raison d'être*, as its members would have proven themselves incapable of countering an attack on the Alliance's territory.

This may seem as worst-case thinking, as Moscow would be risking escalation to the level of full-blown war with NATO. Some Western analysts speculate, however, that Russian plans are based on the assumption that NATO would be unwilling to resort to nuclear war with Russia over the defense of the Baltic.

The recent developments concerning the Russian nuclear arsenal have triggered an intense debate at NATO over the Alliance's own nuclear capabilities in Europe. The service life of the US B-61 nuclear bombs

Nuclear weapons in the world

As of 2015



Nuclear armed states under the NPT
Nuclear armed states outside of the NPT
States currently hosting US nuclear weapons
Suspected nuclear armed states

Source: International Law and Policy Institute

stationed in Europe is already being extended. However, critics argue that these life extending programs would also improve the accuracy of the B-61, thereby making their use more likely. In any event, the number of US nuclear warheads stored in Europe will probably not be increased above the current number of about 180. They can be delivered by US warplanes stationed in Europe or by aircraft of the European alliance members Germany, the Netherlands, Belgium and Italy as part of NATO's nuclear sharing arrangement. Further, US nuclear weapons are stockpiled on a base in Turkey.

US nuclear forces stationed in Europe mainly served a political purpose after the end of the Cold War: to link the security of Europe to the US strategic nuclear forces and to strengthen the credibility of NATO's nuclear deterrence. From a purely military perspective, they appear ill-suited for actual use in a conflict with Russia. The aircraft designated for delivering these weapons require a fairly long mobilization period and would be vulnerable to Russia's air defense, increasingly even over NATO territory. Besides, NATO is numerically inferior to Russia when it comes to tactical nuclear weapons. In an actual emergency, therefore, the Alliance would be forced to escalate to the strategic level at a fairly early stage; such a threat is difficult to convey credibly though in view of the devastation that would certainly follow.

Accordingly, NATO has initiated a debate on adjusting its nuclear posture. That, however, requires unity among all alliance partners. Reassurance of NATO members, particularly new ones, and escalation control *vis-à-vis* Russia need to be balanced. The latter refers to the NATO-Russia Founding Act, in which the Alliance stated that it had no intention of stationing nuclear weapons on the territory of its new members and saw no need to change its nuclear doctrine. Should NATO renege on the principles of the Founding Act, Europe could face a new nuclear arms race that could result in dangerous instability. Therefore, NATO is well advised to concentrate on measures that do not include changes in its nuclear deployment modes, such as stronger language on the importance of nuclear deterrence for its overall military posture and increased nuclear sharing exercises.

The expansion of NATO's planned missile defense system also risks setting off instability. So far, the Alliance has argued that its missile defense program is not geared towards Russia but aims to ward off threats resulting from the proliferation of missile technology and weapons of mass

destruction. Indeed, Russia's nuclear weapons arsenal is so large that effective defense is hardly feasible. However, NATO may in the future conceive missile defense capabilities for limited regional conflicts with Russia. The aim would be for the Alliance to counter any Russian threat of limited tactical nuclear weapons use, for instance in a conflict over the Baltic, with damage limitation options of its own. This, in turn, might be an incentive for Moscow to enlarge its own tactical nuclear weapons arsenal in an effort to overcome NATO's missile defense capabilities in the region.

Asia: A dangerous dynamic

In addition to the return of nuclear weapons on the US/NATO and Russia agenda, these weapons see a growing importance in Asia. The nuclear powers China, India and Pakistan as well as the 'special case' North Korea all modernize and expand their arsenals. The result might be a growing and dangerous instability.

China

China, as the most influential Asian power, has long practiced nuclear restraint. However, its nuclear policy now becomes more dynamic. While China continues to forgo nuclear first use (a stance that is disputed internally) and aims to secure a survivable nuclear second-strike capability, the country will continue to develop its nuclear weapons arsenal in terms of both quantity and quality, with potentially destabilizing consequences.

Against the background of its economic and political ascent, it makes sense for China to develop its military capabilities in general and its nuclear weapons in particular, which are seen in many parts as the international currency of power. Much more important, though, are China's threat perceptions. Specifically, Beijing is concerned that the US could undermine China's nuclear second-strike capability – on the one hand by extending missile defense capabilities, though these may currently be directed mainly against North Korea; on the other hand through the development of Conventional Prompt Global Strike (CPGS) capacities. Moreover, Beijing views the US-Indian rapprochement with concern, which may bring advantages for New Delhi not only in the civilian nuclear sphere but also with regard to its nuclear arms program.

According to various estimates, China currently possesses about 240 to 260 nuclear warheads. These are stored separately from their delivery systems; most likely, most of them are not assembled and ready for use. This underscores the hitherto extremely reactive nature of Chinese nuclear

doctrine. China maintains roughly 60 ICBMs that can reach the US directly. Only a few of them are designed for use with multiple warheads. Beijing also has a growing number of shorter-range missiles that are largely equipped with conventional warheads. In a crisis situation, this mix of nuclear and conventional capabilities might lead to misjudgments on the part of the opponent and to unintentional escalation.

Currently, the arsenal of land-based missiles is being modernized: Older, mostly silo-based missiles using liquid propellant are being replaced with newer, road-mobile systems using solid propellant. These can be made combat-ready faster, and are more accurate. The switch from silo-based liquid-propellant missiles to road-mobile solid-propellant rockets is intended to strengthen the survivability of the Chinese nuclear forces. At the same time, these systems will be operational at all times without elaborate fuelling. Furthermore, long-range missiles currently under development are expected to be designed for use with multiple warheads. The increased emphasis on MIRV technology strengthens China's second-strike capability, since any attacker would risk incurring severe destruction even if only a few Chinese missiles were to survive a hostile first strike. However, missiles with multiple warheads constitute extremely valuable targets for the aggressor in a crisis since one of his own warheads can take out multiple enemy ones, which may result in crisis instability. Furthermore, China is in the process of testing a high-speed hypersonic glide vehicle. Such a system improves maneuverability and would be far less vulnerable to missile defenses than existing missiles. Again, Beijing seems to be conducting this program in an effort to secure its nuclear second-strike capability *vis-à-vis* the US. However, this contributes to a classical security dilemma: From the point of view of Washington as well as China's neighbor India, Chinese hypersonic glide vehicles could have a destabilizing effect as they are hard to detect.

China is also making considerable progress in building up a sea-based nuclear deterrent. At the end of 2015, China for the first time deployed a nuclear-powered submarine equipped with ballistic missiles on a nuclear deterrence patrol. The development of a submarine-based nuclear component also improves the survivability of Chinese nuclear weapons. However, that implies a departure from the previous policy of stockpiling missiles and non-assembled warheads separately. It is conceivable that as a result, decisions on the use of nuclear weapons will be pre-delegated to submarine

commanders, especially since China will hardly wish to rely entirely on the reliability of communication links between command centers and submarines in times of crisis. Furthermore, Beijing is currently establishing a comprehensive early-warning system. While this also strengthens the survivability of its nuclear weapons, it only makes sense if China's own nuclear weapons can be launched immediately upon receiving an attack warning (launch on warning).

Taken together, China is on track towards acquiring a more robust nuclear second-strike capability in a changing environment. At the same time, however, the modernization efforts will lead to China distancing itself from its established practice of maintaining a highly reactive nuclear deterrent force. Some experts even believe that the importance of nuclear warfighting options is increasing for China's planners.

India

Similarly to China, India too is pursuing a policy of minimum nuclear deterrence and has renounced the first use of nuclear weapons, although it reserves the right to use nuclear weapons in response to an attack using biological or chemical weapons. Moreover, in case of conflict with its archrival Pakistan, the Indian military apparently plans to carry out conventional attacks against its neighbor's nuclear weapons arsenal at an early stage of conflict. Currently, India possesses about 100 nuclear warheads. Most of these are presumably stored in a non-assembled state. Nuclear warfighting strategies are not part of India's strategic repertoire, but regarding India's growing importance in the world, the country's political elites have committed themselves to building up a complete triad of land-based, sea-based, and air-based nuclear weapons. An important factor is the maintenance of status *vis-à-vis* neighboring China. Also, India is pushing for further development of its nuclear weapons in order to enhance its deterrent capability, which currently rests mainly on nuclear-capable aircraft, in view of the numerically and qualitatively superior forces of China. In doing so, however, New Delhi increasingly finds itself trapped in a conflict of aims: A capability that is credible with a view to China is not minimal with regard to Pakistan, and a minimal deterrent against Pakistan is not credible towards China. Moreover, should India be subjected to renewed provocations such as terrorist attacks supported, or at least endorsed, by Pakistan, it reserves the right to deliver conventional strikes against its neighbor, which could cause Pakistan to escalate to the nuclear level, particularly if forward based Pakistani nuclear weapons were

in danger of being captured by invading Indian forces. In such a case, under India's nuclear doctrine, which does not currently involve flexible nuclear options, the country would either have to deliver a massive nuclear response or do nothing – an approach that would clearly lack credibility.

India is working intensely on the development of new land-based missiles including the Agni V, which could hit targets anywhere in China. It is also working on building a submarine-based nuclear component. MIRV technology is part of India's efforts, but will most likely require some time to acquire. China's ongoing development of missile defense programs, which are most likely intended for use against India (however, this has yet to be decided by China), would add further fuel to India's efforts at expanding its nuclear capabilities. This, in turn, would motivate Pakistan to increase its nuclear arsenal.

Pakistan

Although Pakistan at least in rhetoric follows a minimum nuclear deterrence posture, its nuclear arsenal (currently standing at about 100 warheads, most of which are probably not in a state of immediate readiness for use) is currently the fastest-growing among all nuclear armed states. It is estimated that Islamabad can produce about 20 nuclear warheads a year. It also reserves the right to first use of nuclear weapons, for instance in the case of an Indian conventional attack. The country's growing nuclearization is a problem in light of Pakistan's questionable internal stability. Currently, the Pakistani military appears to be in full control of its nuclear weapons. It is impossible to predict, though, what would happen to this arsenal if the country were to disintegrate.

Pakistan finds itself in a race with its archrival India for the modernization of nuclear delivery systems. This could destabilize relations between the two countries. Indian missile defense systems that are currently under development could also contribute to a destabilization of India-Pakistan relations. A matter of particular concern in terms of stability is Pakistan's increasing attention to matters of nuclear warfighting and the heightened importance it attributes to tactical nuclear weapons as a way of offsetting India's growing superiority in conventional arms. In a crisis, this might lead to local commanders receiving pre-delegation authority, which may in turn result in crisis instability.

North Korea

North Korea is another uncertainty factor in the nuclear picture. Presumably, the country is able to assemble

Selected nuclear capabilities

As of 2015

	Triad				
	Sea	Land	Air	Road/Rail-mobile launchers	MIRV
US	●	●	●		●
Russia	●	●	●	●	●
United Kingdom	●				●
France	●		●		●
PR China	○	●	●	●	◐
India	◐	●	●	◐	◐
Pakistan	◐	●	●	◐	◐
Israel	○	○	○		
North Korea		●		◐	

● Capability
○ Suspected capability
◐ Pursuing capability

Sources: Bulletin of the Atomic Scientists; Federation of American Scientists; Science, Technology & Security Forum; CNN; BBC

simple nuclear devices. Experts are uncertain whether it is also capable of placing these on ballistic missiles. In any event, as was underscored by North Korea's recent nuclear test of January 2016, irrespective of whether the device qualified as a hydrogen bomb or not, the country pursues to enhance its nuclear capabilities. Pyongyang apparently has sufficient weapons-grade plutonium for six to eight nuclear weapons. In addition, it seems that North Korea has resumed its plutonium production and is also able to enrich uranium for weapons purposes. The operational readiness of its long-range missiles is unclear; however, its Nodong missiles, which are probably operational and have a range of over 1,000 kilometers, are sufficient to frighten North Korea's neighbors such as South Korea and Japan. Due to Pyongyang's recurrent policy of brinkmanship, calls for nuclear weapons of their own for deterrence are increasingly heard in those countries. From a purely technical point of view, both Japan and South Korea would be able to acquire such weapons within a relatively short timeframe, thanks to their highly advanced civilian nuclear infrastructure.

Complicated Entanglements

In addition to the nuclear 'wild card' North Korea, the overall nuclear

dynamic in Asia has considerable explosive potential of its own. China and India appear to be discarding their long-standing nuclear self-restraint. China is doing so chiefly in response to US policies concerning missile defenses and CPGS. Beijing is also concerned over the rapprochement between India and the US. India for its part has yet to create a credible nuclear deterrent *vis-à-vis* China. Its efforts in this area are forcing Pakistan's hand. Supported by China, Pakistan has embarked on a massive nuclear arms buildup, not least because of India's growing conventional superiority. This situation is aggravated by the regional proliferation of precision weapons that, even if only equipped with conventional warheads, could facilitate the destruction of hostile command-and-control centers, potentially creating pressure to engage in preemptive nuclear strikes.

Naturally, the danger of nuclear conflicts depends on political relations among the countries involved. In view of the territorial conflicts that are coming to a head in the South China Sea between China on the one hand and US allies such as Japan on the other, the US-Chinese relationship increasingly seems to be on a course towards confrontation, although Beijing and Washington remain mutually dependent in the economic sphere. China and India are still nursing tenacious border conflicts, while Indian-Pakistani relations remain shaped by the unresolved Kashmir conflict as much as by the specter of terrorist attacks in India, supported or endorsed by Pakistan, potentially setting off a far-reaching crisis between the two neighboring states. Nuclear arms dynamics that may lead to nuclear warfare doctrines may result in dangerous crisis instability.

The Middle East: Respite after the Iran deal

For many years, observers have been concerned about an Iranian nuclear program. Some feared a nuclear arms race involving Saudi Arabia, Turkey, or Egypt. Others wondered whether permanent and stable mutual nuclear deterrence between Israel and a nuclear armed Iran might be achievable. The Joint Comprehensive Plan of Action (JCPOA) of July 2015 has now secured a respite but did not necessarily resolve the Iranian nuclear issue.

Iran

Under the agreement, the Iranian nuclear program will be submitted to certain restrictions for a limited period of time. Assuming that the deal is implemented as planned, there would be only a marginal likelihood of Iran building a nuclear weapon in the coming ten to fifteen years.

However, the JCPOA leaves the entire Iranian nuclear infrastructure fundamentally intact. Research and development remain permitted. The specific restrictions will be lifted according to timetables specified in the JCPOA. Iran's missile program is not affected by the deal. In other words, Iran remains a nuclear threshold country that is in principle able to create fissile material for weapons purposes, which possesses delivery systems for the use of nuclear weapons, and presumably the know-how for building nuclear weapons.

Against this background, it should come as no surprise that Iran's neighbors and enemies remain concerned. Thus, agreement on the JCPOA does not preclude the rise of new nuclear powers in the region. The first candidate in this regard is Saudi Arabia. Its geopolitical conflict with Iran, based on ethnic antagonism between Persians and Arabs as well as the religious conflict between Shi'ites and Sunnis, is likely to intensify. As a result, both sides are supporting antagonistic parties in conflicts such as those in Iraq, Syria, and Yemen.

Saudi Arabia

Riyadh is frustrated because the JCPOA essentially acknowledges Iran's status as a nuclear threshold country. This flies in the face of the Saudis' own claim to be able to match all of Iran's capabilities. Accordingly, they have refused to waive their fundamental right to enrich uranium, keeping the option for the future production of fissile material for weapons purposes open in principle. Riyadh will most likely find it difficult, however, to acquire this technology, as its export is banned under the rules of the Nuclear Suppliers Group (NSG). Thus, Saudi Arabia would have to look to potential supplier countries outside of the NSG, such as Pakistan and North Korea.

Saudi Arabia's nuclear infrastructure is obsolete. There are plans to build up light-water reactors for electricity generation. Saudi Arabia signed nuclear cooperation contracts with a number of states, including Russia and China. In addition, Saudi nuclear experts have been trained in Western universities. However, the King Abdullah Atomic Energy Center currently does not even have a research reactor that could be used to train staff.

The often-discussed scenario of Saudi Arabia acquiring nuclear weapons from Pakistan, or allowing Islamabad to station nuclear weapons under Pakistani control on Saudi territory, is rather unlikely. With such a move, Pakistan would risk making an enemy of its neighbor Iran, a nuclear threshold state. Against the background of

its conflict with its militarily superior enemy India, Pakistan's leadership will probably wish to avoid the resulting two-front conflict. Moreover, such a step would warp relations with the US even more, which would ultimately only help India. At the same time, it would be the end of Pakistan's claims to be seen as a responsible nuclear actor.

Turkey

Turkey, too, is believed to keep the nuclear option open. Indeed, compared to Saudi Arabia, for example, Turkey has a considerably advanced nuclear infrastructure. Ankara, too, is planning to build light-water reactors for electricity generation, and refuses to forgo uranium enrichment as a matter of principle. Initial steps towards mastering this technology have already been undertaken. However, at least for the time being, this picture has yet to coalesce into anything that could be described as the rudiments of a Turkish nuclear weapons program. In fact, such an undertaking would certainly create considerable problems for the NATO member Turkey – with the Alliance in general and the US in particular.

Egypt

Finally, Egypt has traditionally asserted a leadership role in the Arab world. Cairo would hardly stand by and watch other countries in the Middle East become nuclear weapons states, all the more so since the country already pursued a nuclear weapons program in the era of Gamal Abdel Nasser. In spite of Egypt's plans for a civilian nuclear program and the associated development of the country's nuclear infrastructure, it is unlikely to develop a nuclear weapons project in the foreseeable future, not least in view of its significant economic problems.

Vigilance, not alarmism

Against this background, alarmism about a potential nuclear arms race in the Middle East seems unwarranted. Nevertheless, such a development cannot be ruled out entirely. The way in which the nuclear deal with Iran is implemented in the coming years will doubtlessly have a strong impact on future developments. Since Iran will remain a nuclear threshold state even if the agreement is implemented as planned, it is reasonable to assume that other states will strive to attain a similar status for themselves. For the time being, however, it seems that some breathing room has been gained.

If the situation should escalate once more, raising the likelihood of a nuclear armament dynamic in the region, this would add another highly dangerous dimension to the numerous conflicts already existing. This

would also be dangerous for Israel, irrespective of its presumed nuclear second-strike capability. Since one or two nuclear detonations on Israeli territory would be sufficient to devastate the country, its political leaders would be under high pressure to take preventive measures. It would be very tempting in a crisis situation to attack any opponent's nuclear forces, such as Iran's, at an early stage. Again, the result would be crisis instability.

Arms control as a necessary supplement to nuclear deterrence

The relevance of nuclear weapons in world affairs is increasing, not decreasing. All nuclear weapons states continue to modernize their respective arsenals. Nuclear deterrence clearly is back in US/NATO-Russian relations. In Asia, a nuclear dynamic that includes China, Pakistan and India, but which is also related to certain weapons developments in the US, may result in dangerous instability. In addition, the nuclear wild card North Korea is an ongoing cause of concern. While the JCPOA gives pause to those who believe that an Iranian nuclear weapons capability is inevitable, the issue is far from ultimately solved. There is still some probability of a nuclear arms race in the Middle East, especially if it turns out in the coming years that Iran does not implement the JCPOA as planned.

At the same time, this renaissance of nuclear weapons is not matched by a comeback of nuclear arms control. To the contrary: Arms control as originally established at the dawn of the nuclear age seems politically dead. Other than during the Cold War, a continuous negotiation process that provides nuclear powers with an opportunity to better understand their opponents' thinking on things nuclear is lacking. Nuclear deterrence is not in and of itself conducive to stability, it also requires the instrument of arms control as a supplement. Unless nuclear powers take into consideration the security interests of their nuclear opponents with the aim of commonly creating strategic stability, the world of nuclear weapons is in danger of spiraling out of control.