

Science: a Force Multiplier for Diplomacy

Introduction

On 5 October 1993 at 3.00 am British summertime, China conducted an underground nuclear explosion at their test site at Lop Nor. Three hours later, before most people had finished their first cup of coffee, VERTIC had announced not only the test itself, but also the yield range, location and orientation of the shaft—and also commented on the political implications of the event. It was the first instance of a small non-governmental organisation (NGO) demonstrating the potency of open-source monitoring in the arms control field, at a time when the internet was mostly unheard of, and state-of-the-art desktop computers were less powerful than today's mobile phones.

In a forerunner to today's International Monitoring System deployed by the Comprehensive Nuclear Test Ban Treaty Organisation, VERTIC used commercial satellite imagery, seismic data scraped from the then US National Earthquake Information Service (NEIS), and computer programmes designed to automate seismic monitoring of the Chinese test site. NEIS sent an electronic bulletin to VERTIC every 30 minutes. Once the algorithm identified a seismic event, the computer set off an air-raid siren. A next software upgrade was supposed to replace this with an audio clip from the movie Robocop, stating “dead or alive, you are coming with me”. According to the principal investigators, Vipin Gupta and Philip McNab, “the Robocop program was never fully operational because of a fatal hardware problem—cat hair in the hard drive”.

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VERTIC's project demonstrated that, without reliance on anything but openly available data, a global seismic network would be adequate for monitoring nuclear yields above a few kilotons at known test sites. In addition, VERTIC's outreach to international media served a quasi-diplomatic function, by raising awareness of the test and highlighting the value of the verification regime of the then-proposed Comprehensive Test Ban Treaty. Highly scientific and technical data was communicated clearly to a wider audience. While the project was principally designed to demonstrate the verifiability of the test ban treaty, it also showed that science, technology and diplomacy combined could be a powerful tool.

Governmental and non-governmental science diplomacy

In his report, 'Sweden and the bomb,' submitted to the International Atomic Energy Agency (IAEA) in 2001—Sweden had signed the so-called Additional Protocol in 1998—Dr Thomas Jonter outlined how science diplomacy had played an important role in nuclear non-proliferation in Scandinavia. Beginning in 1972, the then Swedish National Defence Research Institute (Försvarets forskningsanstalt, FOA), previously tasked with the job of developing a nuclear weapon, started to "support Swedish foreign policy with technical information which would enable Sweden to operate effectively in disarmament negotiations". Many of the country's former nuclear weapon researchers began working on nuclear weapons disarmament. Even today, the Swedish Defence Research Agency (Totalförsvarets forskningsinstitut, FOI) actively participates in technical disarmament verification exercises.

The United States has long upheld the interface between science and diplomacy. The US Arms Control and Disarmament Agency (ACDA) was established in 1961 and operated until it was subsumed under the US State Department in 1999. The same year, the US National Research Council published a report entitled 'The Pervasive Role of Science, Technology, and Health in Foreign Policy: Imperatives for the Department of State' in which it argued that expert scientific and technical knowledge is "essential to the anticipation and resolution of problems" and to achieving foreign policy goals. It recommended that the US State Department work to establish mechanisms that "facilitate ready access by the department to technical communities for advice on complex issues". It

also advocated scientific and technical support "during inter-governmental negotiations, major international conferences, and implementation of international programs". One practical outflow of this report was the establishment, also in 1999, of the Key Verification Assets Fund, which is still in operation today. The extensive web of National Nuclear Laboratories overseen by the US Department of Energy still make significant contributions to the scientific and technical understanding of arms control.

In the United Kingdom, science diplomacy efforts have been conducted by both Porton Down laboratory (formerly known as the Chemical and Biological Defence Establishment, CBDE) and the Atomic Weapons Establishment (AWE). The CBDE emphasised verification and monitoring when the UK signed the 1993 Chemical Weapons Convention, while verification research has been undertaken for two decades at the AWE. Since 2007, the AWE has been collaborating with Norway on the first ever formal technical exchange on nuclear disarmament verification between a nuclear and a non-nuclear weapon state.

The AWE exchange with Norway sparked debate in the United Kingdom on the need for science diplomacy. In January 2010, for example, the UK Royal Society published a report entitled, 'New frontiers in science diplomacy', which held that to be effective, science diplomacy "requires international policymakers to have a minimum level of scientific literacy or at least access to others who have it". As there are relatively few policymakers who are also scientists, the Society argued that the effective use of science diplomacy also 'requires scientists to communicate their work in an accessible and intelligible way, which is sensitive to its wider policy context'. The Royal Society, while noting that science diplomacy is a "fluid concept", pointed to three areas where it could, nevertheless, play an essential role:

- informing foreign policy objectives with scientific advice (science in diplomacy);
- facilitating international science cooperation (diplomacy for science); and
- using science cooperation to improve international relations between countries (science for diplomacy).

Lately, the European Commission has also taken an interest in the concept. Under the EU's 'Horizon 2020' initiative, nearly €40bn of funding has been supplied to research initiatives since 2014. One strand of this has been the 'S4D4C' project, which, amongst other goals, aims to provide "new insights and a better understanding of the contributions of science and science collaborations to foreign policy goals". This research effort continues to yield results, one of which is the recently adopted 'Madrid Declaration on Science Diplomacy'. The Declaration understands science diplomacy as a "series of practices at the intersection of science, technology and foreign policy", responding to "identified challenges at the interface of science and foreign policy". The Declaration espouses seven principles to which, presumably, science diplomacy should adhere. It should:

- generate value for citizens;
- recognise and embrace methodological diversity;
- have a demonstrable impact, and also take account of unintended consequences;
- be evidence-informed, in terms of content, context and process;
- be based on collaboration and inclusion;
- be geared towards capacity building, to include training and education at all stages; and
- recognise independence, ensuring that ideological goals do not distort scientific findings.

VERTIC's contributions to science diplomacy

Originally formed as the Verification Technology Information Centre, VERTIC was for a long time one of the few NGOs residing in the brackish waters where politics and science coexist. However, there is now a discernible trend of emphasising scientific collaboration in areas where political disagreement is rife—arms control and disarmament is one of those areas. The Centre has, in the meantime, continued its emphasis on exploring the boundaries between the policy world and the scientific and technical world. Three projects, out of several in our archives, illustrate our approach: the UK-

Norway Initiative; our technical exchange with China; and our exploration of the IAEA's role in disarmament verification.

The UK-Norway Initiative

In 2006, the Centre held consultations with the UK Ministry of Defence and the Norwegian Radiological Protection Authority with the aim of finding common ground for cooperation. After a few months, we saw the potential in bringing together active UK and Norwegian efforts on nuclear warhead dismantlement as part of a joint research programme. Building on those talks, in early 2007 we organised and hosted the first workshop bringing together various research centres from the two countries. On the back of this meeting, the UK-Norway Initiative on verified warhead dismantlement was started and is still on-going.

The establishment of a research cooperation project to study the verification aspects of nuclear disarmament was a deceptively simple idea. However, the initiative was resource-intensive and called for a not insignificant investment in resources, facilities and personnel. Nonetheless, it proved—and continues to show—that practical exercises are necessary to explore and test various verification choices for nuclear disarmament. It also demonstrated how important it is to build trust and confidence in scientific exchanges.

Scientific collaboration between nuclear and non-nuclear states is both achievable and sensible. It allows those in the laboratory of the nuclear-weapon state to escape the intellectual confines of their classified environment. Moreover, on the other side, it enables those in the non-nuclear-weapon states to grasp the many theoretical and practical problems that face those in the weapons camp. On the outside, it allows parliamentarians and the public to gain some idea of the many scientific, technical and procedural steps—and obstacles—that are a prerequisite to nuclear disarmament. In so doing, the initiative fulfils many of the principles of the Madrid Declaration, mentioned above.

This joint UK-Norwegian initiative identified several starting points for the verification debate, which are still being explored today. It noted, for example, that the authentication of warheads would remain an essential feature of a future disarmament verification regime. The initiative developed an authentication device—an 'information barrier'—mainly to confirm that such equipment can be built and that it would

have technical utility. The design principles agreed by the initiative remain of great value and include the use of commercially-available components, as little computation as possible and joint development.

The initiative also demonstrated that on-site inspections will be necessary to reach acceptable confidence levels in disarmament verification. Unlike the verification of delivery vehicles, warhead dismantlement cannot be verified by national technical means. Inspectors must be allowed access to nuclear dismantlement centres—and for such inspections to be effective, nuclear-weapon states need to accept some level of inspection intrusiveness. At the same time, states' national security concerns need to be respected. VERTIC concluded that, despite several practical problems encountered during the project, verification of warhead dismantlement is technically feasible.

The UK-China Technical Exchange

In 2014, the UK Foreign & Commonwealth Office decided to support a new Track 1.5 dialogue between officials and scholars based in China and the United Kingdom. At the time, there was no such nuclear-focused initiative between the two countries, although it was possible to draw on experience from cross-cutting approaches from other fields, such as biological and chemical arms control. The dialogue was predominantly technical but also included consideration of the interfaces between policy, procedure and technologies. The initiative aimed to build strong Sino-British scientific and policy relationships both in the public sector and in the non-governmental communities, as well as advancing knowledge in the nuclear issue area.

The final project meeting was held in 2016 at the Royal Society. It discussed several issues, amongst them China's technical approach to verified warhead dismantlement. One consequence of the work was increased Sino-British collaboration on the removal and destruction of legacy chemical weapons abandoned on Chinese territory after the Second World War, especially on safety training for handling discarded chemical munitions.

The role of the IAEA in disarmament verification

This project ran from 2012 to 2015 and aimed, in its first phase, to review the state of current technology and procedural development in verifying nuclear arms reductions and to also

identify unresolved issues. It involved 58 researchers from five governments and one intergovernmental organisation. Specifically, the project asked two key questions:

1. What is preventing the verification of nuclear warhead dismantlement today—as well as the fissile components and material that is taken out of warheads as part of the dismantlement process?
2. What are the special constraints and problems when considering multilateral verification of the dismantlement processes, whether by a team sourced from an intergovernmental organisation such as the IAEA or by any team that includes inspectors from non-nuclear-weapon states?

The second aim of the project was to investigate a potential future role for the IAEA and, linked to that, what kind of capacity-building or institutional re-organisation would be required were the Agency to become the accredited agency for independent verification of nuclear weapons reduction activities worldwide.

The third aim was to identify the kinds of equipment—or at least the requirements and specifications of equipment—that inspectors from non-nuclear weapon states or the IAEA would need to have available to complete a successful verification mission in all the situations that they would likely face. Intertwined with this are the operating procedures and protocols that would be required for this kind of future activity. The project aimed to develop outlines of these equipment specifications, procedures and protocols.

The fourth aim of the project was to design a comprehensive verified nuclear disarmament exercise, taking into account the whole nuclear cycle of a nominal state. This was to be achieved using computer modelling, table-top exercises and other tools. It was also intended that this part of the project would provide a focus for some of the project's other workstreams.

Overall, the project reached several conclusions. First, there is a role for intergovernmental organisations in disarmament verification, and the IAEA, in particular, appears to enjoy a large level of support among non-nuclear weapon states.

Second, while existing initiatives examine warhead verification

challenges, there is a vast area of unexplored work relating to nuclear material disposition, destruction and the application of safeguards on disarmed states. These areas must be explored before any deeper reduction of nuclear materials in the armed states can be realised.

Third, there has been no attempt to survey and apply existing safeguards technologies to nuclear disarmament verification processes. This is a major weakness in already existing initiatives, which may lead to unnecessary and costly duplication of work.

Fourth, the baseline knowledge of disarmament verification issues is relatively strong, especially in industrially advanced non-nuclear weapon states. Many of these states appear very capable in areas such as equipment development.

Fifth, while the project found that the IAEA has excellent baseline knowledge and experience of disarmament verification, mostly found in Agency employees from nuclear weapon states, this depends on effective recruitment policies by the IAEA Secretariat. Finally, while there is support among non-nuclear weapon states for an IAEA role in multilateral disarmament verification, nuclear-armed states are either silent on the matter or publicly opposed to it.

Irrespective of how the findings of this project are interpreted, it did demonstrate that technical exchanges can generate additional value, have an impact and be evidence-based. The findings of this project were independently reached and free from policy bias.

Benefits and drawbacks

Scientists work on the principle of scientific consensus. This is separate from a political consensus. The debate on climate change illustrates this. While the scientific view, as formulated and refined by the Intergovernmental Panel on Climate Change, is that our climate is changing, potentially dramatically, and that greenhouse gas emissions are the predominant cause of this change, there is no political consensus on how to address the issue—and in some cases, the politics even disagrees with the science. Policymakers are, of course, free to make their decisions irrespective of what the science tells them.

Many may point to this as being a severe limitation on the value of scientific collaboration. Nothing, however, would be further from the truth. It is necessary to understand the problem in order to find a solution. Without a scientific evidence-base, decision-making is reduced to guesswork or opinion. Of course, judgement, including political judgement, also plays an important role. To quote the late Hans Rosling, the founder of the Gapminder Foundation, the “world cannot be understood without numbers. But the world cannot be understood with numbers alone”.

Andreas Persbo Executive Director

Andreas Persbo is the Executive Director of the London-based Verification Research, Training and Information Centre. He has been working on a range of issues at the centre for more than a decade. His focus has been on on-site inspections, with a particular emphasis on on-site inspections of warhead dismantlement, fissile material controls and monitoring, and CTBT inspection methodology.

Mr Persbo holds a juris kandidat from Stockholm University, Sweden, as well as a diploma in Nuclear Law from the University of Montpellier I, France. Before VERTIC, Andreas has worked with the British American Security Information Council. Before that, he served at a Swedish District Court. In the early 1990s, he completed two tours of duty as a United Nations Peacekeeper: in Lebanon and Former Yugoslavia.

His latest publications are “Compliance science: the CTBT’s global verification system.” *The Nonproliferation Review* 23, no. 3-4 (March 10, 2017): 317-28; and Persbo, Andreas, ‘Verification requirements’ in Loodgard, Sverre, ed. *Stable Nuclear Zero: The Vision and Its Implications for Disarmament Policy*. S.l.: Routledge, 2016. Print.

Verification Watch

The Hanoi Summit and its consequences

Elena Gai, Researcher

On 27-28 February a second bilateral meeting between US President Donald Trump and the North Korean Chairman Kim Jong-Un took place in Hanoi. The high-level meeting followed a first historic summit in Singapore in June 2018, at which a joint statement formalized three major principles to further shape US-North Korean relations: the normalization of bilateral relations, the establishment of a permanent peace regime, and the denuclearization of the Korean peninsula. In addition, President Trump announced the suspension of joint US-South Korean military exercises for the remainder of 2018.

In a parallel process, in September 2018, a high-level meeting between South Korean President Moon Jae-in and Kim Jong-un took place in Pyongyang. A declaration containing measures to ease tensions and build confidence between the two Koreas was signed, which included joint demining operations, establishing a no-fly zone, demolishing 20 guard posts in the demilitarized zone and implementing some economic cooperation measures.

Despite these positive steps, there was a lack of progress on the agreed terms of the joint statement agreed in Singapore. However, it was still a surprise when the meeting in Hanoi ended abruptly without joint declarations or signed documents. While details of the discussions between Pyongyang and Washington remain undisclosed, the US National Security Advisor affirmed that the North Korean offer represented “a very limited concession”. Reuters, after having seen an official US document, reported that, in order to take forward the commitment to ‘complete denuclearization’ of North Korea, Washington had requested Pyongyang “to provide a detailed declaration of its nuclear program and full access to U.S. and international inspectors; to halt all related activities and construction of any new facilities; to eliminate all nuclear infrastructure; and to transition all nuclear program scientists and technicians to commercial activities”. North Korea’s apparent rejection of this request led to the impasse and collapse of the summit.

According to subsequent comments from both sides, it appears as if the stalemate also stemmed from disagreement over sanctions relief for five UN Security Council sanction resolutions passed in 2016 and 2017. The sanctions have been severely damaging the North Korean economy, and Pyongyang was expecting some of them to be lifted in exchange for disabling the Yongbyong nuclear facility.

The construction of the Yongbyong Nuclear Scientific Research Centre, which has always been at the core of North Korea’s nuclear research, started in 1961, following a nuclear cooperation agreement with the Soviet Union in the late 1950s. The site includes an A IRT-2000 research reactor, a 5MWe reactor and 50 MWe reactor, a 25-30 light water reactor still under construction, uranium enrichment and fuel fabrication facilities, a radiochemistry laboratory and three waste storage facilities.

The 5MWe reactor is central to North Korea’s plutonium production. It is a graphite-moderated and gas-cooled reactor, similar in technology to the UK’s Calder Hall reactor. It was finished in 1986 and IAEA inspectors started their activities after Pyongyang ratified its safeguards agreement in 1992. Since then, the IAEA has acknowledged discrepancies that eventually led Pyongyang to abandon the NPT in 2003. As a recent report on North Korea’s nuclear programme by Stanford University’s Centre for International Security and Cooperation pointed out, “the spent fuel generated during reactor operations from the summer of 2016 to early 2018 appears to have been reprocessed beginning in May to separate an estimated 5 to 8kg weapon-grade plutonium”. Nevertheless, commercial satellite imagery collected by 38North from 11 and 21 February 2019 shows no indication that the reactor is still currently operating.

Pyongyang’s pledge to “permanently and completely dismantle all the nuclear material production facilities in the Yongbyong area” would deeply constrain the country’s nuclear programme, by halting the main source of its plutonium production. However, many experts believe that North Korea has gradually reduced its reliance on plutonium production

in favour of uranium enrichment. According to US intelligence, there are at least two undeclared enrichment facilities outside of Yongbyong. The Middlebury Institute located one of them in Kangson.

It is difficult to predict the next steps by either side. According to some analysts, North Korea started rebuilding key facilities at the satellite launch facility of Tongchang-ri and at the ICBM-related site of Sanum-dong, and completed restoration work on the key long range rocket launch site in DOUNGCHANG-RI. These activities may represent a return to provocative North Korean actions. For the United States, an attempt to reinvigorate diplomatic dialogue would appear to be a plausible path, but the current delay in establishing a negotiating process at working group level to advance the goal of denuclearization suggests that the impasse is unlikely to be broken any time soon.

The African Commission on Nuclear Energy (AFCONE): Verifying the African Nuclear Weapon-Free Zone

Noel Stott, Senior Researcher

In July 2009, the African Nuclear-Weapon-Free Zone Treaty (Treaty of Pelindaba) entered into-force. Having been opened for signature in 1996, today, the Treaty has 41 States Parties with only 14 states still to deposit their instruments of ratification with the African Union (AU). Under the terms of the treaty, African states renounce all nuclear explosive devices and undertake to prevent the stationing of such devices on the African continent and its associated islands. They also pledge to prohibit the testing of nuclear devices and the dumping of radioactive waste, while improving the physical protection of nuclear materials and facilities and promoting the peaceful use of nuclear material in the Zone. Uniquely, the Treaty of Pelindaba also prohibits armed attacks on nuclear installations, including nuclear research or power reactors.

Protocols to the Treaty are designed to ensure that non-African states respect the status of the zone and undertake not to use or threaten to use nuclear weapons against any African country thereby providing 'negative security assurances'. Only Spain and the United States have not ratified the relevant Protocols.

The African Commission on Nuclear Energy (AFCONE)

In line with Article 12 States Parties have established the African Commission on Nuclear Energy (AFCONE) to ensure that there is compliance with the basic principles of the treaty. AFCONE members are elected for a three-year term and presently include: Algeria, Chad, Ghana, Namibia, Niger, Nigeria, Mali, Mauritania, Mauritius, South Africa and Zimbabwe. Operating from offices in South Africa, AFCONE's secretariat is headed by an Executive Secretary, currently Messaoud Baaliouamer, an experienced nuclear physicist from Algeria.

AFCONE's overall goal is 'to ensure safety, security and socio-economic progress in Africa through co-ordinating, strengthening and developing continental nuclear peaceful applications programmes and playing a dynamic role in disarmament & non-proliferation affairs'. To achieve this goal, AFCONE has established four thematic working groups to develop activity plans in relation to: Applications of nuclear science; Compliance and verification; Safety, security and safeguards; and Co-operation and partnerships.

Key verification activities of AFCONE include: ensuring compliance by all parties with all their non-proliferation obligations; protecting Africa from nuclear testing and the dumping of nuclear materials; promoting the peaceful application of nuclear science and technology; and developing outreach activities to states eligible to ratify the Treaty. AFCONE also undertakes certain administrative functions in support of compliance, such as soliciting and collating reports from States Parties, facilitating the exchange of information and establishing a complaints procedure. So far, 17 States Parties have designated a National Point of Contact while 12 have submitted annual national reports.

Article 9 of the Treaty deals with the verification of peaceful uses. The provision obliges states not to provide source or special fissionable material to any non-nuclear armed state unless it complies with International Atomic Energy Agency (IAEA) safeguards. The Treaty thus explicitly recognises that verification of States Parties' compliance with their treaty obligations can be met by ensuring that all their nuclear material, facilities and activities are subject to full-scope IAEA safeguards. The Treaty thus reinforces the obligations of states under the Treaty on the Non-Proliferation of Nuclear Weap-

ons (NPT), in addition to those provided under the Convention on the Physical Protection of Nuclear Material (CPPNM) (and its 2005 Amendment) and the Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa (Bamako Convention).

The Treaty of Pelindaba is thus explicit in linking African nuclear disarmament and non-proliferation efforts to international organisations and regimes mandated to work towards a world-free of nuclear weapons and to promote the peaceful use of nuclear energy. In order to avoid duplication of verification efforts, AFCONE has or is currently drafting memoranda of agreements with the IAEA and the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) as well as the African Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology (AFRA). What is also required, however, is for AFCONE to initiate a complete assessment of the laws and regulations currently in force at the domestic level of States Parties to identify regulatory gaps. This should be done with the assistance of the secretariats of the abovementioned international organisations—many of whom offer legal assistance with implementing the various related instruments.

Verifying the Arms Trade Treaty

Noel Stott, Senior Researcher

The Arms Trade Treaty (ATT) entered into force on 24 December 2014. Today, the Treaty has 100 States Parties with an additional 35 states that have signed it but not yet ratified, approved or accepted it. However, a number of key arms suppliers, exporters and importers are among the 59 states that have not yet joined the Treaty, including China, Egypt, India, Russia, Saudi Arabia and the United States.

The ATT requires States Parties to establish formal control regimes at the domestic level to regulate imports and exports of conventional arms. An ATT secretariat and working groups on implementation, universalization and on transparency/reporting, aim to ensure that the treaty functions effectively. The different manufacturing, import/export profiles and legal systems among States Parties raise potential verification difficulties. A steady decline in the submission of annual reports required under the Treaty is also problematic.

Verifying whether states are conforming with the ATT is difficult, since many need to review their national laws and undertake an assessment of whether their legislative frameworks are in line with the Treaty and are being implemented effectively. Amending or strengthening these frameworks can be a lengthy and bureaucratic process.

Domestic policy, legislation and regulations needs to cover a range of issues pertinent to the trade in arms, including manufacture, marking, record-keeping, licencing, transit, transshipment, and brokering activities and the imposition of criminal sanctions for non-compliance. Often such legislation is covered by various distinct laws: for example, those encompassing domestic firearm possession, customs and the use of force by security authorities. Other laws, such as those addressing domestic violence, may be indirectly relevant. Compounding these potential verification difficulties are differences between states' legal systems, administrative resources and developmental priorities. All these factors may make for uneven implementation of the ATT at the national level.

An important transparency measure requires States Parties to report on arms transfers and treaty implementation. All reports are shared with other States Parties, but it is optional whether they are made publicly available. In 2017, 39% of States Parties failed to submit a report, and by August 2018 less than 75% of all States Parties had reported on implementation measures. Low reporting is exacerbated by the quality and completeness of reports with some States Parties keeping their reports confidential for reasons of national security and several others omitting information for commercial reasons.

Implementation Watch

Former US congressional candidate attempts to buy radioactive substance on the dark web

Leanna Burnard, Legal Officer

In October 2018, a political activist and former congressional candidate from Wisconsin, United States was charged with attempting to possess radioactive material with intent to cause death or serious bodily injury under Title 18 of the United States Code, Section 2332i(a)(1) and (3). The maximum penalty is life imprisonment. He pleaded 'not guilty'.

This offence was created to implement the International Convention for the Suppression of Acts of Nuclear Terrorism 2005. In particular, Article 2 of the Convention makes it an offence to intentionally and unlawfully possess, or attempt to possess, radioactive material. Article 5 requires States Parties to establish the offence and an appropriate penalty under national law.

The United States signed the Convention in 2005. However, it was not ratified until ten years later. National implementation was attempted in 2013 under the Nuclear Terrorism Conventions Implementation and Safety of Maritime Navigation Act, which was passed by the House but was unsuccessful in the Senate. This was largely due to disputes over the application of the death penalty and authority for wiretaps to investigate the new crimes. In 2015 the provisions implementing the Convention were incorporated into the USA Freedom Act, which was passed by the Senate and signed by former President Barack Obama on 2 June of that year.

In March 2018, seven months prior to his arrest, an FBI Online Covert Employee navigating the hidden websites of the 'dark web' received a message from a person (allegedly the defendant) seeking to buy a lethal poison in the form of a radioactive substance, namely polonium-210. Polonium is one of the deadliest known radioactive materials. The person requested a lethal substance, "that is not going to be extremely brutal and drawn out" and is "extremely difficult to procure so that people automatically suspect the government".

The conversation fell dormant until October 2018, when the

person placed an order for the radioactive substance. The buyer requested that it be sufficient to kill a 6ft male weighing 220lbs and wanted it, "to look like [the victim] may have died from either cancer or cancer treatment... so long as they won't figure out what it is and if they do will never think he did it himself". The buyer advised that the target was willing to take the substance and wanted to die as quickly and painlessly as possible.

Bitcoins valued at 569 USD were used to purchase the substance and deliver it to the defendant at a United Parcel Service store in Madison, Wisconsin. The FBI sent a package to this address, which was picked up by the defendant on 24 October 2018. He was arrested by FBI personnel shortly after.

The defendant was refused bail by the District Court as a flight risk and a risk to public safety. He remains in custody.

According to his defence lawyer, the defendant has a complex history of mental and physical health issues. He has claimed for many years that he suffers from brain cancer. However, this has not been verified by medical evidence.

The defence argues that in attempting to acquire the substance, the defendant was planning to kill himself and make it look like he died from cancer. It states that, he "does not present as someone who wants to create a dirty bomb or poison a rival, renegade spy... at the very worst, this was a very dramatic suicide attempt, that was not meant to hurt anyone else". It submitted a pre-trial motion to dismiss the case, arguing that the indictment criminalises unlawfully causing death with radioactive materials but there is nothing "unlawful" about killing oneself.

Alternatively, the prosecution submits that, "even if the defendant intended to use the Po-210 to commit suicide, suicide is not a permissible use of [radioactive material]". It further highlights that in the emails to the FBI undercover agent the defendant indicates an intention to make future orders of the radioactive substance for use on others. It also emphasises the potential danger posed to third parties from accidental exposure. The case continues.

Belgian companies convicted of chemicals exports to Syria

Yasemin Balci, Senior Legal Officer

On 7 February 2019, an Antwerp court convicted three Belgian companies (specialising in chemical wholesale, customs advice and logistics), and their two managers, for exports of chemicals to Syria. These chemicals have civil applications, but can also be used as chemical weapons.

From May 2014 to December 2016 the defendants exported 167,960 kg of isopropanol and other chemicals to Syria, worth €346,443.31. Isopropanol is a precursor to sarin, a highly toxic nerve agent. Sarin was used as a weapon in Syria in Ghouta on 21 August 2013, in Khan Shaykhun on 4 April 2017, “very likely” used in Ltamenah on 24 March 2017, and “more than likely” used in Ltamenah on 30 March 2017. However, there is no evidence of a connection between the exports and these chemical weapons uses.

In their declarations to the Belgian customs authorities the defendants did not mention the export licences which have been required for these chemicals since 2012 under EU Regulation 36/2012 concerning sanctions on Syria.

The exports were a violation of this Regulation and related Belgian legislation, but not of legislation implementing the Chemical Weapons Convention. Sarin is a Schedule 1 chemical, the most tightly controlled chemical under the Convention. However, isopropanol does not appear on any of the Convention’s schedules. According to chemical weapons expert Jean Pascal Zanders, this is because of the vast scale of isopropanol’s use in civilian industries ranging from cosmetics to pharmaceuticals.

The court established that the defendants had knowingly made incorrect declarations in violation of Article 231 of Belgium’s General Law on Customs and Excise. The authorities’ failure to detect these did not absolve the defendants of their obligation to make correct declarations.

In sentencing, the court noted that these were serious offences purely carried out for monetary gain. There had been “no shrinking back from exporting potentially dangerous goods to a war zone where these could be used to cause inhu-

man suffering to innocent people”. The three companies received fines of €346,443.31, €500,000 and €75,000 respectively. Their two managers were sentenced to 4 and 12 months imprisonment and fines of €346,443.31 and €500,000 respectively.

New EU Council Decision in support of the BTWC

Sonia Drobysz, Programme Director

On 21 January 2019, the Council of the European Union adopted decision 2019/97 in support of the Biological and Toxin Weapons Convention (BTWC) in the framework of the EU Strategy against Proliferation of Weapons of Mass Destruction. Over a period of 36 months and with a budget of more than €3 million, it will seek to enhance the implementation of the objectives reached at the 2017 and 2018 Meetings of States Parties to the BTWC. These objectives include six projects on: universalisation; national implementation; biosecurity networks; the inter-sessional programme and preparations for the Ninth Review Conference; preparedness to prevent and respond to biological incidents; and outreach, education and engagement.

The decision’s technical implementation is entrusted to the UN Office for Disarmament Affairs (UNODA), in close cooperation with relevant international organisations and civil society actors. VERTIC is explicitly mentioned as an implementing partner under Project 1, which promotes universal adherence to the BTWC and, more significantly, under Project 2, which supports capacity development for BTWC implementation. VERTIC’s legal expertise will be called upon to assist five beneficiary countries selected by UNODA, the BTWC Implementation Support Unit and the High Representative of the Union for Foreign Affairs and Security Policy, to adopt legislative or administrative measures which encompass the full scope of the BTWC prohibitions and preventive measures.

This is a welcome recognition of the services provided by VERTIC’s National Implementation Measures (NIM) Programme under previous EU decisions. Under EU Council Decision 2016/51 the NIM team participated in workshops in Sierra Leone, Côte d’Ivoire, Cameroon, Malawi, Nepal and Lebanon with governmental lawyers, legal drafters, representatives from the ministries of Health, Justice, Foreign

Compliance Watch

Affairs and Defence, and others national experts. Participants examined gaps in laws and regulations in force in those countries, discussed the different approaches to strengthening BTWC national implementation, considered regional examples, consulted relevant legislative drafting tools and started the drafting process. National legislative action plans towards the finalisation and adoption of legislative bills were also prepared. VERTIC looks forward to following up on the assistance already provided and working with additional countries under the new decision.

European countries take steps against US extraterritorial sanctions to enable trade with Iran

Cristina Rotaru, Researcher

On 31 January 2019, the UK, Germany and France—also known as the E3—announced in a joint statement that the EU had formally launched a special purpose vehicle (SPV) called INSTEX (Instrument for Supporting Trade Exchanges) to facilitate legitimate trade with Iran with the aim of preserving the Joint Comprehensive Plan of Action (JCPOA). The announcement came nearly six months after the United States re-imposed secondary sanctions on Iran in the aftermath of its withdrawal from the JCPOA in May 2018.

Designed to support legitimate European trade with Iran by allowing companies in France, Germany and the UK to receive payment for exports to Iran without violating US secondary sanctions, INSTEX is currently registered in Paris as a private entity under the directorship of the former Commerzbank Head of Financial Institutions. In its present form, the instrument focuses on sectors described as “essential to the Iranian population”, predominantly in the food, pharmaceutical and medical devices industries. This, critics argue, makes for a limited application of the vehicle, especially when considering that the humanitarian trade it endeavours to facilitate is already exempt from US secondary sanctions. However, the E3 have affirmed that in the long term, INSTEX aims to “be open to economic operators from third countries who wish to trade with Iran and the E3 continue to explore how to achieve this objective”.

In light of the issues facing Europe’s trade with Iran—particularly the fact that exporters are currently unable to receive payments to their bank accounts without violating US extraterritorial sanctions—INSTEX may prove a useful tool for enabling the keeping of records of debits and credits accrued by exporters and importers. However, the mechanism does not presently address the underlying problem that most financial institutions are still reluctant to accept transfers of funds associated with trade with Iran because of the risk of incurring US penalties.

There are still technical details to be worked out before INSTEX is activated. In the meantime, the E3 have pledged to continue to work on concrete and operational details to define the way the company will operate, once it does become active—although, so far, no indication has been given as to when that may be. Moreover, before INSTEX can begin to function, Iran must first establish an “effective and transparent” corresponding SPV of its own to process payments with Europe. Iran is also required to reform its Anti-Money Laundering and Combating the Financing of terrorism (AML/CFT) legislation, as well as immediately implement all elements of its Financial Action Task Force (FATF) action plan. In this respect, INSTEX is said to require “the highest international standards” and full compliance with EU and UN sanctions.

To enable the SPV, the EU, too, had to amend its original 1996 Blocking Statute which had been introduced in response to US extra-territorial sanctions legislation. The statute aims to counter the effects of US sanctions on EU economic operators engaging in lawful activity with third countries, and was updated in response to the US decision to withdraw from JCPOA and re-impose sanctions against Iran. This updated statute criminalises compliance with US sanctions in cases where they are not compatible with EU law. According to the statute, EU operators can recover “any damages, including legal costs, caused by the application of the laws specified in its Annex or by actions based thereon or resulting therefrom”. In another related matter, the United Kingdom in February adopted legislation to criminalise activity that contravenes the EU Blocking Statute under the Extraterritorial U.S Legislation (Sanctions against Cuba, Iran and Libya) (Protection of Trading Interests) (Amendment) Order 2018.

For EU and multinational companies in Europe looking to do business with Iran, the choice of whether to enforce the EU Blocking Statute—under which they are prohibited from complying with US extraterritorial sanctions on Iran—or to observe the US sanctions laws—under which they are prohibited from engaging with Iran despite the EU’s legislation—may prove a particularly difficult legal challenge to navigate. This conundrum, coupled with the present transatlantic trade tensions and a clear divergence in political objectives between the EU and the United States in relation to Iran and beyond, could result in a possible increase in

enforcement activity by EU Member States for breaches of the Blocking Statute once its modifications enter into force. Such enforcement activity could range from fines to criminal sanctions to damages claims by business partners. However, according to official EU guidance, European operators remain “free” to choose “whether to engage in an economic sector on the basis of their assessment of the economic situation”.

EU imposes first ever CW sanctions

Celeste Donovan, Researcher

On 15 October 2018, the European Union (EU) adopted a new sanctions framework to address the use and proliferation of chemical weapons. It provides for targeted sanctions, such as an EU-wide travel ban and asset freeze against “individuals, entities, groups or governments responsible for the use of chemical weapons, as well as those who assist or encourage such activities”.

The adoption of this framework comes after two high-profile incidents involving the use of chemical weapons to target dissidents or critics of a regime: the 2017 poisoning of Kim Jong-nam, the half-brother of current North Korean leader Kim Jong-un, with the VX nerve agent; and the 2018 poisoning of former Russian spy Sergei Skripal and his daughter Yulia with the Novichok nerve agent in Salisbury (UK). The latter incident marked the first known use of chemical weapons on European soil since the end of the Second World War.

On 21 January 2019, the EU announced its first designations under the Chemical Weapons Sanctions Regime. Under Decision (CFSP) 2019/86 amending Decision (CFSP) 2018/1544, it imposed restrictive measures against nine individuals and one entity said to be involved in the use and proliferation of chemical weapons. These designations included the Deputy Head of the GRU (Main Directorate of the General Staff of the Russian Armed Forces), and two GRU officers held responsible for “possession, transport and use of a toxic nerve agent” used in the Salisbury attacks. Sanctions were also imposed on the Syrian Scientific Studies and Research Centre (SSRC), the Syrian entity “responsible for the development and production of chemical weapons”, as well as five Syrian individuals who worked at the SSRC.

The sanctions announcement was met with a mixed diplo-

matic response. According to the New York Times, the Kremlin's spokesman, Dmitry Peskov, rejected the decision and claimed that the Russian GRU officers and Deputy Head were "suspected groundlessly". The UK Foreign Secretary Jeremy Hunt stated that the sanctions "deliver on our vow to take tough action against the reckless and irresponsible activities of the Russian military intelligence organization, the GRU, which put innocent British citizens in serious danger in Salisbury last year".

North Korean cyber-heists

Celeste Donovan, Researcher

The most recent report by the UN Panel of Experts (which is part of the UN Security Council Sanctions Committee on North Korea) was released on 5 March 2019. It investigated, among a range of other topics on the implementation of North Korean sanctions, a trend in North Korea's use of cyber attacks to evade sanctions by illegally forcing the transfer of funds from financial institutions and cryptocurrency exchanges. According to the Panel, such attacks have developed in "sophistication and scale since 2016" and have become an "important tool in the evasion" of sanctions by North Korea.

The report notes that despite the strengthening of financial sanctions in 2017, their effectiveness is being "systematically undermined" by the deceptive practices of North Korea and the failure of UN Member States to recognize and prevent them. Specifically, the Panel cited a number of "computer intrusions and cyber-heists" against financial institutions in the United States, Europe, Asia, Africa, North America and South America by the North Korean government-sponsored hacking teams, with attempted losses "well over \$1 billion".

This includes an \$81 million cyber-heist from Bangladesh Bank and a series of hacks against the global banking system using the global SWIFT messaging system. Two such hacking cases in 2018 were the \$13.5 million theft from Cosmos Bank in India and a \$10 million theft from Banco de Chile. The report concludes that these more recent attacks highlight how North Korea "has become an increasingly sophisticated actor in cyberattacks for financial gain, with tools and tactics steadily improving".

In addition to cyber attacks on banks, North Korean-sponsored hackers "carried out at least five successful attacks against cryptocurrency exchanges in Asia between January 2017 and September 2018, resulting in a total loss of \$571 million". Cryptocurrencies provide North Korea with even more ways to evade sanctions because they are "harder to trace, can be laundered many times and are independent from government regulation".

The Panel recommends that the UN Security Council take cyber activity into account when drafting future financial sanctions, and proposes that UN Member States develop processes for sharing information with each other, as well as with their own financial institutions.

Science & Technology Scan

Trilateral missile competition and the demise of the INF Treaty

Alberto Muti, Senior Researcher

On 1 February 2019, US Secretary of State Mike Pompeo announced the suspension of US obligations under the Intermediate-Range Nuclear Forces (INF) Treaty, effective from 2 February 2019, and formally served the United States' six-month written notice to withdraw from the agreement. Thus, according to Pompeo's statement, unless Russia returns "to full and verifiable compliance with the Treaty by eliminating all 9M729 missiles, their launchers, and associated equipment in this six-month period" the treaty will terminate on 2 August 2019. This followed a December 2018 request from Pompeo that gave Russia 60 days to return to "full and verifiable compliance" with the treaty. Responding to the February notification, Russia also suspended its implementation of the 1987 arms control agreement. The INF Treaty bans ground-launched ballistic and cruise missiles with a range between 500 and 5,500km, and binds states "not to possess, produce or flight-test" systems of this kind, as well as their launchers and associated infrastructure. Concerns about possible Russian non-compliance were first raised officially in 2013, and in 2014 the US formally accused Russia of violating the INF Treaty. Russia has always rejected these accusations, and leveled counter-accusations about US violations. The Treaty includes a Special Verification Commission for the resolution of disputes, but its inspection protocol expired in 2001 (see *Trust & Verify* No. 162).

The Russian Novator 9M729 missile system (NATO designation SSC-8) is at the heart of the dispute. Officially, the 9M729 has a range of 480 km, and features some guidance improvements on its predecessor (9M728). The United States, and some NATO countries believe, however, that the 9M729 has been tested up to ranges of 2000 km. The evidence to support these accusations is not in the public domain and Russia categorically rejects them. The 9M729 system has entered operational use, with first deployment in late 2017. At present, it is believed that four battalions have been deployed with a total of approximately 100 missiles, including spares.

The 9M729 is part of a rapid modernisation of Russian missile forces, which includes hypersonic missiles (such as the short-range Zircon missile and the long-range Avangard), as well as the nuclear-tipped and nuclear-powered 9M730 Burevestnik cruise missile. In February, Russian Defence Minister Sergey Shoigu announced that Russia would produce intermediate-range ground-launched missiles, including a new hypersonic weapon, and a ground-launched version of the sea-launched 3M14 Kalibr cruise missile, which has a range of 2000 km. Some experts have claimed that the 9M729 may itself be a ground adaptation of the Kalibr, based on similar reported range and development by the same design bureau. According to Shoigu, these systems will be ready for production by 2021. Discussions on post-INF options are also taking place in the United States. In 2017 Vice Chairman of the US Joint Chiefs of Staff USAF General Paul Selva stated that "There are no military requirements we cannot currently satisfy due to our compliance with the INF Treaty". US forces have several intermediate-range missile options through existing sea- and air-launched missiles (such as, respectively, Tomahawk and JASSM cruise missiles). New capabilities are also already in development, such as Lockheed Martin's JASSM 'Extreme Range' (XR) configuration, which will double the system's range to 1900 km. Despite this, the United States announced in April 2019 upcoming tests for intermediate-range, ground-launched missile systems—the first since the treaty entered into force in 1988. The first of these proposed new systems is a ground-launched adaptation of the sea-launched Tomahawk, which could see deployment within 18 months. A second system with a longer range of 3-4000 km, which will see a first test in November, will likely not be ready for deployment for at least five years.

The United States will also need to discuss with allies where to deploy these new systems. NATO allies, mindful of the 'euro-missile crisis' in the 1980s that sparked the INF negotiations in the first place, have shown little appetite for intermediate-range weapons deployed in Europe. Some US analysts and officials see additional ground-launched missile systems as balancing China's rapidly developing missile forces. China is not an INF signatory, and its missile forces (including a large contingent of intermediate-range missiles) enable it to project military power and challenge US su-

premacry, especially in the South China Sea. Again, however, the United States may face opposition from allies in the Asia-Pacific region, since like the European NATO allies, many are likely to be wary of hosting such systems and of sparking a new arms race.

Movement on Novichok

Andreas Persbo, Executive Director

On 14 January 2019, the Executive Council of the Organisation for the Prohibition of Chemical Weapons (OPCW) adopted decision EC-M-62/DEC.I. The document adds two chemical agents to Schedule I of the Annex on Chemicals to the Convention, both belonging to the so-called Novichok family. The proposal to include these agents was tabled by Canada, the Netherlands and the United States in October 2018 and was evaluated by the OPCW Director-General in December the same year. VERTIC ran several articles on Novichok in *Trust & Verify* No. 160 and first noted the possibility of these agents in June 1993 (see *Trust & Verify* No. 38). While the Executive Council considered and adopted the proposal by consensus, Russia disassociated itself from it. In its national statement, Russia highlighted that it wanted to include “several hundred” compounds in the convention’s schedules and “submitted extensive material (over 300 pages)” of materials identified in the scientific literature. Presumably, Russia wanted all of the compounds to be evaluated by the Technical Secretariat and lamented that “this proposal was left hanging”. The Russian Ambassador to the OPCW, Alexander Shulgin, later opined on Twitter that the opposition to the Russian proposal by Western powers was “because they research prohibited chemicals in NATO’s specialized centres”. The Canadian Ambassador wrote in response that Russia’s proposal was designed “to fuel a disinformation narrative, aimed at distracting from Novichok use in Salisbury”.

All states which produce, acquire, retain, transfer or use Schedule I chemicals are now required to include this in their declarations to the OPCW following Part VI.A. of the Verification Annex. Given that Russia maintains that it is not producing these materials, it is highly unlikely to include them in its reporting to the OPCW. This opens up the possibility for a challenge inspection under article IX of the Treaty. Moreover, those governments which are using these chemicals in ‘protective research’ will also have to declare their

possession. With the Russian proposal still ‘left hanging’ and with the prospect of further allegations of non-compliance, Novichok is likely to continue to be a focus of attention in the coming years.

Estimating North Korea’s Uranium Mines

Andreas Persbo, Executive Director

In September 2018, Alexander Glaser and Zia Mian, researchers at the Program on Science and Global Security at Princeton University, published an article in *Science* which, amongst other things, pointed to the importance of fissile material accountancy in future North Korean denuclearisation efforts. Glaser and Mian point out that one concern is the potential existence of undeclared nuclear facilities in the country. Here, yet to be discovered uranium enrichment plants is foremost on the analyst’s minds. There are many more unknowns in regards to North Korea’s fuel cycle, however. Is there an understanding of the country’s capacity to mine and mill uranium ore? Is there enough knowledge on the DPRK’s uranium conversion capabilities, where milled ore (so-called yellowcake) is converted into uranium hexafluoride, suitable for use in centrifuges? These questions would need to be answered (and the answers then verified) before one can establish an accurate baseline of North Korea’s fissile material holdings. Glaser and Mian, therefore, call for a ‘freeze’ on all activities and an ‘agreed baseline’ of ‘current stockpiles of nuclear weapons, fissile materials, ballistic missiles, and key components.’

One way of checking completeness is to establish a set of presumed data which can then be compared with the declared data. Glaser and Mian appear to be advocating this technique, noting that perhaps ‘the best option would be to reconstruct North Korea’s history of uranium supply and use.’ They note that such ‘an effort would assess uranium production at North Korean mines, uranium purification, UF₆ production, and enrichment.’ This year, VERTIC, in consortium with the Centre for Nonproliferation Studies and the Royal United Services Institute, is embarking on a three-year effort to do just that. Together, we intend to make the best possible assessment of North Korea’s ability to produce and use fissionable material, using a combination of sophisticated fuel cycle analysis software and commercially acquired satellite imagery.

Centre News

National Implementation

Sonia Dobrysz, Programme Director

This quarter was particularly busy for the National Implementation Measures (NIM) team, with staff facilitating state implementation of chemical, biological, radiological and nuclear (CBRN) international instruments. Work continued on the EU CBRN Centres of Excellence (CoE) Project 61 on chemicals management in Southeast Asia. Yasemin Balci attended a preliminary planning meeting in Indonesia in November 2018, and in December 2018 she attended a Steering Committee Meeting in Laos to communicate the progress made on the project and the plans for next year.

Under EU CBRN CoE Project 53 on biosafety and biosecurity in Central Asia, Sonia Dobrysz attended a Steering Committee Meeting in Belgium in January 2019 to discuss the status and next steps in the project's implementation. Our former colleague Cédric Apercé attended a World Health Organisation meeting in Hong Kong in December 2018 to present the findings of a report on emergency response planning in Central Asia. Yasemin discussed VERTIC's work on the project at a regional conference in Uzbekistan in March 2019. In addition, Yasemin and Sonia took part in legislative assessment activities under EU CBRN CoE Project 67 on CBRN waste management in South East and Eastern Europe.

With the support of the UN Office for Disarmament Affairs and the EU, the NIM team undertook awareness-raising and legislative drafting activities in relation to the Biological and Toxin Weapons Convention in both Nepal and Lebanon in January 2019.

Finally, the team engaged states and advocated for national implementation of CBRN international instruments at events across Europe. In November 2018, Yasemin delivered a statement to the Chemical Weapons Convention (CWC) Fourth Review Conference in The Hague. She also presented at a side event on national implementation of the CWC in African states. In December Sonia attended the BTWC Meeting of States Parties in Geneva, and later that month she discussed VERTIC's experience of developing and using model legisla-

tion at a workshop in Vienna on the African Union's Weapons of Mass Destruction Model Law. In February 2019, Sonia joined the Global Partnership Working Group Meetings in Paris and gave a presentation during the Chemical Security Working Group meeting.

Verification and Monitoring

Larry MacFaul, Programme Director

During this period, the programme carried out activities across several projects, while also welcoming a new staff member: Elena Gai, Researcher.

We have continued to develop our new initiatives on nuclear disarmament verification that build on our longstanding work on this subject. The team has been concentrating on research, developing methodologies and network-building in this area. In line with these activities, in February, Programme Director Larry MacFaul, Senior Researcher Noel Stott and Executive Director Andreas Persbo travelled to Oslo to visit the Norwegian Ministry of Foreign Affairs. Meanwhile further work was carried out to develop and refine approaches for our project on 'Examining technology and associated procedural needs for international bio-forensic investigations strengthening biological weapons investigations'.

The team has also been finalising two projects. One was a new project for the team, focusing on ways in which the OPCW can improve standards of chemical security. The other forms part of our longstanding assistance in strengthening non-proliferation controls. In particular, in March, Senior Researcher Alberto Muti visited Cameroon for a meeting with government officials to discuss the status of legislative efforts on safeguards. Later in the period, Alberto Muti and Elena Gai visited Senegal where they ran a workshop on 'Coordinating stakeholders in safeguards reporting' attended by various government agencies.

We also participated in a number of meetings in support of our work. In December, Andreas Persbo and Alberto Muti attended the annual nuclear non-proliferation conference at Wilton Park. This year's theme was 'The nuclear non-prolif-

eration regime towards the 2020 NPT Review Conference'. In March, Elena Gai travelled to Washington to attend the Carnegie International Nuclear Conference and attended sessions on public technical means for monitoring nuclear non-proliferation agreements, among others. Elena also visited Sussex University for a meeting on 'Deconstructing the Fourth CWC Review Conference'.

As ever, we are grateful for the support of the Ministries of Foreign Affairs of Norway and Sweden, as well the Foreign and Commonwealth Office, and the US Department of State.

Special Projects

Angela Woodward, Deputy Executive Director

During this period the team participated in various sanctions-related meetings and workshops, and conducted analysis of states' legislative implementation of the UN Security Council maritime-related sanctions on North Korea.

The Special Projects Programme Director, Angela Woodward, participated in workshops on North Korean maritime sanctions implementation held in Johannesburg, South Africa on 3-4 October; Panama City, Panama on 23-24 October; Manila, Philippines on 6-8 November; and Taiwan on 5-6 December. She gave presentations on states' obligations under the relevant UN Security Council resolutions and discussed approaches to legislative implementation. Angela also wrote a dissertation on the effectiveness of the international legal framework for denuclearisation and nuclear disarmament, submitted on 21 December, for her Diploma in International Law at the University of Montpellier, France.

Celeste Donovan, Researcher, and Angela met with Dr Lassina Zerbo, Executive Secretary of the Comprehensive Nuclear-Test-Ban Treaty Organization during his visit to Christchurch, New Zealand on 23 November. They met at the National Radiation Laboratory, which is a certified Radionuclide Laboratory (RL12) in the CTBT verification system, located in the Institute of Environmental Science and Research (ESR) at the University of Canterbury, in Christchurch. Celeste and Angela also met with Dr Zia Mian, Co-Director of the Program on Science and Global Security at Princeton University when he gave a talk on 'The crises of nuclear arms control and non-proliferation: nuclear weapons

and the 21st century' at the University of Canterbury on 11 December.

Cristina Rotaru, Researcher, participated in a roundtable on 'Security the Supply Chain: Private Sector Collaboration on Sanctions Implementation' organised by RUSI in collaboration with Dechert, in London on 30 October. Cristina attended further roundtables on North Korean sanctions organised by RUSI, on 14 November, and RUSI and the Center for Advanced Defense Studies, on 14 December, both held in London.

The team bid farewell to Sylvia Barnett, Volunteer, on 30 November as she completed her Legal Internship studies at the University of Canterbury by submitting her analysis of legislative implementation of cargo inspection obligations under the UN Security Council sanctions on North Korea, which she researched while working alongside Angela Woodward. The team wish her well for the remainder of her studies.

New website

Andreas Persbo, Executive Director

Regular followers of our work will know that we've experimented with several ways in which we can bring Trust & Verify, as well as our opinions out to the broader community. In the past, we have struggled to do so effectively, but thanks to Tarek Atrissi design, we are now able to realise some of our aspirations. The aspiring web-designer will note that the site now is powered with WordPress, which offers us a wide range of integration options.

Our redesigned website will rest at the centre of our communications effort going forward, and especially so two pages, 'news' and the blog. Here, we intend to republish our articles from Trust & Verify, so that our readership can comment on them, and hopefully share them. The blog will also be used to offer our views the verification, implementation or compliance developments in international affairs. This section, we hope, will contain viewpoints from both our established permanent staff, as well as the volunteers that support us. Enjoy the new site. Engage with it. We hope this is the starting shot of bringing our 33-year old organisation into the 2020s.

Grants and administration

Some funding news ...

The Special Projects Programme agreed on a grant worth approximately US\$570k to continue its work on multilateral sanctions on North Korea. We are implementing this work as part of a consortium coordinated by the James Martin Center for Non-Proliferation Studies.

... and some staffing news

Much effort has gone into increasing our capacity to deal with both current and future work. The centre has recovered from the losses it sustained about five years ago, but will have to grow further. In late April, the implementation team will be joined by Mr Thomas Brown, who holds a law degree in Public International Law from the University of Leiden. In June, the Verification & Monitoring team will be joined by Dr Grant Christopher, a Ph.D. holder in Experimental Particle Physics at New York University, and presently Programme Manager for Nonproliferation at Ridgeway Information. A further appointment within the programme is currently under consideration. Finally, VERTIC is now in a position where it may require a Director of Finance and Administration. We expect to advertise for this role in late April, with a view of appointing in summer, so if you are interested, do keep an eye on our website for more information.

building trust through verification

VERTIC is an independent, not-for-profit, nongovernmental organisation. Our mission is to support the development, implementation and effectiveness of international agreements and related regional and national initiatives, with particular attention to issues of monitoring, review, legislation and verification. We conduct research, analysis and provide expert advice and information to governments and other stakeholders. We also provide support for capacity building, training, legislative assistance and cooperation.

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