On-site inspection training in the CTBTO's formative years

In October 2012, I was asked by VERTIC to write an article on the early stages of developing and testing a training programme for inspectors in an international inspectorate—in my case the Comprehensive Test Ban Treaty Organization/On-Site Inspection (CTBT/OSI), where I was the first chief of training. VERTIC hoped that such an article could record valuable lessons for the future and would also help to explain how and why inspector systems function the way they do now.

The idea of recording the history of the OSI training programme in the early years of the CTBTO's existence appealed to me very much since I was among those who had a central role in its establishment and initial testing, which occurred between 1997 and 2002. Moreover, there are several lessons learned that could apply in the future and are therefore valuable to the CTBTO and hopefully to other international organizations that might struggle with operating efficient and effective training programmes in their inspectorates. The CTBTO training programme is currently running successfully on a similar basis as that set out in those early days, though with necessary adjustments and developments over time such as the addition of e-learning modules and computer simulations, brief tabletop exercises and more field exercises.

In September 1997, I moved to Vienna where the Provisional Technical Secretariat (PTS) of the CTBTO, OSI Division, is based. The secretariat had been established in April of that year and at that point had only 20 employees, including the then Executive Secretary, Dr. Wolfgang Hofmann. I was chosen to head the training of surrogate inspectors for the new organization ('surrogate' because, according to the treaty, the actual inspectors were to be

In this issue

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Verification Research, Training and Information Centre (VERTIC)
Development House
56–64 Leonard Street
London EC2A 4LT
United Kingdom
tel +44 (0)20 7065 0880
fax +44 (0)20 7065 0890
website www.vertic.org

nominated only after its entry into force).

Browsing through the treaty—which I knew well since I had participated in its negotiation between 1994-1996 as a representative of my country—I realized that there are only three brief paragraphs that address, or are relevant to, training:

• Protocol, Part II, On-site Inspection, B. Designation of inspectors and inspection assistants.
Paragraph 15. Inspectors and inspection assistants shall be nominated for designation by the states parties....
Paragraph 16. Each state Party, no later than 30 days after entry into force of the Treaty for it, shall notify the Director General the names...of the persons proposed by the State Party for designation as inspectors and inspection assistants….
• Protocol, Article I, Paragraph 25. 'Each inspector…shall receive relevant training. Such training shall be provided by the Technical Secretariat pursuant to procedures specified in the Operational Manual for On-Site Inspectors...the Technical Secretariat shall coordinate with the states parties a schedule of training for the inspectors.'

Political and operational challenges

These articles and the lack of any further details in the treaty text signaled to me that there could and probably would be problems ahead in designing, testing and operating a successful training programme for OSI inspectors. The challenges fell into two principal areas: first, political; and second, operational.

The political reasons were embedded in the treaty language and surfaced when the PTS submitted the plans for work programmes to the 'Preparatory Commission' (PrepCom) for review and approval. The PrepCom is the policy-making organ of the CTBT. Composed of representatives from states that have signed or ratified the treaty, it convenes in Vienna twice a year and decides on recommendations put forward by two working groups: 'Legal and Institutional' (WGA), and 'Verification' (WGB). The PrepCom also approves the annual plans of the PTS and the annual budget of the CTBTO.

At that time, some states maintained that training was not an activity that the new organization should be occupying itself with. Rather, priority should be given to the buildup of international monitoring system (IMS) stations and to the international data centre (IDC), which together form the main technical elements of the treaty verification regime related to monitoring activities—see Box 1. Some states also argued that since the treaty specified that inspectors would be nominated only after entry into force, there should be no training at that time.

On the other hand, there were states that supported the development of a training programme and recognized that this activity should not be left to the last minute. This view was sharpened by the perception at that time that entry into force was relatively close, but these states in any case considered that it was important to test the validity of the suggested training framework and its components in practice and not just by designing curricula on paper.

Operational considerations were also daunting. Assuming that suitable courses and exercises could be developed (which, at that time, were unexplored proposals), the training section of the OSI Division came to realize that the chief problem was not so much finding professional candidates competent in the various technologies and techniques required by the treaty provisions, but rather to train those candidates to be inspectors in line with the treaty provisions. This challenge was particularly acute because the OSI Operational Manual had not yet been developed at that early stage in the life of the CTBTO.

Last but not least from the operational perspective, during a full OSI up to 13 technologies and techniques can be called on, plus overflights and photography as specified in paragraph 69 of the protocol. These include radionuclide identification and sampling, visual observation, active seismology and gravitational field mapping, among others. The Training Section therefore had to first find experts in all of those technologies and techniques and ensure that states signatories nominated them for training. The Training Section also had to develop and implement the training cycle, which would include designing training courses and exercises in a comprehensive and integrated programme, conducting the training, and subsequently drawing lessons that could be used to improve the process.

In sum the challenge was fourfold: first, to build support among states to establish a live training programme for OSI as early as possible; second, to secure funding and approval for it by the PrepCom; third, to design it; and fourth, to test it.

Box 1: the CTBT verification regime

The verification regime of the CTBT includes the following elements:

IMS: The International Monitoring System: 337 stations deployed globally, from a base of four technologies: seismic, radionuclide, infrasound and hydroacoustic monitoring. Today, most of the stations have been completed and provide continuous monitoring, sending their signals to the International Data Center (IDC) in Vienna.

IDC: The International Data Center is a sophisticated hub of computers and data storage and analysis. Dozens of analysts work following the automatically screened-out data sent by the IMS and analyzing non-screened-out signals. The IDC produces several types of data bulletins for states to review, and to judge whether they see any problems with those reports, that is, whether a possible treaty violation has occurred.

OSI: On Site Inspection provides an increased deterrent element for the CTBTO verification regime. In situations where a treaty violation is suspected, it is the prerogative of the state-members (after entry into force however) to request an OSI. Once an OSI is approved by the Executive Council, within two days (about six days after the request), an Inspection Team composed of 40 inspectors, arrives at the 'point of entry' established beforehand by the inspected state party. The inspection team negotiates its inspection plan with the state party. It should then receive authorization to begin inspection activities, once the Executive Council of the CTBTO approves the OSI request, using 13 OSI technologies and techniques in a graduated way. The inspection can last up to 130 days at the inspection area, composed of three periods (Initial, Continuation and Extension).

Consultation and Clarification: A mechanism of finding out by exchange of information and explanations the nature of the vent that caused concern—through direct or indirect consultations between the states. This is without prejudice to the right of any state to skip this process and go directly to an OSI request. Its main aim is to save time and money and avoid tensions.

OSI training programme: concept and practice

Against the backdrop described above and with the cooperation and support of several representatives of interested states, I designed a conceptual framework for a training programme with the following attributes:

- An initial, modest, programme with the flexibility to grow and develop over time;
- A simple, modular, step-by-step approach, enabling the programme to easily adjust to developments;
- A relatively inexpensive framework with an annual cost of several hundred thousand US dollars.

In line with these attributes, the training programme would begin with Introductory Courses teaching the basics of the treaty and the OSI regime. It would then continue with advanced courses focusing on OSI technologies and techniques, and would culminate with Tabletop Exercises (TTE) and Field Training Exercises (FTX).

The elements were tested by running several introductory courses (each of which lasted five days and included some 40 participants) as well as a tabletop exercise for the Operations Support Center (three days and 30 participants), another, larger, tabletop exercise, for the OSI process (five days and 50 participants), and two advanced courses (five days and 40 participants). Following this, a major study and planning effort was launched for designing a Long Range Plan (LRP) for the Training Program (see section on this below).

These early tests of the initial training cycle produced several cardinal lessons. First, the introductory courses should have dynamic elements added (that is, elements to encourage more active participation, such as using class team work to investigate a specific area). Second, the advanced courses should be restructured to have one course on each technology or activity area rather than an integrative format covering all technologies and areas. Third, the exercises would benefit from using more tabletop approaches and at least one field exercise every couple of years.

During the first five year period of the CTBTO, we also recognized that the OSI Operations Center needed a permanent facility. The CTBTO now has such a facility (renamed

the Operation Support Center) that operates during OSI exercises and training courses. In addition, auxiliary equipment for training and testing purposes was specified, agreed and purchased by the PTS. This was the beginning of establishing what would later become OSI equipment and its storage site—currently the Equipment Storage and Maintenance Facility at Gutmansdorf. When the treaty enters into force this collection will become approved OSI equipment. During this five-year phase, two advanced courses were planned and conducted with a focus on identifying the best approach to running these kinds of classes:

1. Integrative advanced course, Shnezinsk, Russia—aimed at developing curricula for the various technologies. This course lasted five days. Its participants designed and reviewed curricula for courses on all OSI technologies and charted the merits of possible methodologies for these courses.
2. Radionuclide advanced course, near Paris, France—focused on building capacity and integrated work patterns among RN experts.

This course included a review and analysis of the best possible curricula for such a course both in class and field activities. It involved demonstrations of equipment, safety practices, and using hand-held low-resolution gamma spectrometry along a route where simulated radioisotopes were deployed to test if the equipment and search tactics used by the trainees would reveal them. We planned to add further advanced courses in other OSI technologies and techniques such as seismics and overflights.

Several field activities were conducted during the two courses including study/training 'stations' operated by instructors where equipment was exhibited and tested. The field activities also involved hands-on training in communications, health and safety, navigation of inspectors in a small 'Inspection Area' and radionuclide identification using suitable equipment (such as hand-held low-resolution gamma spectrometry).

Tabletop and field training exercises

For professionals in training it goes without saying that plans and curricula on paper are not enough and that one must test them through dynamic play using Tabletop Exercises (TTE) and Field Training Exercises (FTX). It was hard work to convince the PrepCom to move from class to field, mainly because of cost considerations. In addition, several states also argued that the time had not yet come for this type of activity because they felt trainees should gain more experience and advances were needed in the development of the On-Site Inspection Operational Manual (OM). Nevertheless, the secretariat managed to pursuade the states of the need for such exercises, and by the end of the first five years, three TTEs had been conducted: one, in 1999, using a scenario where the inspected state party (ISP) played out against an inspection team (IT) based on an OSI scenario and two others that tested a plan for an OSI Operation Center.

In addition, notably, the first Integrated Field Experiment (IFE) was conducted in October 1999 in Kazakhstan. This important development involved, for the first time, a visit by a small inspection team of ten experts in various technologies to the former Soviet Union nuclear test site in Semipalatinsk, where hundreds of nuclear tests had been conducted, to test initial OSI capabilities in a challenging area and scenario. The exercise focused on OSI equipment for training, existing procedures and the level of training provided by the PTS up to that point. It was to be the first in a series continuing in 2002 and 2008 in that country. The next IFE is planned for 2014 in Jordan. Among the conclusions drawn from these activities to improve and advance the training programme were:

- Confidence on the adequacy on the basic structure of the testing cycle for OSI;
- The need to continue and improve the introductory courses as a theoretical and practical introduction to the more complex advanced courses (for example, by adding semi-field activities such as hands-on equipment training and familiarisation with the generic practical capabilities every inspector needs to have in communications, health and safety and so on);
- Adding field activities as an integral part of the advanced course curricula and dedicating a part of those courses to integration with other technologies;
- The TTE and FTX are crucial elements during advanced training of inspectors.

Diplomatic negotiations for operationalising OSI

In order to provide the training programme with a real chance of taking-off, the OSI Division in general and its Training Section in particular conducted a diplomatic campaign in the verification-focused Working Group B of the PrepCom during its first two years (1997-1998). The CTBTO Executive Secretary backed the OSI Division in this endeavor.

The campaign included gaining the support of, and getting advice from, representatives of major states and other interested representatives from all regional groups. It also involved organizing support for the operational and funding aspects of the programme during Working Group and PrepCom sessions. In addition, the campaign included drafting support of representatives of underdeveloped states interested in developing science and technology in their countries by highlighting the fact that conducting such a training programme that included those elements would provide additional benefits to them. For example, the advanced courses in particular included many elements related to science and technology and would expose their experts to new scientific materials.

The success of the introductory courses (six of them were conducted during the first five years) and the gradual recognition by many states that the training programme must be tested to confirm its suitability, overcame initial hesitation by several countries that wanted to delay the roll-out of the testing phase as a whole. By the end of the first five years of the PrepCom, the OSI training programme was solidified and well established. Thus, the lessons learned, coupled with the diplomatic effort invested, resulted in the following elements being included in the training programme by the end of the first five years:

Introductory Courses: five days, approximately 40 international participants selected mainly on the basis of their CTBT-relevant professions and expertise but also with a view to fair geographic distribution.

The ICs were conducted in Vienna, mostly in class. They included lectures by well-known experts and PTS staff on the treaty and its verification regime. The lectures on OSI looked at its main components such as overflight, managed access, sampling and photographing, as well as IMS and IDC essentials. The curriculum also included greetings by the CTBTO Executive Secretary and the OSI Division head. In addition, a dynamic element was introduced into the courses through the nomination of four teams, headed by a team leader. These teams were tasked with preparing an assignment related to OSI and then presenting it to the full class.

Advanced Courses: these were scientifically and operationally advanced courses designed to demonstrate to professionals how their areas of expertise would be applied in the CTBT context and to practice the material learned in class and in the field. Each technology or technique was covered by a dedicated course including radionuclides, seismology, geophysics and so on. The idea behind these courses was to develop appropriate professional behavior for each technology with two principal objectives in mind: applying the technology or technique during OSI field operations and ensuring its integration with the application of the various technologies and techniques being used by the other OSI sub-teams. This programme had also been reinforced by the inclusion of a Long-Range Plan (LRP) for training.

Developing the LRP for training

The success and subsequent approval of the annual training programme by the PrepCom in 1999 provided a good opportunity to launch the LRP for OSI training by getting the support of a well-respected international organization with a proven record of preparing and testing training programmes. The objectives were:

- To have the so-far basic PTS/OSI/Training programme assessed by an external organization—a process that would provide the training programme with credibility over the course of the plan, which was intended to run for a good several years;
- To design and propose a detailed training programme.

A formal bid was launched and it took several months to choose the most appropriate candidate from among the several applicants. The successful bidder was the UK defence evaluation and research agency DERA, which had proposed a well-honed work plan for the lowest cost.

The OSI Training section worked closely with DERA for

more than a year to pinpoint OSI training needs, thereby giving the agency the best opportunity of providing a LRP tailored to OSI and CTBTO needs. The result was the production of a 200-page training plan that satisfied the OSI Division and the PTS.

The plan was presented to the verification Working Group and the PrepCom through a detailed information paper (INF) as well as by a presentation, which was followed by a lively discussion. We were pleased when the plan was subsequently (and enthusiastically) approved. At the end of my five years term, therefore, I was able to leave satisfied that the CTBTO/OSI had a solid LRP of training for the years ahead. The three elements of the initial training plan were developed over time but the core essence remains the same—see Box 2.

Conclusion

During the first five years of the PrepCom, the On-Site Inspection training programme was developed, tested, improved and put into the framework of a long-range plan. The main achievements of the effort were:

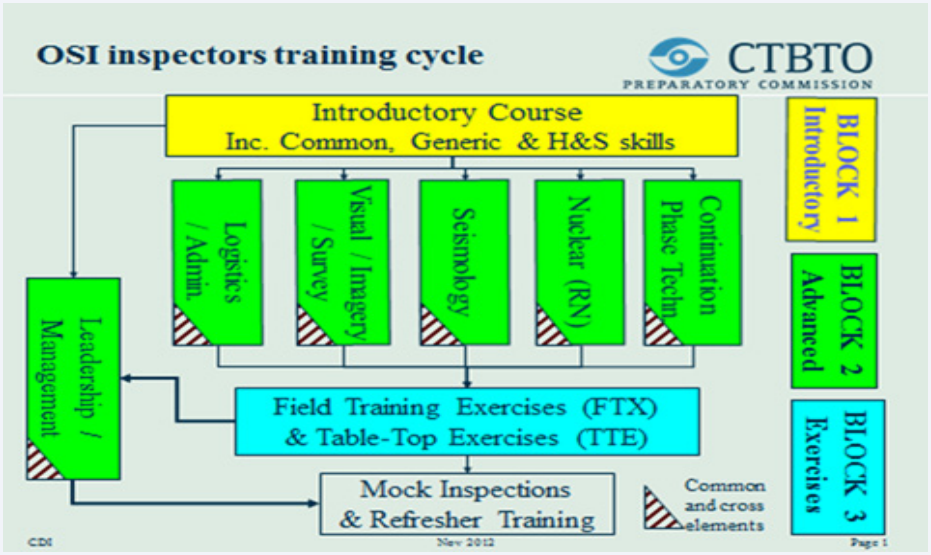
• The recognition, by almost all states within the PrepCom, that the CTBTO could not wait for entry into force for the development and application of a training programme. In addition was an overall agreement that plans have to be ground-tested and not remain on paper only.
• The development of a Long-Range Plan and its approval by the PrepCom. This enabled the next generation of OSI trainers to focus on the development and implementation of the programme and to establish a solid roster of inspectors ready for entry into force by conducting two training cycles (2004-2012) of 50 inspectors each. These trainees were nominated for the training cycles by their states and one could assume that once the treaty has entered into force, these experts, or those of subsequent training cycles, will be nominated as inspectors.
• OSI training becoming a kind of engine that pushed forward the development of OSI Operational Manual.
• Purchase of OSI equipment for testing and training.

In sum, during the first five years since the establishment of the PrepCom, six Introductory Courses, three Tabletop Exercises and one Field Exercise were conducted; a roster of more than 100 trained surrogate inspectors exists today; the Long-Range Plan for OSI training was drafted and then approved by the PrepCom.

In the years that followed (2002-2012) and especially during the term of Tibor Tóth as Executive Secretary (2005-2013), the training programme received a big push forward, helped by his support.

The training cycle proposed in the LRP has been fully practiced and tested and is now well established. Two established training cycles of surrogate inspectors have been executed; and the coming IFE to be held in 2014, with its preparatory training activities, will be another focal point for testing both the training programme and the inspectors' capabilities, among other objectives.

Box 2: OSI training cycle (source: CTBTO)



Dr Itshak Lederman was born in Tel Aviv, Israel in 1948. He earned a B.A. and M.A. from Tel Aviv University in Political Science, Middle East Studies and Business. Dr. Lederman had military and government careers for 40 years and is an expert on arms control and nuclear affairs.

This article is written in a personal capacity and the views expressed herein are the author's own.

Verification Watch

PrepCom NPT review meeting takes place in Geneva

Sonia Drobysz, Geneva and Paris

The Preparatory Committee to the 2015 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (PrepCom) held its second session in Geneva from 22 April to 3 May. The purpose of the event was to prepare for the 2015 Review Conference by assessing implementation of the treaty. Ambassador Cornel Feruta of Romania was the chair-designate for this second session.

The climate surrounding the meeting was not favourable to smooth discussions. High on the agenda was Iranian, North Korean and Syrian non-compliance with non-proliferation related obligations, but the proposed Middle East Weapons of Mass Destruction Free Zone (MEWMDFZ) was undoubtedly the 'most urgent and acute issue of this NPT review cycle', as Russia noted in its opening statement to the PrepCom.

The goal of organising a conference on establishing a MEWMDFZ was a key practical step in the 2010 NPT Final document. However, the conference has been postponed to a non-specified future date due to disagreements among the proposed participants. During the PrepCom, Russia disassociated itself from the other conference conveners, including the UN Secretary-General, the United States and the United Kingdom, making clear it 'never gave its consent to postponing the dates.' The League of Arab states also strongly condemned the postponement, but dropped previous threats to boycott the PrepCom. Egypt surprised everyone, however, by announcing on Monday 29 April its withdrawal from the remainder of the session to express a 'strong message of dissatisfaction with the lack of seriousness in dealing with the issue of establishing a zone free of nuclear weapons.'

No other countries joined the Egyptian delegation in the walkout. The chairman's factual summary, distributed on the last day of the PrepCom, noted that 'states parties recognized that while the deadline for convening the Conference had not been met, the opportunity had not been lost.'

More generally, the PrepCom gave NPT parties the opportunity to reaffirm their support to the treaty regime and consider ways to promote its implementation. The event highlighted progresses on certain non-proliferation actions, especially with respect to IAEA verification of nuclear material and activities to detect and prevent diversion to unauthorized uses. While states have yet to agree on a strengthened verification standard including a comprehensive safeguards agreement and an additional protocol, 120 additional protocols are now in force, an increase of 19 since May 2010 when the last review conference was held.

Moreover, many encouraged implementation of the so-called state-level concept to all states, promoting a safeguards approach that is more objectives-based and that considers all safeguards-relevant information about a state. As announced on 3 June, the IAEA Director General intends to report to the September meeting of the IAEA Board of Governors on the conceptualisation and development of the state-level concept. The extension of the IAEA's verification mandate was also promoted: a number of states parties called for the development of effective and credible multilateral verification arrangements to ensure the irreversible removal of fissile material designated by nuclear-weapon states as no longer required for military purposes.

In addition, NPT parties emphasised the role of the IAEA in efforts to improve the global nuclear security framework and to promote its implementation. According the chairman's summary, they stressed 'the need to strengthen the coordination and complementarity of nuclear security activities', and welcomed the IAEA's initiative to organise the International Conference on Nuclear Security that will be held in Vienna this July. The outcome of the conference should be on the long list of points to discuss at the third (and final) PrepCom session next year in New York. •

IMS detects isotopes from North Korean nuclear test

Russell Moul, London

The previous issue of *Trust & Verify* discussed how the International Monitoring System of the Comprehensive Nuclear-Test-Ban-Treaty (CTBT) recorded the North Korean test earlier this year. A few months after the initial detection, that same International Monitoring System detected levels of two radioactive isotopes, xenon-131m (131m-Xe) and xenon-133 (133-Xe), thought to have been released during the third nuclear test announced by the Democratic People's Republic of Korea (DPRK) in February of this year.

The CTBT detection regime consists of a global network of three different waveform technologies—seismic, hydroacoustic and infrasound—together with global monitoring of radionuclide aerosols and noble gases in order to detect, trace and identify nuclear events down to 1 kt TNT equivalent. In cases of underground explosions, such as those performed by the DPRK, it has been observed that radioactive gases like 131m-Xe and 133-Xe, can be released into the atmosphere.

These isotopes, along with xenon-133m and xenon-135, are produced in fission reactions and exhibit suitable half-lives and radiation emissions to be detected in the atmosphere at low levels at great distances from the release site. According to the website of the CTBTO, which administers the treaty, the 'ratio of the detected xenon isotopes' recently identified are 'consistent with a nuclear fission event occurring more than 50 days before the detection', and correspond with the DPRK's announced test back in February, 55 days before the measurements.

The detections were registered at the Japanese radionuclide station in Takasaki on 8 and 9 April 2013. This location is over 600 miles away from the DPRK's nuclear test site, while lower levels were detected at Russia's Ussuriysk station from April 12 to 14.

The Takasaki station, an automatic station of the Radionuclide Aerosol Sampler and Analyzer (commonly known as a RASA type), is a fully integrated and automated system for monitoring airborne radionuclides. By utilising Atmospheric Transport Modelling (ATM) to analyse three-dimensional travel paths of noble gases exposed to prevailing winds, the DPRK test site was implicated as a potential source for the emissions.

But despite this, CTBTO representatives remain cautious as the detection of radioactive noble gases more than seven weeks after the event is considered highly unusual.

After an underground explosion, radioactive noble gases can seep through layers of rock and sediment until they reach the air, or they can be released by human activity at the test site. However, determining the site where the radioactive gas originated from through atmospheric sampling is not easy: xenon isotopes are not only produced by nuclear explosions but also by nuclear reactors and by medical isotope production.

Further uncertainty surrounds the expected amount of noble gas released from underground nuclear explosions. These explosions create large quantities of xenon but the amount released into the atmosphere depends on the geological and containment charactersistics of the site of detonation. It is expected that only a fraction of the xenon generated will escape, especially if efforts are made to ensure the explosion is well contained.

Nevertheless, the latest detections demonstrate the sophistication of the CTBT International Monitoring System and its ability to provide confidence to member states that no significant nuclear explosions will escape detection.

It also highlights the importance of radioactive noble gases in this process: xenon not only provides a means to monitor nuclear explosions, its ability to escape into the atmosphere and to be detected weeks after an event can make it an important factor in deterring future non-compliance with the CTBT. •

Special feature • Arms Trade Treaty negotiation to implementation

In the last edition of *Trust & Verify*, David Cliff recorded the historic moment on 2 April 2013 when the Arms Trade Treaty was adopted with overwhelming support by the UN General Assembly in New York.

Two months later, we have already taken a significant step towards entry-into-force, when some 70 countries signed the treaty at a special ceremony on 3 June hosted by UN Secretary-General Ban ki-Moon. The Arms Trade Treaty (ATT) will come into force when 50 countries have ratified, so the signs are positive.

In my four years working on arms control and disarmament in Geneva, there have been highlights in the Non-Proliferation Treaty, the Biological and Toxins Weapons Convention, and in the Landmines and Cluster Munitions conventions. But the stand-out has been negotiating the ATT, because of the potential for the treaty to have a practical impact from the day it comes into force. By adopting strong global standards to govern the arms trade, the ATT should:

• Save lives and reduce conflict;
• Promote sustainable development by enabling resources to reach schools, healthcare services, and critical infrastructure rather than being wasted on conflict;
• Reduce human suffering by preventing arms being used in serious violations of human rights and international humanitarian law;
• Help to combat terrorism and crime by steadily reducing the unfettered proliferation of weapons which threaten the security not only of the countries where terrorists base themselves but also their neighbours and the rest of the world.

The international community has taken the first important step, but how will we know whether the Arms Trade Treaty is delivering when it lacks an external monitoring and compliance body?

In my view, the best way to monitor progress is to continue with the partnership model that has been the hallmark of the ATT campaign. From the seven diverse states, including the United Kingdom, which co-authored the first UN General Assembly Resolution in 2006, to the civil society advocates and parliamentarians, to the regional organisations such as the Caribbean Community—(CARICOM), the European Union (EU) and the Economic Community Of West African States (ECOWAS), the campaign to establish an ATT has been characterised by groups supporting and challenging each other to stick to the plan, and then to do better. 'Support and Challenge' can help the ATT to stay on track.

There are still many details to be worked out on ATT implementation. I would expect to see some or all of the following elements, building on the partnership model:

• States parties will carefully scrutinise the information that we will share with each other, from our annual declarations recording progress in implementation—including on national structures and legislation—to the information we will share about actual arms transfers. I would expect Meetings of States Parties to build in time to review those returns.
• Peer Review. This is always a sensitive area, but I would expect a push for a mechanism to allow the ATT community to 'Support and Challenge' fellow states parties.
• NGOs will monitor and publicise progress, as they already do for the Landmines and Cluster Munitions conventions, helping to sustain momentum and encouraging countries to meet the highest possible standards.
• Regional organisations such as the European Union and ECOWAS will continue to play a critical role in driving up standards and coordinating technical assistance, often working in partnership with NGOs such as VERTIC and

IANSA to provide specialised and tailored expertise.

To evaluate success, the ATT community will need to establish a base-line from which to build. This is not a straightforward task but it should be done before the ATT enters into force.

On the technical side, we will need to map how many states parties have the right national legislation and structures in place to comply with the ATT's requirements. It will be more difficult to quantify the ATT's role in reducing conflict, stemming the flow of weapons, and preventing human rights violations, but I hope we will invest time and creative thinking in finding the means to do exactly that. It will be a sensitive task to build support for a particular methodology to collate and analyse the evidence. But I don't think it's beyond us, given the collective problem-solving approach which has also characterised the ATT's evolution to date.

Finally, the UK-Norway project on verifying nuclear warhead dismantlement has offered some important pointers which the ATT could follow.

The project has shown time and again that building and maintaining trust among the parties is just as important as getting the technical aspects right. In the ATT context, this could mean: maintaining an inclusive and cooperative approach to developing the ATT within the UN; adopting a transparent approach to progress in implementation accompanied by a willingness to accept challenge and scrutiny by other states parties and by civil society; offering support through technical assistance and the sharing of best practice.

I will always remember with great pride the moment on 2 April when a sea of green lights in the UN General Assembly Hall showed that the Arms Trade Treaty had been adopted. The United Kingdom had played a large part in the campaign. But now we must ensure that we bring as much determination and rigour to the implementation phase, and that we can find a way to measure and evaluate the results which the ATT will bring. As a diplomat, my goal has always been to 'negotiate as though implementation mattered'. Nowhere is this more true than with the Arms Trade Treaty. •

Ambassador Jo Adamson was the UK's Chief Negotiator at the Arms Trade Treaty negotiations in 2012 and 2013. She joined the UK Foreign and Commonwealth Office in 1989 and has served in Geneva, Jerusalem, London and Washington, on a range of policy issues including the Middle East, arms controls, disarmament, and counter proliferation. She worked with the United Nations on postings in New York, the Middle East and Kosovo.

This article is written in a personal capacity and the views expressed herein are the author's own.

The signing of the Arms Trade Treaty at the UN in New York. (Keith Bedford, Control Arms; Flickr)

Recent publications

VERTIC Brief No. 20, 'Iran's nuclear fuel cycle: a technical outline', David Cliff with David Keir

VERTIC Brief No. 19, 'Nuclear disarmament verification: the case for multilateralism', David Cliff, Hassan Elbahtimy, David Keir and Andreas Persbo.

Fact Sheet 13: National Implementation Measures for the Additional Protocol (French version)

Science & Technology Scan

Los Alamos develops small drones for sample collection

Alberto Muti, London

In late April, Los Alamos National Laboratory presented its new 'MODCOPTER' programme, aimed at developing Unmanned Aerial Systems (UAS) for sample and data collection. Currently available 'enthusiast level' UAS technology has been presented as a viable option, as it is relatively cheap and versatile, and easy to modify for specialised applications. According to the development team, the resulting platform could make new 'game-changing technologies' available in several sectors—including nuclear safeguards and nuclear forensics.

Unmanned systems have been extensively used in Japan to conduct operations inside the damaged Fukushima-Daiichi nuclear plant and to monitor radioactivity levels in the surrounding areas. While considerable attention has been dedicated to the use of UAS in disaster scenarios, options for including them in routine operations have also been investigated.

So far, these plans focused on bigger and more sophisticated Unmanned Aerial Vehicles (UAV). These platforms would be able to autonomously conduct long, GPS-assisted flights over large areas, collecting airborne particles and performing preliminary in-situ analysis through methods such as spectrography, while preventing the exposure of human personnel to dangerous radiation levels. Similar projects have been studied by the IAEA and by the Finnish Radiation and Nuclear Safety Authority. In addition, researchers at Sandia National Laboratories in the US have developed radiation sensing and sample collection equipment to use aboard US 'Reaper' drones to track and analyse the spread of radioactive fallout in the event of a nuclear explosion. The high-end UAVs required to carry out these tasks require considerable operational expertise, however—and come at a high financial cost.

The MODCOPTER programme, on the other hand, aims at producing smaller and cheaper UAS, which can be employed in a wider range of scenarios. The type of UAS chosen for the programme is a small multi-rotor helicopter capable of hovering and moving with great agility.

MODCOPTER platforms will retain certain basic features seen in other programmes, such as GPS navigation and a certain level of autonomy (autopilot systems are set to be developed in the coming year) but will likely employ simpler equipment, mostly focusing on cameras for remote viewing and different kinds of manipulators—such as grabbing instruments and contact samplers.

The programme's main goal is to produce a system able to carry out the 'fast, inexpensive, consistent and safe' collection of physical samples. Notably, another proposed application is sensor placement.

MODCOPTER systems could be used for environmental sampling over a wide area by dropping several UAS from a larger aerial platform, or to collect samples from areas that are dangerous or difficult to reach, such as the location of a nuclear explosion.

What is most notable, though, is that these systems are suitable for operating in other contexts where larger UAVs could not be employed, including the interior of nuclear facilities. UAS could be used to collect swipe samples from installations, easily reaching relevant sampling areas such as exhaust vents, regardless of their position and without exposing inspectors to safety hazards. Contact sampler modules, using adhesive rolls, have already been tested and have successfully collected proxy materials.

The MODCOPTER programme is still at an early stage of development, and the first results are expected in 2014. If this, or other similar programmes, generate the expected results, UAS could be employed for routine tasks like sample collection in the near future. This could ease the time and personnel requirement of inspections, in line with the oft-stated objective of using technology to increase the efficiency of inspection operations. •

Special feature • The case for multilateral nuclear disarmament

The speech reproduced below was delivered earlier this year in the UK Parliament House of Lords by Des Browne, Lord Browne of Ladyton, the former British Secretary of State for Defence. The address formed part of the Lords debate on the 'prospects for multilateral nuclear disarmament and the contribution which Britain could make.'

Lord Browne introduced his remarks by observing that although some progress has been made since President Obama's speech in Prague in 2009, including the New START treaty and the nuclear security summit process, the steam has gone out of the disarmament agenda. Lord Browne's speech highlights the current challenges to stability: an increasing number of nuclear-armed states, a growing diffusion of nuclear technologies, limitations to deterrence strategies, and new research describing the severity of impacts from a nuclear exchange. This situation, Browne argues, requires the international community and the UK to take a more proactive approach to achieving security. As part of this, he outlines five key steps towards preventing a nuclear conflict. These steps centre on strengthening nuclear security and non-proliferation agreements, on multilateral, bilateral and unilateral disarmament, as well as on a decrease in the reliance on nuclear weapons for national security.

The nuclear test by North Korea and the subsequent aggressive rhetoric that occurred only a few weeks after this speech was delivered have neatly underscored the importance and relevance of its message.

'Some say the dangers of the current environment and their uncertainties strengthen the case for our continued reliance on nuclear weapons. In the short term, I agree with them. I was partly responsible for the decision to renew the UK nuclear deterrent in 2006 and I still do not support the unilateral abandonment of an independent UK deterrent. However, this is not 2006 and relevant factors have changed even since then, as has their significance.

It is becoming clear that deterrence as a cornerstone of our defence strategy is decreasingly effective and increasingly risky. As nuclear technologies spread, it will be more difficult, not easier, to prevent acts of nuclear terrorism. In 2006 I believed that our deterrent could play a role in deterring nuclear terrorism by threatening any state known to support it, but as the sources of material used for terrorism multiply, it will be more difficult to pinpoint the state responsible. If one cannot do that, one has no target for a credible threat of retaliation.

Cyber attacks are more commonplace today and they will grow both in number and in intensity. Attribution of the source is difficult, if not impossible. Where one cannot attribute an attack to a source, again one cannot deter with a threat of massive retaliation. That is not to say that nuclear weapons are irrelevant to all 21st century challenges, but it is to say that they offer less of an insurance policy against the challenges we will face in the future.

Further, I invite noble Lords to reflect on recent research into the climate change impacts of even a small nuclear exchange, let alone the effects of one between superpowers. Since 2006, new scientific research has revisited the nuclear winter theme. The research, employing more sophisticated climate models, stresses the devastating climate effects that would follow the use of nuclear weapons. A major use would be suicidal. It would so alter the climate and, as a consequence, our agriculture, that the attacker's population would starve to death, even without any nuclear retaliation.

Even a smaller nuclear exchange, for example, between India and Pakistan would produce global temperatures colder than any experienced in the last millennium, with massive impacts on agriculture affecting up to 1 billion people, particularly in China and the United States, causing economic damage and huge political instability around the world.

If we want to be secure against nuclear and other threats, we have to think more creatively than our current reliance on deterrence implies. We have to shift the emphasis away from the threat of massive retaliation to prevention of nuclear catastrophe and resilience in the face of any attacks. On the nuclear side, we must plan for the unthinkable, but prevention is our main route to safety. Fewer nuclear weapons and materials in the world must be better than more of both. Those who argue the opposite are dangerously overconfident about our ability to keep control of nuclear weapons and materials, particularly in the face of terrorists' ambitions. Prevention means a number of things.

First, we have to get and keep better control of the world's nuclear weapons and materials. It is essential that the nuclear security summit in the Netherlands is ambitious. This is an issue for continued leadership attention. It is important that world leaders reaffirm their commitment to continue this process, and talk of the meeting in the Netherlands being the last of the series is foolish. Secondly, we have to cap the problem by making progress towards a fissile material cut-off treaty. The issue of such a treaty cannot be allowed to languish in the conference on disarmament any longer; it has been there for far too long.

Thirdly, it is essential that President Obama and President Putin meet and pursue a follow-on deal to the new START treaty as soon as possible. The US needs to show flexibility on missile defence, agreeing to share more details because that is the key to unlocking the door to further nuclear reductions and a deal in which the US could agree to reduce the warheads it holds in reserve and Russia could agree to cuts and more transparency about its non-strategic nuclear weapons. Fourthly, we must never miss an opportunity to tell both the US and China that they have a solemn international responsibility to ratify the Comprehensive Nuclear Test-Ban Treaty.

Fifthly, we have to work harder to strengthen the grand bargain at the heart of the non-proliferation treaty or risk losing it. We are becoming dangerously complacent about it. All states have a responsibility here, but the nuclear weapons states bear a special responsibility. Successive governments have reduced the number of warheads in the UK arsenal, but we need to do more. Formally, we are committed to the like-for-like renewal of Trident and the operational posture of continuous at-sea deterrence. The government and all Members of this House need to reflect further on this position. Are we telling the countries of the rest of the world that we cannot feel secure without nuclear weapons on continuous at-sea deployment while at the same time telling the vast majority of them that they must forgo indefinitely any nuclear option for their own security? Is that really our policy? If so, do we expect the double standard that it implies and indeed contains, to stick in a world of rising powers?

The non-nuclear weapon states signatories to the Non-Proliferation Treaty committed themselves to non-nuclear status only in the face of a commitment by the nuclear weapon states to pursue disarmament. Some of that disarmament must come through multilateral negotiation and agreement, but some of it can come through independent action, as in the case of several rounds of announced reductions in the size of the UK nuclear warhead stockpile, none of which we negotiated with anyone else.

The time is now right, in my view, to change our posture and to step down from continuous at-sea deterrence. This would demonstrate that nuclear weapons are playing less and less of a role in our national security strategy, and along with the reductions in stockpile numbers we have made, it would strengthen our ability to argue internationally for the kinds of measures I have outlined in this speech.

There are those, I know, who will argue that we have already done enough, that it is time for others to act and that, in any case, such measures will have no impact on the actions of the Irans and North Koreas of this world. They may well be right.

Certainly, some states must be confronted with firm international action and other states must also step up and take their responsibilities more seriously if we are to avoid the worst. If a disastrous nuclear incident does occur, it will not be all or even partially the fault of this country, but what consolation will there be in the blame game the morning after London has been devastated by a terrorist nuclear at-

tack? What consolation will there be when we cannot secure incontrovertible evidence of the source of the attack and therefore cannot use the nuclear weapons we have on continuous deployment, even should we wish to? What will the value of our insurance policy be then? Where will the consolation be if even a small nuclear exchange between India and Pakistan has the kind of climatic effect I described earlier? The choice is not between one risky and one risk-free future. There are no risk-free futures on offer.

The primary purpose of our policy must be to ensure that we never suffer the consequences of a nuclear attack. At this stage in our history, nuclear deterrence still has a residual role to play in achieving this objective, but the character of 21st century threats means that its shelf life is eroding.

To achieve our objective, we now need to shift the emphasis to the kinds of measures I have talked about-on to reducing the chances of any nuclear weapon ever being used anywhere. That means the relentless pursuit of nuclear weapons reductions, a relentless strengthening of nuclear security and non-proliferation regimes, and a decreased reliance on nuclear weapons for national security by all, including ourselves.' •

Amended reproduction from Hansard reporting of House of Lords' debate on nuclear disarmament, 24 January 2013. Contains Parliamentary information licensed under the Open Parliament Licence v1.0

Lord Browne of Ladyton is a British Labour politician and former MP for Kilmarnock and Loudoun. He has served as Defence Secretary of State as well as Scottish Secretary of State. He is the current Convenor of the Top Level Group of Parliamentarians for Nuclear Disarmament and Non-Proliferation. Lord Browne is also a member of VERTIC's Board of Trustees.

VERTIC news

National Implementation Measures Programme

Over the past three months, NIM staff completed two legislation surveys related to the international legal instruments to secure nuclear and other radioactive material and two surveys for the Chemical Weapons Convention (CWC), as well as revising four surveys relating to the Biological Weapons Convention (BWC). NIM staff also reviewed one country's draft law to implement both the Biological and Chemical Weapons Conventions and conducted one drafting activity. Scott Spence and Yasemin Balci attended the CWC review conference in The Hague from 8-12 April and delivered a statement during the plenary meeting (the first time that NGOs had been invited to do so). VERTIC also co-organised a joint universality workshop in Angola with the British Embassy in Luanda and the OPCW.

The workshop, aimed at advancing Angola's accession to the CWC and the BWC, took place on 22 and 23 April in Luanda. Experts from VERTIC, the BWC Implementation Support Unit, Portugal, and Brazil promoted accession to the BWC and initiated cooperation with Angolan authorities, national stakeholder groups and assistance providers on national implementation measures and activities.

From 26-30 April, Scott Spence and Sonia Drobysz attended the second session of the preparatory committee for the 2015 Nuclear Non-Proliferation Treaty Review Conference in Geneva. Yasemin Balci attended a regional workshop for national implementation of the Biological Weapons Convention in Eastern Europe in Kiev, Ukraine, from 27-29 May. She gave a presentation on the status of implementation of the BWC and UNSCR 1540 in Eastern Europe.

Scott Spence spoke at a meeting of the Global Partnership Biosecurity sub-Working Group in London on 12 June 2013 on VERTIC's efforts in the area of BWC implementing legislation, and also spoke at the EU BWC Action Workshop in Geneva on 13 June. Sonia Drobysz participated in the Global Partnership's Nuclear and Radiological Security sub-Working Group in London on 13 June.

Yasemin Balci and Sonia Drobysz participated in the EU Non-Proliferation Consortium's second consultative meeting of European experts on issues of non-proliferation and arms control, 17-18 June in Brussels, Belgium. Angela Woodward participated in a meeting of the Public Advisory Committee on Disarmament and Arms Control, Wellington, New Zealand, 26 June. Angela was appointed to this committee by New Zealand's Minister for Disarmament and Arms Control in 2011.

Sonia Drobysz began working as a Legal Officer in the NIM Programme on 1 July. Bilqees Esmail also joined the NIM Programme as a Legal Officer at the end of April. During this period Yasemin Balci authored 'National Implementation of the Chemical Weapons Convention: Using the law to prevent chemical weapons' for Non-Proliferation Monthly and 'The Future of the CWC, Implications for National Implementation' for the European Union Institute for Security Studies. Sonia Drobysz authored 'Article III: garanties et vérification' for the Observatoire de la Non-Prolifération. •

Verification and Monitoring Programme

This April saw VERTIC participate in the Carnegie International Nuclear Policy Conference in Washington DC where the organisation was represented by Andreas Persbo, Executive Director. April also saw VERTIC at the Non-Proliferation Treaty PrepCom—the second of the 2010-2015 NPT review cycle—in Geneva with VERTIC's Senior Legal Officer Scott Spence and Legal Officer Sonia Drobysz in attendance.

In May, VERTIC also attended a cyber-security policy forum in London, a UN open-ended working group on verification in Geneva, and a seminar in Helsinki run by VERIFIN: the Finnish Institute for Verification of the Chemical Weapons Convention; Andreas Persbo participated for VERTIC at these events. May also saw our participation at the Fifth Plenary Meeting of the Forum of Nuclear Regulatory Bodies in Africa (FNRBA) which was held in Hammamet, Tunisia. Larry MacFaul, Senior Researcher, and Hassan Elbahtimy, Researcher, represented VERTIC at this meeting and presented on VERTIC's work on universalising the IAEA Additional Protocol. The VM programme also engaged in an ESARDA meeting on safeguards and non-proliferation in Brugge, Belgium represented by Programme Director David Keir who also sat on an expert panel discussion hosted by the German Network of Scientists on Arms Control Verification. This quarter also saw David Keir present for VERTIC on nuclear arms control issues in Reykjavik, Iceland, and also participate in a working group on baseline declarations run by the Nuclear Threat Initiative in Washington. We also engaged in a nuclear history conference in Washington and a roundtable meeting on disarmament matters held at Chatham House in London. Hassan Elbahtimy represented VERTIC at these events.

June also saw Sonia Drobysz present on French nuclear arms control policy at the 2013 Annual Conference of the UK Project on Nuclear Issues, in London. At the end of the month, the entire VM team went to Stockholm, Sweden, to host a conference on the multilateral verification of nuclear disarmament.

During this quarter, the programme worked on preparing analytical and capacity building tools for implementing the IAEA Additional Protocol for our assistance project on this instrument. We also carried out a range of scoping activities for VERTIC's project on multilateral verification of nuclear disarmament. The programme also released a briefing paper on the Iranian nuclear fuel cycle. •

Verification Quotes

To unscrupulous arms dealers, dictators and human rights abusers, we have a clear message: your days of easy access to weapons and ammunition are over. The world is watching, and the world will hold you to account—Anna MacDonald, Head of Arms Control at Oxfam, on what the Arms Trade Treaty means for accountability in global arms transfers.

This level of evidence is much wider but you still wouldn't get a conviction in a court on it because of the difficulty of proving who used it—Chemical weapons expert Hamish de Bretton-Gordon on French evidence of sarin use in the Syrian civil war, June 2013.

Grants and administration

We are pleased to announce that VERTIC has secured a major grant this quarter with the Norwegian Ministry of Foreign Affairs, for £817,000 over three years. This grant will allow us to intensify our examination of multilateralism in nuclear disarmament verification. We are grateful to the ministry for their continued support of this project and our mission.

We have also benefitted from the assistance of Alberto Muti as an intern this quarter. Alberto is a Master's student at King's College London, and has been assisting the Verification and Monitoring Programme with their work on the Additional Protocol since April. Alberto has been a real asset to the team and will complete his internship in July.

In June, Ariane Jugieux begun her internship with the Verification and Monitoring team. Ariane recently completed a B.A. at the University of Glasgow and will begin her Master's degree in International Relations at the London School of Economics in September. •

VERTIC
Development House
56–64 Leonard Street
London EC2A 4LT
United Kingdom

tel +44 (0)20 7065 0880
fax +44 (0)20 7065 0890
website www.vertic.org

Registered company no. 3616935

Registered charity no. 1073051

building trust through verification

VERTIC is an independent, not-for-profit nongovernmental organization. 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 through capacity building, training, legislative assistance and cooperation.

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EDITOR Larry MacFaul
DESIGN Richard Jones
PRODUCTION David Cliff

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