SIPRI YEARBOOK 2019
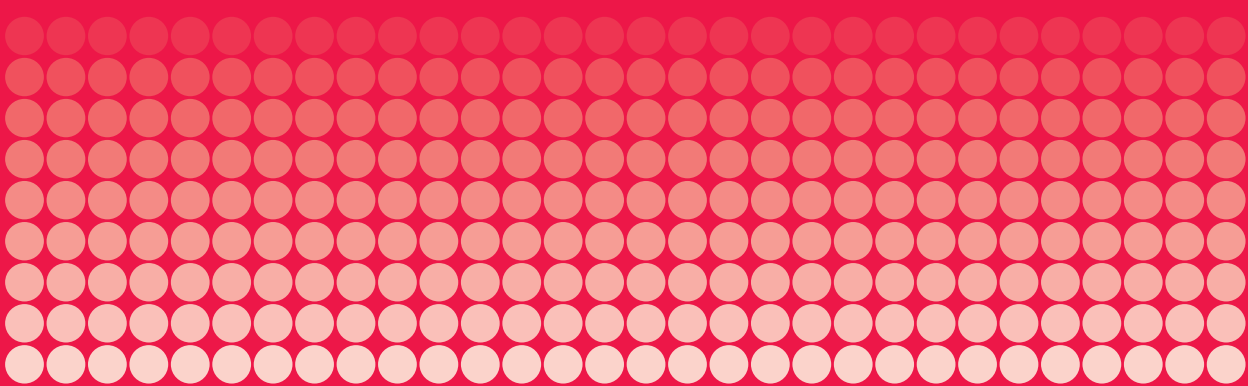
Armaments, Disarmament and International Security

Summary

STOCKHOLM INTERNATIONAL PEACE RESEARCH INSTITUTE

SIPRI is an independent international institute dedicated to research into conflict, armaments, arms control and disarmament. Established in 1966, SIPRI provides data, analysis and recommendations, based on open sources, to policymakers, researchers, media and the interested public.

THE SIPRI YEARBOOK

SIPRI Yearbook 2019 presents a combination of original data in areas such as world military expenditure, international arms transfers, arms production, nuclear forces, armed conflicts and multilateral peace operations with state-of-the-art analysis of important aspects of arms control, peace and international security.

This booklet summarizes the contents of *SIPRI Yearbook 2019* and provides samples of the data and analysis that it contains.

CONTENTS

1. INTRODUCTION. INTERNATIONAL STABILITY AND HUMAN SECURITY IN 2018

DAN SMITH

This is the 50th edition of the SIPRI Yearbook. Over the years it has reflected changes in world politics and military technologies, while consistently providing essential data on armaments, disarmament and international security.

The trends revealed in recent yearbooks have been broadly negative. While there were some positive signs in 2018—notably in detente on the Korean Peninsula, United States diplomacy with North Korea (and a vague road map for moving forward on denuclearization), a concerted effort to address, limit and end the violence in Yemen, the Eritrea–Ethiopia peace accord, and evidence that the United Nations Security Council is starting to address the security implications of climate change— there were also significant negatives. Among these were the US withdrawal from the Iran nuclear deal and the Intermediate-range Nuclear Forces Treaty (INF Treaty), and the persistence of geopolitical tensions in a number of locations. More generally, military spending, arms transfers and the incidence of armed conflict worldwide all remained high. Overall, the balance of negatives and positives remains deficient.

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 and an expanded programme of ballistic missile defence. In Russia, the strategic path is no less expansive. Moreover, the use of chemical weapons in Syria in 2018 and an attempted assassination in the United Kingdom using a nerve agent raised further questions about the viability and reliability of disarmament and arms control regimes in the current international political climate.

In the absence of a strongly status quo power, there is less clarity about whether the explicit laws and rules of the international system will be respected, let alone its unstated norms and assumptions. China, Russia and the USA are all actively challenging components of the global order, from the political geography of key regions to the balance of power in international finance. The drift into global instability was demonstrated in 2018 by continuing tensions between the West and Russia, a US–China 'trade war' and the power struggle between Iran and Saudi Arabia, pitching them on opposite sides of the armed conflicts in Iraq, Syria and Yemen.

The intersecting challenges of climate change and insecurity have potentially profound and unavoidable consequences for human security, national security in many countries and international stability. Without corrective action to mitigate carbon emissions and adapt to the consequences of climate change, serious difficulties will emerge mid century or before. Some progress is being made in adapting agendas and institutions to face these challenges but, as in arms control and disarmament, the role of cooperation and multilateral approaches remains essential. There is a pressing need to find a way out of the multiple power competitions that characterize world politics. ●

2. ARMED CONFLICTS AND PEACE PROCESSES

Most contemporary armed conflicts involve a combination of regular armies, militias and armed civilians. Fighting rarely occurs on well-defined battlefields and is often intermittent with a wide range of intensities and brief ceasefires. The number of forcibly displaced people worldwide at the start of 2018 was 68.5 million, including more than 25 million refugees. Protracted displacement crises continued in Afghanistan, the Central African Republic (CAR), the Democratic Republic of the Congo (DRC), Myanmar, Somalia, South Sudan, Syria and Yemen.

The Americas

In the Americas, implementation of the peace process in Colombia ran into a series of problems in 2018. Although this was the only country with an active armed conflict in the region, insecurity and instability were pervasive due to the presence o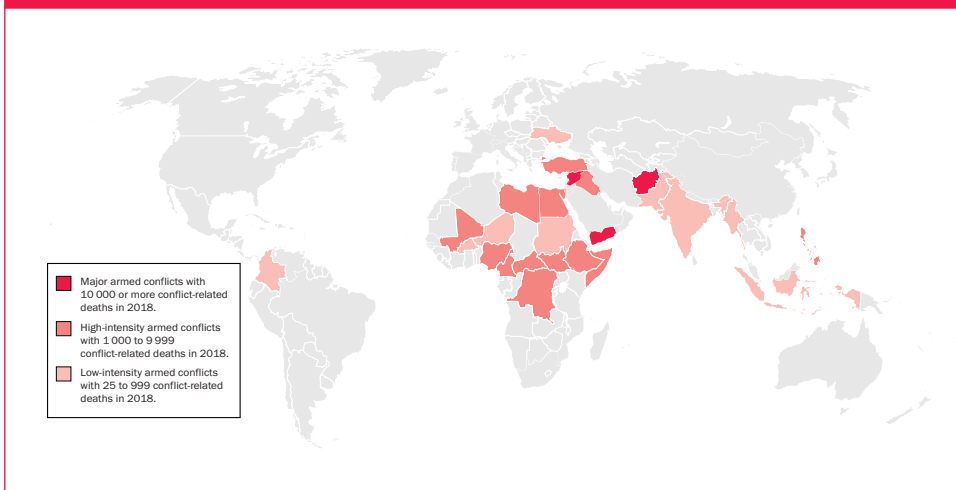f organized criminal gangs and non-state armed groups in many countries in Central and South America. Political unrest and violence occurred in Nicaragua, while in Venezuela a growing humanitarian crisis, including a large outflux of refugees, raised concerns about regional destabilization. Economic problems and endemic crime and corruption contributed to deteriorating levels of confidence in democracy.

Asia and Oceania

There were seven countries with active armed conflicts in Asia and Oceania in 2018: Afghanistan, India, Indonesia, Myanmar, Pakistan, the Philippines and Thailand. The war in Afghanistan was the world's most lethal armed conflict in 2018, killing more than 43 000 combatants and civilians. Despite some promising developments in the various peace processes, at the end of the year the conflict parties were as divided as ever, violence on the ground was increasing, and regional and international powers held divergent positions.

Two emerging regional trends were: growing violence linked to identity politics,

ARMED CONFLICTS IN 2018

Major armed conflicts with 10 000 or more conflict-related deaths in 2018.

High-intensity armed conflicts with 1 000 to 9 999 conflict-related deaths in 2018.

Low-intensity armed conflicts with 25 to 999 conflict-related deaths in 2018.

based on ethnic and/or religious polarization; and increased activity by transnational violent jihadist groups, including an Islamic State presence in Afghanistan, China, India, Indonesia, Malaysia, Pakistan and the Philippines. Two key positive developments were the peace process on the Korean Peninsula and the reinstatement of the truce between India and Pakistan over Kashmir.

Europe

The conflict in Ukraine was the only active armed conflict in Europe in 2018. Apart from a number of temporary ceasefires, little progress was made in the peace process. Elsewhere in Europe, tensions remained linked to unresolved conflicts, especially those in the post-Soviet space and in highly militarized and contested security contexts such as the Black Sea region. More promisingly, the name dispute between Macedonia and Greece was close to resolution by the end of the year, and the Basque separatist group Euskadi Ta Askatasuna (ETA, Basque Homeland and Liberty) formally disbanded.

The Middle East and North Africa

There were seven countries with active armed conflicts in the Middle East and North Africa in 2018: Egypt, Iraq, Israel, Libya, Syria, Turkey and Yemen. Three cross-cutting issues also shaped the region's security dilemmas: (*a*) regional interstate rivalries with a shifting network of external alliances and interests; (*b*) continuing threats from violent jihadist groups; and (*c*) increasing competition over water and the growing impact of climate change.

The ongoing armed conflict and civil unrest between Israel and Hamas and other Palestinian organizations in Gaza rose to its highest level since 2014. While the Syrian civil war was far from over, there was a clear de-escalation in 2018 due to the Syrian Government's consolidation of territorial control and the near defeat of the Islamic State. Nevertheless, it continued to be one of the most devastating conflicts in the world. In Yemen, humanitarian conditions worsened in 2018 as a stop-start fight for the port city of Hodeida ensued. The Stockholm Agreement between the Houthis and the Yemeni Government at the end of the year offered cause for optimism, although significant differences remained to be bridged in follow-on talks.

Sub-Saharan Africa

Eleven countries had active armed conflicts in sub-Saharan Africa in 2018: Burkina Faso, Cameroon, the CAR, the DRC, Ethiopia, Mali, Niger, Nigeria, Somalia, South Sudan and Sudan. Many of these conflicts overlap across states and regions, notably in the Lake Chad Basin and the Sahel, as a result of the transnational activities of violent Islamist groups, other armed groups and criminal networks. They are also linked to extreme poverty, poor governance, economic fragility and low levels of resilience. Three cross-cutting issues also shaped the region in 2018: (*a*) the continuing internationalization of counterterrorism activities in Africa; (*b*) changes in the scale and frequency of election-related violence; and (*c*) water scarcity and the growing impact of climate change. A peace agreement between Ethiopia and Eritrea in July was a potential game-changer in the Horn of Africa. ●

3. PEACE OPERATIONS AND CONFLICT MANAGEMENT

The North Atlantic Treaty Organization (NATO) Mission in Iraq (NMI) was the only new multilateral peace operation established in 2018 and only two closed—the UN Mission in Liberia (UNMIL) and the Southern African Development Community (SADC) Preventive Mission in the Kingdom of Lesotho (SAPMIL). There were 60 multilateral peace operations active in 2018, the lowest number since 2013.

The number of personnel serving in multilateral peace operations decreased for the third year in a row. It was 144 791 by the end of 2018: 95 488 in UN peace operations (a reduction of 2.9 per cent in 2018); and 49 303 in non-UN multilateral peace operations led by regional organizations and alliances or by ad hoc coalitions of states (an increase of 3.7 per cent in 2018). NATO accounted for most of the latter increase by reinforcing the Resolute Support Mission (RSM) in Afghanistan. The total number of personnel deployed in Africa fell for the third consecutive year, to the lowest level in five years: 104 238 personnel.

Trends in United Nations peace operations

Around 66 per cent of all personnel in peace operations are deployed in UN peace operations and some 72 per cent are in Africa. Nonetheless, a trend appears to be developing away from the UN and away from Africa. This is primarily because of the continuing negative atmosphere surrounding UN peace operations, especially over budgets and fatalities, as well as an increasing belief in militarized solutions.

The UN peacekeeping budget decreased from $7.9 billion in 2016–17 to $6.7 billion in 2018–19, mainly as a result of the closure of missions already scheduled to drawdown, rather than new approaches or increased efficiency. If no new missions are established, further reductions can be foreseen following the closure of the African Union/UN Hybrid Operation in Darfur (UNAMID) and the UN Stabilization Mission in the Democratic Republic of the Congo (MONUSCO). In addition, many of the cuts sought by the administration of US President Donald J. Trump have not yet taken place.

In 2018 the number of fatalities in UN peace operations linked to malicious acts decreased sharply in comparison to 2017. The 27 hostile deaths were less than half the number in 2017 and the lowest since 2012. However, 2017 was an extreme year and the number of personnel deployed has also declined. In 2018 the number of hostile deaths per 1000 deployed uniformed personnel was back to 2013–16 levels. Moreover, while conditions in the UN Multidimensional Integrated Stabilization Mission in Mali (MINUSMA) improved, the number of deaths remained relatively high in the UN Multidimensional Integrated Stabilization Mission in the Central African Republic (MINUSCA) and MONUSCO.

Militarized solutions

The Trump administration is only partly responsible for the increased emphasis on militarized solutions. It is also illustrated by earlier European Union and NATO training and mentoring missions (e.g. the NMI and the RSM, which sought to enable local forces) and regional coalition-based multilateral non-peace operations (e.g. the Joint Force of the Group of Five for the Sahel, JF G5S, and the Multinational Joint Task Force, MNJTF, against Boko Haram).
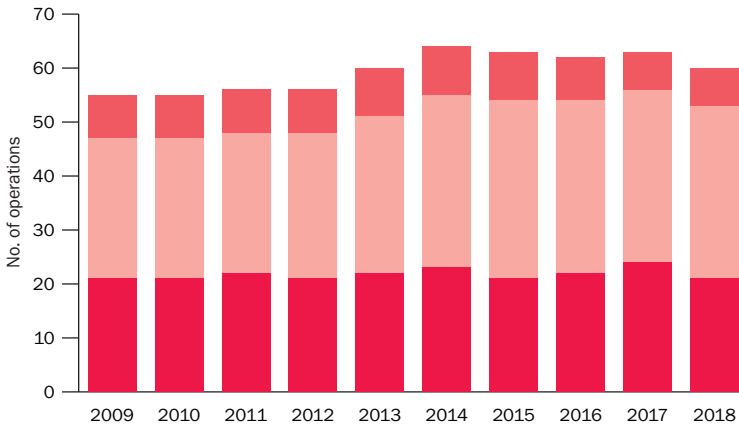
While UN peace operations clearly have their challenges, it remains to be seen whether the alternative of training national forces and setting up multilateral non-peace operations to fight insurgents and 'terrorists' will be more productive. In the Sahel, for example, further destabilization has occurred, the JF G5S and the MNJTF have come under sustained attack and national forces have been implicated in serious human rights abuses.

United Nations peacekeeping reforms

The UN is continuing its 'peacekeeping reforms'. The UN secretariat is working to implement the recommendations of the Cruz Report on reducing hostile deaths, and has begun strategic reviews of operations focused on the prevention of and response to sexual exploitation and abuse. On 1 January 2019 it implemented a reform of the UN's peace and security architecture. In the context of the Secretary-General's Action for Peace (A4P), UN member states and other partners and stakeholders agreed a 'Declaration of Shared Commitments' in 2018 on topics such as the protection of civilians, safety and security, and performance and accountability.

While the UN secretariat is introducing reforms to keep UN peace operations relevant, the challenges associated with training and mentoring missions and multilateral non-peace operations remain significant. It is still too early to tell what will become of UN peace operations and whether other types of missions will become even more relevant for enhancing international peace and security. ●

4. MILITARY EXPENDITURE

World military expenditure is estimated to have been $1822 billion in 2018, accounting for 2.1 per cent of world gross domestic product (GDP) or $239 per person. Total expenditure grew for the second consecutive year and exceeded $1.8 trillion for the first time; it was 2.6 per cent higher than in 2017 and 5.4 per cent higher than in 2009.

The growth in total spending in 2018 was largely influenced by expenditure patterns in the Americas and Asia and Oceania, in particular by substantial rises in military expenditure by the United States and China. In Europe, spending grew by 1.4 per cent, mostly due to a rise in expenditure in Western Europe, where all but three countries increased spending. Military expenditure decreased in Africa, by 8.4 per cent. For the fourth successive year, SIPRI cannot provide an estimate of total spending in the Middle East, but the combined military expenditure of the 11 Middle Eastern countries for which data is available decreased by 1.9 per cent.

The military burden—military spending as a share of GDP—fell between 2017 and 2018 in all regions except Europe, where there has been a push by member states of the North Atlantic Treaty Organization (NATO) to reach the guideline spending level of 2.0 per cent of GDP by 2024. On average, states in the Americas had the lowest military burden in 2018, at 1.4 per cent of GDP; this rises to an average of 1.6 per cent in Europe, 1.7 per cent in both Africa and Asia and Oceania, and 4.4 per cent in the Middle Eastern countries for which data is available.

The five biggest spenders in 2018 were the USA, China, Saudi Arabia, India and France, which together accounted for 60 per cent of global military spending.

WORLD MILITARY SPENDING, 2018

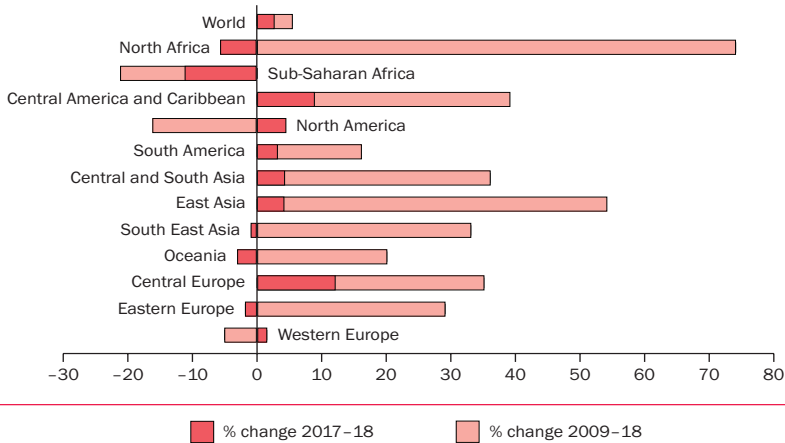| Region	Spending (US$ b.)	Change (%)
Africa	(40.6)	−8.4
North Africa	(22.2)	−5.5
Sub-Saharan Africa	18.4	−11
Americas	735	4.4
Central America and Caribbean	8.6	8.8
North America	670	4.4
South America	55.6	3.1
Asia and Oceania	507	3.3
Central and South Asia	85.9	4.2
East Asia	350	4.1
Oceania	29.1	−2.9
South East Asia	41.9	−0.8
Europe	364	1.4
Central Europe	28.3	12
Eastern Europe	69.5	−1.7
Western Europe	266	1.4
Middle East	..	..
World total	**1 822**	**2.6**

( ) = uncertain estimate; . . = data unavailable. Spending figures are in current (2017) US$. All changes are in real terms for the period 2017–18.

The USA increased its military spending for the first time in seven years to reach $649 billion in 2018. Spending by the USA accounted for 36 per cent of world military spending and was 2.6 times more than the next highest spender, China. The rise in US military spending can be attributed to two factors: a 2.4 per cent increase in the salaries of military personnel; and the implementation of large and costly conventional and nuclear arms acquisition programmes.

China allocated an estimated $250 billion to its military in 2018. This represented a 5.0 per cent increase compared with 2017 and an 83 per cent increase since 2009. China's military spending is roughly linked to the country's economic growth, which

World	
North Africa	
Sub-Saharan Africa	
Central America and Caribbean	
North America	
South America	
Central and South Asia	
East Asia	
South East Asia	
Oceania	
Central Europe	
Eastern Europe	
Western Europe	

−30 −20 −10 0 10 20 30 40 50 60 70 80

■ % change 2017–18   ■ % change 2009–18

slowed in 2018 to the lowest level in 28 years. Slower growth in military spending can therefore be expected in the coming years.

Saudi Arabia had the highest military burden in the world at 8.8 per cent of GDP in 2018. Its military spending fell by 6.5 per cent in 2018 to $67.6 billion. India ($66.5 billion) and France ($63.8 billion) were the fourth- and fifth-highest spenders in the world in 2018.

At $61.4 billion, Russian military spending in 2018 had fallen by 22 per cent from its post-cold war peak in 2016, and Russia was ranked outside the top five military spenders for the first time since 2006.

The three biggest relative increases in military spending between 2017 and 2018 were by Burkina Faso (52 per cent), Jamaica (40 per cent) and Armenia (33 per cent), while the three largest relative decreases were by South Sudan (50 per cent), Sudan (49 per cent) and Benin (28 per cent).

Transparency in military expenditure

The decline in responses to the United Nations Report on Military Expenditures continued in 2018. Having peaked at 81 responses in 2002, in 2018 only 36 of the 193 UN member states submitted a report on their military expenditure. In contrast, at the national level, data was obtained for 155 of the 168 countries for which SIPRI attempted to collect military expenditure information for 2018. The data came from official government documents for 150 of these.

Transparency in military spending requires not only public availability of data, but also comprehensiveness, ease of access and details on the various types of funding of military activities. Disaggregation of military budgets into military and non-military activities is an important step towards improving transparency in military expenditure. According to a case study on Brazil, accurate disaggregation of resources allocated to the military for police tasks improves the accuracy of military spending data. ●

5. INTERNATIONAL ARMS TRANSFERS AND DEVELOPMENTS IN ARMS PRODUCTION

The volume of international transfers of major arms grew by 7.8 per cent between 2009–13 and 2014–18, reaching its highest level since the end of the cold war. This growth is a continuation of the steady upward trend that began in the early 2000s.

The five largest suppliers in 2014–18 were the United States, Russia, France, Germany and China, and they accounted for 75 per cent of the total global volume of exports. Since 1950, the USA and Russia (or the Soviet Union before 1992) have consistently been by far the largest suppliers and, together with West European exporters, have historically dominated the top 10 list of suppliers.

The USA was the largest exporter of major arms in the five-year period 2014–18, with deliveries to at least 98 states. The gap between the USA and all other exporters widened. In 2009–13, US arms exports were 12 per cent higher than those of Russia—the second-largest arms exporter

in that period. In 2014–18, US arms exports were 75 per cent higher than Russia's.

Asia and Oceania was the main recipient region, accounting for 40 per cent of the global volume of imports of major arms in 2014–18. The Middle East accounted for 35 per cent of imports. The flow of arms to the Middle East grew by 87 per cent between 2009–13 and 2014–18. In contrast, the flow of arms to all other regions decreased between the two periods: to the Americas by 36 per cent, to Europe by 13 per cent, to Asia and Oceania by 6.7 per cent and to Africa by 6.5 per cent. The five largest arms importers were Saudi Arabia, India, Egypt, Australia and Algeria, which together accounted for 35 per cent of total arms imports.

The group of largest importers is more diverse and has seen more changes over time than the group of largest exporters. Since 1950, SIPRI has identified 255 actors (202 states, 48 non-state armed groups and 5 international organizations) that received major arms in at least one year. Of these, 26 received arms in all the years between

THE TREND IN TRANSFERS OF MAJOR ARMS, 1950–2018
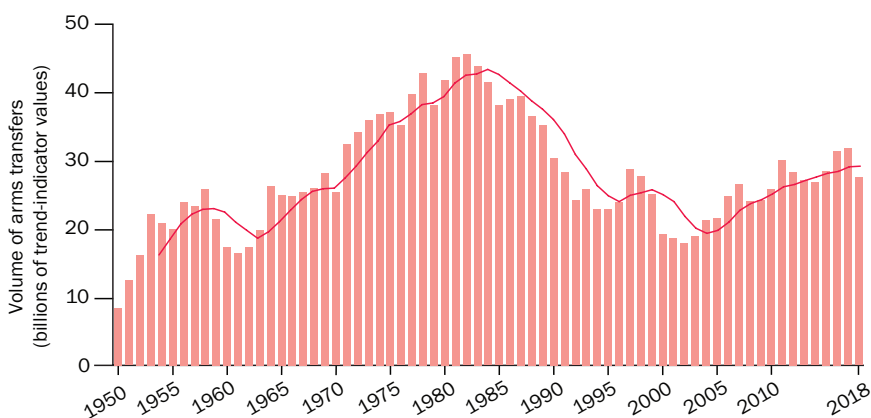
THE MAIN EXPORTERS AND IMPORTERS OF MAJOR ARMS, 2014–18			
Exporter	Global share (%)	Importer	Global share (%)
1 USA	34	1 Saudi Arabia	12
2 Russia	22	2 India	9.5
3 France	6.7	3 Egypt	5.1
4 Germany	5.8	4 Australia	4.6
5 China	5.7	5 Algeria	4.4
6 UK	4.8	6 China	4.2
7 Spain	2.9	7 UAE	3.7
8 Israel	2.9	8 Iraq	3.7
9 Italy	2.5	9 South Korea	3.1
10 Netherlands	2.1	10 Viet Nam	2.9

1950 and 2018, and another 3 in all the years they existed.

Transparency in arms transfers

The number of states reporting their arms exports and imports to the United Nations Register of Conventional Arms (UNROCA) remained at a very low level and no major changes occurred in the various national and regional reporting mechanisms. As more states ratified the 2013 Arms Trade Treaty (ATT), the number of states fulfilling their treaty obligation to report arms exports and imports has grown. However, the proportion of ATT states parties submitting a report decreased in 2018.

The financial value of states' arms exports, 2017*

While SIPRI data on arms transfers does not represent their financial value, many arms-exporting states do publish figures on the financial value of their arms exports. Based on such data, SIPRI estimates that the total value of the global arms trade in 2017 was at least $95 billion.

* The latest year for which data is available.

IMPORTS OF MAJOR ARMS, PERCENTAGE OF GLOBAL SHARE, BY REGION AND SUBREGION, 2014–18	
Region	Global share (%) 2014–18
Africa	7.8
North Africa	5.9
Sub-Saharan Africa	1.9
Americas	6.2
Central America and Caribbean	–
North America	–
South America	2.4
Asia and Oceania	40
Central and South Asia	1.6
East Asia	10
Oceania	4.8
South Asia	14
South East Asia	9.4
Europe	11
Central Europe	–
Eastern Europe	–
Western Europe	–
Middle East	35
Other	0.1

– = no deliveries.
'Other' refers to international organizations (or some non-state actors) that are not based in a single region, as well as unidentified recipients that cannot be linked to a specific region.

Arms production and military services

The SIPRI Top 100 arms-producing and military services companies ranks the largest companies in the arms industry (outside China) by their sales, both domestic and for export. The total value of the sales of the SIPRI Top 100 in 2017* was $398 billion, a 2.5 per cent increase compared with 2016. This growth was driven by increases in arms procurement spending by several states, in particular the USA and Russia as well as various countries participating in armed conflicts, notably in the Middle East. ●

6. WORLD NUCLEAR FORCES

At the start of 2019, nine states—the United States, Russia, the United Kingdom, France, China, India, Pakistan, Israel and the Democratic People's Republic of Korea (DPRK, North Korea)—possessed approximately 13 865 nuclear weapons, of which 3750 were deployed with operational forces. Nearly 2000 of these are kept in a state of high operational alert.
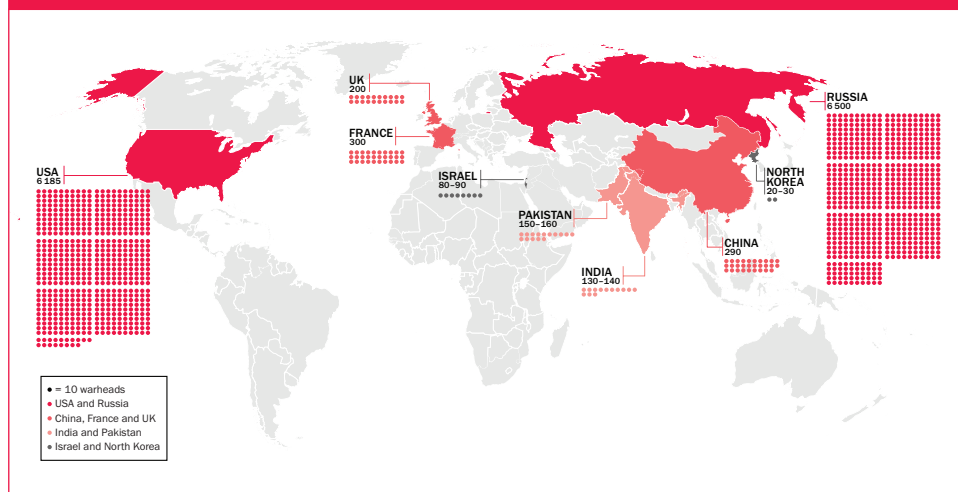
Nuclear arsenals

Overall, the inventories of nuclear warheads continue to decline. This is mainly due to Russia and the USA, which collectively account for over 90 per cent of global nuclear weapons, reducing their strategic nuclear forces in line with the 2010 Treaty on Measures for the Further Reduction and Limitation of Strategic Offensive Arms (New START) while also making unilateral reductions. However, the pace of their reductions has slowed compared with a decade ago, and neither Russia nor the USA has committed to making further negotiated reductions in their respective nuclear forces. At the same time, both Russia and the USA have extensive and expensive programmes under way to replace and modernize their nuclear warheads, missile and aircraft delivery systems, and nuclear weapon production facilities. In 2018 the US Department of Defense set out plans to develop new nuclear weapons and modify others to give them expanded military roles and missions.

The nuclear arsenals of the other nuclear-armed states are considerably smaller, but all are either developing or deploying new weapon systems or have announced their intention to do so. China is gradually increasing the size and diversifying the composition of its nuclear arsenal. India and Pakistan are expanding their military fissile material production capabilities on a scale that may lead to significant increases in the size of their nuclear weapon inventories over the next decade. North Korea continues to prioritize its military nuclear programme as a central element of its national security strategy, although in 2018 it announced a moratorium on the testing of

GLOBAL NUCLEAR WEAPON STOCKPILES, 2018

UK
200

FRANCE
300

RUSSIA
6 500

USA
6 185

ISRAEL
80–90

NORTH KOREA
20–30

PAKISTAN
150–160

CHINA
290

INDIA
130–140

• = 10 warheads
• USA and Russia
• China, France and UK
• India and Pakistan
• Israel and North Korea

The raw material for nuclear weapons is fissile material, either highly enriched uranium (HEU) or separated plutonium. China, France, Russia, the UK and the USA have produced both HEU and plutonium for use in their nuclear weapons; India and Israel have produced mainly plutonium; and Pakistan has produced mainly HEU, but it is expanding its ability to produce plutonium. North Korea has produced plutonium for use in nuclear weapons but may have produced HEU as well. All states with a civilian nuclear industry are capable of producing fissile materials.

The International Panel on Fissile Materials compiles information on global stocks of fissile materials.

	Global stocks, 2018
Highly enriched uranium	~1 340 tonnes
Separated plutonium	
Military stocks	~220 tonnes
Civilian stocks	~300 tonnes

Country	Deployed warheads	Other warheads	Total inventory
USA	1 750	4 435	6 185
Russia	1 600	4 900	6 500
UK	120	80	200
France	280	20	300
China	–	290	290
India	–	130–140	130–140
Pakistan	–	150–160	150–160
Israel	–	80–90	80–90
North Korea	–	(20–30)	(20–30)
Total	**3 750**	**10 115**	**13 865**

– = zero; ( ) = uncertain figure not included in the total.

'Other warheads' includes operational warheads held in storage and retired warheads awaiting dismantlement. The figures for Russia and the USA do not necessarily correspond to those in their 2010 Treaty on Measures for the Further Reduction and Limitation of Strategic Offensive Arms (New START) declarations because of the treaty's counting rules. Total figures include the highest estimate when a range is given. All estimates are approximate and as of Jan. 2019.

nuclear weapons as well as medium- and long-range ballistic missile delivery systems.

A lack of transparency

The availability of reliable information on the status of the nuclear arsenals and the capabilities of the nuclear-armed states varies significantly. The USA and the UK have disclosed considerable information about their respective nuclear stockpiles and capabilities, and France has also declared some information. Russia refuses to publicly disclose a detailed breakdown of its forces counted under New START, even though it shares this information with the USA. China now publicly displays its nuclear forces more frequently than in the past but releases little information about force numbers or future development plans. The governments of India and Pakistan make statements about some of their missile tests but provide no information about the status or size of their arsenals. North Korea has acknowledged conducting nuclear weapon and missile tests but provides no information about its nuclear weapon capabilities. Israel has a long-standing policy of not commenting on its nuclear arsenal. ●

7. NUCLEAR DISARMAMENT, ARMS CONTROL AND NON-PROLIFERATION

North Korean–US nuclear dialogue

In 2018 there was renewed diplomatic engagement between the Democratic People's Republic of Korea (DPRK, North Korea) and the United States over the latter's long-standing demand—supported by multiple United Nations Security Council resolutions—that North Korea verifiably abandon its nuclear weapon and ballistic missile programmes. At the first-ever summit meeting between the North Korean and US leaders in Singapore in June, North Korea committed to work towards the 'complete denuclearization' of the Korean Peninsula. As part of the easing of political and military tensions during the year, North Korea announced that it had suspended the testing of nuclear weapons and ballistic missiles and had destroyed its nuclear weapon test site.

Russian–US nuclear arms control

In 2018 Russia and the United States completed the implementation of the 2010 Treaty on Measures for the Further Reduction and Limitation of Strategic Offensive Arms (New START). In February, the two countries announced that they had achieved the final New START force reduction limits by the specified deadline. However, the prospects for sustaining this progress appeared increasingly remote, given the political and military differences between the two countries. New START will expire in 2021 unless both parties agree to extend it, but there were no discussions in 2018 about doing so.

The INF Treaty

The future of nuclear arms control was also called into question in 2018 by the intensified dispute between the USA and Russia over a seminal cold war-era arms control treaty, the 1987 Soviet–US Treaty on the Elimination of Intermediate-Range and Shorter-Range Missiles (INF Treaty). The USA alleges that Russia has developed and deployed a mobile ground-launched cruise missile with a flight range prohibited under the treaty—an allegation that Russia has consistently dismissed as baseless. In October, US President Donald J. Trump announced that the USA would formally withdraw from the INF Treaty if Russia did not promptly address US compliance concerns. The year ended with growing pessimism that either party would take steps to preserve the treaty.

Iran and the Joint Comprehensive Plan of Action

In 2018 Iran continued to implement the 2015 Joint Comprehensive Plan of Action (JCPOA), an eight-party agreement designed to limit Iran's proliferation-sensitive nuclear activities and to build international confidence about the exclusively peaceful nature of its nuclear programme. Political tensions between Iran and the USA culminated in President Trump announcing in May that the USA would cease participation in the JCPOA and take steps to reimpose US sanctions against Iran that had been lifted or waived in connection with implementing the agreement. The Iranian Government appealed to the other signatories, especially the European Union, to provide guarantees that at least some degree of sanctions relief—one of Iran's principal benefits under the JCPOA—could be provided despite the

Category of data	Treaty limits[a]	Russia		United States	
		Feb. 2011	Sep. 2018	Feb. 2011	Sep. 2018
Deployed ICBMs, SLBMs and heavy bombers	700	521	517	882	659
Warheads on deployed ICBMs, SLBMs and heavy bombers[b]	1 550	1 537	1 420	1 800	1 398
Deployed and non-deployed launchers of ICBMs, SLBMs and heavy bombers	800	865	775	1 124	800

ICBM = intercontinental ballistic missile; SLBM = submarine-launched ballistic missile.

[a] To be reached by 5 Feb. 2018.

[b] Each heavy bomber is counted as carrying only 1 warhead.

extraterritorial impact of the US sanctions in order for Iran to stay in the deal.

Treaty on the Prohibition of Nuclear Weapons

The Treaty on the Prohibition of Nuclear Weapons (TPNW), which was negotiated and opened for signature in 2017, remained a focus of international efforts to promote progress towards achieving the long-term goal of global nuclear disarmament. The TPNW is the first legally binding agreement to prohibit the development, deployment, possession, use and threat of use of nuclear weapons. During the year, there were debates in a number of states about whether to accede to the TPNW. The debates tended to focus on assessments of the normative impact of the proposed nuclear-weapon ban as well as its implications for nuclear deterrence-based security strategies and alliances. The treaty will enter into force once it has been signed and ratified by 50 states.

Multilateral arms control and disarmament

In other nuclear arms control-related developments during the year: the second session of the Preparatory Committee for the 2020 Non-Proliferation Treaty (NPT) Review Conference was held in April–May; and a new UN disarmament agenda, 'Securing Our Common Future', was launched by the UN Secretary-General, António Guterres, in May. In June, the high-level fissile material cut-off treaty (FMCT) expert preparatory group completed its work with the adoption of a final report that made recommendations on the scope and substantive elements for the future negotiation of an FMCT. In December, the UN General Assembly First Committee adopted a resolution calling for the UN Secretary-General to convene a conference in 2019 on creating a weapons of mass destruction-free zone in the Middle East. ●

8. CHEMICAL AND BIOLOGICAL SECURITY THREATS

Allegations of chemical weapon use in Syria and the UK

Allegations of chemical weapon (CW) use in Syria continued to dominate the work of the Organisation for the Prohibition of Chemical Weapons (OPCW) in 2018. Among the allegations of use was an attack in Douma on 7 April that prompted the United States, the United Kingdom and France to launch retaliatory strikes against three sites one week later. Outside Syria, in March, a toxic chemical from the Novichok nerve agent family was used in Salisbury, UK, hospitalizing three people. Two further people were exposed to the same agent in June and one of them subsequently died in July.

Attribution of responsibility for chemical weapon use

The issues surrounding CW use, and attribution of responsibility where use is found, resulted in a major division between states parties to the 1993 Chemical Weapons Convention (CWC) in 2018. The expiry of the mandate of the OPCW–United Nations Joint Investigative Mechanism created a gap in the international community's ability to respond to use once proved. In an attempt to fill this gap, France launched the International Partnership Against Impunity for the Use of Chemical Weapons in January 2018, and 38 countries plus the European Union had joined by the end of the year.

In May, 11 permanent representatives to the OPCW called for a Special Session of the Conference of the States Parties with a single substantive agenda item: upholding the global ban on CWs. Held over two days in June, the Special Session voted to empower the OPCW to attribute responsibility. Those states that support this decision consider the numerous claims of CW use in Syria to be credible and believe that an attribution mechanism is essential; those that oppose the decision argue that the allegations have led to the OPCW becoming politicized. This division has effectively destroyed—at least in the short term—the culture of consensus decision-making at the OPCW and created serious tensions between states parties. These tensions were played out at both the 23rd Conference of the States Parties and the 4th Review Conference.

Biological arms control

Key biological disarmament and non-proliferation activities in 2018 were carried out in connection with the first set of inter-sessional Meetings of Experts and the Meeting of States Parties to the Biological and Toxin Weapons Convention (BWC). The latter meeting in December endorsed a set of substantive measures designed to ensure the BWC's future financial sustainability, although further discussions on the financial situation will take place in 2019.

In an unanticipated development, the Meeting of States Parties was unable to reach a consensus on the deliberations of the Meetings of Experts, including on any possible outcomes. The impasse resulted from what was labelled the 'obstinacy' of a single delegation and underscored the meeting's outdated working methods. However, an unusually large number of BWC-related workshops took place during the year. ●

9. GLOBAL INSTRUMENTS FOR CONVENTIONAL ARMS CONTROL

The CCW Convention and lethal autonomous weapon systems

In 2018, efforts to regulate lethal autonomous weapon systems (LAWS) continued to be made within the framework of the 1981 Convention on Certain Conventional Weapons (CCW Convention). For the second year, discussions on LAWS took place within a Group of Governmental Experts (GGE) and focused on: (*a*) the characterization of LAWS; (*b*) the human element in the use of force and aspects of human-machine interaction; (*c*) potential military applications of related technologies; and (*d*) options for addressing the humanitarian and international security challenges posed by emerging LAWS technologies. There was no agreement on the way forward, but the mandate of the GGE was extended into 2019.

United Nations Programme of Action on small arms and light weapons

The Third Review Conference of the 2001 United Nations Programme of Action (UNPOA) on small arms and light weapons took place in June 2018. On two issues—linkages to some of the sustainable development goals (SDGs) and ammunition—the outcome document built on earlier advances and included language that increases the scope and relevance of the UNPOA. However, the persistence of previous divisions prevented the adoption of new language on arms transfers to non-state actors.

Cybersecurity

There were over 250 state-sponsored cyberattacks in the period 2005–18.

However, after two decades of UN discussions on cybersecurity, there is little common ground on the nature of the threat and the measures required to address it. States are polarized around two positions. First, a mainly Western group of states regards the proliferation of information and communication technologies (ICTs) as a positive tendency and considers existing international law sufficient for guiding state behaviour in cyberspace. Second, a group of countries led by China and Russia regards digitalization as a threat and would prefer new normative guidance on state use and development of ICTs. With no international consensus on a way forward, several regional organizations, such as the European Union, the North Atlantic Treaty Organization, the Organization for Security and Co-operation in Europe and the Association of Southeast Asian Nations, have made significant progress. There have also been important national and corporate initiatives. ●

10. DUAL-USE AND ARMS TRADE CONTROLS

Global, multilateral and regional efforts continued in 2018 to strengthen controls on the trade in conventional arms and in dual-use items connected with conventional, biological, chemical and nuclear weapons and their delivery systems. There were growing signs that the strength of these instruments is being increasingly tested by stretched national resources. This could be seen in the shortfalls in compliance with mandated reporting under the 2013 Arms Trade Treaty (ATT), the many reported violations of United Nations arms embargoes and the difficulties in finding states willing to act as chair of some of the export control regimes. Broader geopolitical tensions and the rapid pace of technological advances are also eroding international consensus on both the broader purpose and the effectiveness of export controls.

The Arms Trade Treaty

The Fourth Conference of States Parties to the ATT took place in Tokyo in August 2018. While the conference was focused on the topic of diversion, it was also forced to spend a considerable amount of time discussing the administration of the trust fund that supports the participation of low-income states and other aspects of treaty architecture. Moreover, levels of compliance with the ATT's reporting and funding obligations continued to fall short in several areas, posing clear challenges to the long-term relevance and health of the treaty. Efforts to achieve universalization have made some progress in recent years and by the end of 2018 the treaty had 100 states parties. Membership remains unbalanced geographically, however, with Europe, Africa and the Americas most

heavily represented. The Middle East and North Africa has some of the lowest levels of engagement with the ATT, despite being a region in evident need of stronger controls on arms transfers.

Multilateral arms embargoes

In 2018 there were 36 multilateral arms embargoes in force: 14 imposed by the UN, 21 by the European Union (EU) and 1 by the

League of Arab States. Of the EU's 21 embargoes, 10 implemented UN arms embargoes directly, 1 was put in place before an equivalent UN embargo was imposed, 2 were similar to UN embargoes but differed in geographical scope or the types of weapon covered and 8 had no UN counterpart. Most of these embargoes only covered conventional arms. However, the UN and EU embargoes on Iran and North Korea, and the EU embargoes on Russia and Syria also covered exports of dual-use items.

One new multilateral arms embargo was imposed in 2018: a UN embargo on South Sudan. The UN and EU arms embargoes on Eritrea, imposed in 2009, were lifted. As in previous years, investigations by the UN revealed problems with the implementation of its embargoes, and numerous reported cases of violations. However, the scope and significance of these violations varied considerably. Some involved large shipments of arms in contravention of the embargo while others involved a failure by a supplier or recipient state to notify a sanctions committee about a transfer.

Export control regimes

Membership of the four multilateral export control regimes—the Australia Group (AG), the Missile Technology Control Regime (MTCR), the Nuclear Suppliers Group and the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-use Goods and Technologies (Wassenaar Arrangement, WA)—remained stable following recent expansions. During 2018, all four regimes reviewed their respective trade control lists and guidelines. As in previous years, commonalities among the regimes centred around keeping up with technical developments and illegal procurement efforts—helped by an increase in inter-regime engagement on these issues.

The EU is the only regional organization to have established a common legal framework for dual-use and—to a more limited extent—arms export controls. In 2018 the EU institutions continued work on the 'recast' of the EU Dual-use Regulation and began work on a review of the EU Common Position on Arms Exports. In both cases, the European Parliament and non-governmental organizations sought to expand their scope—particularly by strengthening language on human rights and international humanitarian law. Some EU member states opposed these suggested changes.

Controlling technology transfers

In 2018 the United States, the EU and a number of EU member states increased the use of controls on foreign direct investment (FDI) to regulate transfers of 'sensitive' or 'strategic' technology. Long-standing challenges to the efficacy of export controls have been compounded by rapid advances in military-relevant emerging technologies in the civilian sector and the growing levels of foreign investment in the companies and research institutes involved. However, attempts to use FDI regulations to place restrictions on the trade in technology may come to be seen as further evidence of the willingness of states to use export controls to further their own economic interests. In the long term, such attempts may undermine the value of export controls as a multilateral tool for, among other things, preventing destabilizing transfers of arms and dual-use items. ●

Arms control and disarmament agreements in force, 1 January 2019

1925   Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare (1925 Geneva Protocol)

1948   Convention on the Prevention and Punishment of the Crime of Genocide (Genocide Convention)

1949   Geneva Convention (IV) Relative to the Protection of Civilian Persons in Time of War; and 1977 Protocols I and II Relating to the Protection of Victims of International and Non-International Armed Conflicts

1959   Antarctic Treaty

1963   Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water (Partial Test-Ban Treaty, PTBT)

1967   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)

1967   Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (Treaty of Tlatelolco)

1968   Treaty on the Non-Proliferation of Nuclear Weapons (Non-Proliferation Treaty, NPT)

1971   Treaty on the Prohibition of the Emplacement of Nuclear Weapons and other Weapons of Mass Destruction on the Seabed and the Ocean Floor and in the Subsoil thereof (Seabed Treaty)

1972   Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction (Biological and Toxin Weapons Convention, BTWC)

1974   Treaty on the Limitation of Underground Nuclear Weapon Tests (Threshold Test-Ban Treaty, TTBT)

1976   Treaty on Underground Nuclear Explosions for Peaceful Purposes (Peaceful Nuclear Explosions Treaty, PNET)

1977   Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (Enmod Convention)

1980   Convention on the Physical Protection of Nuclear Material and Nuclear Facilities

1981   Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons which may be Deemed to be Excessively Injurious or to have Indiscriminate Effects (CCW Convention, or 'Inhumane Weapons' Convention)

1985   South Pacific Nuclear Free Zone Treaty (Treaty of Rarotonga)

1987   Treaty on the Elimination of Intermediate-Range and Shorter-Range Missiles (INF Treaty)

1990   Treaty on Conventional Armed Forces in Europe (CFE Treaty)

1992   Treaty on Open Skies

1993   Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (Chemical Weapons Convention, CWC)

1995   Treaty on the Southeast Asia Nuclear Weapon-Free Zone (Treaty of Bangkok)

1996   African Nuclear-Weapon-Free Zone Treaty (Treaty of Pelindaba)

1996   Agreement on Sub-Regional Arms Control (Florence Agreement)

1997   Inter-American Convention Against the Illicit Manufacturing of and Trafficking in Firearms, Ammunition, Explosives, and Other Related Materials (CIFTA)

1997   Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction (APM Convention)

1999   Inter-American Convention on Transparency in Conventional Weapons Acquisitions

2001 Protocol on the Control of Firearms, Ammunition and other related Materials in the Southern African Development Community (SADC) Region

2004 Nairobi Protocol for the Prevention, Control and Reduction of Small Arms and Light Weapons in the Great Lakes Region and the Horn of Africa

2006 ECOWAS Convention on Small Arms and Light Weapons, their Ammunition and Other Related Materials

2006 Treaty on a Nuclear-Weapon-Free Zone in Central Asia (Treaty of Semipalatinsk)

2008 Convention on Cluster Munitions

2010 Treaty on Measures for the Further Reduction and Limitation of Strategic Offensive Arms (New START)

2010 Central African Convention for the Control of Small Arms and Light Weapons, Their Ammunition and All Parts and Components That Can Be Used for Their Manufacture, Repair and Assembly (Kinshasa Convention)

2011 Vienna Document 2011 on Confidence- and Security-Building Measures

2013 Arms Trade Treaty (ATT)

Agreements not yet in force, 1 January 2019

1996 Comprehensive Nuclear-Test-Ban Treaty (CTBT)

1999 Agreement on Adaptation of the CFE Treaty

2017 Treaty on the Prohibition of Nuclear Weapons

Security cooperation bodies

Developments in 2018 included India joining the Australia Group; Ukraine ending its partici- pation in the institutions of the Commonwealth of Independent States; and six states (Argentina, Brazil, Chile, Colombia, Paraguay and Peru) suspending their membership of the Union of South American Nations (UNASUR). ●

CHRONOLOGY 2018, SELECTED EVENTS

2 Jan.   United States President Donald J. Trump and North Korean leader Kim Jong Un exchange nuclear threats on Twitter.

28 Feb.   The second meeting of the Kabul Process for Peace and Security Cooperation is held in Afghanistan.

4 Mar.   A former Russian military officer and his daughter are poisoned in Salisbury, United Kingdom, with a nerve agent, later confirmed to be Novichok.

13 Apr.   The USA, France and the UK conduct airstrikes against suspected chemical weapon storage and research facilities in Syria.

8 May   The USA declares that it is with- drawing from the Iran nuclear agreement (the Joint Comprehen- sive Plan of Action, JCPOA).

12 June   At the first-ever summit meeting between the North Korean and US leaders, North Korea reaffirms its commitment to the 'complete denuclearization' of the Korean Peninsula.

8–9 July   Eritrea and Ethiopia sign a joint declaration formally ending their border conflict.

2 Aug.   A draft code of conduct in the South China Sea is agreed by the Associ- ation of Southeast Asian Nations and China.

12 Sep.   A peace agreement aimed at resolv- ing the conflict in South Sudan is signed by President Salva Kiir and rebel leader Riek Machar.

27 Oct.   Peace talks on Syria involving the leaders of France, Germany, Russia and Turkey take place in Istanbul.

29 Nov.   A draft US presidential directive sets out plans to establish a Space Force.

4 Dec.   The USA announces that it will with- draw from the INF Treaty within 60 days unless Russia resumes com- pliance with the treaty.

SIPRI DATABASES

SIPRI Military Expenditure Database

Gives the annual military spending of countries since 1949, allowing comparison of countries' military spending in local currency at current prices; in US dollars at constant prices and exchange rates; and as a share of gross domestic product.

SIPRI Arms Industry Database

Contains annual data on total revenue and revenue from arms sales and military services since 2002 for the 100 companies with the highest arms sales in the world (with the exception of Chinese companies).

SIPRI Arms Transfers Database

Shows all international transfers of major conventional arms since 1950. It is the most comprehensive publicly available source of information on international arms transfers.

SIPRI Arms Embargoes Database

Gives information on all arms embargoes that have been implemented by an international organization, such as the European Union or the United Nations, or by a group of nations. All embargoes that are in force, or have been in force since 1998, are included.

SIPRI National Reports Database

Provides links to all publicly accessible national reports on arms exports and is constantly updated to include links to newly published national reports on arms exports.

SIPRI Multilateral Peace Operations Database

Offers information on all UN and non-UN peace operations conducted since 2000, including location, dates of deployment and operation, mandate, participating countries, number of personnel, costs and fatalities.

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The SIPRI Yearbook is an authoritative and independent source of data and analysis on armaments, disarmament and international security. It provides an overview of developments in international security, weapons and technology, military expenditure, arms production and the arms trade, and armed conflicts and conflict management, along with efforts to control conventional, nuclear, chemical and biological weapons.

This booklet summarizes the 50th edition of the SIPRI Yearbook, which covers developments during 2018, including

- *Armed conflicts and conflict management*, with an overview of armed conflicts and peace processes as well as a focus on global and regional trends in peace operations
- *Military expenditure, international arms transfers and developments in arms production*
- *World nuclear forces*, with an overview of each of the nine nuclear-armed states and their nuclear modernization programmes
- *Nuclear arms control*, with a focus on North Korean–US nuclear diplomacy as well as developments in the INF Treaty and Russian–US nuclear arms control and disarmament, and implementation of Iran's nuclear deal
- *Chemical and biological security threats*, including the investigation of allegations of chemical weapon use in the Middle East and a suspected assassination attempt in the United Kingdom
- *Conventional arms control*, with a focus on global instruments, including efforts to regulate lethal autonomous weapon systems and explosive weapons in populated areas, and dialogue on international cybersecurity
- *Dual-use and arms trade controls*, featuring developments in the Arms Trade Treaty, multilateral arms embargoes and export control regimes, including the challenges of seeking to control transfers of technology

as well annexes listing arms control and disarmament agreements, international security cooperation bodies, and key events in 2018.