# Verifying a WMD-Free Zone in the Middle East

In November 2011, the International Atomic Energy Agency (IAEA) convened a forum in Vienna on the subject of 'Experience of Possible Relevance to the Creation of a Nuclear-Weapon-Free Zone in the Middle East'. No less than eleven years have passed since this meeting was first called for. But ahead of a planned 2012 regional conference on a *weapons of mass destruction*-free zone (WMDFZ) in the Middle East, the gathering of 275 participants from nearly 100 countries at the IAEA forum is, hopefully, an indication of willingness to engage on this issue.

At the opening of the two-day event, held between 21-22 November, the Director General of the IAEA, Yukiya Amano, noted that although there is broad support for the establishment of a nuclear weapon-free zone (NWFZ) in the Middle East, a number of long-standing 'differences of view' among regional powers and other states persist. The forum, he said, provided a 'unique opportunity...to learn about, compare and discuss experience and practice to date.' Nuclear weapon-free zones have brought 'real security benefits, both regionally and to the whole world,' Mr Amano said, expressing his hope that the forum would promote 'creative and constructive' dialogue on the matter at hand.

## A short history of the proposed zone

There are, at present, five nuclear weapon-free zones in existence around the world: in Latin America and the Caribbean, the South Pacific, South-East Asia, Africa and Central Asia. The idea of a NWFZ in the Middle East dates back at least as far as 1974, when the United Nations General Assembly first gave its support to the idea following a joint Egyptian-Iranian proposal. Nonetheless, in the region today, Israel is widely presumed to

## In this issue




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possess a nuclear arsenal and IAEA reports suggest that Iran may be trying to develop a nuclear weapons capability of its own.

In 1990, the proposed scope of what should be prohibited in the Middle Eastern zone was widened to include all weapons of mass destruction—nuclear, chemical and biological— under an initiative spearheaded by the then Egyptian president Hosni Mubarak. Five years later, the Nuclear Non-Proliferation Treaty (NPT) Review and Extension Conference backed this shift of emphasis, with parties passing a resolution that called upon all states in the region 'to take practical steps' to promote the 'establishment of an effectively verifiable Middle East zone free of weapons of mass destruction...and their delivery systems'.

As Patricia Lewis and William Potter noted in September 2011 in *Arms Control Today*, the WMD-Free Zone approach was pursued in tandem with the NWFZ track. It envisaged a bargain in which Israel would verifiably abandon its nuclear weapons capability while all states in the region would agree to dismantle, or forego, 'any offensive chemical and biological weapons capabilities and join relevant global treaties and agreements'.

However, they conclude that: 'Although this approach made sense theoretically, it has thus far failed to produce any tangible product.' Indeed, political volatility, military conflict and a dearth of confidence-building initiatives in the region have robbed both the 'Mubarak Initiative' approach to the zone and the narrower NWFZ approach of the momentum necessary for them to commence—let alone make progress. The result has been an ongoing pre-negotiation stage, with few forward steps to show for it.

## The November forum: 'a positive step'

The IAEA forum was one such step, however—at least in terms of generating dialogue between states in the region on this issue. At the event, states expressed their strong support for the creation of a NWFZ in the Middle East, according to the account of the forum chair, Ambassador Jan Petersen of Norway. The ambassador's report also notes that several states welcomed the forum 'as a positive step' towards the establishment of the broader WMD-Free Zone. Notably, Iran chose to boycott the event in protest at a recent IAEA Board of Governors rebuke of its nuclear programme.

Arguably the most important 'finding' of the forum was the participants' conclusion that the establishment of nuclear weapon-free zones was possible in spite of 'serious obstacles, such as geopolitical complexities, lack of trust, and an often-lengthy process of entry into force'. According to Ambassador Petersen, forum participants agreed that overcoming such problems relied on a combination of political will, commitment, dialogue, flexibility 'and an incremental step-by-step approach.'

The next formal gathering of states to discuss a zone in the Middle East will be the aforementioned 2012 conference on creating a Middle Eastern WMDFZ. This conference was promised as part of the 'Action Plan' agreed at the 2010 NPT Review Conference, and much is seen to be riding on it. In October 2011, nearly a year and a half after the Action Plan was agreed, it was announced that a Finnish diplomat, Mr Jaakko Laajava, would be the facilitator for this conference, which will also be held in Finland. There remain many outstanding issues, however, including uncertainties over participation and the agenda. In particular, what constitutes 'success' for the meeting is a matter of debate.

## Exercising effective verification

If any nuclear or WMD-Free Zone in the Middle East is to become a reality, and be sustainable, verification will play an essential part. As the 1995 NPT resolution notes, a WMD-Free Zone in the Middle East should be 'effectively verifiable'.

The role of verification in such a zone cannot be underestimated. If conducted properly, verification would be able to detect any instances of non-compliance, as well as deter states from attempting to breach the obligations to which they have signed up. In a region historically rife with mistrust, effective verification would also be able to play a useful role in building confidence among states—which may, in turn, lead to other knock-on benefits for dialogue and diplomacy.

How would verification be conducted though? For chemical weapons, verification protocols under the 1993 Chemical Weapons Convention are already well-established, although Israel has yet to ratify the treaty and Egypt and Syria have yet to accede.

Verification of biological weapons is a quite different matter, however, since the 1972 Biological and Toxin Weapons Convention does not have a verification regime (due, in part, to US concerns over industrial espionage and the rapid pace of advancements in biotechnology). At the time of publication, the Seventh Review Conference of the BWC had yet to release its final report. It is unlikely, however, that states parties to the BWC will agree to return to negotiations on a verification protocol for the convention. They may decide to establish working groups, however, to look at compliance and verification, and to discuss how to improve the existing confidence-building measures regime.

Given their indiscriminate destructive power, efforts to establish a WMDFZ arguably hinge on states' nuclear capabilities though. Any spread of nuclear weapons in the Middle East would significantly change the region's calculus of conflict. Western governments and analysts have warned for a number of years of the risks of nuclear weapon proliferation in the Middle East.

## Nuclear non-proliferation verification

In the nuclear weapon-free zones currently in place, the parties have asked the IAEA to carry out verification activities through existing instruments such as the Comprehensive Safeguards Agreement (CSA) and the Additional Protocol (AP). The NWFZ treaties covering Latin America and the Caribbean, the South Pacific, South-East Asia and Africa each stipulate that state parties must accept CSAs, which apply to all nuclear material 'within the control of [a] state, under its jurisdiction or carried out under its control anywhere'.

The most recent NWFZ treaty to be established concerns Central Asia. It opened for signature in 2006 and requires states parties to bring into force both a CSA *and* an AP. The Additional Protocol would require states to provide more information on their nuclear activities to the IAEA and simultaneously allow IAEA inspectors greater freedom of movement in the course of their duties. These enhancements increase the Agency's ability to provide assurance of the absence of undeclared nuclear material and activities in a state.

Based on the most recent experience of developing a zone for the prohibition of nuclear weapons, it can be assumed that a Middle East zone treaty—whether nuclear-only in scope or, as is perhaps nowadays more likely, a WMD one—would also require each of its parties to accept a CSA and an AP, if they did not already have these in place beforehand. Many do; at present, Israel is the only state in the region that remains outside the NPT and has not agreed a CSA (or, consequently, an AP) with the IAEA. The uptake of Additional Protocols is, however, less widespread: several key regional states with CSAs have yet to bring an AP into force, including Egypt, Saudi Arabia and Syria.

## Nuclear disarmament verification

The verification of nuclear disarmament in the Middle East could also benefit from a review of the experiences of the other NWFZs. In this regard, the 1996 Treaty of Pelindaba—which established the African NWFZ—is particularly informative.

A key clause of the Pelindaba treaty calls for each party to: declare any capability for the manufacture of nuclear explosive devices; to dismantle and destroy any nuclear devices manufactured prior to the treaty's entry into force (which finally happened in 2009); to destroy or convert to peaceful uses any facilities used in the manufacture of nuclear explosive devices; and, crucially, to allow the IAEA to 'verify the process of dismantling and destruction of the nuclear explosive devices, as well as the destruction or conversion of the facilities for their production.'

The Treaty of Pelindaba thus explicitly, and somewhat innovatively, provides a role for the IAEA in the verification of nuclear disarmament—a provision not replicated in the later Central Asia NWFZ treaty in 2006. IAEA involvement in disarmament verification is in keeping with the mandate

of the organization, which says that the Agency is to conduct its activities 'in conformity with policies of the United Nations furthering the establishment of safeguarded worldwide disarmament and in conformity with any international agreements entered into pursuant to such policies.'

IAEA involvement in disarmament verification would not set an entirely new precedent. The Agency used nuclear weapon experts to verify that South Africa's small nuclear arsenal had been dismantled as declared in the early 1990s. On the research front, from 1996-2002 it also took part in the so-called Trilateral Initiative (along with the US and Russia) to investigate the issues associated with IAEA verification of classified forms of weapons-origin fissile material. Negotiators of a future Middle Eastern nuclear or WMD-free zone may consider that the IAEA could play a role in verifying disarmament as well as implementing safeguards.

The arrangements and architecture of disarmament verification for a WMDFZ in the Middle East are issues that may take years to crystallize into concrete proposals. But since verification concerns will tightly underpin any Middle Eastern zone, it is a topic for which consideration needs to begin as soon as possible.

## Confidence-building measures

There is much, in addition, that can be done in terms of confidence-building measures to promote the establishment of a Middle Eastern zone. As noted elsewhere in this edition of *Trust & Verify*, transparency and confidence-building measures are currently being sought to drive progress on a treaty to enshrine the peaceful uses of outer space. Similar initiatives could conceivably be taken in the Middle East WMDFZ realm.

One of the most obvious confidence-building measures that could apply is encouraging comprehensive regional uptake of the 1996 Comprehensive Nuclear-Test-Ban Treaty (CTBT). Fifteen years after its opening for signature, the CTBT is yet to come into force. It still awaits eight key ratifications from among the countries included in its 'Annex II' list of 44 states that participated in CTBT negotiations and possessed nuclear reactors at that time. Of those eight 'hold-out' states, three—namely Egypt, Israel and Iran—are in the Middle East.

Ratification of the CTBT by these three states would serve as a strong confidence-building measure for the region that could help catalyze the negotiating process for a WMDFZ. The extensive monitoring regime of the CTBT means that this treaty is highly verifiable. And as the preamble to the CTBT notes, an end to nuclear testing would, 'by constraining the development and qualitative improvement of nuclear weapons and ending the development of advanced new types of nuclear weapons,' constitute an effective nuclear non-proliferation and disarmament measure.

Securing these regional ratifications for the CTBT in the near future will not be easy, however, particularly given heightened tensions between Iran and the West, ongoing political instability in Egypt and poor signs of progress in the Middle East peace process—many of the same problems, in fact, as those standing in the way of progress on establishing a WMDFZ. The CTBT, however, has at least already gone through the negotiation process. In addition, much of the monitoring equipment is already in place and the treaty now has 155 parties. Ratification of the CTBT by states in the Middle East would represent a powerful symbolic step away from nuclear weapons that could galvanize efforts to reach agreement on a zone.

Regional members might also find that verified accords covering delivery systems could build confidence in the region (even if these were initially conducted as a network of bilateral accords to bypass any lack of unanimity that might beset a multilateral process). Those states currently not party to the Chemical or Biological Weapons Conventions (or in some cases both) could also potentially raise levels of confidence by joining these in the future.

## Looking ahead

Next year's Finnish-facilitated conference has the potential to be a significant milestone on the road to a weapons of mass destruction-free zone in the Middle East. In a region

where transparency could play such an important role, both in efforts to establish a zone and in the successful implementation of one, verification is likely to be a hotly-debated topic at the meeting. States' approaches to the role of the IAEA in the verification of a zone, and whether states foresee a role for the IAEA in the verification of regional nuclear disarmament, will be a particularly interesting issue to follow.

The goal of ridding the region of nuclear, chemical and biological weapons is now several decades old, but after so much stagnation, the realization of this project has come to be seen by some as an almost Sisyphean task. The productive result of the IAEA forum in November, however, raises cautious hopes that some movement forward can be made in the coming year.

What is perhaps most essential is to ensure that the 2012 meeting does not become a 'one-off' event. Rather, for both organizers and participants, it must be the start of a new process of multilateral dialogue. If it initiates a process of regular dialogue among regional players, then the space in which progress can be made will open up—and that would be one way in which to characterize 'success'.

*David Cliff, London*

*With research contributions by Sonya Pillay*

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Sonya Pillay was an intern with the VERTIC Arms Control and Disarmament Programme from September-December 2011.

## VERTIC blogs, October-December 2011

Can GPS navigate us to covert underground nuclear test sites? – Isadora Blachman-Biatch – 6 October

Building confidence between India and Pakistan: 'a step whose time has come' – Kate Farrell – 13 October

Bringing the CTBT into force: looking back at the 2011 Article XIV Conference – Sonya Pillay – 20 October 2011

Final preparations for the Durban climate change conference – Hugh Chalmers – 27 October 2011

India's proposals for the assessment and review of climate change action – Sonya Pillay – 4 November 2011

Fears of further North Korean nuke tests – Ryoji Sakai – 10 November 2011

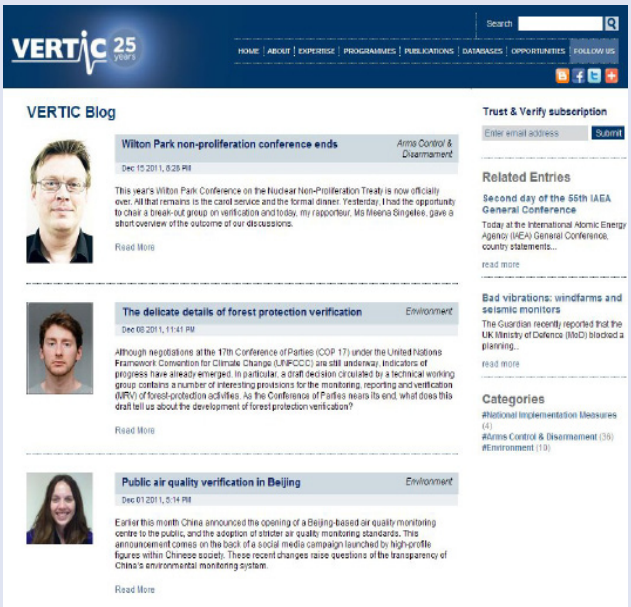
Iran and the Board of Governors – Hugh Chalmers, Andreas Persbo and Sonya Pillay – 16 November 2011

Exercising the CTBTO's on-site inspectors – Ryoji Sakai - 25 November 2011

Public air quality verification in Beijing – Grete Luxbacher – 1 December 2011

The delicate details of forest protection verification – Hugh Chalmers – 8 December 2011

Wilton Park non-proliferation conference ends – Andreas Persbo – 15 December 2011



# The role of the CTBT in regional and global security: perspectives of the research community

*The following article is drawn from the statement given by VERTIC Researcher David Cliff to the cross-regional workshop on the 'Role of the CTBT in Regional and Global Security', held in Istanbul, Turkey, from 15-16 November 2011.*

*The workshop brought together some 70 participants from governments, inter-governmental organizations and non-governmental bodies. It was jointly organized by the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) and the government of Turkey. The workshop focused on enhancing understanding of the role of the CTBT, and its verification system, in regional and global security—in addition to addressing states' specific needs with regard to the use of data generated by the CTBT's monitoring stations around the world.*

*VERTIC was invited by the CTBTO to give a presentation to the workshop session on: 'Perspectives of the Research Community'.*

## Recent VERTIC activities

Two months ago, VERTIC released the fifth and final paper in a series of publications that we commissioned on the CTBT. These papers, which are available on the VERTIC website, dealt with a wide range of CTBT-related issues.

The series saw Edward Ifft of the US State Department write for us in a personal capacity on the 'Modalities' and 'Technical Considerations' of the on-site inspection regime of the treaty; Victor Slipchenko, who was involved in CTBT negotiations for the Russian Federation in the 1990s, also wrote for us on 'Russia, ratification and the CTBT's entry-into-force'; and Jeffery Lewis, then at the New America Foundation, contributed with a paper on 'Prospects for entry-into-force' of the treaty.

Most recently, Dr John Walker of the UK Foreign & Commonwealth Office wrote a briefing paper for VERTIC on 'Verification and Deterrence' in which he expressed his own views on the role of the CTBT's International Monitoring System and its associated architecture in the deterrence of nuclear testing. This presentation includes some highlights from this publication series.

## The CTBT's role in security—now and in the future

The importance of the CTBT in the overall nuclear non-proliferation regime—and its relevance for nuclear disarmament efforts—is, by now, well-established. As the treaty itself states, the cessation of nuclear testing would constitute a 'meaningful step' on the path to nuclear disarmament by impeding both the development of advanced new types of nuclear weapons as well as the qualitative improvement of existing designs.

VERTIC has been a strong supporter of the CTBT, and the work of the Preparatory Commission for the CTBTO, for many years. We fully recognise both the value of the treaty in shoring up the increasingly robust norm against nuclear testing and, crucially, the capabilities of the CTBT's global verification and monitoring systems (even in their as-yet unfinished state).

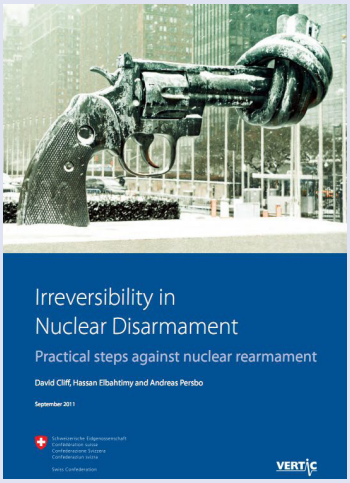
An instructive way to consider the CTBT's role in regional and global security is to see it from two different angles:

First, there is the current role of the CTBT in security—that is, with the treaty not in force but nevertheless fitted out with a well-developed, global verification regime. And second, there is the potential impact of the CTBT on peace and security after the treaty comes into force.

## Present realities

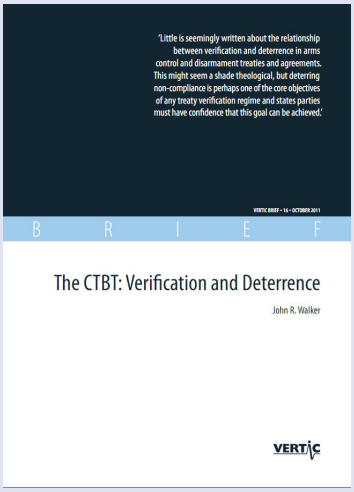
It is a remarkable achievement that after a long and technically-demanding process, the globe-spanning International Monitoring System (IMS) of the CTBT is now largely in

# New publications and presentations: October-December 2011



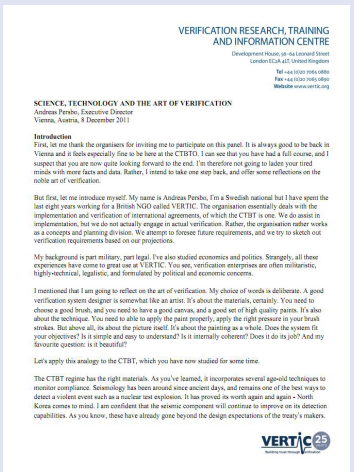

## 'Irreversibility in Nuclear Disarmament' report released

In October 2011, VERTIC released its report on 'Irreversibility in Nuclear Disarmament: Practical steps against nuclear rearmament', now available for download on the VERTIC website. The report was launched in New York City by VERTIC's Executive Director Andreas Persbo. The report deals with a concept—irreversibility—that features often in policy statements and official documents, but one that has been hitherto largely unexplored in the context of nuclear disarmament. VERTIC's report seeks to provide an understanding of the term that is applicable to this field. What we have produced is a technically-focused report that frames irreversibility in terms of the costs and difficulty of rearmament and outlines practical steps against rearmament in a state having abandoned a nuclear arsenal.




## VERTIC Brief No. 16, 'The CTBT: Verification and Deterrence' released

October also saw the release of VERTIC Brief No. 16, on 'The CTBT: Verification and Deterrence', by Dr John R. Walker. This paper looks at the capabilities of the CTBT's verification regime and the role of that regime in deterring clandestine nuclear testing. Dr Walker argues that in the context of CTBT verification, 'negotiators designed an integrated system that will clearly complicate the plans of any state thinking that it could evade that system and derive a meaningful political, military or strategic advantage from doing so.' He writes that the treaty's verification regime 'presents a formidable set of obstacles for a would-be violator to surmount.' That in turn, Dr Walker argues, plays an important role in deterring parties from attempting to evade the treaty in the first place. This paper is also available for download on the VERTIC website.




## VERTIC Executive Director presentation to CTBTO Advanced Course

On 8 December, Andreas Persbo travelled to Vienna, Autsria, to give a lecture on the interface between science and diplomacy to the CTBTO Advanced Course on Science and Diplomacy. This presentation—titled: 'Science, Technology and the Art of Verification'—has now been made available on the VERTIC website. In his presentation, Mr Persbo highlighted the capabilities of the CTBT's verification regime and the way in which the Prepartory Commission for the CTBTO embraces new and innovative technologies. The CTBTO 'is improving on an already good product,' Mr Persbo said. It is an organization that is 'not content with the good', but one that 'seeks the best in all that it does.'

place, functioning well—and to a very high level of sensitivity.

As John Walker wrote in his recent VERTIC brief on verification and deterrence: 'A [verification] regime that can demonstrate a very high level of technical reliability, coverage and sensitivity presents a formidable obstacle to anyone who wants to cheat. The IMS does that.'

While at present it serves a treaty that is not yet in force, the effectiveness of the CTBT's verification regime makes it very difficult for states wishing to detonate a nuclear device to do so without being detected. The capabilities of the International Monitoring System, combined with the underlying normative trend against nuclear testing that the CTBT itself bolsters (increasingly so with each new ratification), makes for an effective deterrent against nuclear testing. It is that deterrence effect that makes the CTBT so valuable, even today, in the promotion of regional and global security.

## Future possibilities

Were the treaty to come into force, the on-site inspection (OSI) provisions of the CTBT could, where necessary, be brought into play. In any scenario where a nuclear explosion is suspected, and assuming that an OSI is approved by the CTBTO's Executive Council, the ability of the organization to conduct an on-site inspection would equip the organization with a powerful additional tool to conclusively detect instances of non-compliance.

As Edward Ifft noted in December 2009, 'one can expect that there would be a high probability that a properly conducted OSI would identify any militarily significant nuclear explosion,' and crucially, that 'the possibility of an OSI should have a powerful deterrent effect on any country contemplating cheating.'

Following their first-hand participation in the CTBT's Integrated Field Exercise in 2008 (when the CTBT's OSI regime was field-tested, for the first time, in Kazakhstan), Oliver Meier and VERTIC's-own Andreas Persbo praised the 'robustness' of the developing verification regime. '[W]hat occurred on the steppes of Kazakhstan,' they wrote in *CTBTO Spectrum* in 2009, 'should inspire confidence in the CTBTO's operational readiness by the time the treaty becomes legally binding.' It is likely that the next Integrated Field Exercise, scheduled to take place in 2014, will result in similar conclusions.

And so, as Dr Walker has written: 'Knowing that the treaty's OSI capability is effective and would stand a very good chance of uncovering facts strongly suggestive of non-compliance, a cheating state will have to obstruct the inspectors in the field.' But that is by no means a good option for a non-compliant state. 'A systematic pattern of evasion, delay, obstruction, obfuscation and down-right hostility tells its own story,' Dr Walker has noted, 'especially since inspectors are allowed to comment on the cooperation (or lack thereof) provided by an Inspected State Party in their final inspection report.'

## Bridging the entry-into-force divide

How to transition from present realities to a future in which the CTBT is in force is the obvious challenge confronting proponents of the treaty around the world. Jeffrey Lewis, however, struck an upbeat tone in his paper for VERTIC, which we released in June 2010.

As he and many others have argued, US ratification of the CTBT would represent a significant step forward along the road to entry-into-force, with China possibly choosing to also ratify the treaty if the US to do so first.

But even among the most strident Annex II hold-outs in places such as the Middle East, Central and Northeast Asia, Dr Lewis sketched out avenues to ratification that are not inconceivable to foresee—even if they cannot be entirely divorced from regional power struggles and security issues.

To take just the case of the US though, where CTBT ratification efforts are slower-moving than many hoped in the immediate aftermath of Barack Obama's 2009 speech in Prague, Victor Slipchenko argued in 2010 that Russia might be able to play an important role in securing US ratification of the treaty.

For their part, the Russian Federation ratified the CTBT back in 2000, four years after it was first opened for signature. Russia, according to Mr Slipchenko, could today usefully reaffirm, but at a high political level, previous statements of Russian officials that align its understanding of the terms of the treaty with that of the US. That is, that the CTBT is a zero-yield treaty: an absolute ban, with no low-set thresholds whatsoever.

Moreover, Mr Slipchenko argued that the Russian Federation should reaffirm past suggestions of potential confidence-building measures that could be taken after entry-into-force (such as exchanges of test site geological data and the results of certain tests)—but that Russia should additionally suggest that negotiations over such measures begin before entry-into-force.

## Conclusion

Though the CTBT is not yet in force, it has nonetheless managed to affect global and regional security in a positive fashion. This positive impact is a function both of the growing norm against nuclear testing that the steadily rising number of signatory and ratifying states has helped to strengthen, and the effectiveness of the CTBT's verification and monitoring systems—which, even without the availability of the OSI provision, are able to detect the signatures of nuclear explosions large and small with high levels of confidence.

Once the treaty is in force, its impact will be greater still. Not only would this development send a powerful signal that nuclear testing is no longer acceptable to the overwhelming majority of the international community (including all five nuclear-weapon states), but the enhanced compliance mechanisms associated with OSIs will add an extra layer of security by making it even more difficult to avoid detection when carrying out a nuclear explosion test. For that reason, ensuring the CTBT is brought into force at the earliest opportunity is a goal that it is extremely important not to lose sight of.

*David Cliff, Istanbul*

# Verification Watch

## Prospects for verifying ETA's disarmament

On 21 October, Euskadi Ta Askatasuna (ETA), the Basque nationalist and separatist terrorist group, declared that they would no longer use violence to achieve their goals. The terrorist organization has fought for independence of the Greater Basque Country for over 43 years, killing 829 people, injuring thousands and kidnapping a dozen people during this period.

Three days before the announcement, a 'Peace Conference' held in San Sebastian called for ETA's 'definitive cessation of all armed action'. The conference was attended by several recognized international conflict mediators such as Kofi Annan, Jonathan Powell, Gerry Adams, Bertie Ahern, Brian Currin, Pierre Foxe and Gro Harlem Brundtland. The meeting has been seen as a prelude to ETA's announcement and requested the Spanish government to open a dialogue with the terrorist group on prisoners and weapons.

ETA's announcement raises a number of important questions over the future of the terrorist group. Will there be political negotiations with Spain and France, for instance? Will the terrorist group disband? What will happen to the members of the group and the prisoners? And, crucially, will the parties manage to agree on a disarmament process?

It is thought that ETA does not possess a large number of weapons. Most of their weapons were obtained from robberies, though some of them were acquired aboard. Over the last few years, Spain and France have reinforced their sustained fight against ETA and have been able to decommission some 189 firearms and 6.830 kilos of explosives. As a result, the group was substantially weakened. In total it has been estimated that ETA currently has around 500 small weapons, 300 firearms, grenades, rockets and explosive material. Most of it remains hidden in caches in the countryside in Spain and France.

In an interview on 11 November to the Basque newspaper 'Diario Gara', ETA insisted that disarmament is in their

agenda and that they are ready to 'commit' to the process. If ETA is serious about their commitment to the end of violence, a verifiable decommissioning process would need to be agreed.

A recent precedent exists for this type of process: the decommissioning process for the Irish Republican Army (IRA) in Northern Ireland. The Independent International Commission on Decommissioning (IICD) was established in 1997 to monitor, review, and verify progress on the decommissioning of the IRA's illegal arms.

Decommissioning was politically impossible before peace negotiations commenced: the IICD's activities started after the 1998 Belfast agreement, where the parties reaffirmed their commitment to the total disarmament of all paramilitary organizations. From 2001, the Independent Commission oversaw four acts of decommissioning by the IRA; and in 2006 the IICD stated that the IRA had put all of its arms beyond use.

A similar process could be established to provide assurance on the decommissioning of ETA's arsenal. An independent international commission consisting of international experts and supported by all the parties—the governments of Spain, France and members of ETA—could verify the process.

Two methods can be envisaged: the independent commission could collect the weapons with information on location and quantities provided by ETA; or ETA could destroy their weapons themselves and this process could be verified by the independent commission. Either way, talks involving all the parties, reporting from the established Independent Commission on progress of decommissioning activities and transparency should be ensured at all stages of the process.

*Rocio Escauriaza Leal, Madrid*

## UN discusses arms in outer space

The United Nations General Assembly (UNGA), during its 66th session this year, adopted a resolution (A/66/410) that calls for the prevention of an arms race in outer space (PAROS). The resolution also emphasises the need for the treaty to have effective verification measures. The resolution passed by a vote of 176 in favour and none against, with two prominent abstentions (by Israel and the United States).

The first treaty concerning the use of outer space entered into force in 1967. This agreement—the Outer Space Treaty (OST)—prohibits states from placing nuclear weapons and other weapons of mass destruction in Earth's orbit or on celestial bodies. It also demands that states' use of the Moon and other celestial bodies is for exclusively peaceful purposes.

As an additional mechanism to ensure the peaceful use of outer space, the 1978 UNGA special session on disarmament first introduced the issue of PAROS in its final document (S-10/2). It has been on the international agenda since then, but has not yet materialised as a form of legal agreement. While the OST is an important treaty that outlines some basic principles of space governance, it only focuses on weapons of mass destruction and does not address any other type of weapons. In fact, the 2011 PAROS resolution recognises that the existing legal regime does not guarantee the prevention of an arms race in space.

The concept of PAROS has been receiving favourable reaction except from a few countries, most notably the United States. In 2008, the Bush administration voiced its policy rejecting further arms control agreements that might restrict its activities in space. The Obama administration, however, altered the previous policy in 2010. This new US position says that the government would 'consider proposals and concepts for arms control measures if they are equitable, effectively verifiable, and enhance the national security of the United States and its allies'.

It is worthwhile noting that both the feasibility and necessity of outer space verification have been contested matters, and are likely to remain so for the foreseeable future. For

instance, China and Russia in 2006 presented to the CD a joint working paper on verification aspects of PAROS (CD/1781). Describing possible verification measures, this paper admitted that verifying PAROS might be both technically and financially challenging.

Given this difficulty, it argued that having a relevant legal instrument without verification measures might still be preferable to having no regulations whatsoever. As an example, the working paper mentioned that the OST had been an important and effective agreement despite lacking a verification mechanism. It is clear, however, that creating a regulatory treaty without verification is not compatible with US space policy.

Given the conflicting views on outer space verification, other transparency and confidence-building measures (TCBMs) have been sought as a way of moving the discussion forward. The 2011 PAROS resolution recognised TCBMs in the peaceful uses of outer space as an additional, though not alternative, means of ensuring the objectives of PAROS.

While specific measures are yet to be negotiated, some positive steps have been taken in the last few years. For one, the UN Secretary-General published a report in 2010 compiling some member states' proposals on outer space TCBMs (A/65/123). Furthermore, a study on TCBMs by a group of governmental experts is due to commence in 2012, as decided by a 2010 UNGA resolution (A/RES/65/68). These examples could be seen as a positive development given the lack of movement on verification.

*Ryoji Sakai, London*

## The FMCT and the CD: at a crossroads?

Frustration over the stalemate in the Conference on Disarmament (CD) was manifest in the 66th session of the United Nations General Assembly (UNGA). The Geneva-based CD has been unable to make progress for more than a decade on negotiating an agreement banning the production of fissile material for nuclear weapons—commonly referred to as a Fissile Material Cut-off Treaty (FMCT). As a consequence, the UNGA this autumn paid particular attention to the work of the CD, as well as the proposed fissile material treaty. The discussion resulted in the adoption of several relevant resolutions.

Unresolved issues, such as verification and the inclusion of existing stocks of fissile material in the proposed ban, as well as the lack of political will, have all contributed to the stalemate in the CD. For example, the Bush administration argued in 2004 that the proposed ban would be inherently unverifiable.

While this position was reversed by the Obama administration in 2009, verifiability still remains a contentious issue. To help resolve this, in 2011, Australia and Japan co-hosted three meetings of experts on an FMCT in Geneva, two of which focused on its verification aspects. Despite these developments, however, the CD remains unable to resume substantive negotiations due to the lack of consensus.

At least three UNGA draft resolutions presented in the UNGA 66th session sought to find a way out of the deadlock. First, Austria, Mexico and Norway jointly presented a draft resolution urging that the CD adopt and implement a programme of work during next year's session. It was also intended to demonstrate the international community's resolve to consider alternative ways of advancing disarmament negotiations in case the CD fails to adopt a programme of work in the 2012 session.

For this purpose, the draft proposed the establishment of working groups in Geneva whose main task would be to develop recommendations and submit a consolidated report to the UNGA in its 68th session. This draft resolution, however, was withdrawn without a vote. According to Reaching Critical Will, a non-governmental organisation, the Austrian delegation said that the resolution was withdrawn to avoid compromise and preserve its integrity.

Another resolution on the CD was submitted by the Netherlands, South Africa and Switzerland. Reiterating its 'grave concern about the current status of the disarmament ma-

chinery', this draft resolution highlighted the urgent need to revitalise the CD and the UN disarmament machinery as a whole.

As part of the revitalisation process, the draft urged the CD to adopt and implement a programme of work in its 2012 session. Unlike Austria, Mexico and Norway's withdrawn draft, it does not call for a specific action, such as creating working groups. The UNGA adopted the resolution without a vote (due to a recommendation to do so from the First Committee, that is: the UNGA's sub-committee on disarmament and international security).

Canada, for its part, proposed a draft resolution that exclusively focuses on negotiations of a fissile material ban at the CD. Recognising the importance of a verifiable FMCT in nuclear disarmament and non-proliferation, the Canadian draft, like those mentioned above, urged the CD to resume negotiations on the proposed treaty in 2012. The Canadian draft noted that the UNGA would 'consider options' for the negotiations of a fissile material ban if the CD fails to agree and implement a programme of work next year. It also encouraged all states to continue negotiations by holding meetings with scientific experts on various technical aspects of the proposed treaty, drawing on expertise from the IAEA and other relevant bodies. The UNGA adopted the resolution by a vote of 158 in favour and 2 against (North Korea and Pakistan), with 21 abstentions.

The insistent call for the revitalization of the CD clearly indicates that the majority of states have been left frustrated by the stagnation of negotiations on disarmament. It is not yet clear how the CD will respond to this pressure next year.

Nonetheless, unless the disarmament forum proceeds to substantive discussions very soon, calls for a fissile material ban to be negotiated elsewhere are sure to grow in both frequency and volume.

*Ryoji Sakai, London*

## Roadmap to climate change verification agreed

This year's UN climate change conference concluded recently in Durban, South Africa, with a number of agreements that map out the shape of the future treaty's verification regime. A working group established during the conference has been tasked with developing a new agreement that will be the first to hold both developed and developing states to emission reductions with 'legal force'. Interim reporting and verification guidelines for this new agreement were also established at Durban which, while not representing the ultimate form such measures will take, provide a glimpse of the form of future climate change treaty verification.

These interim guidelines build on a reporting and verification framework agreed on during the UN conference in Cancun last year, and lay out a work-plan for their further development. Although these guidelines continue to evolve, they will maintain the long-held principle of a differentiated approach to developed and developing state obligations.

Biennial reports introduced at Cancun for developed states have been fleshed-out by new guidelines adopted at Durban. These guidelines list specific aspects of national climate-related activities that must be reported, and request both qualitative and quantitative information from states in order to generate an understanding of the national approach to emission reduction pledges.

These biennial reports will also be subjected to a process of 'international assessment and review' (IAR). This process will consist of two steps; a technical review of the standard of a state's submissions to evaluate how reliable the information is, and a 'multilateral assessment' of progress towards achieving national emission reduction pledges. While the former will be conducted by a group of experts, the latter is designed to involve all states, with presentations given by the party being assessed, and the opportunity for questions and answers.

Guidelines have also been adopted for developing state biennial update reports (which were also introduced at

Cancun). A major objective of these guidelines is to develop standards of reporting and to channel assistance, rather than to provide a basis for assessment. Less than half of the issues to be reported on relate to mitigation actions and their effects. The majority relate to the development of monitoring and reporting standards. The developing country reporting guidelines are intended to accommodate these states' capacity constraints. And some of the steps only have to be taken if adequate support is provided by developed states.

As agreed in Cancun, these reports will undergo a process of 'international consultation and analysis' (ICA). The new guidelines adopted at Durban go some way towards explaining what this process might look like. The guidelines emphasize that the process will be 'non-intrusive' and 'non-punitive', and will consist of a technical analysis of reporting standards and a 'facilitative sharing of views'. The former will involve a three-month consultation period with the party concerned, while the latter will involve a one to three-hour consultation open to all parties.

The Durban guidelines will be trialled over the next few years. The first developed state biennial reviews are due on 1 January 2014, with the IAR process beginning in March of that year. The first developing state biennial update reports are then due in December 2014 with the ICA process beginning in July 2015. As the development of a future climate treaty must finish at the end of 2015, there is little time to thoroughly address any issues raised by these trials.

It is not entirely clear exactly how the provision of support from developed states will be reviewed, and the guidelines include no mechanism for producing recommendations from either IAR or ICA. While the UNFCCC awaits the first submissions, it should waste no time reviewing and refining these guidelines.

*Hugh Chalmers, London*

## New chemical weapons stores found in Libya

The recent find of two secret chemical weapons caches in the Libyan desert, linked to the former Gaddafi regime, highlights the difficulty in verifying baseline declarations under disarmament regimes. The *Washington Post* reported on 21 November 2011 that revolutionary forces found the ageing sulfur mustard-filled artillery shells at remote weapons stores, believed to be located at Houn and Sabha. Libya is understood to have purchased the artillery shells, and filled them with toxic mustard gas, well before it famously renounced weapons of mass destruction in 2003 following concerted diplomatic pressure and joined the Chemical Weapons Convention (CWC) in 2004.

At that time, the regime made a declaration to the Organisation for the Prohibition of Chemical Weapons (OPCW) that included 25 metric tonnes of bulk mustard agent, 1,400 metric tonnes of precursor chemicals, 3,500 unfilled CW-capable unfilled aerial bombs and three chemical weapons production facilities. These were then submitted for verified destruction. It is unclear why the sulfur mustard shells were not declared to the OPCW when Libya joined the CWC or thereafter during Gaddafi's rule, but the reasons may simply boil down to poor record-keeping, the loss of pertinent information or a failure to transmit information between government ministries. In any case, the new Libyan regime's prompt alerting of the OPCW to these newly discovered stockpiles is commendable.

The sulphur mustard shells are now heavily secured and pending verified destruction—along with some remaining declared items—by the OPCW. Inspectors from the organisation conducted an evaluation visit in early November to assess whether any items were diverted during the recent conflict. Although the new regime is making concerted efforts to ensure the weapons are kept safe, given the generally challenging security situation, the urgent destruction of all Libya's remaining CW-related items and facilities must be prioritized.

*Angela Woodward, Christchurch, NZ*

# Science & Technology Scan

## Antineutrino detectors show verification promise

Neutrinos have been in the news this year, with the claim by the CERN and INFN-Gran Sasso laboratories to have apparently accelerated these particles to faster-than-light speeds. This remains unresolved as we go to press.

However, work focusing on another particle, the anti-neutrino, produced during nuclear decay, has over the past few years also generated some interesting findings. Researchers say that they have developed a new type of detector, designed to register anti-neutrinos, that is able to monitor the content of the core of a nuclear reactor as a safeguards tool. Specifically, anti-neutrino measurement is being proposed for monitoring the status, power and burn-up in nuclear reactors, as well as, potentially, the composition of uranium and plutonium in the core.

This development could provide an alternative to current safeguards procedures, which rely on secondary indicators such as water flow and temperature, to bolster the basic item-counting approach of current safeguards. The ability to monitor what is happening in a reactor's core more directly would make the anti-neutrino technique more tamper-resistant. And because anti-neutrinos can travel unaffected through most matter, it is possible to use the device remotely as the detectors can be situated up to 100 metres away from the reactor itself. The detectors are also small enough (3x3 metres) to be placed inside the plant without being a hindrance to normal operations.

Current safeguards approaches for the verification of declared conventional reactors are based, among other techniques, on item-counting and attribute measurements of nuclear fuel assemblies, backed up by traditional safeguards technologies (such as containment and surveillance systems), These, however, may not be relevant to future generation reactors where the fuel is more fluid (for example, pebble bed reactors or liquid-core reactors where there are no longer items to count). So, when these types of reactors come online, the anti-neutrino detector may become increasingly important. The French CEA has developed a radiation sensor that detects five times as many anti-neutrinos as earlier models. The sensor, called Nucifer, is a one-ton Gadolinium-doped liquid scintillator, and is to be deployed at the Osiris reactor and the Institut Laue-Langevin research reactor in Grenoble by the end of 2012. The CEA has scheduled installation of the Nucifer detector at a commercial nuclear reactor, in collaboration with the IAEA, by 2013.

Several projects on anti-neutrino detectors are in fact running concurrently. These include a joint venture by Lawrence Livermore National Laboratory and Sandia National Laboratories, with researchers from Atomic Energy of Canada Limited's Chalk River Laboratories. Their detector, the fourth in a series, is planned for installation at the Point Lepreau Generating Station, a CANDU-type nuclear reactor in New Brunswick, Canada.

The IAEA has taken a great interest in these developments and believes that anti-neutrino detectors could be a valuable tool for nuclear safeguards. Their Department of Safeguards is currently monitoring developments through an 'ad hoc working group of anti-neutrino experts'. A new Sub-Group on Stand-off Detection of Anti-neutrinos has also been formed as part of the European Safeguards Research and Development Association (ESARDA) working group on 'New Approaches and Novel Technologies'.

There have been some preliminary suggestions that this kind of technology may be useful in other branches of nuclear security and even possibly applicable to the detection of nuclear weapon tests. Further information on the applicability of ant-neutrino monitoring as a safeguards tool can be found in the September 2011 presentation to ESARDA by Muriel Fallot and R.J. De Meijer 'Antineutrino detection as a novel tool for reactor monitoring: an overview'.

*David Keir, London*

## Developments in bio-threat assessment technology

In a recent interview with the American Forces Press Service and the Pentagon Channel, Andrew C. Weber, the US Assistant Secretary of Defense for Nuclear, Chemical and Biological Defense Programs, asserted that rapid detection capabilities for bio-threats are 'essential because the most important aspect of preventing mass causalities in a biological attack is time.'

Three companies recently released information about new bio-threat assessment products that they will be marketing. These products have shorter response times and enhanced detection technology compared to previous techniques.

The 'PLEX-ID' detection system—developed by Abbott in 2005—has this year been augmented with an additional component. The PLEX-ID provides microbial screening, genotyping, antibiotic resistance and virulence characterization through its use of broad, targeted, and characterisation assays. Results are produced in less than eight hours. This is a considerable decrease in time from culture-based testing in which results take several days to produce. Earlier this year Abbott released its new, targeted 'Biothreat Assay' for the Plex-ID system. Now this system has the ability to recognise 17 diverse bio-threat agents through the analysis of blood, water, food, or air filter samples, without the need for culture testing.

The PLEX-ID system proved its ability in the field in 2007 during a suspected anthrax attack in Afghanistan's Nimroz province. After analysing samples with the system it was discovered that it was not anthrax, but rather a bacterial strain found in bubonic plague. This discovery came after failed attempts to correctly identify the bioagent.

The system has received praise from both the scientific and defence communities for its identification and detection abilities, and the addition of the Biothreat Assay has been welcomed as a further advancement.

For their part, Smiths Detection and ANP Technology announced in November 2011 that they would be working together to market several of their bio-threat detection

## *Verification Quotes*

*'A number of principles lie behind our firm commitment to the [Comprehensive Nuclear-Test-Ban] Treaty. First, the national mandate laid down by the 1945 [Indonesian] Constitution to help maintain peace and justice throughout the world. Second, because the treaty is nondiscriminatory and inclusive, under its provisions, all states—whether they have nuclear arsenals or not—must play by the same rules. And third, because it is indeed do-able: The technology is already in place to police nuclear explosions all around the world. This is made possible through an open-source International Monitoring System encompassing the entire planet, with its detectors dispersed from the poles to the tropics, whose data is owned by the 182 states that have so far signed the treaty. Thus the treaty represents the marriage of robust science to an inclusive and democratic international legal instrument.'* —Marty M. Natalegawa, Indonesian Minister of Foreign Affairs, writing in the *Jakarta Post* after Indonesia's ratification of the CTBT in early December.

*'The possibility to verify the compliance by all the states with their BTWC obligations is a guarantee that the provisions of the convention are not violated and the regime of prohibition of biological and toxin weapons is functioning effectively...It is impossible to ensure this confidence through transparency measures alone, no matter how important and useful they are. That is why we strongly believe that a legally binding BTWC verification mechanism should be developed.'*—From the statement of the Russian Federation to the 7th BWC Review Conference in Geneva, December 2011.

***'In the meantime, we expect nothing less than the full implementation of countries' actions pledged in Copenhagen and anchored in Cancun. We need a robust MRV [Monitoring, Reporting and Verification system] to ensure transparency of these actions and build trust.'***—Marcin Korolec, Minister of the Environment, President of the Council of the European Union, in his address to the COP17 UN climate meeting in Durban, South Africa, in December 2011. His comments refer to what must be done in the years leading up to 2015, by which time states agreed that a universal legal agreement on climate change must be adopted.

technology products. Smiths Detection's 'Prime Alert' and 'BioCheck' systems will be marketed alongside ANP's 'Nano-Intelligent Detection System' (NIDS). Together, these products will help first responders in the early and rapid detection and identification of possible bio-threat agents.

The Prime Alert system is a portable device that enables first responders to detect biotoxins, bacteria, and potential viruses in less than ten minutes. Likewise, the BioCheck analyses unidentified powders for the presence of a protein common to 'virtually all BWA [Biological Warfare Agents] microbes and biotoxins.' Results are available in less than five minutes, depending on the concentration of the protein.

These products will be marketed for use in conjunction with NIDS, a multiplexed immunoassay test strip with the ability to recognise as many as five different bio-threats in a single use. The pairing of these technologies was seen as a move towards quicker and more accurate bio-threat detection.

This new wave of bio-threat assessment technology has overcome several of the limitations faced by older technology by being easier to use, having lower rates of false positive and negative results and having increased sensitivity.

While the aforementioned technologies all provide the ability to detect bioagents such as those found in anthrax, cholera, smallpox, plague, and e-coli (to name a few), their applicability differs. Smiths Detection and ANP Technology's products are best suited for first responders conducting on-the-spot testing. They provide quick detection to identify what, if any, threat exists. The new Biothreat Assay, on the other hand, is able to give a more complete picture as to the type of threat faced, due to its ability to identify 'drug resistance, virulence, and strain type.'

*Grete Luxbacher, London*

## Measuring carbon with the CAO LiDAR system

The July-September 2010 issue of Trust & Verify highlighted the LiDAR (Light Detection and Ranging) technology that enables scientists to build a forest map by collecting data from a survey plane. According to Mongabay.com, a recent study has shown that the Carnegie Airborne Observatory's (CAO) LiDAR system can be as accurate as traditional plot-based estimates in assessing carbon in tropical forests (which involves on-the-ground work that can be expensive and lengthy).

The accuracy of the CAO system was proven by a group of researchers who compared data gathered by using the CAO system and plot data for Barro Colorado Island, Panama. Mongabay.com also reports that another group of scientists published a research paper that lays out a universal equation for calculating forest carbon stock values from airborne LiDAR data. The equation can be adjusted for a given forest region.

Greg Asner, a scientist at the Carnegie Institution for Science and a co-author of these research papers, told Mongabay.com that the findings have important implications for mapping of carbon stock in tropical forests. Asner argues that the CAO system, with its accurate monitoring capacity, can help to support the development of international strategies to combat climate change.

Asner's team is currently conducting an ecosystem survey of the Amazon rainforest in Peru, where little research has been previously done due to its harsh geographic and weather conditions. The team utilises the CAO, a specialised aircraft equipped with the Airborne Taxonomic Mapping System (AToMS) that was launched only half a year ago, in June 2011.

According to Carnegie Institute for Science, the system combines high resolution spectrometers with the LiDAR system so that it can create three-dimensional maps of vegetation structure and plant communities. The AToMS can also identify individual plant species and forest conditions by detecting various signals, such as photosynthetic pigment concentrations and water content of leaves. Furthermore,

when flying at a specific altitude, the CAO can capture images of individual trees at a rate of 500,000 or more per minute.

Adrian Forsyth, an ecologist who works in Peru, said that the CAO could be useful in conducting biological assessments of unknown areas, reports Rhett Butler at Mongabay.com. Forsyth added that the CAO system could compensate for the lack of field biologists who can conduct field research in remote areas. And by providing scientists with information to narrow down particular areas for further research, the CAO might also be able to save the cost of having to dispatch large research teams.

Given the scale of the challenge in tackling deforestation, degradation and climate change, the data provided by these developments in monitoring capacity could prove particularly helpful in facilitating informed decision-making on forests and tracking progress on policy performance.

*Ryoji Sakai, London*

## A note from the editor

The editor would like to thank everyone who has contributed to *Trust & Verify* throughout this year and looks forward to a great year for the publication and for VERTIC in 2012.

Wishing you all a Merry Christmas and a Happy New Year.

*Larry MacFaul*

### Christmas and New Year office opening hours:

**The VERTIC office in London will be shut from close of business UK time on Friday 23 December 2011 until Tuesday 3 January 2012.**

**VERTIC overseas staff will also not be working between these dates.**

VERTIC News & Events

## National Implementation Measures Programme

During this quarter the NIM team completed three legislation surveys and participated in three awareness-raising workshops.

In addition, in October the NIM programme had meetings on BWC national implementation issues with the New Zealand Red Cross, the Asia-New Zealand Foundation and the US Embassy in Wellington, New Zealand. The programme also attended the 'Annual International Symposium on Biosecurity and Biosafety: Future Trends and Solutions' and the second meeting of experts for the CBRN Centres of Excellence in Milan, Italy.

NIM staff also participated in the 'Regional workshop for South-East Europe on the Seventh Review Conference of the Biological Weapons Convention (BWC)' in Belgrade, Serbia from 1-2 November, which was organized by the European Union Joint Action in support of the BTWC (EUJA). From 31 October to 5 November, one NIM staff member also participated in a course on counter-terrorism and organized crime in Madrid.

From 9-11 November, NIM staff took part in the 'Regional workshop on national implementation of the BWC' in Lima, Peru. From 27-28 November, a NIM legal officer attended the 16th Conference of the States Parties to the Chemical Weapons Convention in The Hague, the Netherlands. The team also continued to strengthen cooperation with regional organizations such as the EU, OSCE, SICA and CARICOM through a variety of activities. On 29 November, a staff member attended a meeting for US Department of State Biosecurity Engagement Programme project implementing agencies in Washington, DC.

December was a particularly special month for the team as the Seventh Review Conference of the BWC took place in Geneva, Switzerland between 5-22 of the month. To celebrate VERTIC's 25-year anniversary, the NIM team hosted a side event on 14 December, during which Dr Mohammad Qasim Hashimzai, Deputy Minister of Justice of the Islamic Republic of Afghanistan, gave a presentation. The NIM team also presented statistics on the current status of national legislation regarding the BWC and announced the expansion of the NIM Programme into the illicit trafficking of radioactive and nuclear materials. Members of the British and Canadian delegations to the Review Conference gave some introductory remarks as funder states of VERTIC's NIM Programme.

## Arms Control and Disarmament Programme

The last three months have been busy ones for the VERTIC Arms Control and Disarmament team. Since the early autumn, and throughout this quarter, programme staff have been working on VERTIC's multilateral disarmament verification project, including the organization of a conference to be held on this issue next March in South Africa.

This work, funded by the Norwegian government, investigates the potential of role of intergovernmental organizations in future verified nuclear warhead dismantlement processes. The team has also been examining legal dimensions of the problem of illicit trafficking of nuclear and radioactive materials, under a project funded by the UK Foreign and Commonwealth.

The ACD programme has also participated in many events since the last edition of *Trust & Verify* was released. In October, Andreas Persbo travelled to the headquarters of the United Nations in New York to launch VERTIC's report on 'Irreversibility in Nuclear Disarmament'. The launch event took place on the margins of the UN First Committee meeting, and was held in collaboration with the Swiss government and the Stockholm International Peace Research Institute. The report itself is available to download from the VERTIC website.

October also saw Mr Persbo travel to Aix-en-Provence in southern France to attend a workshop meeting on 'Future Directions for Nuclear Safeguards and Verification' organ-

ised by the European Safeguards Research and Development Association (ESARDA) and the Institute for Nuclear Materials Management (INMM). This ESARDA-INMM event, which takes place every three to four years, saw Mr Persbo participate in a working group that sought to review current and future non-proliferation and disarmament regimes.

ACD staff also attended a number of meetings in London in October. Among them, David Cliff and David Keir attended a meeting on 'Prospects for Nuclear Disarmament and Non-Proliferation in 2012 and Beyond' at Parliament, Andreas Persbo attended a UNA-UK roundtable meeting on 'Forging Consensus on Disarmament and Non-Proliferation', and Mr Cliff attended the 6th London Conference on a Middle East WMD-Free Zone at the London School of Oriental and African Studies.

In addition, David Keir met with Mr Jaakko Laajava—newly-appointed facilitator of the promised 2012 regional meeting on a WMD-Free Zone in the Middle East—at the UK Foreign and Commonwealth Office.

November saw Andreas Persbo, David Keir and Larry MacFaul travel to Sweden to hold meetings with the Swedish Ministry of Foreign Affairs regarding VERTIC's project on multilateral disarmament verification.

Also in November, David Cliff travelled to Istanbul, Turkey, to participate in a conference on the 'Role of the CTBT in Regional and Global Security' organised by the CTBTO's Preparatory Commission and the Turkish government, while Andreas Persbo went to Berlin, Germany, to take part in a workshop on 'Improving Transparency on Tactical Nuclear Weapons' run by the Frankfurt Institute for Peace Research and Security Policy. David Keir also travelled in November—to Amman, Jordan, to attend a meeting on 'Opportunities for Nuclear Non-Proliferation and Nuclear Security' run by the Arab Institute for Security Studies.

Back in London, November also saw the VERTIC Arms Control and Disarmament team organise a discussion meeting on the question of a Middle Eastern WMD-Free Zone.

## *Director's reflections*

The numbers have not come in yet, but all indications are that 2011 was our most successful year in over a decade, both in terms of fundraising and in terms of products delivered. This year, we saw the emergence and growth of our blog resource, mostly staffed and driven by our wonderful interns and volunteers. The site itself is drawing increasing amounts of traffic, despite the specialized nature of our work.

Over the past year, we have also implemented projects supported by funders on three continents. We have served many more. We have by now worked with over 30 countries on their national legislation to implement the Biological Weapons Convention. Next year, we will embark on the next logical step of this journey by offering implementation solutions tailored to fulfill all requirements of United Nations Security Council Resolution 1540.

VERTIC already hosts the largest arms control and disarmament programme in the United Kingdom. We intend to maintain that position, and to grow our activities in the environment field to match—focusing, among other things, on the ever-warming Arctic. We have already begun discussions with the Chair of the Arctic Council, so watch this space.

Our work is not possible without our Trustees and our network of advisors. We are truly blessed to be supported by such able, committed and utterly competent individuals. Above all, however, I wish to express my thanks to our volunteers and interns, many of which are still very engaged in our work. We have formed a small family. In this season of blessings, that is truly the biggest of them all.

Finally, a very happy 2012 to all our readers and supporters. Without you, we are nothing.

*Andreas Persbo, Executive Director*

The meeting was well-attended by London-based arms control and disarmament practitioners from governments, academia and NGOs.

This meeting formed one of the series of 25th anniversary events that VERTIC has organised over the course of 2011. It was intended to take stock of the Middle East WMDFZ situation at present and to share ideas about what to expect—and how best to contribute—in 2012. There remains much preparatory work to do if the meeting that is to be facilitated next year by Mr Laajava is to be a success, and it was in this spirit that VERTIC's meeting was convened. We would like to thank all those that attended and contributed to it.

In December, Andreas Persbo travelled to Vienna, Austria, to deliver a lecture to a CTBTO-run Advanced Training Course on the Comprehensive Nuclear-Test-Ban Treaty, and also to Wilton Park in West Sussex, England, to participate in the annual Wilton Park conference on nuclear non-proliferation and disarmament.

## Environment Programme

During this quarter, the programme carried out initial research on Artic affairs including territorial disputes, resources and industry, and environmental standards. In November, the programme travelled to Stockholm, Sweden, to meet the Chair of the Artic Council to discuss emerging issues in the region.

The programme also explored land-use governance issues to support our grasp of this increasingly important issue.

Over the last three months, the VERTIC blog has featured several environment articles. These have looked at the UN climate change conference in Durban, air quality in China and forest monitoring technologies.

## 25th anniversary news

During the course of 2011, VERTIC has held a number of events to mark the organization's 25th anniversary. The central event of this celebratory year was a conference co-organised with Wilton Park under the heading of: 'Uncertain futures: where next for multilateral verification?' The conference, held in early June at Wiston House in West Sussex, was attended by around 50 leading experts across the arms control and environment fields.

The aim of the conference was to discuss the current state of multilateral verification and its future development. The conference examined the effectiveness, benefits and relevance of multilateral verification across a range of major arms control and environment regimes, and considered options for improving policy and practice. It resulted in a summary VERTIC briefing paper (Brief No. 15, 'Verifying multilateral regimes: uncertain futures'), written by Yasemin Balci.

In September, VERTIC organised a 25th anniversary social reception for delegates and friends of VERTIC on the margins of the IAEA General Conference in Vienna. This event saw Ms Jill Cooley, Director of the Division of Concepts and Planning at the IAEA Department of Safeguards, deliver keynote remarks. In her comments, Ms Cooley noted that the IAEA and VERTIC play their own respective roles in the field of verification and that 'they share the common goal of building trust through effective verification.' She added kindly that: 'The research and analysis VERTIC has carried out has been valuable not only to the broader verification community but also to Agency staff who carry out safeguards activities on a day-to-day basis.'

The next event in VERTIC's 25th anniversary calendar was a November discussion meeting in London, held to address the timely issue of a Weapons of Mass Destruction-Free Zone (WMDFZ) in the Middle East. This meeting heard from representatives frrom both sides of the government/non-governmental divide and made for a useful forum for the sharing of opinions and ideas.

In December, VERTIC hosted a side-event at the 7th Review Conference for the Biological Weapons Convention (BWC)

in Geneva. To celebrate our 25th anniversary, a lunch was held, followed by statements from ambassadors and senior government officials from Afghanistan, Canada and the UK. At this event, VERTIC also gave an overview of the global and regional status of national implementation of the BWC, and officially launched the expansion of its NIM Programme into legislative drafting assistance for the comprehensive implementation of UN Security Council Resolution 1540.

*Trust & Verify*

In addition to these events, over the past year VERTIC has made all back-issues of *Trust & Verify* available online, as well as several other archived publications. Since its launch in 1989, *Trust & Verify* has provided its readers with regular commentary on verification matters by VERTIC staff and invited authors. It is our hope that this collection, available on the VERTIC website, will not only illustrate the organization's rich past, but also serve as an archive for all those who are interested in the evolutionary aspects of arms control and the environment, as well as peace agreements.

## In memoriam: Susan Willett, 1952-2011

VERTIC's current and former staff, past and current board members and advisers, and VERTIC supporters were shocked and saddened to learn of the death on 13 May 2011 of Sue Willett. Sue was for many years a VERTIC Board member and, under my directorship, chair of the Board. But much more than that she was an exuberant supporter of VERTIC and its work, providing moral support to me and my staff in difficult times and, in her inimitable fashion always urging us on to greater heights.

Sue was an iconoclast, constantly expressing scepticism of the motives of governments and corporations and demanding constant vigilance against their impingement on our liberties. VERTIC's role of promoting monitoring and verification of states' compliance with their treaty and other obligations was a natural fit for her guiding hand. Although she was not on the staff of VERTIC, her own work was often directly relevant. Her research into the costs of disarmament for the UN Institute for Disarmament Research in Geneva was groundbreaking and especially pertinent to VERTIC's work. At VERTIC and elsewhere Sue was especially active in nurturing the next generation of arms control researchers. As VERTIC's Deputy Director Angela Woodward notes, she was particularly supportive of women working in the field, having herself struggled, successfully, to rise to the top in the male-dominated field of defence analysis.

Above all, though, it was Sue's personality that she will be most remembered for. The photo of her published in *The Independent* of 2 June 2011 (and reproduced below) says it all: there she is on the beach at Brighton, surfboard on her car, impish grin on her face, ready to take to the water. She is loved and missed.

*Trevor Findlay*
*VERTIC Director, 1999-2005*

## Grants and Administration

This quarter, VERTIC focused on project delivery and the implementation of existing grants. We also secured a contract for our Arms Control and Disarmament work. VERTIC is grateful to its funders for their continued support.

VERTIC's internship programme continues to thrive and attract strong applicants. We currently have Gabriele Loche supporting the Arms Control and Disarmament Programme, Grete Luxbacher supporting the Environment Programme, Nibras Hadi supporting the National Implementation Measures Programme and Ryoji Sakai as intern to the Office of the Executive Director. We are grateful for all their hard work.

Finally, we would like to thank Sonya Pillay, whose internship finished in December, for her contribution to VERTIC over the last four months.

***VERTIC wishes all our friends a Merry Christmas and a Happy New Year***

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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. We focus on agreements and initiatives in the areas of arms control, disarmament and the environment, with particular attention to issues of monitoring, review and verification. We conduct research and analysis and provide expert advice an information to governments and other stakeholders. We also provide support through capacity building, training, legislative assistance and cooperation.

**PERSONNEL** Andreas Persbo, *Executive Director*; Angela Woodward, *Programme Director*; David Keir, *Senior Researcher*; Larry MacFaul, *Senior Researcher*; Scott Spence, *Senior Legal Officer*; Hassan Elbahtimy, *Researcher*; Rocío Escauriaza Leal, *Legal Officer*; Yasemin Balci, *Associate Legal Officer*; David Cliff, *Researcher*; Unini Tobun, *Administrator*; Hugh Chalmers, *Consultant* (2011-12); Sonia Drobysz, *Consultant* (2010-11); Nibras Hadi, *Intern* (November 2011-February 2012) Gabriele Loche, *Intern* (November 2011-January 2012); Grete Luxbacher, *Intern* (November 2011-January 2012) Ryoji Sakai, *Intern* (October-December 2011); Sonya Pillay, *Intern* (September-December 2011).

**BOARD OF DIRECTORS** Gen. Sir. Hugh Beach; Dr Wyn Bowen; Rt Hon Lord Browne of Ladyton; Rt Hon James Arbuthnot MP; Dr Owen Greene; Dr Edwina Moreton; Mr Nicholas A. Sims.

**INTERNATIONAL VERIFICATION CONSULTANTS NETWORK** Dr Nomi Bar-Yaacov; Ambassador Richard Butler; Ms Joy Hyvarinen; Dr Edward Ifft; Dr Odette Jankowitsch-Prevor; Mr Robert Kelley; Dr Robert J. Matthews; Professor Colin McInnes; Professor Graham Pearson; Dr Arian L. Pregenzer; Dr Rosalind Reeve; Minister Victor S. Slipchenko.

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