

Putting legislation to the test: a H5N1 virus case-study

Earlier this year, VERTIC was invited to give a presentation to the Biological Weapons Convention Meeting of Experts, which took place between 16-20 July in Geneva, Switzerland. VERTIC chose to describe a scenario relating to recent events surrounding the avian influenza virus, H5N1. The presentation then invited the meeting's delegates to consider whether their respective countries' legislation was sufficient to address the various issues and activities described.

The scenario was based on the recent scientific studies in the Netherlands and the United States that succeeded in making the H5N1 virus transmissible between mammals via aerosol. These studies were significant in highlighting the potential for this highly deadly virus to evolve and be transmitted through the air between humans.

During the past year, there has been a heated debate over whether these findings should be published and, if so, whether the methodology and other details should be redacted. They were eventually published in the science journals *Nature* and *Science* in full.

While these studies will help public health officials and scientists to develop medical countermeasures to save lives, they could also directly or indirectly facilitate the weaponization of the H5N1 virus or the development of other biological weapons. Now that the studies' findings have been published, information on the transmissibility of H5N1 is now in the public domain and scientists around the world will likely wish to work on these new strains of H5N1 in order to be prepared for dealing with any threats that may emerge.

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So, how might states manage any proliferation risks associated with these developments? If countries do not have effective legislation in place that implements the Biological Weapons Convention, such risks could include: unregulated development, possession, transfer, transport or use of the new H5N1 virus strains; or an inability to prosecute related crimes involving a state's nationals but which occurs outside its territory.

Each party to the Meeting of Experts considered how any laws they had adopted to implement the provisions of the Biological Weapons Convention, or related legislation, could be applied to this case and, if existing laws were found wanting, what additional measures they might require. Meanwhile, VERTIC proposed several key legal elements that are essential for managing these types of risks and for giving effect to the convention.

A definition of 'biological weapon'

National legislation needs to include a definition of the concept of 'biological weapon' to help with the interpretation of any provision referring to biological weapons, especially

criminal provisions. If 'biological weapon' is defined in accordance with Article I of the Biological Weapons Convention, H5N1 could be considered a biological weapon if it is used, developed, produced, stockpiled or otherwise acquired or retained in quantities that have no justification for prophylactic, protective or other peaceful purposes.

Criminal provisions

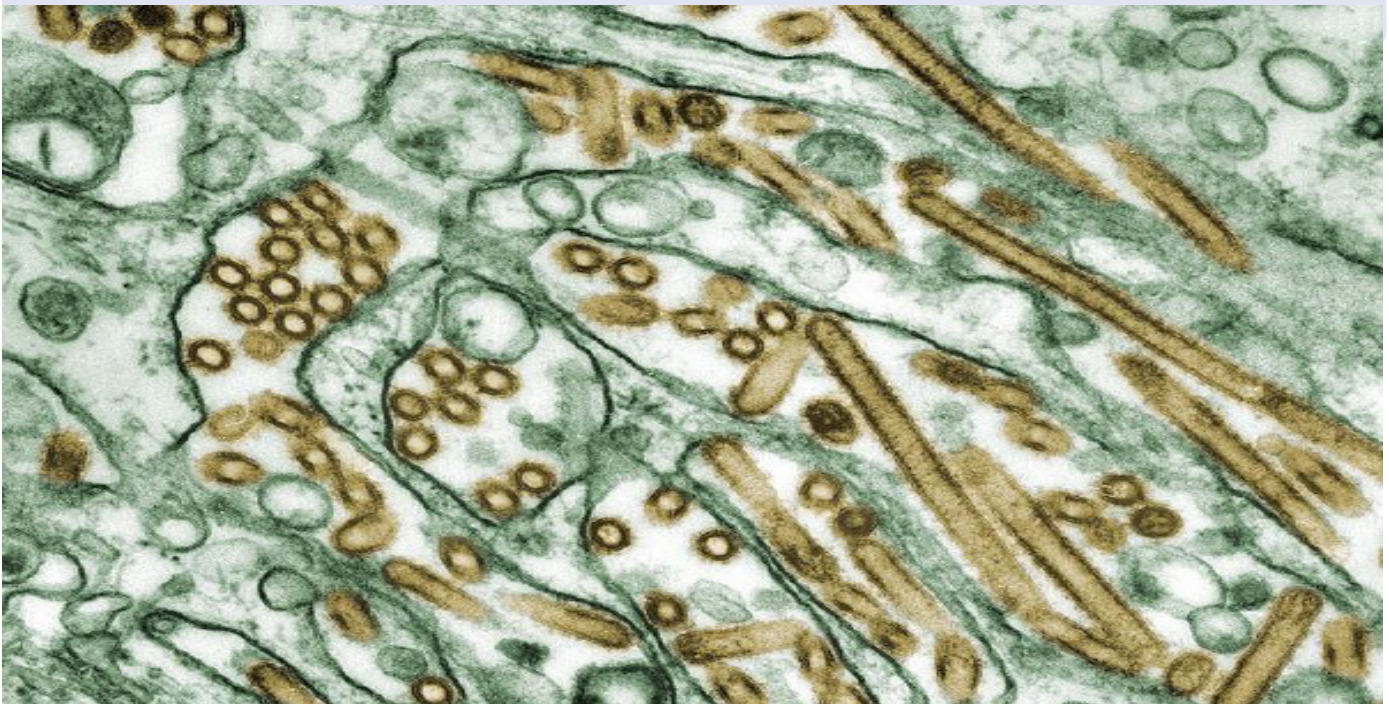
States need to criminalize the development, production, possession, acquisition, transport, transfer or use of biological weapons, otherwise they will not be able to effectively prosecute individuals breaching the prohibition against biological weapons in Article I of the BWC.

In addition, states can criminalize the intentional use of biological agents, such as H5N1, to achieve a political, social or economic purpose (acts of bioterrorism) and thereby harm people, animals or plants.

Any use of the new strains of the H5N1 virus as a weapon could also fall under the umbrella of other common crimes. Depending on the result, a prosecutor may seek to prosecute the crime as a 'murder' or 'infliction of injury', but penalties

PICTURE 1

Colourized transmission electron micrograph of Avian influenza A H5N1 viruses (seen in gold) grown in Madin-Darby canine kidney cells (seen in green). CDC/ Courtesy of Cynthia Goldsmith; Jacqueline Katz; Sherif R. Zaki



associated with the infliction of injury may be less severe and these crimes do not contemplate the nature of the means used to perpetrate the crime. Some penal codes criminalize the intentional spreading of disease but they are usually old provisions with inadequate penalties. Criminal provisions that are specific to biological weapons are preferable, and should also include preparatory acts, which are not generally covered under existing criminal legislation.

Alternative criminal liability

Alternative criminal responsibility applies to other actors that have been involved in the commission of the crime such as instigators, accomplices or assistants. For example, if a state does not criminalize the financing of the acquisition of a biological agent, toxin or virus for biological weapons purposes, whether by a criminal organization or an individual, they may not be able to prosecute, or effectively prosecute, some of the actors or entities that have been essential for the perpetration of the crime.

Jurisdiction

Territorial jurisdiction will be sufficient to prosecute crimes connected with the new strains of H5N1 if they are perpetrated wholly within a state's territory. However, criminal or terrorist organizations, or rogue individuals, may seek to carry out criminal activities connected with the new strains of the H5N1 transnationally. States therefore should consider establishing extra-territorial jurisdiction to prosecute every actor and activity connected with the main crime whether they took place within the state or not. This is because elements of the criminal activity, such as financing to acquire the virus, may be carried out abroad, or the perpetrator of a crime related to H5N1 may be a national acting in a foreign state. Another possibility is that the victim of an attack with a weapon involving H5N1 may be a national in a foreign state.

Transfer controls

States need to include H5N1 in their transfer control lists. If a state does not currently regulate H5N1 in this way, it may want to consider amending its control lists to include types and subtypes of the avian influenza virus. Some states already have a 'catch-all' clause in their transfer controls legislation. Such clauses are very helpful, as they enable a state to control

transfers of unlisted viruses (and other biological agents and toxins) if it considers that the new virus strains could pose a threat to public safety and security.

Scientists have already expressed interest in acquiring samples of the new H5N1 strains for research for prophylactic purposes. Certain transfer control measures are necessary to ensure that the new strains are used only for peaceful or prophylactic purposes. If an individual or organisation wants to import samples they should be required by law to request a permit to do so. This authorisation system should be able to check that the prospective importer has a legitimate purpose for doing so. If scientists wish to export samples they should be required by law to request an export permit and present an end-user certificate to guarantee that the exported samples of the new H5N1 strains will only be used for prophylactic, protective or other peaceful purposes. Other activities such as re-export, transit and transshipment should also be authorised in accordance with legislation.

It is possible that some scientists might want to acquire knowledge of how to develop the new H5N1 strains, so states also need to control transfers of information that could facilitate this – the 'know-how'. To do this, states might choose to include a provision controlling 'intangible transfers' in their transfer controls legislation. This term includes the transfer of knowledge, for example research sent via email. Scientists wishing to export or import the know-how to develop the new H5N1 strains would then be required by law to apply for an export/import permit and be subject to the various control measures stipulated by the licensing system.

Biosafety/biosecurity measures

The new strains of H5N1 are deadly and highly contagious, so states need to consider carefully how they will authorize their use, development, possession and transport. Each state should put in place authorization procedures for laboratories seeking to carry out research with the virus to ensure that they can account for and secure the quantities they handle, and confirm that their research is for prophylactic, protective or other peaceful purposes, and remains so.

If authorised laboratories within a state's jurisdiction wish to

work with the new H₅N₁ strains, they should be required to have certain biosafety and biosecurity measures in place. These should include, at a minimum:

- Appropriate and effective biosafety and biosecurity training and vetting procedures for laboratory personnel handling such materials;
- Precautions to prevent the accidental release of an aerosol-transmissible H₅N₁ virus (or other biological agents or toxins) and to mitigate the risk of its deliberate diversion;
- Risk assessment and risk mitigation plans (these could include mechanisms to notify theft or loss or other diversion of samples);
- Physical protection measures at facilities (such as fences, locks, access codes, cameras, guards, etc.);
- Transport security measures for samples (involving authorized transporters, package tracking, the monitoring

of routes, etc.); and

- Measures to regulate the funding and publication of research of dual-use concern to minimize the risk of biological weapons proliferation.

Enforcement

In order to investigate and prosecute any crimes related to the use of H₅N₁ as a weapon, states should ensure that their existing criminal procedural measures enable them to: gather intelligence (for example, intercept communications); investigate biological weapons crimes with properly trained law enforcement and public health officials; enter premises to gather evidence and ensure chain of custody of materials seized; and co-operate in criminal and judicial matters with other countries that have also been affected by any illicit activities involving the strains.

In addition, states need to ensure that laboratories working

PICTURE 2

Inoculating 10-day old emryonated chicken eggs with a specimen containing an H₅N₁ avian influenza virus’.

Credit: CDC/ Taronna Maines●



with the new H₅N₁ strains are only engaged in prophylactic, protective or other peaceful activities. This might be achieved through inspections of facilities that have been authorized to work with the new strains of H₅N₁ in order to verify that the terms of their license are being complied with, and check that accountability and security measures are being implemented and followed.

States also need to prepare an effective co-ordinated response mechanism to deal with any accidental or intentional spread of H₅N₁ (or any other deadly biological agent or toxin for that matter). This is crucial for ensuring the containment of any disease outbreak and for investigating the source of an outbreak. A national system for this can be mandated through legislation, which can also coordinate with any other national or international agencies that offer assistance•

YASEMIN BALCI, ROCÍO ESCAURIAZA, SCOTT SPENCE AND ANGELA WOODWARD

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Explaining China's emissions estimates

Ryoji Sakai, London

The reliability of national statistics on energy consumption and CO₂ emissions is a key factor when a country is trying to demonstrate to the international community how it is faring in tackling climate change. It is also important for helping governments to make an informed assessment of whether the steps they are taking to reduce emissions are working or not. Consequently, if criticisms—from reliable sources—are voiced on the accuracy of national statistics, they need to be examined to see if they are valid, and if they are, to work out what can be done to improve the situation.

An article published in *Nature* in June 2012 pointed out that several studies conducted in the last decade challenged the credibility of emissions estimates released by China, the largest CO₂ emitter in the world, but less attention has been paid to its more recent data problems. The authors of the article have attempted to get a clearer understanding of China's recent CO₂ emissions by a close examination of publicly available official energy data sets.

Dabo Guan, Senior Lecturer at the University of Leeds' Sustainability Research Institute, and his colleagues compared China's national and provincial energy statistics, both of which are published by the National Bureau of Statistics of China. Following the Intergovernmental Panel on Climate Change emission accounting approach, they found that there are large discrepancies between national statistics on CO₂ emissions and the aggregated emissions of all China's provinces. Guan and his colleagues point out that the statistical discrepancy in 2010 amounts to 18 per cent or 1,394 million tons of CO₂. This is equivalent to about five per cent of the global total and is higher than the total amount generated by the world fourth largest emitter, Japan. Their findings indicate that a major contributor to the inaccuracy is the inconsistency in coal consumption between national and provincial statistics.

The authors of the *Nature* article explain that one of the causes of the inaccuracies in China's CO₂ emissions is the opaque approach used to gather statistical data. In many industrialised regions in China, energy-intensive industries such as steel and power production have improved the quality of its energy consumption data. However, many of small firms that produce and consume energy, such as coal, do not have proper records or qualified personnel to report energy data. As 31 per cent of coal in 2009 was produced by small firms, problems with their data, can skew China's energy statistics.

Furthermore, the authors suggest that political pressure by governmental agencies 'to provide statistical data "to fit" different political purposes' contributes to the statistical corruption. Two conflicting political interests are identified. First, the authors suggest that the Chinese government publishes emission figures as low as possible to strengthen its record in front of the international community on environmental issues. Second, economic growth plays an important role in the promotion prospects for government officials—and as economic growth is measured by statistical data, there is an incentive for governmental officials to indulge in 'statistical corruption'

The problem of inaccurate emission statistics is not limited to China, though. In fact, Zhu Liu, co-author of the *Nature* article suggests that, while it has not been widely recognised, the same issue probably applies globally, particularly in large developing countries. Given the complexity in calculating precise emission figures and the impact of inaccurate information, research such as this, if correct, could help to get a more reliable picture of countries' emissions profiles and may help to improve the quality of countries emissions calculations●

Arms Trade Treaty talks end without agreement

Edward Perello, London

July saw the first formal international negotiations to establish a long-proposed Arms Trade Treaty (ATT) to regulate the trade in conventional arms. The negotiations took place at UN Headquarters in New York City, with 193 states participating. The meeting was the result of several years of talks, analysis and positioning by governments and others involved in the arms trade sector. The talks, however, concluded after four weeks on 27 July without agreement. UN Secretary-General Ban Ki-moon described the outcome as a 'setback' in controlling the poorly-regulated international arms trade, estimated by the UN to be worth around \$60 billion a year.

Nonetheless, the effort put into July's negotiations was encouraging, as was the common ground identified between states. Tanks, light armoured combat vehicles, large-calibre artillery systems, combat aircraft, attack helicopters, warships, missile systems, small arms and light weapons were all included as commodities to potentially be controlled by the draft treaty. States also agreed to measures to prevent re-export and diversion to organised criminals and terrorist groups.

The logic behind controlling the trade of these weapons is to stop them from undermining national or international peace and security as well as any associated impacts on socio-economic development. Within that overall goal, though, many states disagreed on the specifics of clauses focusing on restraining arms transfers that could facilitate human rights violations, genocide, crimes against humanity and other serious war crimes.

Weapons categories lay at the heart of many disagreements. The UK, Germany, France, Sweden and Norway called for a comprehensive treaty that included ammunition in its scope. However, the US, China, Syria and Egypt all pushed to exclude ammunition on the basis that adequate monitoring of it would be difficult to implement. China additionally pushed to exclude small arms. Given that the treaty must be adopted by consensus, the fact that many states are

so far apart on these positions, and others, will be a significant challenge. Even so, despite these disagreements, the draft treaty text circulated towards the end of the final week contained a number of promising and constructive articles that demonstrate that an effective ATT is possible.

The draft clauses propose that a state, when considering whether to authorize an export of arms that fall within the scope of the treaty, must assess a range of factors that could affect what impact the transfer ultimately has on peace and security. Assessments must pay attention to the potential for the importing state to use the weapons for the kinds of acts that the treaty is trying to prevent, such as human rights violations. The exporter would also have to consider if the materials would contribute to peace and security. In making such assessments, the exporting state would be required to act 'in an objective and non-discriminatory manner' taking into account 'all relevant factors', including information provided by the importing state.

The draft treaty requires each party to keep detailed records of relevant arms transactions, and notes that they 'may' report annually to an Implementation Support Unit on 'any actions taken to address the diversion of conventional arms to the illicit market.' The draft calls on each state party to provide an initial report to all states parties 'of relevant activities undertaken' in order to implement the treaty within one year after its entry into force. Such activities were listed as including domestic legislation, regulations and administrative measures. Under the draft treaty, each state party would be required to submit an annual report on transactions to the Implementation Support Unit, which the unit would then make public.

For its part, the Implementation Support Unit would have five principal responsibilities: receiving and distributing reports; maintaining and regularly distributing to state parties a list of national contact points; and facilitating 'the matching of offers and requests of assistance' for treaty implementation and the promotion of international cooperation. It is also tasked with facilitating the work of the conference of states parties and performing other duties as mandated by the conference•

The return of the IAEA safeguards resolution

Andreas Persbo, London

The safeguards resolution of the IAEA General Conference has, for many years, been one of the meeting's highlights. It receives a lot of media attention, and that may be one of the reasons that member states invest so heavily in it. But all this effort can also be explained by simple economics. The resolution addresses one of the central work areas of the organization, an area worth some 37 per cent of the regular budget. From that perspective, it is natural that member states are keen to have a say in how that money is spent.

The safeguards resolution was introduced in 1991. At the time, it represented an important shift in the internal debate on safeguards. Prior to its introduction, resolutions on safeguards tended to focus on the financing of the safeguards system, and not its operation. Since then, however, the IAEA membership has focused not so much on how the system should be financed, but on how it can be improved. Last year, the conference could not unite on language, breaking a two-decade long string of formulated, reformulated and restated understandings on the safeguards system. This year, however, the resolution was passed—with 89 for, 16 abstentions and none against.

It seems that the 2012 resolution waters down important language on safeguards. In particular, references to the IAEA's 'state-level' concept of safeguards implementation have been modified or deleted. For instance, in 2010 the General Conference welcomed 'the important work being undertaken by the Agency in the conceptualization and development of state-level safeguards approaches to safeguards implementation' and also 'in the implementation of state-level integrated safeguards approaches which support more effective and efficient safeguards'. This language was weakened this year, with the conference simply 'taking note' of this work, while the reference to 'state-level integrated safeguards approaches' was deleted.

The conference also requests 'the Secretariat to report to the Board of Governors on the conceptualization and develop-

ment of the State-level concept for safeguards'. This is significant, as it will force the Secretariat to clearly communicate what the state-level concept means, and how it will impact on safeguards implementation. Some are worried that the concept introduces a level of discrimination in the system. The state-level concept has always been designed with non-discrimination in mind, however, and the secretariat now has the opportunity to explain this in more detail.

In 2010, the General Conference also urged the IAEA to ensure that the transition to integrated safeguards is given high priority. This reference is gone and gone with it, presumably, is the will of the conference to emphasise the need for safeguards reform. A new operative paragraph, later in the resolution, simply 'encourages the Agency to continue to pursue the implementation of integrated safeguards in those states where both a comprehensive safeguards agreement and additional protocol are in force'.

There have also been a few additions. In the preamble, language has been added to note the conference's recognition that 'safeguards must be effective and implemented in an efficient manner, in accordance with relevant safeguards agreements,' as well as a recognition that 'the Agency's safeguards implementation is continually reviewed and evaluated by the Agency'. This language will hardly change the way the Agency is implementing safeguards.

More importantly, the resolution now emphasises 'the obligation of states to cooperate with the Agency in order to facilitate the implementation of safeguards agreements'. The conference also 'calls on the Agency to continue to exercise fully its authority in accordance with the Statute in the implementation of safeguards agreements'.

VERTIC blogs, July-September 2012

'Nuclear warhead dismantlement exercise held in Norway'
David Cliff, 5 July 2012

'Kiwifruit vine disease, biosecurity and the BWC'
Angela Woodward, 12 July 2012

'The state of Arms Trade Treaty negotiations'
Edward Perello, 19 July 2012

'A new inter-sessional period for the BWC begins'
Edward Perello, 27 July 2012

'Exercising the CTBTO Executive Council'
Andreas Persbo, 2 August 2012

'Syria: international law and the use of chemical weapons'
Scott Spence, 8 August 2012

'National measures effective in curtailing Ebola outbreak in Uganda'
Edward Perello, 16 August 2012

'Protecting inspectors in the field'
Andreas Persbo, 24 August 2012

'UN observer mission in Syria ended amidst ongoing violence'
David Cliff, 30 August 2012

'Disarmament and non-proliferation education'
Angela Woodward, 6 September 2012

'Nuclear reactor safety in the post-Fukushima world'
David Keir with Larry MacFaul, 13 September 2012

'Accusations from Iran at the IAEA General Conference'
David Cliff, 20 September 2012

'The return of the safeguards resolution'
Andreas Persbo, 27 September 2012

Recent VERTIC publications

Fact Sheet 11: 2005 International Convention for the Suppression of Acts of Nuclear Terrorism

Fact Sheet 12: The IAEA Code of Conduct on the Safety and Security of Radioactive Sources

VERTIC's Guide to National Implementation of UN Security Council Resolution 1540

'Illicit Trafficking of Nuclear and other Radioactive Material: The Legislative Response' - ACD and NIM teams.

'Challenging times for sustainable fisheries: Combating illegal, unreported and unregulated fishing' - David Doulman, UNFAO



Verification Quotes

'Accurate and efficient identity verification is vital for meeting the evolving challenges of complying with financial crime prevention rules.'—Nigel Spencer, Chief of

Commercial Affairs at the UK Law Society, explains why verification is so important in his field. If it's important for financial crime prevention. White collar crime requires white collar phraseology on verification.

'Biased verification is unacceptable.'—Moon Jae-in, the presidential candidate of the South Korean Democratic United Party, in response to plagiarism allegations directed at fellow candidate Ahn Cheol-soo and the ensuing debate on who's right and who's wrong. We don't know the answer to that debate, obviously, but nevertheless think that Mr. Ahn's statement is pretty spot-on. Unbiased verification is acceptable.

'This is not the result we wanted. But we have made huge progress. The chair's draft treaty has our full support as well as that of the great majority of other states'

—UK Foreign Secretary William Hague on the failure of the Arms Trade Treaty negotiations to reach an agreement, 28 July 2012. Not quite time to break out the champagne. Then again, Rome wasn't built in a day, Mr. Secretary, and we firmly believe that the ATT will become reality very soon. So keep at it.

'We also want to see a treaty that seeks to increase transparency and prevent the diversion of arms from the legal market to illicit trafficking networks.'—A strong Arms Trade Treaty for a safer world: let's finish our work - Joint Communiqué by the Ministers of Foreign Affairs of France, Germany, Italy, Spain, the United Kingdom and the Minister for Trade of Sweden (September 26, 2012). Transparency may be a weak word, but we think it at least has a nice ring to it.

'We note that the substantial progress in strengthening the CTBT's verification regime is being increasingly recognized by members of the scientific community, including in states yet to ratify. We reaffirm our commitment to support the completion of the verification regime and urge all states signatories to do likewise'—

From a joint statement issued on 27 September 2012 in New York at a ministerial meeting to discuss the CTBT's entry-into-force. Just another way of saying that the CTBTO's IMS is awesome, and one can only agree with that.



US considers options to enhance radiation monitoring

Meghan Brown with David Keir, London

Every day, around the world, a vast number of cargo containers are shipped via air, land and sea, and transported across countries' borders. This makes them an attractive target for smuggling nuclear material or other components for terrorist weapons, into a country. Radiation monitoring at countries' entry points is therefore an important, practical component of efforts to prevent nuclear and radioactive material-based terrorism.

Keenly aware of this threat and the available countermeasures, the United States has embarked on an ambitious programme aiming to ensure that every container reaching its borders is screened for radiation. It has reportedly negotiated a number of bilateral instruments such as the Container Security Initiative, where US Customs personnel work on detection projects in foreign ports. The US and Japan, for example, have agreed to increase the compatibility of their respective anti-terrorism programmes, conduct joint investigations and coordinate regional capacity building.

Global Security Newswire (GSN), on the other hand, notes that the US Department of Homeland Security (DHS) has recently been criticized for not doing enough implement a law that requires screening all cargo bound for the United States by using an option to delay implementation until July 2014 (Congress agreed to this option when it passed the screening law to allow for possible logistical and technical challenges). The DHS argues that it chose to use the delay because full implementation would cost billions of dollars and interrupt the carefully planned system of Just In Time (JIT) shipping that much of US industry relies upon. According to GSN, they argue that until cheaper, more efficient technology can be implemented, a targeted, risk-based approach to monitoring is the most effective means of fighting nuclear material smuggling. The authors of the bill, Representatives Jerrold Nadler, Edward Markey, and Bennie Thompson, however, accuse the DHS of using the delay to avoid full implementation altogether.

At present, the detection of radioactive materials is carried out in a variety of ways, depending on the situation. Fixed radiation portal monitors are used as front-line detectors (but not usually identifiers) to screen cargo entering ports, for instance. Hand-held gamma and neutron search detectors are used as second-line instruments, for search and pinpoint purposes at ports of entry and as the main instruments in field searches. Some of these have a crude identification capability—so the isotope in question can be indicated.

In applications where there is more time, and the target is not moving, high resolution gamma spectrometers can be employed to produce a detailed spectrum of gamma-emitting isotopes; and finally, personal radiation detectors are worn to indicate dose levels to people in proximity to radioactive materials—and some of these are equipped to alarm if a dangerous limit is reached.

The *New York Times* notes that the US Customs and Border Patrol responds to hundreds of thousands of alarms at its ports annually, because radiation portals often give false positives and raise the alarm on a wide range of legitimate goods, including bananas, cat litter, dinnerware, ceramics, smoke alarms, and a variety of electronics, to name but a few.

While false positives may seem better than the alternative, their frequency resulted in startling waste of resources, including dispatching teams to examine suspect containers, and laboratory resources to confirm the radiation signature of offending items; and perhaps a sense of complacency when the alarm does sound.

The authors of the screening mandate note that an efficient high-volume scanner has recently been installed in Hong Kong. And in Indonesia, where the head of the Nuclear Energy Regulatory Agency, Asnatio Lasman, has stated that he believes there is a strong chance that nuclear smuggling is already taking place, a radiation portal, claimed to be

capable of detecting specific types of radioactive and nuclear material was donated by the IAEA and has been installed at a Belawan Seaport.

Meanwhile, Sandia Research Laboratories have been working to develop new sensors that could be less expensive and more efficient. These new portals would use spectral shape discrimination and metal-organic frameworks to allow radiation portals to discriminate between illicit nuclear material and NORM (natural-occurring radioactive material)—harmless radiation that is present in legitimate goods, described above.

It will therefore be interesting to see whether the US DHS decides to procure and install more advanced equipment, for a reasonable cost in the near future, and whether these new capabilities change their mind on the feasibility of screening all cargoes●

Adapting space technology for nuclear verification

Ryoji Sakai with David Keir, London

Scientists at the University of New Hampshire and a Michigan-based technology company are working together to produce a new remote detection system for nuclear material. To do this, they are re-designing instrumentation developed for space-based missions to pinpoint illicit radioactive and fissile materials from a 'safe distance'. Once they have completed the changes, they claim that the technology will be usable for homeland security tasks.

Their detection instrument is called the Portable Neutron Spectroscope (NSPECT). They say that the same technologies were used by the NASA Compton Gamma Ray Observatory (which is no longer operational), launched aboard the space shuttle Atlantis—the instrument being used for looking at radiation from black holes, solar flares, gamma-ray bursts and pulsars.

NSPECT, which is now in the process of commercialisation, is claimed to have two main technological advantages: it uses a neutron and gamma-ray detection system that will be able to allow a full, 360-degree survey of a room without

having to move the instrument; and an innovative power supply that is efficient and compact.

Since the instrument detects gamma rays as well as neutrons, it is intended to be capable of identifying radioactive material and nuclear material that could be used for making nuclear bombs.

James Ryan, principal scientist for NSPECT and professor at the University of New Hampshire, summarises the technology in the press release: 'Basically, what people have to do now is go into a building or a container and fish around in hopes of finding the source. The expertise that has been acquired over many years in the space program can now be brought to bear on this problem to better find and locate nuclear bomb-making material'.

In judging the effectiveness of all these systems it is important to bear in mind that all radioactive materials are not the same. A powerful gamma-emitter will be detectable from far away by even the crudest gamma detector, whereas an alpha emitter will be essentially invisible until an appropriate detector is brought within millimetres.

The developers of NSPECT claim that they will ultimately make the detection system field-deployable, equipped with graphical user interface and live video-imaging capability. They plan to make the completed instrument small enough to fit in the back of an SUV and to make it possible to control it remotely. Even smaller versions of the instrument are envisaged.

For further information on radioactive material detection and how countries can meet international obligations and other measures to tackle illicit trafficking in these substances, see VERTIC's 2012 report on 'Illicit Trafficking of Nuclear and other Radioactive Material: The Legislative Response'●

National Implementation Measures Programme

During this quarter, the NIM team reviewed a draft bill and completed four legislation surveys on implementation of the Biological and Toxin Weapons Convention (BWC).

From 11-13 July, NIM staff lectured during an Advanced Postgraduate Course on Biological Safety in Milan, Italy. During the BWC Meeting of Experts from 16-20 July in Geneva, we presented as a 'Guest of the Meeting' on national implementation of the BWC using the recent advances in H₅N₁ transmissibility research as a case study (see page 1 for a report on this presentation and case study).

NIM staff attended a meeting of the Public Advisory Committee on Disarmament and Arms Control in Wellington, New Zealand on 23 August and participated in a workshop on the Implementation of Nuclear Security Legal Instruments in Kuala Lumpur, Malaysia, from 28-29 August. VERTIC gave presentations on national implementation of UN Security Council Resolution 1540 and making the offences in the Convention on the Physical Protection of Nuclear Material and International Convention on the Suppression of Acts of Nuclear Terrorism punishable under nuclear law.

From 27 August to 7 September, Rocio Escauriaza-Leal attended the International School of Nuclear Law of the OECD Nuclear Energy Agency and the University of Montpellier, in France. The team also presented on the future of national implementation of the Chemical Weapons Convention at a workshop organized by the European Union Institute for Security Studies (EUISS) in Brussels, Belgium on 10 September 2012. Staff also participated in and presented at the first round-table on CBRN Safety and Security for the North Africa and Sahel region organized by the Centres of Excellence in Algiers, Algeria, from 12-13 September. Both NIM and ACD staff attended the IAEA General Conference in Vienna, Austria, from 17-21 September.

The NIM team published VERTIC's 'Guide to national

implementation of UNSCR 1540', Fact Sheet 11 on national implementation of the International Convention for the Suppression of Acts of Nuclear Terrorism and Fact Sheet 12 on the national implementation of the Code of Conduct on the Safety and Security of Radioactive Sources.

NIM staff also produced the following publications: Scott Spence, 'Legal aspects of the control and repression of illicit trafficking of nuclear and other radioactive materials—Is there a need for an international convention?', OECD Nuclear Law Bulletin No. 89, Vol. 2012, Issue 1; Rocio Escauriaza-Leal, 'VERTIC: Legal and Regulatory Assistance', 1540 Compass, Vol. 1, Issue 2; Yasemin Balci, 'The Biological and Toxin Weapons Convention and VERTIC', BWC News e-book, Korea Biotechnology Industry Organization, 2012 No 6; Angela Woodward, 'Arms Trade Treaty negotiations call a time out', PassBlue UN blog, 20 August 2012; and Angela Woodward, 'National implementing legislation for the Chemical Weapons Convention', OPCW Today, Vol. 1 No. 2 (forthcoming 2012)•

Arms Control and Disarmament Programme

During this quarter, VERTIC continued work on its project on Universalisation of the Additional Protocol, including developing resources and engagement plans on ratification and implementation assistance for states. In support of this project, July 2012 saw Larry MacFaul travel to Hanoi, Vietnam, to participate in a meeting on 'Next Generation Safeguards: Implementing Comprehensive Safeguards Agreements and Additional Protocols' run by the US Department of Energy's National Nuclear Security Administration (NNSA) and the Vietnamese Agency for Radiation and Nuclear Safety. July also saw both Andreas Persbo and David Keir travel to Vienna to present to the Comprehensive Test Ban Treaty Organization's (CTBTO) 'Intensive Policy Course'. As part of this event, Mr Persbo played the role of CTBT chief in a table-top simulation of the organization's executive council. While in Vienna David Keir also attended a meeting hosted by the Vienna Centre for

Disarmament and Non-Proliferation entitled 'Maintaining Strategic Stability on the Road to Zero', at which two senior Chinese figures gave presentations on China's current position on nuclear deterrence and disarmament issues.

The Arms Control and Disarmament team continue to develop and coordinate the multilateral nuclear disarmament verification project, funded by the Norwegian government. In August, VERTIC prepared several working papers and hosted a second project meeting in the UK involving the now-established group of participants from around the globe. The meeting reviewed the project's progress so far and identified near-term activities and proposed work streams for the future.

September was a particularly busy period for the ACD team. David Cliff travelled to Birmingham to present on 'Trust and Warhead Dismantlement Verification' at a conference organised by the universities of Birmingham and Leicester, while David Keir went to Como, Italy, for a meeting, co-sponsored by US NNSA, centred on Scientist Engagement, but including cyber-security along with nuclear, radiological, chemical, biological and nano threats within its purview.

September also saw the full Arms Control and Disarmament team and staff from the VERTIC National Implementation Measures programme travel to Vienna to carry out a range of project and engagement activities at the International Atomic Energy Agency's 56th General Conference. Late September also saw Dr Keir travel to Copenhagen to take part in a well-attended conference on the possibility of creating a nuclear weapon-free zone in the Arctic.


VERTIC
Director's reflections

Over the summer, we drafted a new strategic plan based on the June review of all our programme activities. This plan is detailed and outlines our strategic priorities, our fundraising targets and our growth objectives. I have taken steps to reduce our overheads, cut down on unnecessary paperwork, better our IT infrastructure and speed up our internal decision making process, and we will take steps to trim the fat even further. The rationale for doing this is that I am a firm believer in having projects at the centre of our work. Our funders donate to us to deliver services. Our programmes deliver those services, and so, programmes should drive the organization forward, not a top-heavy administrative infrastructure.

We need to remain conscious of the mandate our founders gave us back in 1986. They envisioned an organization devoted to the verification and implementation of international agreements. They did not specify, however, that we should focus all our effort on arms control, or the environment. VERTIC just evolved that way. The new strategic plan calls on us to revisit our founders' objectives, and too look at ourselves in a different light. This is why the plan abolishes the Arms Control and Disarmament as well as the Environment Programmes. In its place, a new programme will take shape: the Verification and Monitoring Programme. All these changes will be implemented in the coming quarter. The true transformation of VERTIC, however, will take many more years. I hope that you will continue to follow our story.

For you, the readers, little will change. *Trust & Verify* will come out every quarter, and it will still feature the usual articles. And in the years to come, it will hopefully broaden its focus, add more content, and be a true reflection of our founders' intentions.

Grants and administration

On 12 September 2012, VERTIC held a meeting of the Board of Trustees. The board considered and approved the organization's budget for the financial year 2012/2013 as well as the Strategic Plan for 2012-2016.

At this meeting, the board also approved the Executive Director's recommendation to appoint David Keir as the programme director for the Verification and Monitoring Programme (VMP). The VM programme is a consolidation of VERTIC's Environment and Arms Control & Disarmament programmes. In addition, Larry MacFaul was appointed permanent Editor of VERTIC publications. VERTIC intends to complete its reorganization, and make final appointments, by the end of Quarter 4 2012.

VERTIC has also, finally, taken steps to move its IT infrastructure into the 'cloud'. Earlier in 2012, the Gallery Partnership won a tender to carry out a significant upgrade to our communications. Designed to make our work more effective, this upgrade will enable staff to access the VERTIC IT infrastructure from anywhere in the world. The company has also significantly beefed-up its IT security.

We also welcome new intern Katherine Tajer and would like to thank Meghan Brown, Jasmin Kaisla and Edward Perello for their work and assistance—all three have made outstanding contributions to the organization during their internships•

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, analysis and provide expert advice and information to governments and other stakeholders. We also provide support through capacity building, training, legislative assistance and cooperation.

PERSONNEL Mr Andreas Persbo, *Executive Director*; Ms Angela Woodward, *Programme Director*; Dr David Keir, *Senior Researcher*; Mr Larry MacFaul, *Senior Researcher*; Mr Scott Spence, *Senior Legal Officer*; Mr Hassan Elbahtimy, *Researcher*; Mr Rocío Escauriaza Leal, *Legal Officer*; Ms Yasemin Balci, *Associate Legal Officer*; Mr David Cliff, *Researcher*; Ms Unini Tobun, *Administrator*; Ms Renata Dalaqua, *Consultant* (2011-12); Ms Sonia Drobysz, *Consultant* (2010-12); Ms Greta Luxbacher, *Consultant* (2012-13); Mr Ryoji Sakai, *Consultant* (2012-13); Ms Katherine Tajer, *Intern* (September-December 2012).

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