1. Introduction: International stability and human security in 2018

DAN SMITH

This is the 50th edition of the annual review by the Stockholm International Peace Research Institute (SIPRI) of developments in the field of armament, disarmament, arms control and security. In the first edition, *SIPRI Yearbook 1968–69*, Robert Neild, SIPRI's first director, said the aim was to 'produce a factual and balanced account of a controversial subject—the arms race and attempts to stop it'.[1] This remains among the major issues covered by more recent editions of the SIPRI Yearbook, including this one. Other topics have also come to the fore. Like the inaugural edition, this volume reviews military spending and arms transfers as well as the status of nuclear forces and of chemical and biological weapons, along with events and efforts in disarmament and arms control negotiations. In addition, it surveys armed conflicts and interstate stand-offs, peace processes and peace operations, and the implementation of arms control agreements.

These data add up to some of the key indicators for assessing global peace and security. Naturally, in any year, any attempt at a summary characterization of the risks and opportunities for peace and security has to be set in the context of the trend line in that period.

Bluntly put, the trend of recent years has been broadly negative. In January 2018, the widely referenced and well-respected 'Doomsday Clock' of the *Bulletin of the Atomic Scientists*, on which midnight means apocalypse, was set at two minutes to midnight.[2] Coming at the start of the year, the setting of the clock offers a judgement about where the previous year's events have taken us. The clock-setters, looking back on 2017, perceived it to be the most dangerous global situation since the 1950s, the last time the clock was set so close to midnight.

Regrettably, as 2018 unfolded, it became clear that the recent deterioration had not been reversed. Although there were some positive signs—notably in detente on the Korean peninsula, a concerted effort to address, limit and end the violence in Yemen, the persistence of the Colombia peace settlement between the government and the Revolutionary Armed Forces of Colombia–People's Army (Fuerzas Armadas Revolucionarias de Colombia–Ejército del

[1] 'Preface', *SIPRI Yearbook of World Armaments and Disarmament 1968/69* (Almqvist & Wiksell: Stockholm, 1969), p. 5.

[2] Mecklin, J., 'It is 2 minutes to midnight', *Bulletin of the Atomic Scientists*, 25 Jan. 2018.

Pueblo, FARC–EP), the Eritrea–Ethiopia peace accord ending two decades of conflict and enmity, and evidence of the United Nations Security Council starting to address the security implications of climate change—there were also significant negatives. Among these were the crumbling of arms control, including the US withdrawal from the Joint Comprehensive Plan of Action (JCPOA), commonly referred to as the Iran nuclear deal, and the persistence of tensions in a number of zones of geopolitical confrontation. More generally, military spending, arms transfers and the incidence of armed conflict worldwide all remained high.

The balance of negatives and positives shows no further deterioration compared to previous years. But a persistent high level of risk is a profound cause for concern; it is also, or should be, a motivation for seeking ways out of the current confrontations and impasses that dog global politics. Overall, the balance remains deficient. The discomfiting questions noted in preceding editions of the SIPRI Yearbook have not yet received satisfactory answers.

I. The crisis of nuclear arms control

US withdrawal from the INF Treaty

On 20 October 2018, United States President Donald J. Trump announced that the USA will withdraw from the 1987 Treaty on the Elimination of Intermediate-Range and Shorter-Range Missiles (INF Treaty), which eliminated all US and Soviet ground-launched missiles with ranges between 500 and 5500 kilometres.[3] The reason for the US withdrawal was given as Russian non-compliance, relating to the development of a ground-launched cruise missile (GLCM) with a range above 500 kilometres.[4]

The achievements of East–West arms control—primarily dating from the end of the 1980s with the end of the cold war and for several years into the 1990s—have been eroding for some time.[5] The specific charge made by President Trump about Russian non-compliance with the INF Treaty was first raised with Russia by the administration of President Barack Obama in May 2013 and made public the following year.[6] At the July 2018 summit of the North Atlantic Treaty Organization (NATO), the USA's allies aligned

[3] For a summary and other details of the INF Treaty and other bilateral arms control treaties in this section, see annex A, section III, in this volume.

[4] On the nuclear arms control developments related to Russia and the USA, including the INF Treaty, see chapter 7, section II, in this volume.

[5] For a discussion of the main pillars of arms control at the end of the cold war (end of the 1980s and start of the 1990s), see Smith, D., 'Introduction: International stability and human security in 2017', *SIPRI Yearbook 2018*.

[6] Ali, I., 'US general says Russia deploys cruise missile, threatens NATO', Reuters, 8 Mar. 2017; Gordon, M. R., 'US says Russia tested cruise missile, violating treaty', *New York Times*, 28 July 2014; Gordon, M. R., 'Russia deploys missile, violating treaty and challenging Trump', *New York Times*, 14 Feb. 2017; and Panda, A., 'The uncertain future of the INF Treaty', Council on Foreign Relations backgrounder, 22 Oct. 2018.

themselves with the US accusation, albeit somewhat guardedly. The summit statement said that, 'in the absence of any credible answer from Russia on this new missile, the most plausible assessment would be that Russia is in violation of the Treaty'.[7] This can be interpreted both as supporting the charge of Russian non-compliance and as maintaining a degree of open-mindedness about it, leaving diplomatic room for manoeuvre. However, the NATO position had hardened by the end of the year. The foreign ministers' meeting in December expressed strong support for 'the finding of the United States that Russia is in material breach of its obligations'.[8]

Russia rejects the US accusation. It makes the countercharge that the USA has itself violated the treaty in three ways: it uses treaty-banned missiles for target practice, some US unmanned aerial vehicles are effectively cruise missiles, and a missile defence system based in Europe (Aegis Ashore) could be used for intermediate-range nuclear forces. In turn, the USA rejects these charges.[9] A further Russian criticism is procedural. The treaty includes a channel for complaints about non-compliance, the Special Verification Commission (SVC), but it did not meet between 2003 and 2016. It was during that 13-year interval that US concerns about Russian cruise missiles arose, yet—so Russia has complained—the USA went public with them rather than using the SVC or other official channels. When the USA did raise its complaint through SVC meetings in November 2016 and December 2017, however, there was no progress.[10] Accordingly, it is difficult to assess what weight to place on the procedural issue.

What is clear, however, is that a charge of non-compliance in regard to a single weapon system has grown into a root-and-branch crisis of contemporary arms control. The issue is not only the US withdrawal from the INF Treaty, with Russia at the end of 2018 looking likely to follow suit, but there is an additional, broader problem.

New START and the nuclear strategies of the USA and Russia

The numbers of US and Russian strategic nuclear weapons are limited by the 2010 Treaty on Measures for Further Reduction and Limitation of Strategic Offensive Arms (New START).[11] It runs out in 2021; by the end of 2018, there

[7] NATO heads of state and government, 'Brussels Summit Declaration', 11 July 2018, para. 46.

[8] NATO foreign ministers, 'Statement on the Intermediate-Range Nuclear Forces (INF) Treaty', Brussels, Press Release (2018) 162, 4 Dec. 2018, para. 2. This was partly due to reports from the French and Dutch intelligence services that claimed to have independently verified the US allegation. See chapter 7, section II, in this volume.

[9] US Department of State, 'Bureau of Arms Control, Verification and Compliance factsheet—Refuting Russian allegations of US noncompliance with the INF Treaty', 8 Dec. 2017.

[10] Woolf, A. F., *Russian Compliance with the Intermediate Range Nuclear Forces (INF) Treaty: Background and Issues for Congress*, Congressional Research Service (CRS) Report for Congress R43832 (US Congress, CRS: Washington, DC, 8 Feb. 2019).

[11] For a summary and other details of New START and the preceding US–Russian bilateral strategic agreements, see annex A, section III, in this volume. See also chapter 7, section II, in this volume.

were no talks about renewing or replacing it. Russia claims that the USA is technically not complying with New START and that it is not possible to start work on any follow-on agreement until the issue has been resolved.[12] On the US side, the National Security Adviser, John Bolton, said the administration was considering its position on talks about renewing or replacing New START, adding that there was 'plenty of time' before 2021.[13] This was far from a clear declaration of intent. It can be noted that, in 2010, Bolton depicted New START as entailing US unilateral disarmament; similarly, shortly after his inauguration, President Trump described New START as 'one-sided' and 'just another bad deal that the country made'.[14]

Meanwhile, both the USA and Russia are on a path of strategic nuclear renewal. In the USA, this includes enhanced and modernized nuclear weapons, a proposed new Space Force (see below) and an expanded programme of ballistic missile defence (BMD). In Russia, the strategic path is no less expansive and President Vladimir Putin has justified this in part by reference to US BMD capabilities and plans.[15]

In February 2018, the USA released its new Nuclear Posture Review (NPR).[16] Overall, the NPR maintained an approach to nuclear weapon policy consistent with that of successive US administrations. However, it set out expanded scenarios for the possible use of nuclear weapons against non-nuclear threats, including cyber threats, and outlined a plan for new low-yield nuclear warheads for some missile systems. This became the focus of a controversy that reflected contending views on nuclear strategy going back over 40 years to the mid 1970s and controversies over 'mini-nukes' and, in particular, 'the neutron bomb'.[17] The NPR contends that these capabilities would broaden the range of nuclear deterrence (i.e. increase the number of actions from which potential adversaries would be deterred). Against that,

[12] Russian Ministry of Foreign Affairs, 'Foreign Ministry statement', 5 Feb. 2018; and Russian Ministry of Foreign Affairs, 'Statement by Vladimir I. Yermakov, Head of delegation of the Russian Federation to the First Committee of the 73th UNGA session, Director of the Department for Nonproliferation and Arms Control of the Ministry of Foreign Affairs of the Russian Federation, within the General Debate', New York, October 9, 2018', 10 Oct. 2018.

[13] Mehta, A., 'One nuclear treaty is dead. Is New START next?', *Defense News*, 23 Oct. 2018.

[14] Bolton, J., 'New Start is unilateral disarmament', *Wall Street Journal*, 8 Sep. 2010; and Holland, S., 'Trump wants to make sure US nuclear arsenal at "top of the pack"', Reuters, 23 Feb. 2017.

[15] President of Russia, 'Meeting of the Valdai International Discussion Club', Transcript of interview with President Vladimir Putin, 18 Oct. 2018.

[16] US Department of Defense, 'Nuclear Posture Review 2018', Feb. 2018; and see chapter 6, section I, in this volume.

[17] The neutron bomb controversy began with Pincus, W., 'Neutron killer warhead buried in ERDA budget', *Washington Post*, 6 June 1977; see also Warshawsky, A. S., 'Radiation battlefield casualties—credible', *Military Review*, May 1976. On the controversy, see e.g. Leitenberg, M., 'Background information on tactical nuclear weapons (primarily in the European context)', ed. F. Barnaby, SIPRI, *Tactical Nuclear Weapons: European Perspectives* (Taylor & Francis: London, 1978); Cohen, S., 'Enhanced radiation warheads: Setting the record straight', *Strategic Review*, Winter 1978; and *Newsweek*, 'Furor over the neutron bomb', 17 Apr. 1978.

critics argue that the effect would be to lower the nuclear threshold, thus increasing the risk of nuclear war.[18]

For its part, Russian strategic planning for 2018–27 gives high priority to improving Russian nuclear forces.[19] An advanced strategic bomber is under development and new strategic nuclear submarines are to be produced.[20] Further new systems were dramatically unveiled by President Putin in a public ceremony at the beginning of March 2018.[21]

In recent years, US analysts and officials have discussed alleged Russian interest in low-yield nuclear warheads comparable to those referenced in the US NPR of 2018, in support of a strategic concept dubbed 'escalate to de-escalate'. In essence, this means using nuclear escalation to assert dominance in a war and thus end it advantageously, regardless of whether the adversary has itself used nuclear weapons. In other words, it is understood to mean lowering the nuclear threshold and being willing to initiate nuclear war.[22] Despite the currency of this assessment of Russian strategy within the USA, there is no clear evidence that the concept entered into official Russian strategic thinking. Indeed, some analysts have concluded it is an idea that official Russian doctrine rejects.[23] Although Russia, like the USA and NATO, makes it clear that, if attacked, it may use nuclear weapons regardless of whether its adversary has used them first, its declared doctrine states that this options arises 'when the very existence of the state is in jeopardy'.[24] In October 2018, without distinguishing between a nuclear and a conventional attack on Russia, President Putin stated that the Russian strategic concept is

[18] Coyle, P. E. and McKeon, J., 'The huge risks of small nukes', *The Agenda*, 3 Oct. 2017. For an emphasis on the veritable oddness of small nuclear weapons, see Rawnsley, A. and Brown, D., 'The Littlest Boy', *Foreign Policy*, 30 Jan. 2014.

[19] Cooper, J., 'How much does Russia spend on nuclear weapons?', SIPRI Commentary, 1 Oct. 2018. See also chapter 6, section II, in this volume.

[20] Tass, 'Russia to develop first prototype of next generation strategic bomber by early 2020s', 13 Apr. 2017.

[21] Osborn, A., 'Russia names Putin's new "super weapons" after a quirky public vote', Reuters, 23 Mar. 2018; and President of Russia, 'Presidential address to the Federal Assembly', 1 Mar. 2018. For details, see also chapter 6, section II, in this volume.

[22] See e.g. House Committee on Armed Services, 'Statement of Robert Work, Deputy Secretary of Defense, and Admiral James Winnefeld, Vice Chairman of the Joint Chiefs of Staff, Before the House Committee on Armed Services', 25 June 2015; Payne, K. B. and Schneider, M. B., 'Russia's new national security strategy', Real Clear Defense, 11 Feb. 2016; Pifer, S., 'Time to push back on nuclear saber-rattling', Brookings Institution, 10 May 2016; Schneider, M. B., 'Escalate to de-escalate', *US Naval Institute Proceedings*, vol. 143/2/1368 (Feb. 2017); and Kroenig, M., 'The case for tactical US nukes', *Wall Street Journal*, 24 Jan. 2018.

[23] See e.g. Oliker, O., 'Russia's nuclear doctrine: What we know, what we don't, and what that means', Center for Strategic and International Studies, May 2016; Oliker, O. and Baklitskiy, A., 'The Nuclear Posture Review and Russian de-escalation: A dangerous solution to a nonexistent problem', War on the Rocks, 20 Feb. 2018; and Long, A., 'Russian nuclear forces and prospects for arms control', Testimony presented before the House of Representatives Committee on Foreign Affairs, Subcommittee on Terrorism, Nonproliferation and Trade, 21 June 2018.

[24] President of Russia, [Military doctrine of the Russian Federation], 5 Feb. 2010 (in Russian); also available in English from the Carnegie Endowment for International Peace, '"The Military Doctrine of the Russian Federation" approved by Russian Federation presidential edict on 5 February 2010'.

to use nuclear weapons only when Russian territory is under attack.[25] Taken together, this sets the bar for nuclear use at about the same level as the new US NPR, which states that 'For any President, the use of nuclear weapons is contemplated only in the most extreme circumstances to protect our vital interests and those of our allies'.[26]

The US Space Force and missile defence

In June, President Trump announced the forthcoming formation of a Space Force, describing it as the sixth branch of the US military.[27] In August, Vice President Mike Pence outlined some of the concrete steps needed to create it.[28] Under the administration's proposal, the new Space Force would bring in personnel from the other service branches. There would also be a Space Development Agency to streamline hardware procurement and innovation.

This may inject some sense of urgency into international efforts towards the prevention of an arms race in outer space (PAROS). Since the Outer Space Treaty entered force in 1967, there has been no further international agreement on regulating military activities in outer space.[29] The UN Conference on Disarmament has held discussions over the years but there has been no concrete result. In 2008, Russia submitted a draft Treaty on the Prevention of the Placement of Weapons in Outer Space, followed by a revised version jointly submitted with China in 2014.[30] The USA has strongly criticized the 2014 draft, arguing that it is 'not verifiable' and omits mention of anti-satellite weapons.[31] A group of governmental experts met to discuss PAROS in 2017; another meeting of the group is scheduled for 2019. However, although expert discussions are important in setting out what could be done, international political relations will have to change before real progress is possible in avoiding the militarization of outer space.

BMD has also returned to the strategic limelight, partly as a result of the disputes over the INF Treaty and partly because of renewed interest in BMD

[25] President of Russia, 'Meeting of the Valdai International Discussion Club', Transcript of interview with President Vladimir Putin, 18 Oct. 2018.

[26] US Department of Defense (note 16).

[27] Weisgerber, M. and Tucker, P., 'What Trump's Space Force announcement means?', Defense One, 18 June 2018; and 'Toward the creation of a US "Space Force"', US Congressional Research Service, 16 Aug. 2018.

[28] White House, 'Remarks by Vice President Pence on the future of the US Military in space', The Pentagon, 9 Aug. 2018.

[29] Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies (Outer Space Treaty), opened for signature 27 Jan. 1967, entered into force 10 Oct. 1967. For a summary and further details, see annex A, section I, in this volume.

[30] Nuclear Threat Initiative, Proposed Prevention of an Arms Race in Space (PAROS) Treaty, 29 Sep. 2017.

[31] Schlein, L., 'US to confront Russia, China on militarization of outer space', Voice of America, 4 Oct. 2018.

for strategic defence. The importance of missile defence if nuclear deterrence should fail was signalled in the US NPR; it is far from being a new concern for US administrations, although the objectives have been scaled down since the days of the Strategic Defense Initiative of President Ronald Reagan's administration in the 1980s, commonly known as Star Wars.

BMD is deployed in Europe. NATO repeatedly emphasizes that, as the July summit declaration put it, 'NATO BMD is not directed against Russia and will not undermine Russia's strategic deterrence'.[32] The argument is that NATO BMD is designed to defend against threats from outside the Euro-Atlantic area, principally from Iran. It does not seem that this message has ever sounded persuasive to Russian ears. After the administration of President George W. Bush withdrew from the 1972 Anti-Ballistic Missile (ABM) Treaty in 2002, Russia argued that US development of BMD systems would weaken Russian deterrence and thus destabilize mutual deterrence.[33] Thereby, Russia argued, BMD would become a major obstacle to nuclear arms reductions. Russia has raised those concerns repeatedly since 2007, and especially after the announcement of US plans to set up ballistic missile defences in Eastern Europe.[34] Indeed, the missile that the Obama and Trump administrations identified as breaching the INF Treaty was first tested in 2008. Although it is not possible to prove a direct connection between an emergent US BMD capability and Russia's development and testing of a new GLCM, it does seem prima facie plausible that Russian official thinking was influenced by a perceived connection between them. More recently, there has been some speculation that the USA is looking to adjust its BMD policy to include threats from Russia and China as well as Iran and North Korea.[35]

II. Nuclear non-proliferation concerns

The difficulties in US–Russian arms control are but part of the picture. Nuclear non-proliferation is also facing major challenges in both bilateral and multilateral settings.

US policies towards Iran and North Korea

In 2018, there were important developments in two other arms control arenas. On the one hand, the US administration announced on 8 May that it would pull out of the JCPOA, an agreement between seven states (China,

[32] NATO heads of state and government (note 7).

[33] For a summary and other details of the ABM Treaty see annex A, section III.

[34] Erastö, T., 'Between the shield and the sword: NATO's overlooked missile defense dilemma' (Ploughshares Fund: San Francisco, CA, June 2017).

[35] Sonne, P., 'Pentagon looks to adjust missile defense policy to include threats from Russia, China', *Washington Post*, 2 Mar. 2018.

France, Germany, Iran, Russia, the United Kingdom and the USA) and the European Union, signed in 2015, and often known as the Iran deal.[36] On the other hand, the US administration engaged actively in diplomacy with North Korea, with which there had been an increasingly sharp war of words at the end of 2017 and beginning of 2018. This had culminated not only in personal insults exchanged between the two country's leaders, but also in Kim Jong Un's statement in his New Year address that 'the nuclear button is on my office desk all the time', and President Trump's tweeted counterclaim that his button is 'bigger & more powerful'.[37]

The contrast between US policies under the Trump administration towards North Korea and Iran is striking. By the time of the buttons exchange, North Korea had joined the ranks of nuclear weapon-possessing states, with nuclear-tipped ballistic missiles capable of striking regional targets and possibly some US targets. This was despite major international efforts to prevent it; the UN Security Council had passed nine resolutions establishing sanctions.[38] Kim Jong Un used his 2018 New Year speech to declare that he now spoke from a position of strength and proposed that North Korea and South Korea take steps to reduce the tensions between them.[39] There followed an energetic process of inter-Korean detente and, in June, a summit meeting in Singapore between Kim Jong Un and President Trump. Each leader proved willing to take a diplomatic approach towards a counterpart and state he had previously excoriated.

Unlike North Korea, Iran has neither acknowledged having a programme to develop nuclear weapons nor ever been proven to have one, although there were indications of a possible programme before 2003, and lesser indications in the period since.[40] Nonetheless, if only to ease the pressure of economic sanctions, Iran negotiated and agreed the JCPOA, effectively closing the pathway to nuclear weapons. The JCPOA limits Iran's uranium enrichment programme until 2030 and includes monitoring and transparency measures that will remain in place long after that date; the agreement is technically

[36] Joint Comprehensive Plan of Action (JCPOA), 14 July 2015, Vienna, reproduced as Annex A of UN Security Council Resolution 2231, 20 July 2015. See also Erastö, T., 'Implementation of the Joint Comprehensive Programme of Action in Iran', *SIPRI Yearbook 2018*, pp. 337–46; and chapter 7, section III, in this volume.

[37] *Irish Times*, 'Kim Jong-un says nuclear button "always on his desk"', 1 Jan. 2018; @realDonaldTrump, 2 Jan. 2018, <https://twitter.com/realDonaldTrump/status/948355557022420992>; and BBC News, 'Trump to Kim: My nuclear button is "bigger and more powerful"', 3 Jan. 2018.

[38] The initial sanctions resolution was passed in 2006 via UN Security Council Resolution 1718. Further measures were voted in via the following resolutions: 1874 (2009), 2087 (2013), 2094 (2013), 2270 (2016), 2321 (2016), 2371 (2017), 2375 (2017) and 2397 (2017).

[39] National Committee on North Korea, 'Kim Jong Un's 2018 New Year's Address', 1 Jan. 2018 (accessed 20 Mar. 2019).

[40] The evidence, contested interpretations and arguments each way are reviewed in Kerr, P. K., *Iran's Nuclear Program: Status*, Congressional Research Service (CRS) Report for Congress RL34544 (US Congress, CRS: Washington, DC, 1 Apr. 2019).

sound with clear verification procedures.[41] Saudi Arabia, Israel and most US Republican politicians opposed it from the outset. Trump made abandoning the deal a keynote of his 2016 presidential election campaign. Like most other critics, he has described as major flaws the JCPOA's temporary nature and its lack of controls on Iran's ballistic missile programme and actions in Syria and elsewhere in the region.[42] This cannot occlude the fact that the International Atomic Energy Agency, the body charged with monitoring Iran's JCPOA implementation, found that Iran was in full compliance.[43] The US decision to withdraw from the JCPOA can only be understood, therefore, as a political measure aimed at Iran, rather than as an evidence-based technical objection to the agreement or its implementation.

In August, the USA reimposed extraterritorial sanctions, punishing companies in third countries, including in Europe, that traded with Iran. At the end of the year, France, Germany and the UK were designing the so-called special purpose vehicle (SPV) as a mechanism to facilitate trade between Europe and Iran.[44] The problem for European would-be traders with Iran is that almost all banks that would be involved in financial arrangements for any transaction are vulnerable to punitive US action and fearful of it. Whether the SPV will serve its purpose remains to be seen. Similarly, there remained concern about Iran's reaction to renewed US sanctions even if it could still trade with Russia and China. There could be a backlash against the pressure. US withdrawal from the JCPOA thus increased security risks in the Gulf region (see section III).

By contrast, US diplomacy towards North Korea, alongside the inter-Korean detente, had brought some degree of hope by the end of 2018. The Singapore Summit produced an agreement that set out a vague road map for moving forwards on denuclearization, a lasting peace settlement and return of the remains of service personnel killed in the Korean War.[45] The lack of specificity and clear definitions of the key terms has been harshly criticized in some quarters but it is arguably exactly what was needed for an opening summit between the two leaders, following a period of heightened

[41] See Rauf, T., 'Resolving concerns about Iran's nuclear programme', *SIPRI Yearbook 2016*, pp. 673–88; and Rauf, T., 'Implementation of the Joint Comprehensive Plan of Action in Iran', *SIPRI Yearbook 2017*, pp. 505–10.

[42] Holland, S., 'Trump issues ultimatum to "fix" Iran nuclear deal', Reuters, 12 Jan. 2018.

[43] Reuters, 'Iran fulfilling nuclear deal commitments: IAEA chief', 30 Oct. 2017; and Dixit, A., 'Iran is implementing nuclear-related JCPOA commitments, Director General Amano tells IAEA Board', International Atomic Energy Agency (IAEA), 5 Mar. 2018.

[44] Gharagozlou, L., 'EU implements new Iran trade mechanism', CNBC News, 31 Jan. 2019; and O'Toole, B., 'Facing reality: Europe's Special Purpose Vehicle will not challenge US sanctions', Atlantic Council, 31 Jan. 2019.

[45] White House, 'Joint Statement of President Donald J. Trump of the United States of America and Chairman Kim Jong Un of the Democratic People's Republic of Korea at the Singapore Summit', 12 June 2018. For a discussion of US–North Korean nuclear diplomacy, see chapter 7, section I, in this volume.

tension and heated rhetoric. The agreement could be seen as establishing the headlines, allowing officials on both sides time to hammer out the necessary details over the coming few years.

The Non-Proliferation Treaty: Towards the 2020 Review Conference

The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) entered into force in 1970 and for almost five decades has been the main international instrument against nuclear proliferation.[46] In the early 1970s, the level of concern was indicated by SIPRI's assessment that some 15 states had 'near nuclear' status.[47] At the time, six states possessed nuclear weapons: the five nuclear weapon states (NWS) named in the NPT—China, France, the UK, the USA and the Soviet Union—and Israel, whose possession of nuclear weapons was secret. Since then, three more states have joined them: India, Pakistan and North Korea. When the Soviet Union broke up in 1991, four successor states could have kept nuclear status. Only Russia did so. Belarus, Kazakhstan and Ukraine all gave up nuclear weapons. South Africa abandoned its nuclear weapon development when the apartheid regime ended in 1994. Iraqi and Libyan nuclear weapon programmes were dismantled under international supervision during the following decade. Thus, taken overall, non-proliferation has had some success.

There is, nonetheless, significant impatience worldwide about the NPT. At its core is a bargain, in approximately the following terms: the NWS will eventually give up nuclear weapons and the non-nuclear weapon states (NNWS) can have access to the benefits of peaceful uses of nuclear technology, in return for which they forswear nuclear weapon ambitions of their own. A key part of this bargain is expressed in Article VI of the NPT, in which non-proliferation as a form of arms control becomes a pathway to disarmament:

> Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control.[48]

There have been major reductions in Russian and US arsenals and, since the mid 1980s, the number of nuclear warheads worldwide has reduced from 65 000–70 000 to less than 15 000 as of January 2018.[49] Occasional rhetoric

[46] Treaty on the Non-Proliferation of Nuclear Weapons (Non-Proliferation Treaty, NPT), opened for signature 1 July 1968, entered into force 5 Mar. 1970.

[47] *World Armaments and Disarmament: SIPRI Yearbook 1972* (Almqvist & Wiksell: Stockholm, 1972), pp. 290–98.

[48] Treaty on the Non-Proliferation of Nuclear Weapons (note 46), p. 4.

[49] Kile, S. N. and Kristensen, H. M., 'World Nuclear Forces', *SIPRI Yearbook 2018*, p. 236.

to one side, however, there has been no sign of readiness among the NWS for the complete elimination of nuclear arms. On the contrary, all are currently modernizing their nuclear weapons, delivery systems and related infrastructure.[50]

Against this background, the Treaty on the Prohibition of Nuclear Weapons (TPNW), also known as the nuclear ban, was endorsed by the UN and made available for signature in 2017.[51] During 2018, support for the treaty maintained steady momentum. In addition to 50 NNWS that signed it straightaway, 6 more signed in 2017 and 13 in 2018. At the end of the year, there were 69 signatories and 19 states parties (requiring a further 31 ratifications before the treaty enters into force). While this may appear to be a slow pace of ratification, it is apace with the NPT and quicker than the 1992 Chemical Weapons Convention (CWC) and the 1996 Comprehensive Nuclear-Test-Ban Treaty at the same stage of development, although slower than many other disarmament treaties.[52]

The TPNW is inevitably controversial. Key clauses outlaw nuclear weapons, although this will not have the force of law even when the treaty does enter force, as it will only bind states that are full parties to it. For the treaty's drafters and supporters, the point of these clauses is to stigmatize nuclear weapons and generate 'urgent action on disarmament'.[53] France, the UK, the USA (in a joint statement) and Russia immediately dismissed the TPNW as unfeasible and undesirable because it does not take international realities into account—a rare unity between the Western powers and Russia, albeit with different versions of what international reality is and demands.[54] China's view has been more nuanced. In March 2017, before the TPNW was finalized, the Chinese Ministry of Foreign Affairs said that China's goal of eventual nuclear disarmament is 'fundamentally in line with the purposes of negotiations on the nuclear weapon ban treaty'.[55]

[50] On world nuclear forces, see chapter 6 in this volume.

[51] For a summary of the TPNW see annex A, section I, in this volume. On the negotiation of the TPNW and contending views about it, see Smith, D., 'Nuclear weapons in international politics', *SIPRI Yearbook 2018*, pp. 7–10; Kile, S., 'Treaty on the Prohibition of Nuclear Weapons', *SIPRI Yearbook 2018*, pp. 307–18; and chapter 7, section IV, in this volume.

[52] Van, S., 'Revisiting the Treaty on the Prohibition of Nuclear Weapons', Lawfare, 27 Nov. 2018; For a summary of the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (Chemical Weapons Convention, CWC) and the Comprehensive Nuclear-Test-Ban Treaty (CTBT) see annex A, section I, in this volume.

[53] International Campaign to Abolish Nuclear Weapons, 'Stigmatize, ban and eliminate: A way forward for nuclear disarmament', 1 Oct. 2013; and Beatrice Fihn quoted in Högsta, D., 'ICAN at the UNGA', Heinrich Böll Stiftung, 16 Nov. 2016.

[54] US Mission to the United Nations, 'Joint press statement from the permanent representatives to the United Nations of the United States, United Kingdom and France following the adoption of a treaty banning nuclear weapons', 7 July 2017; and Russian Ministry of Foreign Affairs, 'Foreign Minister Sergey Lavrov's remarks at a UN Security Council meeting on the non-proliferation of weapons of mass destruction: Confidence building measures, New York, January 18, 2018', 18 Jan. 2018.

[55] Chinese Ministry of Foreign Affairs, 'Foreign Ministry Spokesperson Hua Chunying's Regular Press Conference on March 20', 20 Mar. 2017.

The NPT's next five-year review conference is in 2020. Arguments about the TPNW have become part of the preparatory work. At the 2018 Preparatory Committee meeting, most NNWS welcomed the TPNW, while NWS and their allies stressed the need for an 'incremental', 'progressive' or 'step-by-step' approach to disarmament through the NPT.[56] Part of the dispute over the TPNW is about whether the world is safer with nuclear weapons (because of nuclear deterrence) or without them (because of the ineradicable risk that nuclear weapons might one day be used). Part of it is a political disagreement about how to advance nuclear disarmament. Although the NPT reflected the need perceived in the late 1960s to prioritize non-proliferation over the long-term goal of disarmament, the TPNW represents the view that—half a century after the adoption of the NPT—progress on disarmament is long overdue. That view is seemingly shared by the UN Secretary-General, António Guterres. The UN disarmament agenda, published in May, identifies several priority tasks including reducing and eliminating weapons of mass destruction; while taking care not to call on states to sign or ratify the TPNW, the disarmament agenda describes it as 'an important component of the nuclear disarmament and non-proliferation regime'.[57]

III. The use of chemical weapons

A different kind of problem bearing on arms control was revealed by two major incidents involving the use of chemical weapons (CWs) in 2018.[58] This open breaching of the CWC raises further questions about the viability and reliability of disarmament and arms control regimes in the current international political climate.

An attempted assassination in the UK

On 4 March 2018, the CW novichok was used in an attempt to kill Sergey Skripal, a former Russian spy, and his daughter in Salisbury, UK. A perfume dispenser, apparently discarded by the would-be assassins, was later found and given to a woman who tested the substance on her wrist and died.[59] The British authorities quickly identified the chemical used as novichok, a military-grade class of nerve agent. This was confirmed on 12 April by the

[56] See chapter 7, section IV, in this volume.

[57] UN Office for Disarmament Affairs, *Securing Our Common Future: An Agenda for Disarmament* (UN, Office for Disarmament Affairs: New York, 2018). See also chapter 7, section V; chapter 8, section III; and chapter 9, section IV, in this volume.

[58] For fuller treatment of these incidents, see chapter 8, sections I and II, in this volume.

[59] BBC News, 'Novichok: Murder inquiry after Dawn Sturgess dies', 9 July 2018; and Sengupta, K., 'Salisbury poisoning: Woman among Russian hit squad of four identified as key suspects in Skripal novichok probe', *The Independent*, 19 July 2018.

Organisation for the Prohibition of Chemical Weapons (OPCW).[60] Despite initial claims by the then Foreign Secretary, Boris Johnson, that British experts had identified the source of the novichok, British and OPCW experts have been unable to verify its precise source.[61]

Within days of the incident, the British Government stated that it was highly likely the Russian state was responsible, which Russia has vehemently denied.[62] With relations between the West and Russia already at their worst in decades, the Salisbury attack led to increased tensions, accusations and counteraccusations, and diplomatic expulsions on both sides.[63]

The official Russian view treats the accusation and expulsion of diplomats as a manufactured piece of theatre. The head of the Russian Foreign Intelligence Service called the attack 'a grotesque provocation rudely staged by the British and US intelligence agencies'.[64] The Russian Foreign Minister, Sergey Lavrov, drew on *Alice in Wonderland* for a jibe at the UK about the sentence coming before the verdict.[65] Even though Johnson erred by exaggerating the evidence of Russian culpability, responding to serious charges about use of a CW agent with sarcasm and unsubstantiated counterclaims was an unproductive line for the Russian Government to take.

The use of chemical weapons in Syria

During the seven-year Syrian civil war, there have been persistent allegations that President Bashar al-Assad has used CWs against his own people. Several UN-sponsored investigations into CW use in Syria have been carried out in recent years. The OPCW–UN Joint Investigative Mechanism (OPCW–UN JIM), which was unanimously created by the UN Security Council in 2015, issued seven reports and concluded that the Syrian Government was responsible for four cases of CW use and non-state actors were responsible for two.[66] Unfortunately, the JIM's mandate expired in November 2017 because the Security Council was unable to agree terms for an extension due to a

[60] Zanders, J. P., 'Novichok between opinion and fact—Part 1: Deconstruction of the Russian denial', *The Trench*, 10 Apr. 2018.

[61] DW, 'Boris Johnson: Russia's position in Skripal case is "increasingly bizarre"', 20 Mar. 2018; and Morris, S. and Crerar, P., 'Porton Down experts unable to verify precise source of novichok', *The Guardian*, 3 Apr. 2018.

[62] British Government, 'PM Commons statement on Salisbury incident: 12 March 2018', 12 Mar. 2018; and Asthana, A. et al., 'Russian spy poisoning: Theresa May issues ultimatum to Moscow', *The Guardian*, 13 Mar. 2018.

[63] *The Guardian*, 'Western allies expel scores of Russian diplomats over Skripal attack', 27 Mar. 2018; and BBC News, 'Spy poisoning: Russia expels more UK diplomats', 31 Mar. 2018.

[64] TASS, 'Russian foreign intelligence chief slams Skripal case as provocation', 4 Apr. 2018.

[65] RT, 'Lavrov calls UK handling of Skripal case "open mockery of intl law"', YouTube, 5 Apr. 2018.

[66] United Nations, Security Council, 'Seventh report of the Organisation for the Prohibition of Chemical Weapons–United Nations Joint Investigative Mechanism', S/2017/904, 26 Oct. 2017; and Hart, J., 'Allegations of use of chemical weapons in Syria', *SIPRI Yearbook 2018*, pp. 349–61.

Russian veto.[67] More forthright in attributing blame has been the Independent International Commission of Inquiry on the Syrian Arab Republic, established by the UN Human Rights Council to investigate human rights violations in Syria. It has confirmed at least 34 CW attacks since 2013, many using chlorine or sarin, a nerve agent, conducted by the Syrian Government.[68]

A further suspected CW attack on 7 April in the Douma suburb of Damascus reportedly killed at least several dozen civilians.[69] This followed reports of smaller chlorine gas incidents in Douma in March.[70] The OPCW announced an investigation to verify that it was a CW attack and determine what was used. On 13 April, however, the USA, France and the UK pre-empted the investigation and launched 105 cruise and air-to-surface missiles against two suspected CW storage facilities west of Homs and a research centre in Damascus.[71]

The three governments explained the missile attack as punishing the Syrian regime and deterring others from using CWs.[72] These may be legitimate aims but it is unclear that military action can achieve them. The missile strikes did not change President Assad's behaviour or make any discernible difference to the civil population of Syria. Pre-empting the OPCW investigation politicized the issue. Russia's response was once again deficient, initially denying that a CW attack took place, only later to say the CW attack was staged by the UK.[73] The transition from one barely believable storyline to another did not lead to any gain in credibility. Even so, for the Western powers, waiting and acting later with greater international unity could well have been a more effective response.

The integrity of the Russian response on both the Salisbury and Douma CW incidents was thrown into further doubt by the Dutch military intelligence agency's statement that it had evidence of Russia attempting to hack into the OPCW.[74] Nonetheless, by breaching Syria's sovereignty and not waiting for the OPCW, the Western response to an illegal act also weakened respect

[67] Campos, R., 'Russia vetoes extension of mission probing chemical weapons use in Syria', Reuters, 24 Oct. 2017.

[68] Almukhtar, S., 'Most chemical attacks in Syria get little attention. Here are 34 confirmed cases', *New York Times*, 13 Apr. 2018.

[69] Hubbard, B., 'Dozens suffocate in Syria as government is accused of chemical attack', *New York Times*, 8 Apr. 2018.

[70] Sanders-Zakre, A, 'More chemical attacks reported in Syria', *Arms Control Today*, Apr. 2018.

[71] Collins, K., Ward, J. and Yourish, K., 'What we know about the three sites targeted in Syria', *New York Times*, 14 Apr. 2018; and Reuters, 'French declassified intelligence report on Syria gas attacks', 14 Apr. 2018.

[72] CNN, 'Mattis: This is a one-time shot, for now', 14 Apr. 2018.

[73] Reuters, 'Russia denies chemical weapons used in Syria's Douma, Ifax reports', 8 Apr. 2018; BBC News, 'Syria conflict: Russia says no evidence of Douma chemical attack', 9 Apr. 2018; Sputnik, 'We have evidence of UK's role in staging Douma provocation—Russian MoD', 13 Apr. 2018; and BBC News, 'Russia says Syrian "chemical attack" was staged', 13 Apr. 2018.

[74] Reuters, 'Dutch government says it disrupted Russian attempt to hack chemical weapons watchdog', 4 Oct. 2018.

for international law and for international agreements—and thus weakened arms control. Ultimately, lawful ends are best fulfilled through lawful means.

IV. International tensions and the dynamics of power

The vicissitudes of bilateral and multilateral arms control and disarmament agreements and negotiations reflect a tense and uncertain international political environment. It is an oddity of the contemporary international constellation that there is no strongly status quo power. China, Russia and the USA all challenge and seek to modify aspects of the world political order. For China as a rising power and Russia, given its perception that it lost out badly in the decade after the end of the cold war, this challenge is easily understandable. Both are actively challenging components of the global order, from the political geography of key regions to the balance of power in international finance.

What is more striking is that the USA appears to oppose, or be disgruntled by and alienated from, some of the key international institutions and norms it had a major role in shaping and from which it has long benefitted. This may be short term, an effect only of the preferences of the present US administration and its domestic political constituency. It may, however, be more lasting. US exceptionalism and distrust of 'permanent alliance with any portion of the foreign world' (President George Washington) and 'entangling alliances' (President Thomas Jefferson) have long been part of US political thinking.[75] For 165 years after independence, the USA formed no international alliances except for one with France during the Revolutionary War.[76] In 2018, the USA had alliance agreements with 54 other states.[77] A degree of nostalgia for pre-alliance days gained ground in mainstream US Republican Party thinking even before the election of Trump as president in 2016. Indeed, his 'America First' slogan has a long history in US politics, having been used by President Woodrow Wilson among others.[78] Long-standing European allies of the USA have responded to President Trump's visible uncertainty about the logic of alliances with their own open doubts about the lasting reliability of theirs with the USA.[79]

[75] Fromkin, D., 'Entangling alliances', *Foreign Affairs*, July 1970.

[76] Beckley, M., 'The myth of entangling alliances', War on the Rocks, 9 June 2015.

[77] US Department of State, 'US Collective Defence Arrangements'.

[78] White House, 'The inaugural address: Remarks of President Donald J. Trump—as prepared for delivery', 20 Jan. 2017; and Churchwell, S., *Behold, America: A History of America First and the American Dream* (Bloomsbury: London, 2018).

[79] BBC News, 'Merkel: Europe "can no longer rely on allies" after Trump and Brexit', 28 May 2017; *Time*, 'French President Emmanuel Macron calls for a "European army" to defend against China, Russia and the US', 7 Nov. 2018; and *Politico*, 'Macron says Trump acting to 'detriment' of allies', 29 Nov. 2018.

These changes make international politics less predictable, which can lead to increasing uncertainty and a sense of insecurity. There is less clarity than only a few years ago about whether the explicit laws and rules of the international system will be respected, let alone its unstated norms and assumptions. All this means that the tensions and confrontation which, as always, pockmark world politics entail more risks of negative consequences for international stability than has previously been the case.

Russia, the USA and the West

The weakening of ties within the West in the first two years of the Trump administration means that in important details the US–Russia and the West–Russia relationships are no longer the same thing.[80] Nonetheless, the US relationship with Russia is as fractious as that of its European allies with Russia. This is reflected in the breakdown of US–Russian arms control and statements in both the 2017 US National Security Strategy and the 2018 US National Defense Strategy that Russia is a global adversary.[81]

Events have moved a long way since the 1990s when it seemed that Russian integration with the West was on offer; that is no longer regarded on either side as a possibility. Russia's 2014 annexation of Crimea and engagement in the conflict in eastern Ukraine marked decisive moments in the long deterioration of the relationship. In 2018, Russia temporarily escalated that dispute by seizing three Ukrainian vessels and their crew as they entered the Sea of Azov—an area of water to the north-east of Crimea, accessible only through the narrow Strait of Kerch.[82] A bridge over the strait linking Crimea with Russian territory, which opened in May 2018, has been criticized for being illegal and hampering international shipping.[83]

[80] Drury, C., 'European leaders "scared to death" Donald Trump will pull US troops out of continent', *The Independent*, 8 July 2018; and Renouf, J. S., 'Why Trump has made Europe more fearful of a possible Russian attack', The Conversation, 18 July 2018.

[81] White House, 'National Security Strategy of the United States of America', Dec. 2017, p. 3; US Department of Defense (DOD), Summary of the 2018 National Defense Strategy of the United States of America: Sharpening the American Military's Competitive Edge (DOD: Washington, DC, Jan. 2018); and Ali, I., 'US military puts "great power competition" at heart of strategy: Mattis', Reuters, 19 Jan. 2018.

[82] Sasse, G., 'Crimea Annexation 2.0', Judy Dempsey's Strategic Europe, Carnegie Europe, 29 Nov. 2018. On the conflict in Ukraine, see also chapter 2, section IV, in this volume.

[83] Saha, D., Kravchuk, V. and Movchan, V., 'The impact of the new Kerch Strait bridge on Ukraine's trade', Policy Briefing Series, PB/02/2018, German Advisory Group Ukraine, Feb. 2018; Socor, V., 'Azov Sea, Kerch Strait: Evolution of their purported legal status (part one)', *Eurasia Daily Monitor*, vol. 15, no. 169 (3 Dec. 2018); Socor, V., 'Azov Sea, Kerch Strait: Evolution of their purported legal status (part two)', *Eurasia Daily Monitor*, vol. 15, no. 171 (5 Dec. 2018); Socor, V., 'Azov Sea, Kerch Strait: Evolution of their purported legal status (part three)', *Eurasia Daily Monitor*, vol. 15, no. 173 (10 Dec. 2018); and Socor, V., 'Azov Sea, Kerch Strait: Evolution of their purported legal status (part four)', *Eurasia Daily Monitor*, vol. 15, no. 173 (10 Dec. 2018).

Russia punches far above its weight in international affairs. Its economy is considerably smaller not only than the economies of the USA and China but also of nine other states as well.[84] However, its policies are well strategized, opportunistic within that strategy, and determined. It has a proven readiness to use armed force, as in Ukraine since 2014 and Syria since 2015. And its views on international affairs are persuasive to a large audience both inside and outside Russia, although it is worth noting that the Russian Government's views on what constitutes national interest and international order are not very different from those that are current in the West.[85]

On the other hand, while the USA has a much larger military presence worldwide, consisting of a network of some 800 bases and other military sites, the West appears uncertain and divided.[86] It seems to have lost much of the soft power—the power of attraction and sympathy and, therefore, trust—it once had.[87] Symptomatically, in the diplomatic tit for tat and expulsions over the Salisbury poisoning, the countries that lined up with the UK and expelled Russian diplomats did not include any from South America, Africa, the Middle East or the Asia-Pacific region, except Australia.[88] As Russia and the West persist with the rituals of confrontation, with claim and counterclaim about the lawfulness of actions that are never submitted to international adjudication, the drift into global instability continues.

China's international relations

China's economic growth over the past four decades has averaged close to 10 per cent a year.[89] By the most commonly used measure (nominal gross domestic product), the USA remains the world's largest economy, but China looks likely to surpass it around 2030.[90] Since about 2008—the onset of a major crisis in the world economic system—this growth has found reflection in a steadily more assertive international policy, both in regional geopolitics and on the global stage. China has built up its military power; it has gained friends and allies with development assistance and investment in Africa; and

[84] Russia has the world's 12th largest economy; as well as the USA and China, the following (in rank order) all have larger national economies than Russia: Japan, Germany, India, France, the UK, Italy, Brazil, Canada and South Korea. International Monetary Fund (IMF), 'IMF DataMapper', accessed 20 Mar. 2019.

[85] Lieven, A., 'The dance of the ghosts: A new cold war with Russia will not serve Western interests', *Survival*, vol. 60, no. 5 (2018), pp. 115–40.

[86] Pemberton, M., 'US overseas bases: The facts', 27 Nov. 2018; and Pemberton, M., 'Something we can agree on: Close some overseas bases', Defense One, 28 Nov. 2018.

[87] Nye, J. S., *Soft Power: The Means to Success in World Politics* (Perseus: Cambridge, MA, 2004).

[88] Al Jazeera, 'Which countries are expelling Russian diplomats?', 31 Mar. 2018.

[89] Hirst, T., 'A brief history of China's economic growth', World Economic Forum, 30 July 2015.

[90] Hawksworth J. and Chan, D., *The World in 2050: Will the Shift in Global Economic Power Continue?* (PwC: London, Feb. 2015); and International Monetary Fund, 'China's economic outlook in six charts', 26 July 2018.

it is currently engaged in a massive investment programme in transport infrastructure across Asia in the Belt and Road Initiative—the 21st century Silk Road.[91] It has presented itself as a new champion of multilateralism, globalization, and action to mitigate and adapt to climate change.[92] Consistent with this multifaceted process of self-assertion, China presses hard for its national interests in its near abroad, including in a number of territorial disputes.

China's international commercial success has earned it many criticisms for what are depicted as its unfair policies and practices on tariffs, currency and intellectual property rights, and for restricting access to its domestic investment and commercial markets.[93] This has now escalated into a US–China trade war. In 2018, the USA imposed tariffs on $250 billion worth of Chinese products; China retaliated with tariffs on $110 billion worth of US goods.[94] A truce was agreed in December 2018 and the two governments undertook not to impose further tariffs for 90 days while working out a broad trade agreement. If they are unable to do that and the trade war resumes, the consequences for global economic stability could be extremely damaging.

Other issues may make it difficult to find agreement. In September, President Trump accused China of meddling in the US elections, adding to the air of confrontation.[95] Meanwhile, strategic competition between the two intensified in the Taiwan Strait and South China Sea. China is reported to have deployed anti-ship and anti-aircraft missiles on the disputed Spratly Islands and landed several bombers, including the nuclear-capable H-6K.[96] The USA and its allies (including Australia, Canada, France, Japan, New Zealand and the UK) have launched 'freedom of navigation' operations in the area.[97] In September, in a dangerously close encounter, a US warship and a Chinese warship passed within 40 metres of each other.[98]

[91] Ghiasy R. and Zhou, J., *The Silk Road Economic Belt: Considering Security Implications and EU–China Cooperation Prospects*, SIPRI and Friedrich Ebert Stiftung (SIPRI: Stockholm, 2017); and Ghiasy, R., Su, F. and Saalman, L., *The 21st Century Maritime Silk Road: Security Implications and Ways Forward for the European Union*, SIPRI and Friedrich Ebert Stiftung (SIPRI: Stockholm, 2018).

[92] *Financial Times*, 'Xi Jinping delivers robust defence of globalisation at Davos', 17 Jan. 2017; NBC News, 'China's Xi lectures Trump on globalization and climate change', 17 Jan. 2017; and Hilton, I., 'China: Contradictions in climate leadership', The Interpreter, 11 Dec. 2017.

[93] Collins, M., 'It's time to stand up to China', *Industry Week*, 13 June 2016; and White House, 'President Donald J. Trump is confronting China's unfair trade policies', 29 May 2018.

[94] Wong, D. and Koty, A. C., 'The US–China trade war: A timeline', China Briefing, 25 Feb. 2019.

[95] BBC News, 'Trump accuses China of election "meddling" against him', 26 Sep. 2018.

[96] *The Economist*, 'China has put missiles on islands in the South China Sea', 21 May 2018; and Feleke, B., 'China tests bombers on South China Sea island', CNN, 21 May 2018. On the South China Sea and the East China Sea, see Smith, D., 'International tensions and shifting dynamics of power', *SIPRI Yearbook 2018*, pp. 12–13.

[97] Browne, R. and Starr, B., 'US sails warships through Taiwan Strait amid tensions with China', CNN, 23 Oct. 2018.

[98] CNN, 'Photos show how close Chinese warship came to colliding with US destroyer', 4 Oct. 2018.

Iran and Saudi Arabia

The Middle East is steeped in security dilemmas and violent conflicts.[99] Key to understanding some of them is the rivalry between Iran and Saudi Arabia. Their power struggle has pitched them on opposite sides of the armed conflicts in Iraq, Syria and Yemen. Saudi Arabia is part of an anti-Iran coalition of interest that includes Israel, the United Arab Emirates and the USA. The USA has promoted the idea of a new Sunni security and political alliance—the Middle East Strategic Alliance, often referred to as the 'Arab NATO'—to counter Iran's expanding influence. However, despite some suggestions that it would be formed in 2019, significant obstacles to the new alliance remain.[100]

US, Saudi Arabian and Israeli criticism of Iran regularly stresses its regional role and continuing development of ballistic missiles. Iran's strategic interests include supporting the Assad administration in Syria, reinforcing its allies in Iraq and opposing Kurdish independence, sustaining Hezbollah in Lebanon and assisting the Houthis in Yemen. Iran's adversaries have also intervened in these and other countries' affairs in recent years, politically or with direct or indirect use of armed force. In the build-up of missiles in the region, Iran is far from the only state involved. Many countries are acquiring short- and medium-range missiles from multiple suppliers.[101] From the Iranian perspective, its medium-range missiles serve as a conventional deterrent against attack.

The line-up of forces against Iran generates formidable pressure, not least economically. However, the anti-Iran grouping is not completely stable. The assassination of the journalist Jamal Khashoggi in the Saudi Arabian consulate in Istanbul on 2 October prompted a backlash in the USA against Saudi Arabian policy and the seemingly unconditional US support for Saudi Arabia.[102] Revelations emerged not only about the gruesome details of the murder but also about torture of women prisoners in Saudi Arabian jails.[103] This fed increasing criticism of the Saudi war effort in Yemen, whose devastating human costs include a death toll that may be as high as 58 000, over one million cases of cholera in two wartime epidemics and an estimated

[99] On armed conflicts in the Middle East and North Africa, see chapter 2, section V, in this volume.

[100] Al Jazeera, 'Bahrain says "Arab NATO" to be formed by next year', 29 Oct. 2018; *The Economist*, 'A new Arab military alliance has dim prospects', 6 Oct. 2018; and Helou, A., 'What's standing in the way of an Arab NATO?', *Defense News*, 20 Nov. 2018.

[101] On transfers of missiles to the Middle East, see chapter 5, section III, in this volume. See also Erästö, T., 'Dissecting international concerns about Iran's missiles', SIPRI Backgrounder, 15 Nov. 2018.

[102] BBC News, 'Jamal Khashoggi: All you need to know about Saudi journalist's death', 11 Dec. 2018; and Ignatius, D., 'How the mysteries of Khashoggi's murder have rocked the US-Saudi partnership', *Washington Post*, 29 Mar. 2019.

[103] Stancatti, M. and Said, S., 'Saudi Arabia accused of torturing women's-rights activists in widening crackdown on dissent', *Wall Street Journal*, 20 Nov. 2018.

14 million people at risk of famine.[104] Efforts to bring the war to an end were intensified, leading to negotiations and the ceasefire agreement for the port city of Hodeidah, reached in Stockholm in December 2018.[105]

Iran and Saudi Arabia are major regional powers. Their rivalry is often interpreted as a product of conflict within the Sunni and Shia branches of Islam. Religion takes an explicitly central political and constitutional place in both states—the Wahhabi interpretation of Sunni Islam in Saudi Arabia and Shia Islam in Iran—but casting their rivalry as purely sectarian is not persuasive. The USA and Israel are part of the anti-Iran coalition, which suggests that religious priorities alone cannot be all that drives Saudi Arabian policy. Likewise, Iran provides firm support for the Alawite ruling group in Syria and came quickly to the aid of Sunni Qatar in 2017, when Qatar faced sanctions and a near blockade from Saudi Arabia. These actions suggest that national interest and strategic advantage are central features of Iranian policy. This is a state-to-state contestation for power. It will be a key dividing line in regional politics in the coming period. Outcomes are hard to forecast; a greater appetite than currently seems to exist for dialogue and potential compromise will be needed if a disastrous scenario is to be avoided.

V. Human security and international cooperation

In 1994, the UN Development Programme's annual *Human Development Report* introduced the concept of human security, expressing the core of its thinking in these terms:

> The world can never be at peace unless people have security in their daily lives. Future conflicts may often be within nations rather than between them—with their origins buried deep in growing socio-economic deprivation and disparities. The search for security in such a milieu lies in development, not in arms.[106]

This puts human well-being at the heart of security, in contrast with ideas that place state interests and power centre stage. These different approaches often lead to a useful shorthand of soft and hard security approaches: the former involving measures to protect well-being, the latter involving military preparations against potential adversaries.

There is less distance between these two regularly counterposed concepts than may first seem the case. In theory, the interests of state and nation—the people—should be coterminous; the point of hard security, then, is to ensure

[104] Cockburn, P., 'The Yemen war death toll is five times higher than we think—we can't shrug off our responsibilities any longer', *The Independent*, 26 Oct. 2018; Science Daily, 'Mystery of Yemen cholera epidemic solved', 2 Jan. 2019; and UN News, 'Half the population of Yemen at risk of famine: UN emergency relief chief', 23 Oct. 2018.

[105] On the armed conflict and peace process in Yemen, see chapter 2, section V, in this volume.

[106] UN Development Programme, *Human Development Report 1994* (Oxford University Press: Oxford, 1994).

human well-being, at least of the citizens of that country. Issues of human security that do not feature in thinking about military preparations can nonetheless have distinctly hard security consequences. The pressure of drought and poor water management, for example, is part of the background narrative of how the wars in Syria and Yemen came about.[107] There is, in short, a single security space within which different kinds of action and preparation have an impact for better or worse.

Most states' security policies are not planned and implemented with this integrated approach in mind. Most security policies emphasize military preparations with, often, a reference to diplomacy, while human security issues are ignored or left to another institution. There are notable exceptions that draw evidence and reflections on human security into the framework of national security policy and strategy, but they are not plentiful and are often marginal in the key planning decisions that implement policy.[108]

This deficiency in approaches to security will need to be remedied if there is to be an effective response to the challenges to human security and, through it, international stability arising from climate change and other forms of environmental deterioration.

Climate change, the security agenda and hunger

The year 2018 was not the hottest on record. The previous three were all hotter. The fifth hottest was 2014. In other words, the five warmest years on record are the five most recent ones.[109] One forecast suggests the next four years will be another particularly warm period, while another suggests that by the 2040s, what are currently regarded as unusually hot summers will be the average in Europe.[110] Worldwide, the year was marked by droughts, floods and extreme weather events—and Canadian glaciers began breaking up for the first time on record.[111]

During the year, a number of reports appeared warning about trends and consequences. A special report from the Intergovernmental Panel on Climate Change (IPCC), published in October, explored the serious consequences

[107] Krampe, F. and Smith, D., 'Climate-related security risks in the Middle East', in eds A. Jägerskog, M. Schulz and A. Swain, *Routledge Handbook on Middle East Security* (Routledge: Abingdon, 2019).

[108] One such example is the review of future risks produced by the UK's Development, Concepts and Doctrine Centre, *Global Strategic Trends: The Future Starts Today* (British Ministry of Defence: London, Oct. 2018).

[109] NASA, '2018 fourth warmest year in continued warming trend, according to NASA, NOAA', Global Climate Change, 6 Feb. 2019.

[110] Sévellec, F. and Drijfhout, S. S., 'A novel probabilistic forecast system predicting anomalously warm 2018–2022 reinforcing the long-term global warming trend', *Nature Communications*, 14 Aug. 2018; and BBC Newsnight, 'Heatwave 2018 explained', YouTube, 25 July 2018.

[111] Sengupta, S., May, T. and ur-Rehman, Z., 'How record heat wreaked havoc on four continents', *New York Times*, 30 July 2018; and *The Guardian*, '"We've never seen this": Massive Canadian glaciers shrinking rapidly', 30 Oct. 2018.

if average global temperatures rise to 1.5°C above pre-industrial times and compared it to the yet more damaging consequences of getting to and surpassing 2°C above.[112] Other reports revealed an average decline of 60 per cent since 1970 in the populations of vertebrates apart from humans and explored the likely combined effect of climate change and other drivers of environmental deterioration in generating sudden and lasting changes in critical ecological subsystems.[113]

There is sufficient evidence to understand the causal chain that, depending on other circumstances such as the condition of economy and state, can lead from a changing climate through water and food insecurity to risk of social instability, political upheaval and worse.[114] What is still required is the transition from risk awareness to systematic risk management. The necessity to act on this can hardly be overstated. The IPCC estimates that average global temperatures will be about 1.5°C above pre-industrial levels at some point between 2030 and 2052, if they continue to increase at the current rate.[115] The 1.5°C level is the estimated safe maximum for low-lying inhabited places by the sea. Just over a quarter of the territory of small island developing states (SIDS), with some 20 million inhabitants, is less than five metres above sea level.[116] Among the less serious dangers they face are huge impacts on economies, the physical stability of residences, nutrition and health. For some countries, their continued existence is threatened. One estimate identifies nine highly at-risk SIDS with a combined population of about 2.3 million people.[117] Added to those estimates of people at risk must be some proportion of the more than 1 billion people living in coastal areas less than five metres above sea level.[118]

Without corrective action to mitigate carbon emissions and adapt to the consequences of climate change, serious difficulties for the effective

[112] Intergovernmental Panel on Climate Change (IPCC), *Global Warming of 1.5°C* (IPCC: Geneva, 2018); and Levin, K., '8 things you need to know about the IPCC 1.5°C report', World Resources Institute, 7 Oct. 2018.

[113] The findings of the World Wildlife Fund study were often misreported as revealing a decline in the total vertebrate population of 60 per cent, which is statistically quite different from an average 60 per cent loss among all animal populations of widely diverging sizes: *Living Planet Report* (World Wildlife Fund: Washington, DC, 2018). See also Rocha, J. C. et al., 'Cascading regime shifts within and across scales', *Science*, vol. 362, no. 6421 (21 Dec. 2018), pp. 1379–83.

[114] See e.g. Rüttinger, L. et al., *A New Climate for Peace: Taking Action on Climate and Fragility Risks*, Adelphi, International Alert, Woodrow Wilson International Center for Scholars and European Union Institute for Security Studies report, 2015.

[115] IPCC (note 112), introduction, para. A.1.

[116] UN Development Programme, 'Small island nations at the frontline of climate action', 18 Sep. 2017. The main source of data on SIDS is the UN Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS), 'Small Island Developing States (SIDS) statistics'.

[117] Acciona, Sustainability For All, 'Countries at risk of disappearing due to climate change'. See also Statistical Institute of Jamaica, 'Climate Change & Small Island Developing States', Presentation at the 49th Session of the UN Statistical Commission, 7 Mar. 2018

[118] 'The battle for the coast', *World Ocean Review*, vol. 1 (2010).

functioning and essential viability of these areas will emerge in mid century or before. These challenges to well-being have potentially profound and unavoidable consequences for human security, national security in many countries and international stability alike. The risks if there are inadequate national and international responses to these challenges are grave. The international security agenda risks being overwhelmed.

The number of people affected by chronic hunger is rising again after a long period of steadily falling and has reached 821 million people—11 per cent of humanity.[119] Some of the areas hardest hit are severely affected by both conflict and climate change. According to the UN's Food and Agriculture Organization and the World Food Programme, the situation in Afghanistan, the Central African Republic, the Democratic Republic of the Congo, South Sudan and Yemen worsened in the latter part of 2018 largely because of conflict. The Lake Chad region, Somalia and Syria saw some improvements in both food supply and security.[120]

Some progress is being made in adapting agendas and institutions to face the intersecting challenges of climate change and insecurity. Both the African Union and the European Union, for example, have made progress in addressing climate-related security risks.[121] In July 2018, the UN Security Council held a full debate on the impact of climate change on peace and security; a growing number of Security Council resolutions stress the need for adequate climate risk assessments and management strategies.[122] In addition, two recent initiatives offer the potential to help shape future UN actions on climate security: the intergovernmental Group of Friends on Climate and Security, which started in August 2018; and the Climate Security Mechanism, which was created in November 2018 and is hosted by the UN Department of Political and Peacebuilding Affairs.[123]

These are promising developments even if they do not grab the headlines. Climate-related security risks pose multifaceted problems that no country can solve alone. The engagement of multilateral organizations, including the

[119] Food and Agriculture Organization (FAO), IFAD, UNICEF, World Food Programme (WFP) and WHO, *The State of Food Security and Nutrition in the World 2018. Building Climate Resilience for Food Security and Nutrition* (FAO: Rome, 2018).

[120] Food and Agriculture Organization (FAO) and World Food Programme (WFP), *Monitoring Food Security in Countries with Conflict Situations* (FAO and WFP: Rome, Jan. 2019).

[121] Bremberg, N., Sonnsjö, H. and Mobjörk, M., 'The EU and climate-related security risks: A community of practice in the making?', *Journal of European Integration*, 2018; Fishman, A., 'EU event addresses linkages between climate change and security', International Institute for Sustainable Development, 28 June 2018; and Krampe, F. and Aminga, V. M., 'The need for an African Union special envoy for climate change and security', SIPRI Commentary, 7 Feb. 2019.

[122] Government Offices of Sweden, 'Statement by Minister for Foreign Affairs Margot Wallström at the UN Security Council debate on climate-related security risks', New York, 11 July 2018.

[123] SIPRI, 'Expert Working Group on Climate-related Security Risks'; Smith, D. et al., *Climate Security: Making it #Doable*, Clingendael Report, Feb. 2019; and German Federal Foreign Office, 'United Nations: Germany initiates Group of Friends on Climate and Security', 8 Aug. 2018.

UN, is essential. The UN Secretary-General's Climate Summit in September 2019 will be an important moment in shaping the climate agenda.

The UN and multilateral institutions

A theme running through this overview of the global security horizon is the role of cooperation and multilateral approaches to problem-solving. There is a pressing need to construct a new and improved architecture of arms control and disarmament. It is urgent to find a way out of the multiple power competitions that characterize world politics. Above all, it is essential to meet the challenges posed by climate change and other environmental deterioration. All this requires cooperation, multilateral approaches to policy, and strong and effective international institutions. The problem is that an unprecedented need for increased cooperation is met by a declining appetite for it. The three great powers—China, Russia and the USA—display a taste for only selective reference to international norms, legality and multilateral institutions.

The improving health of the UN, with an activist secretary-general with strong agendas on reducing disarmament, preventing violent conflict, combating climate change and fulfilling the Sustainable Development Goals, is therefore an important development. There, perhaps, lie some answers to this period's discomfiting questions about international security. It may be regarded as inevitable that great powers choose when to be bound by the law and when to try to be above it. If so, it should be equally axiomatic that medium and lesser powers will tend more systematically and consistently to favour international law and norms of political behaviour and attempt to press them on the great powers. The nature of contemporary security challenges makes cooperation, norms and institutionalization more important than ever; it remains as ever an open question how the balance between great power exceptionalism and international institutionalism will work out.

VI. In conclusion: The 50th edition of the Yearbook

This, the 50th edition of the SIPRI Yearbook, offers an opportunity to reflect on how the range of topics SIPRI covers has developed over a half century. There is significant continuity between our preoccupations then and now, yet also considerable change. The range is broader, reflecting changes in world politics and military technologies, and also new understanding about what insecurity is and what drives it. The impact of climate change and other forms of environmental deterioration, the concept of human security, the notion of peacebuilding, the importance of recognizing gender issues and making them explicit, the idea of a comprehensive approach to security, the necessity for a multifaceted explanation of what causes armed conflicts,

together with the recognition of the importance of violence that falls outside the standard definitions of war and armed conflict—all these have enlarged the peace and security agenda over the past 50 years. Although not all of these are addressed in this chapter or, indeed, in this edition of the SIPRI Yearbook, they all feature on SIPRI's evolving research agenda. There are also at least two essential constants.

In December 2018, SIPRI's founding director, Professor Robert Neild died.[124] He did much to ensure these two constants became part of our institutional DNA. One is the commitment to peace: SIPRI was established to carry out research so as to improve the prospects for peaceful international relations and for disarmament. The other is the commitment to facts: SIPRI was also established to fill the knowledge gaps that existed then, to provide the essential data on military spending, arms transfers, nuclear weapons, and chemical and biological weapons. Robert Neild had been conducting empirical research on critical problems since the closing years of World War II. The twofold commitment to going where the facts lead and to seeking to contribute modestly to improving the prospects for better relations between states was natural to him and he imbued the new institute with that ethos.

Over the years much of the data collection in the Yearbook has been refined and the scope increased. A much greater variety of public data sources is available (SIPRI gets its data from public sources and compiles it with a consistent and transparent methodology), in no small measure because of the revolution in information technology. There remain deficiencies in the information sources, with transparency deficits in key countries. It is a demanding task to generate information that is as accurate as possible—but it is an important one. Robert Neild and his fellow founders of SIPRI, especially the Swedish politician Alva Myrdal and the economist Gunnar Myrdal, set SIPRI on a path that is as relevant today as ever.

[124] Kaldor, M., 'Robert Neild obituary', *The Guardian*, 8 Jan. 2019.