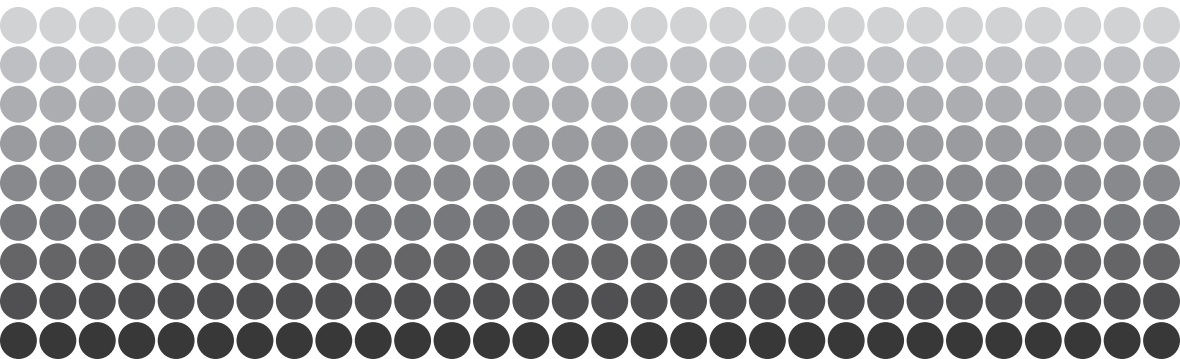**sipri**

SIPRI YEARBOOK 2014
Armaments, Disarmament and International Security

Introduction
International security, armaments and disarmament

IAN ANTHONY

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I. Global and regional security

Several indicators published by SIPRI since the turn of the century suggest an overall positive development in regard to efforts to maintain and strengthen international peace and security. However, the emerging data suggests that there might have been a break in this positive trend. *SIPRI Yearbook 2014* documents some disturbing tendencies in conflict, armament dynamics and international security. The world is still far from achieving anything that could be described as 'global order'. Moreover, given that political, technological, economic, ecological and military activities continue to undergo continuous and rapid change, achieving peaceful solutions to conflicts and promoting a more stable security environment may become increasingly elusive.

With the collapse of the Soviet Union, the economic and cultural predominance of the United States extended to encompass the security and defence sectors. The data presented in this edition of the Yearbook is a reminder that no other country is close to matching the investment that the USA makes in its military security, and this perhaps remains its most durable advantage (see chapter 4 in this volume).

Whether the USA has the skill, legitimacy and commitment to continue playing a pre-eminent role has been questioned from many quarters. For example, in 2007 Russian President Vladimir Putin noted that the concentration of decision authority in one country would not be sustainable. Since the economic and technological potential emerging in different countries would inevitably translate into a demand for greater political influence, Putin observed that the world is at a 'decisive moment when we must seriously think about the architecture of global security'.[1]

Among the group of countries whose international political influence is growing, China is unquestionably a rising power and, inevitably, a global one as its interests are rapidly spreading around the world.[2] In 2012 Henry Kissinger noted that significant groups in both China and the USA claim

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[1] Putin, V., Putin's prepared remarks at 43rd Munich Conference on Security Policy, *Washington Post*, 12 Feb. 2007.
[2] See e.g. Duchâtel, M., Bräuner, O. and Hang, Z., *Protecting China's Overseas Interests: The Slow Shift away from Non-interference*, SIPRI Policy Paper no. 41 (SIPRI: Stockholm, June 2014).

that a contest for supremacy 'is inevitable and perhaps already under way'.[3] However, analysts and observers have also argued that there are a number of states that can reasonably be described as emerging powers. Therefore, the impending contest—which may not necessarily imply military confrontation—may be between the USA and various combination of states, based on alternative approaches to international governance.[4]

Putin objected in particular to the idea of leadership based on what he called 'an almost uncontained hyper use of [military] force'. Internationally—including in the majority of European states—there is a growing emphasis on comprehensive approaches to both inter- and intrastate conflicts, whereby a combination of military, diplomatic, economic, social and cultural instruments are applied. In this context, the tendency to militarize international actions at an early stage is increasingly less likely to gain support from other actors whose engagement is required in order to solve these conflicts.

While the US administration of President Barack Obama has used force frequently, it has been reluctant to launch large-scale offensive military operations, especially when compared to Obama's predecessor, George W. Bush. Instead, in recent years at least, the principal advocates for the use of force (e.g. in Libya and elsewhere in Africa, or as seriously considered in the case of the Syrian conflict) have included other governments and a miscellaneous assortment of domestic and international critics of the Obama administration. The US Government has, in fact, displayed a growing reluctance to engage in further, potentially debilitating military commitments, while simultaneously attempting to wind down its military presence and associated financial commitments in Afghanistan and Iraq.

Rather than relinquishing leadership, the USA may be trying to adapt to new conditions. As he took office in 2009, President Obama signalled that the USA would emphasize cooperation as the preferred means of pursuing its national interest. However, when Obama said that the USA 'will show the courage to try and resolve our differences with other nations peacefully—not because we are naïve about the dangers we face, but because engagement can more durably lift suspicion and fear', it was interpreted by many as a sign of weakness in foreign policy, not least domestically and among the USA's allies.[5]

There is a certain fluidity in international governance. There are now more actors exerting influence around the world, and more centres of decision making. These include countries from the South and the East. In

[3] Kissinger, H., 'The future of US–Chinese relations: conflict is a choice, not a necessity', *Foreign Affairs*, vol. 91, no. 2 (Mar./Apr. 2012).

[4] Cox, M., 'Power shifts, economic change and the decline of the West?', *International Relations*, vol. 26, no. 4 (2012).

[5] White House, 'Inaugural address by President Barack Obama', 21 Jan. 2013, <http://www.white house.gov/the-press-office/2013/01/21/inaugural-address-president-barack-obama>.

addition, a heterogeneous set of non-state actors is now a permanent part of the international security landscape.

Despite this proliferation of influential state and non-state actors, there does not appear to be a new bloc mentality emerging. During the cold war, states allied either with the Soviet Union or with the USA would, for the most part, refrain from public criticism of allies' policies they disagreed with in order to promote group solidarity. Today, states cooperate on issues when they agree, but even close friends and allies are openly critical of one another in cases where the 'correct' approach is contested. One example of this has been the serious dispute between the USA and some of its closest allies over the issue of activities in cyberspace—in particular over issues related to the use of cybertools in espionage (see chapter 9).

The formation of flexible coalitions has perhaps been facilitated by the growing use of informal cooperation arrangements such as the Group of 20 (G20) framework, in which the leaders of a group of states that portray themselves as major advanced and emerging economies meet regularly but also interact with representatives from international organizations and the non-governmental sector.[6] The G20 states first met in Washington, DC, USA, in 2008, and marked their fifth anniversary with a meeting in St Petersburg, Russia, in September 2013. The main focus of the G20 members has been on the impact of the global financial and economic crisis, and the St Petersburg Summit indicated their preferred way of working with each other. Rather than acting as a space in which states find common agreement or take collective decisions, the G20 is a forum in which to coordinate national policies and manage any spillover effects from unilateral decisions.[7]

Multilateral processes are also evolving. Approaches based on negotiating issues of substance with the assistance of specialized institutions, and then codifying those agreements prior to national implementation, appear to be becoming less popular across a spectrum of issue areas. Traditional multilateralism might be said to be in retreat in the fields of trade, finance, information and communications technology (ICT), and the environment. For example, as of January 2014, talks intended to lead to agreement to lower tariffs on international trade in goods that began in 2001 (the so-called Doha Development Agenda) had yet to produce any results.[8] In December 2012, at the World Conference on International Communications in Dubai, European Union (EU) member states, as well as Japan

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[6] The G20 is made up of representatives of 19 states—Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, South Korea, Mexico, Russia, Saudi Arabia, South Africa, Turkey, the UK and the USA—and the European Union.

[7] 'G20 5th anniversary vision statement', G20 Summit, St Petersburg, 5–6 Sep. 2013, <https://www.g20.org/about_g20/past_summits/2013_st_petersburg>.

[8] World Trade Organization, 'The Doha Round', <http://www.wto.org/english/tratop_e/dda_e/dda_e.htm>.

and the USA, rejected revised international telecommunications regulations.[9] In November 2013 the Warsaw Climate Change Conference reached only very modest agreements in limited issue areas, notably enhanced forest management.[10]

In 2013 the inability of the United Nations Security Council to agree on a joint response to the conflict in Syria was also indicative of the fact that working through specialized institutions to forge agreement on issues of hard security has become progressively more difficult (see chapter 1). The analysis in this edition of the Yearbook of the evolving role of the Security Council suggests that Syria was far from an isolated case in this respect (see chapter 2). Any diminution in the effectiveness of the Security Council will inevitably lead to additional questions being raised over its legitimacy.

The most prominent accomplishments of the multilateral approach in 2013 were arguably in the field of military security. Syria agreed to dismantle and destroy its chemical weapon arsenal and join the 1993 Chemical Weapons Convention (see chapter 8). The process of investigating the use of chemical weapons in the Syrian conflict that paved the way for the elimination of the weapons and their associated infrastructure was initially a joint (and evolving) effort by three multilateral bodies—the UN, the Organisation for the Prohibition of Chemical Weapons (OPCW) and the World Health Organization (WHO). None of this could have been achieved by any state unilaterally, or by any group of states acting in a loose coalition.

The multilateral response to the use of chemical weapons in Syria was designed to increase efficiency by reducing the transaction costs entailed in seeking agreement through a web of bilateral consultations. As the scope of issues discussed under the banner of security becomes more complex, logically, there might be a need to strengthen multilateral efforts. The involvement of more actors and different kinds of actor in international governance implies that the multiple contacts required in order to seek agreement bilaterally can quickly overwhelm even the largest governments.

The fact that multilateralism is now often criticized as less efficient than coordination of national policies is a further demonstration of the breakdown of consensus (which was largely a consensus among the USA and its allies) on the principles and values underpinning decisions.[11] The apparent lack of appetite for a new common basis for international agreement is

[9] International Telecommunication Union, 'World Conference on International Telecommunications (WCIT-12)', <http://www.itu.int/en/wcit-12/Pages/default.aspx>.

[10] United Nations Framework Convention on Climate Change, Warsaw Climate Change Conference, Nov. 2013, <http://unfccc.int/meetings/warsaw_nov_2013/meeting/7649.php>.

[11] E.g. Robert Keohane has argued that the legitimacy of multilateralism has been compromised by the failure of institutions and organizations to achieve their substantive purposes. Keohane, R. O., 'The contingent legitimacy of multilateralism', eds E. Newman, R. Thakur and J. Tirman, *Multilateralism under Challenge? Power, International Order, and Structural Change* (United Nations University Press: Tokyo, 2006).

disturbing. Past experience suggests that an approach based on tolerating disagreement can only produce a limited set of rules that will, at best, contain rather than resolve problems among states.

II. Dynamics of peace and conflict

The information presented in successive editions of the SIPRI Yearbook attempting to quantify some of the main tendencies in conflict across the world is the product of collaboration between SIPRI and several important partners, including the Uppsala Conflict Data Program (UCDP) and the Institute for Economics and Peace (IEP). The data that is collected and presented through these partnerships has shown some clear tendencies.

First, the aggregate data suggest that the intensity of some intrastate conflicts is increasing, while the number of interstate conflicts, which are being fought at lower intensity, has become smaller (see chapter 1).

In 2013 the longer-term tendencies related to intrastate conflicts appeared to be borne out by reports from specific conflicts—such as those in the Central African Republic, Mali, South Sudan and Syria—as well as by reports on the impact of conflict on issues such as the protection of civilians, internal displacement of people and the creation of refugee populations outside countries in conflict. In September 2013 a report by the UN Secretary-General concluded that there was 'little room for optimism' in conditions where civilians continue to account for the vast majority of casualties and are regularly targeted and subjected to indiscriminate attacks and other violations by parties to conflict.[12]

According to the UN High Commissioner for Refugees (UNHCR), by late 2013 more than 2 million refugees had fled Syria, illustrating the serious impact of refugee flows on all of Syria's neighbours, while a further 4.25 million were internally displaced, of a total population of about 22 million.[13] There are multiple cases in which there is secondary, or multiple, displacement as people are forced to move several times by a combination of disasters that may quickly become interconnected (e.g. armed conflict, safe access to uncontaminated food and water, and resource scarcity).

Parties to armed conflict, as well as violent actors located in fragile states, appear increasingly willing to resort to terrorist methods.[14] According to the 2012 Global Terrorism Index, the global impact of terrorism increased significantly from 2002 to 2011 and peaked in 2007, at which point the global trend reached a plateau. The wider regional impact of failing to

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[12] United Nations, Security Council, Report of the Secretary-General on the protection of civilians in armed conflict, S/2013/689, 22 Nov. 2013.

[13] UN High Commissioner for Refugees (UNHCR), 'Number of Syrian refugees tops 2 million mark with more on the way', 3 Sep. 2013, <http://www.unhcr.org/522495669.html>.

[14] Institute for Economics and Peace (IEP), *2012 Global Terrorism Index: Capturing the Impact of Terrorism for the Last Decade*, IEP Report no. 19 (IEP: Sydney, 2012), p. 6.

maintain proper control over small arms and light weapons, ammunition, and explosives in Libya was felt across the whole of North Africa and the Sahel region. Moreover, the impact of ready access to modern weapons, abundant supplies of ammunition and military explosives is not only reflected in conflict intensity, but also in the level of violent crime in conflict locations.

Given the general trend towards urbanization, there may be a disturbing tendency to use area weapons—defined by the International Committee of the Red Cross as 'weapons whose effects are extended in space'—as well as high explosives inside cities during conflicts.[15]

In addition, there has been progress in reducing the risk from what former US Secretary of Defense William Perry once labelled 'Type-A threats'—that is, threats to national survival or threats of global war of the kind that dominated thinking for much of the 20th century.[16] The relative lack of concern with Type-A threats could be one factor explaining the relaxation of bloc thinking. In a benign security environment it is safe to take a more independent and critical stance. However, the risk that Type-A threats could re-emerge would be linked to a combination of responsible leaders failing to pay close attention to their relations with one another and significant shifts in military capability.

The data in this year's edition of the SIPRI Yearbook on world military expenditure is interesting to consider from this perspective. SIPRI data indicates that global military expenditure fell in 2013, by 1.9 per cent in real terms, to $1747 billion. This was the second consecutive year in which spending fell, and the rate of decrease was higher than the 0.4 per cent fall in 2012 (see chapter 4). This headline trend largely reflects reductions in spending by a small number of Western countries (first and foremost, the USA) as they extract themselves from over a decade of high-intensity military operations in Afghanistan and Iraq.

Outside the group of Western countries, there are countervailing trends. In absolute terms, measured using constant US dollars, two-thirds of the countries in North America and Western Europe reduced their military spending, while two-thirds of countries in other regions recorded an increase. Perhaps particularly noteworthy is the data for China and Russia, which have both more than doubled their military spending in real terms since 2004.

The SIPRI data on arms transfers also tends to reinforce some of the tendencies revealed in military spending data. For example, over the past

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[15] International Committee of the Red Cross (ICRC), *Weapons that May Cause Unnecessary Suffering or have Indiscriminate Effects* (ICRC: Geneva, 1973), p. 23.

[16] Perry, W., 'Message from the Chair', W. Perry et al., 'An American security policy: challenge, opportunity, commitment', National Security Advisory Group, July 2003, <http://belfercenter.hks. harvard.edu/publication/3144/american_security_policy.html>.

decade the flow of major conventional weapons to Europe has fallen. Flows to Asia and Africa, on the other hand, have risen significantly (see chapter 5). Countries in Asia and Oceania, taken together, account for the lion's share of major conventional arms imports. However, in the past five years Middle Eastern countries, such as Saudi Arabia and the United Arab Emirates—traditionally significant customers for major conventional weapons that seemed to be reducing their consumption—have rejoined the list of the world's top arms importers.

In many parts of the world, dedicated or systematic efforts to reduce the role of military factors in security are either lacking or poorly developed. However, the demilitarization of European politics, and the dismantling of military capabilities that had reached grotesque proportions, is rightly seen as one of the main accomplishments after the end of the cold war. There may now be an emerging tendency to revisit that achievement.

Anders Fogh Rasmussen, the Secretary General of the North Atlantic Treaty Organization (NATO), has often characterized reductions in military spending by the European members of the alliance as a serious problem. In September 2013 Rasmussen was blunt in his assessment: 'let me be very clear from the start. If we in Europe do not invest more—financially and politically—in our own defence and security, then in the future, we will not speak of our influence in the world, but of the influence of others over our world'.[17] Notably, spending in Western Europe fell by 2.4 per cent in 2013. In contract, spending in Eastern Europe rose by more than 5 per cent, and in 2013 the two countries in Europe with the largest year-on-year percentage increases in military spending were Belarus and Ukraine.

The member states of the EU and the European members of NATO actually spend a great deal on defence, together accounting for roughly 15 per cent of world military spending. In contrast, Russian military spending is less than one-third of that of EU members, and roughly equivalent to the combined amount spent by France and Germany. In addition, European states are trying to identify and take advantage of synergies across their respective security and defence acquisition programmes, including at the EU-level through, for example, the identification of relevant civilian research.

In 2011 the outgoing US Secretary of Defense, Robert Gates, coined the phrase 'collective military irrelevance' to describe a significant number of European members of NATO.[18] However, Gates was not referring to the volume of military spending (which measures an input) but military

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[17] Fogh Rasmussen, A., 'Fulfilling Europe's potential', Speech at the Inter-Parliamentary Conference for the Common Foreign and Security Policy and the Common Security and Defence Policy, 6 Sep. 2013, <http://www.lrs.lt/intl/presidency.show?theme=125&lang=2&doc=1305>.

[18] Gates, R., US Secretary of Defense, 'Reflections on the status and future of the transatlantic alliance', Security and Defence Agenda, 10 June, 2011, <http://www.securitydefenceagenda.org/Portals/14/Documents/Publications/2011/GATES_Report_final.pdf>.

capability (which is an output). It has long been recognized that the fragmented way in which resources are used by EU member states creates surpluses in certain kinds of military capability and deficits in others, something that Rasmussen acknowledged in a 2013 speech, in which he said: 'to be frank, some of the capabilities we have, we don't need. And some of the capabilities we need, we don't have'.[19]

In the absence of a more integrated approach, a simple increase in national military spending by all European NATO allies would not solve that problem—if anything, it would make it worse—and, in his reflections, Gates was clear that the most important step European countries could take to enhance capability would be the better allocation and coordination of existing resources. A more serious problem is the failure to recognize, analyse and understand the implications of the problems that European states are trying to address with their military spending.

At the European Council in December 2013, EU leaders emphasized the need to re-examine their contribution to security and defence. But they did not link this to a pledge to increase military spending, referring instead to the need to maintain 'a sufficient level of investment' in the military while seeking efficiency gains from cooperation and synergies between existing capabilities.[20] Perhaps more importantly, the Council promised to prioritize developing the EU's collective comprehensive approach to external conflict.[21] The data presented in this volume further illustrates how the EU has become more active in peace operations over time, under the umbrella of its Common Security and Defence Policy (CSDP)—in 2013, it conducted 12 peace operations, including 3 with a military component (see chapter 3).

SIPRI's partner, IEP, has mapped the characteristics of peaceful countries in its Pillars of Peace programme by matching a broad set of indicators against levels of conflict and violence. The most peaceful countries have a well-functioning government, a sound business environment and equitable distribution of resources; accept the rights of others, have good relations with neighbours and facilitate the free flow of information; and have high levels of education and low levels of corruption.[22] At the opposite end of the spectrum, approximately 35–70 states and territories are either already

[19] North Atlantic Treaty Organization (NATO), 'NATO: ready, robust, rebalanced—speech by NATO Secretary General Anders Fogh Rasmussen at Carnegie Europe', 19 Sep. 2013, <http://www.nato.int/cps/en/natolive/opinions_103231.htm>.

[20] Council of the European Union, 'European Council conclusions', Brussels, 19–20 Dec. 2013, <http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/140214.pdf>.

[21] European Commission, High Representative of the European Union for Foreign Affairs and Security Policy, 'The EU's comprehensive approach to external conflict and crises', Joint Communication to the European Parliament and the Council, JOIN(2013) 30 final, 11 Dec. 2013, <http://www.eeas.europa.eu/statements/docs/2013/131211_03_en.pdf>.

[22] Institute for Economics and Peace (IEP), Pillars of Peace: Understanding the Key Attitudes and Institutions that Underpin Peaceful Societies (IEP: Sydney, 2013).

experiencing armed conflict or are classified as fragile, with a significantly increased risk of conflict and excessive levels of violence.

The EU is present in all of the fragile states and territories in one capacity or another, while CSDP peace operations are only under way in a few locations. While a useful and positive contribution, CSDP missions and operations are far from reflecting the logic of the EU's comprehensive approach to external conflict and crises, which calls for the EU and its member states 'to combine, in a consistent manner, policies and tools ranging from diplomacy, security and defence to finance, trade, development and justice'.[23] The data presented in this edition of the Yearbook suggests that peace operations increasingly emphasize short duration and limited scale. However, it is likely to take a minimum of two decades, and probably closer to four decades, for a country to move from an immediate post-conflict condition to a more peaceful, stable and prosperous condition. The EU is unlikely to be able to sustain its engagement or reach its potential by limiting action to the intergovernmental coordination that underpins the CSDP.

III. The relationship between science and security

Writing in 1949, Vannevar Bush, the Director of the US Office of Scientific Research and Development during World War II, said that

pure science may go its own way, if it is allowed to do so, exploring the unknown with no thought other than to expand the boundaries of human knowledge. But applied science, the intricate process by which new knowledge becomes utilized by the forces of engineering and industry, pursues the path pointed out to it by authority.[24]

Historically, the need to increase military capability has been an important driver of investment in science and technology, a tendency that continues today. Decisions on the direction in which science should develop have been made, first and foremost, by states. Specific decisions about how much to invest in science, and in which branches, reflect differences in national constitutional arrangements, institutions and political priorities. The degree to which military policies are driven by technological development has not been resolved. However, analyses of international security have traditionally placed heavy emphasis on how states master advanced technology and use it to aggregate military capabilities.

The development and production of nuclear weapons is perhaps the ultimate expression of this linkage between science and security. The information published in this edition of the Yearbook shows that, although the overall number of nuclear weapons in the world continues to decline,

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[23] Council of the European Union (note 20).
[24] Bush, V., *Modern Arms and Free Men* (Simon & Schuster: New York, 1949), p. 6.

nuclear weapon-possessing states are also investing to ensure that they retain their nuclear arsenals for the foreseeable future (see chapter 6).

Assessing the implications of scientific progress has become increasingly challenging, given the fact that research is leading to more rapid develop-ments in a larger number of fields with potential security implications than ever before. While it is necessary to consider the various scientific research fields individually, the links between them are also growing more complex, and this complexity is likely to continue to grow in the future. Even in cases where technical solutions to non-military problems are explored, and even when science and technology is developed exclusively for peaceful pur-poses, there are still potential dilemmas that could have important security implications.

Several of these dilemmas are highlighted in the various chapters of this edition of the Yearbook. For example, how best to regulate the security-related aspects of emerging biotechnology has been the subject of negoti-ation among states for a long time.[25] However, in 2013 it became increas-ingly clear that some of the innovations produced from research into, for example, synthetic biology are now being embedded in commercial pro-ducts sold on national and international markets. These products are not aimed at traditional consumers, but at communities carrying out research into biotechnology, and medical researchers. Moreover, key aspects of com-mercial products increasingly depend on information that is transferred using intangible means (see chapter 8).

In a 2012 report the US National Intelligence Council highlighted the potential future role of advanced robotics, noting that 'although much development is still required to improve robots' cognitive abilities, many of the building blocks for futuristic and highly disruptive systems could be in place by 2030'.[26] In December 2012 a group of US scientists and engineers highlighted the fact that machines are evolving 'from human-controlled, to automated, to autonomous, with the ability to act on their own without human input', and that it will become less clear who is responsible for the actions undertaken by autonomous systems (see chapter 9).[27] Regulating the rapid development of autonomous robots is an issue that is becoming the focus of attention for the group of state and non-state actors that are working to preserve and strengthen the legal framework that prohibits or

[25] McLeish, C., *Implications of Bioscience and Technology Advances for the BTWC*, Non-prolifer-ation Papers no. 4, EU Non-proliferation Consortium, Dec. 2011, <http://www.nonproliferation.eu/activities/activities.php>.

[26] US National Intelligence Council (NIC), *Global Trends 2030: Alternative World*, NIC 2012-01, (NIC: Washington, DC, Dec. 2012), p. 90.

[27] Gilroy, W. G., 'Notre Dame's Reilly Center highlights emerging ethical dilemmas and policy issues in science and technology', University of Notre Dame, 17 Dec. 2012, <http://news.nd.edu/news/36397-notre-dames-reilly-center-highlights-emerging-ethical-dilemmas-and-policy-issues-in-science-and-technology/>.

restricts the use of certain weapons that are considered excessively injurious or whose effects are indiscriminate.

In December 2013 the Organisation for Security and Cooperation in Europe (OSCE) was the first organization to reach agreement on a set of confidence-building measures to reduce the risk that a suspicious act in cyberspace could be interpreted as hostile (see chapter 9). The agreement highlighted the importance that states now place on the role of ICT within security policy. In parallel to discussions on reducing risks, many of the members of the OSCE (as well as many others) continue to develop their national capabilities to conduct both offensive and defensive operations in cyberspace.

IV. Conclusions

In terms of conclusions that can be drawn from events and developments in 2013 in armaments, disarmament and international security, the interactions between three interlocking sets of issues should continue to be analysed.

First, the evolving approach to international governance will have a direct bearing on the capacity of states to reach common understanding and agreement on the best ways to promote international and regional security. The various chapters in this edition of the SIPRI Yearbook underline the emergence of a series of tensions of different kinds—for example, within the various specialized institutions and between global and regional bodies charged with security governance. The continuous movement from seeking common ground to tolerating national differences and managing their consequences has progressively corroded multilateral approaches and, as the security discourse escapes the confinement of agreed frameworks, a new fluidity can be seen in the alignment of states over different issues.

Second, improving understanding of the relationship between development and security will help identify opportunities for joint actions by actors that have not traditionally been partners. Few people would dispute the existence of a relationship between economic, social and human development on the one hand, and peace and security on the other. The relationship is complex: while security can lead to development and development can lead to security, neither is sufficient to promote the other and both may not always be necessary, in the short term. Better understanding of this relationship will require more research, using an approach that concentrates on analysing problems in their entirety, rather than focusing on trying to solve the individual elements. In order to understand how the different parts of these problems interact, it will be necessary to draw from many academic disciplines.

Third, the rapid pace and scope of advances in various fields of science and technology and the way that these advances interact with one another may now be considered an independent factor shaping international security. With growing complexity, the assessment of technology has become more difficult. Understanding the interaction between science and public policy has also become more of a challenge.

The need for 'competent, unbiased information concerning the physical, biological, economic, social, and political effects of the increasingly extensive and larger applications of technology' to support government decision making and the legislative process—the mandate of a now defunct US agency—is an idea that is certainly not outdated, but arguably more necessary than ever.[28]

[28] US Office of Technology Assessment, *Annual Report to the Congress* (US Government Printing Office: Washington, DC, 15 Mar. 1974), p. 3.