

A biological weapons protocol: verification lite?

Negotiations in Geneva on a verification protocol for the 1975 Biological Weapons Convention (BWC) have, after six years, entered their final stage. On 23 April, Chairman Tibor Tóth presented his 200-page draft at the opening of the twenty-third session of the Ad Hoc Group (AHG), and urged states parties to accept his 'composite text with compromise solutions' as the foundation for agreement. Tóth asked delegations to take a 'holistic view' of his proposal and to move beyond the hitherto line-by-line discussions on the so-called Rolling Text—a cumbersome 300-page document, containing more than 1,400 brackets indicating points of disagreement.

The verification measures envisaged in the Chairman's draft include an international Organization for the Prohibition of Bacteriological (Biological) and Toxin Weapons (OPBW) that would be in charge of monitoring compliance. States parties would have to declare certain facilities, such as commercial research and production plants and larger bio-defence establishments. Triggers for declarations would include the bio-safety level of the facility, as well as whether it worked with specified agents that could potentially be useful for the development of biological weapons (BW). Declared facilities would be subject to non-challenge 'visits' in order to enhance transparency and to increase confidence in the accuracy of declarations. Consultation procedures could be used to clarify ambiguous or suspicious information. Furthermore, field investigations could be instigated in the event of an unusual outbreak of disease or suspected BW use, while facility investigations could be launched to assess whether clandestine BW production was occurring. The draft text also envisages measures to strengthen technical co-operation and to increase scientific exchanges among states parties.

While reactions to the Chairman's text were mixed, they were generally supportive. No delegation completely endorsed all of the proposed measures. Yet the vast majority of states was in favour of using the final AHG session in July–August 2001 to attempt to reach consensus on the basis of the new proposal. Only a few states—China, Iran, Libya and Pakistan, for example—wanted to retain the old Rolling Text as the basis for negotiations. These and other non-aligned countries also emphasised that it was vital to establish a fair, transparent and multilateral export control mechanism as part of the future OPBW, and that export control regimes outside the treaty should be abolished. Other delegations, including Western and some developing nations, criticised the text for not encompassing stronger compliance measures. They reminded negotiators that the protocol must deliver the requisite international confidence that the Convention's prohibitions are being upheld.

The largest delegation and the country with the biggest biotechnology and pharmaceutical industry—the US—did not join in this lively debate. On the final day of the talks, it made its

Inside this issue . . .

John Russell examines the end of on-site verification under the Intermediate-range Nuclear Forces Treaty. In addition, all of the usual features: Verification Watch, Science and Technology Scan, Peace Missions Monitor, Verification Quotes and VERTIC News and Events.

Trust & Verify

May–June 2001 • Issue Number 97 • ISSN 0966-9221

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US practices BW investigations

Despite the likelihood that the US will reject the draft BW protocol, the US Department of Defense conducted a trial ‘investigation’ of the Maryland-based Armed Forces Institute of Pathology’s Division of Microbiology on 20–22 March, under conditions designed to mimic those that could be provided for under a BW protocol. The exercise was the first in a series being carried out in accordance with a congressional requirement that the American government conduct one practice ‘visit’ and one practice ‘investigation’ annually to assess the impact of a future protocol.

Source ‘Pentagon conducts BWC protocol “trial visit”’, *Arms Control Today*, April 2001, vol. 31, no. 3, p. 31; and Gail Kaufman, ‘Pentagon conducts Biological Weapons Convention training’, *Stars and Stripes*, 23 March 2001, quoted in *CB Daily Report*, 27 March 2001.

only public statement, simply acknowledging that the composite text had been tabled. The US observed that many of its positions were not reflected in the Chairman’s draft, but stopped short of rejecting it. According to press reports, however, an internal policy review in Washington had concluded—even before the start of the meeting in Geneva—that the administration of US President George W. Bush should reject the protocol as currently conceived. Reportedly, the review has unanimously concluded that the protocol’s verification provisions are not strong enough.

Debate over the future course of action in the AHG, especially against the backdrop of possible American opposition to the Chairman’s draft, dominated private discussion and informal consultation during the session. Most of the negotiating time was spent listening to Tibor Tóth’s detailed explanation of his draft proposal. A lively response to his comments rendered the ensuing debate about the formal status of the draft (as opposed to the Rolling Text) somewhat academic, since *de facto* the new proposal has already taken centre stage.

The way ahead

Should the AHG fail to reach consensus this year, the BWC will remain, for the foreseeable future, the only treaty dealing with weapons of mass destruction that has no verification system. The AHG has set itself the target of completing its work before the Fifth BWC Review Conference, which will be held from 19 November–7 December in Geneva. Should that deadline not be met, political momentum is likely to dissipate. Regardless of whether negotiations continue in a different form and under a new mandate, or whether the current talks are extended, a sense of failure will prevail. The remaining four weeks of negotiations in July–August should, therefore, be used to reach agreement among those states that support the underlying principles of the current proposal.

In addition, some of the shortcomings of the Chairman’s draft need to be fixed. Many of the provisions fall well short of the state-of-the-art verification exhibited by other regimes,

notably those under the Chemical Weapons Convention, the Comprehensive Nuclear Test Ban Treaty and International Atomic Energy Agency nuclear safeguards. A BW verification regime also needs to be adaptable to changing political and technical circumstances. Opportunities for strengthening the regime can be included in the current text without states having to surrender any of their current substantive preferences. The future OPBW (and its Preparatory Commission) must be able to rectify the protocol’s verification deficiencies. VERTIC believes that three key areas need to be fortified:

- *declaration follow-up measures should be more credible*: the current provisions for non-challenge visits look more like ‘bio-tourism’ than real verification;
- *the role and powers of the OPBW and its Technical Secretariat should be enhanced*: the Organization should be given a true ‘BW watch’ function and the freedom to draw information from whatever sources it deems appropriate; and
- *novel verification technologies and techniques should be permitted*: the regime should be allowed to make use of new monitoring and sensing technologies when necessary.

Watering down the verification provisions of the modest draft in anticipation of US criticism is unwise. It would not only alienate supporters of a strong protocol, but, as experience with the 1997 Landmine Convention demonstrated, it may also produce the worst of both worlds: a weakened treaty without American agreement. When it comes to verification, the US wants to have it both ways: it continues to argue that the proposed regime is not intrusive enough to verify the BWC, but, at the same time, it sees it as far too invasive for American industry to stomach. Faced with this schizophrenia, negotiators should agree the strongest protocol possible and let the US come on board when it is ready.

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INF inspections end, but unilateral verification continues

Midnight on 31 May 2001 signals the conclusion of 13 years of on-site verification under the landmark Intermediate-range Nuclear Forces (INF) Treaty, signed in 1987 by the US and the Soviet Union. Continuous monitoring of missile assembly plants at Magna, Utah, in the US, and at Votkinsk in Russia, will end, as will the right to conduct challenge on-site inspections (OSIs). Since the agreement is of indefinite duration, however, each of the parties will continue to verify the other's compliance unilaterally, using its own national remote monitoring capabilities.

The INF accord was the first agreement to eliminate a whole class of nuclear weapons, banning all ground-launched ballistic and cruise missiles with ranges between 500–5,500 kilometres, including Russian SS-20s and American *Pershing* IIs. It also prohibited related launchers, equipment, global support facilities and operating bases, test flights and the future production of INF missiles. But associated warheads and guidance systems were not banned.

All missiles covered by the treaty were successfully eliminated by May 1991, within the three-year limit specified under the accord. By agreeing to eradicate all INF missiles, rather than setting limits on their numbers, the verification challenge was made significantly easier. Yet, because INF systems are small and extremely mobile, verification needed to be highly intrusive. This became possible when, for the first time in a nuclear arms reduction treaty, the Soviets agreed to on-site verification.

Several different types of on-site verification were envisaged. They would be undertaken, where applicable, in the Soviet Union and the US, as well as in seven East and West European countries where INF were deployed. A Memorandum of Understanding attached to the treaty declared the numbers and locations of all INF missiles, launchers, support equipment and facilities. Baseline inspections were then conducted to confirm the accuracy of the declarations. Elimination inspections were then carried out to verify that missiles and associated hardware were destroyed in accordance with the Protocol on Elimination. Finally, 'close-out' inspections were instigated to confirm the absence of all INF equipment, support structures and prohibited activity at missile bases and support facilities. The treaty also contained, for the first time, provision for short-notice challenge inspections of declared sites. The US conducted the penultimate challenge inspection allowed under the treaty in the Baltic Sea enclave of Kaliningrad in early May, following reports that Russia had moved tactical nuclear weapons there.

In addition, the agreement allowed continuous perimeter or portal monitoring of one former INF production facility in each party's territory in order to confirm the cessation of production. This was included because the Soviets continued to manufacture the SS-25—a road-mobile missile with a range of 6,500 miles, which was not banned, but which had a first stage 'outwardly similar but not interchangeable' with that of the SS-20. Monitoring of the *Pershing* II rocket motor plant in Utah was conducted for reasons of reciprocity rather than necessity.

Another cornerstone of the verification regime is the use of so-called National Technical Means (NTM)—monitoring capabilities under the control of each party. Particularly important in this context is the use of satellite imagery. The treaty prohibits interference with such means. Furthermore, a Special Verification Commission (SVC), comprising representatives of the two sides, provides a forum for addressing compliance concerns and resolving implementation problems.

Implementation a success

Although implementation of the treaty could have been complicated by the collapse of the Soviet Union, negotiations in the SVC ensured that Belarus, Kazakhstan and Ukraine, which had INF missiles or related equipment on their territory, all implemented the treaty satisfactorily. Otherwise there were only a few, relatively inconsequential difficulties pertaining to treaty implementation and verification.

Inspections under the INF treaty

Baseline inspections to verify the location and number of all declared items.

Elimination inspections to witness the eradication of missiles.

Close-out inspections to confirm that a given missile base or support facility was free of any INF equipment.

Short-notice inspections to alleviate concerns about non-compliance. For the first three years each party was allowed 20 per year, excluding elimination inspections; for the next five years and for the final five years, each party was permitted 15 and 10 per year, respectively.

Portal monitoring of one former INF missile assembly plant on each party's territory to confirm that INF missile production had ceased.

Peace Missions Monitor

UNMEE establishes security zone

The UN Mission in Ethiopia and Eritrea (UNMEE), which has been monitoring the withdrawal of Ethiopian troops from Eritrea, has officially established a Temporary Security Zone along the border shared by the two nations.

Source *Jane's Defence Weekly*, 2 May 2001, p. 18.

OSCE monitors Macedonian 'spillover'

The Organisation for Security and Co-operation in Europe (OSCE) has stepped up its border monitoring activities and boosted the staff serving with its so-called Spillover Monitoring Mission in the Macedonian capital, Skopje, following the upsurge in fighting since February between government troops and Albanian separatists based in Kosovo.

Source *OSCE Newsletter*, vol. 8, no. 4, April 2001, pp. 3-4.

Movement in the Congo

The UN Organization Mission in the Congo (MONUC) has begun deploying more troops to monitor implementation of the multiparty ceasefire in the Democratic Republic of the Congo (DRC). Force Commander General Mountaga Diallo welcomed the first troop contingents from Senegal and Uruguay in April, with Tunisian and Moroccan contingents expected in May. The UN has reduced the size of MONUC from the planned 5,500 to just 3,000 personnel. But the force will include riverine units, totalling some 400 troops, to patrol the country's extensive river system, as well as aircraft and helicopters. After numerous false starts, implementation of the July 1999 Lusaka peace agreement finally appears to be making progress, with Uganda pledging to withdraw its forces completely from the Congo.

Source *International Herald Tribune*, 9 May 2001, p. 4; *Jane's Defence Weekly*, 21 February 2001, p. 6; Thalif Deen, 'UN Congo peace initiative hailed as step "in the right direction"', *Jane's Defence Weekly*, 11 April 2001, p. 14.

In 1988 the US discovered eight defective *Pershing* IA missiles (used for training) that it had failed to declare. These were subsequently reported to the Soviets and destroyed. In March 1990, American inspectors declared an 'ambiguity' after the Russians refused to allow the use of x-ray equipment to monitor three SS-25s seen leaving the Votkinsk factory. Russia argued that the US equipment was recording images several centimetres larger than permitted and that these could be electronically enhanced, thereby revealing secret design information. Certain technical adjustments were made and the issue was resolved. Also in March 1990, East Germany admitted to possessing 24 conventionally armed SS-23 missiles and launchers, which were destroyed by the end of November. A smaller number of SS-20s was also reported and subsequently destroyed in Bulgaria and the Czechoslovakia. Russia argued that the missiles had been transferred before the treaty came into force and that this had gone unreported to its foreign ministry. Finally, in 2001, the Russians accused the US of violating the treaty by using short-range *Hera* missiles as targets for testing ballistic missile defence systems.

While OSIs generally worked well, the inspectors tended to find themselves overly constrained by the treaty's procedures. Having been drafted at a time when relations between the two parties were still characterised by suspicion, the accord allowed inspectors little autonomy to resolve simple ambiguities on-

site. These rigidities were overcome with experience and the development of personal relationships between the inspectors and the inspected.

Surviving on NTM

While the INF treaty must now survive indefinitely without on-site monitoring and inspections, verification will carry on via NTM. The SVC will also be available to handle compliance questions and could even agree new verification provisions if needed. Portal monitoring of the Votkinsk plant will be maintained under the first Strategic Arms Reduction Treaty (START) of 1991.

Although the achievements of the agreement are impressive, INF represented only a tiny fraction of the nuclear arsenals of the two countries and were of limited strategic significance. The INF verification system, moreover, applied only to missiles, not warheads. Nonetheless, the INF treaty established groundbreaking verification practices and instituted working relationships between erstwhile adversaries which have fostered further co-operation and established a strong basis for the more complex arms control agreements to come.

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US kicked off monitoring bodies

The US has failed to win re-election to two international monitoring organisations, the Human Rights Commission and the UN International Narcotics Control Board (INCB). In two separate votes on 3 May, the 54 members of the UN Economic and Social Council (ECOSOC) chose European Union member states to represent the Western group of countries, in both cases ending longstanding American membership. The Geneva-based Human Rights Commission, which probes human rights abuses around the world, was founded in 1947 at US instigation. The Vienna-based INCB monitors and enforces compliance with three multilateral treaties: the 1961 Convention on Narcotic Drugs, the 1971 Convention on Psychotropic Substances, and the 1988 UN Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances.

Source International Narcotics Control Board website, www.incb.org; 'Narcotics Control; US loses seat on UN Board', *UN Wire*, 9 May 2001, www.unfoundation.org; 'US fails to win re-election to UN Rights Commission', *Reuters*, 3 May 2001.

Dealing with old and abandoned CW: Ethiopia and Panama

Chemical weapons (CW) have been discovered at a construction site in the Ethiopian town of Ambalaghe, north of Addis Ababa. The find reportedly consists of some 800 artillery shells, 300 grenades and bulk chemical agent. Another source, however, estimates that approximately 1,400 munitions were uncovered. Ethiopia's National Authority for implementing the 1993 Chemical Weapons Convention (CWC) believes that Italian troops brought approximately 80,000 tonnes of CW into Ethiopia in the mid-1930s when they invaded the country. It says that unused CW was 'dumped' prior to the Italian withdrawal in 1941. The implications of this find are currently being considered by the Organization for the Prohibition of Chemical Weapons (OPCW), which verifies compliance with the CWC. If the weapons prove to be of Italian origin, Italy will have primary responsibility for disposing of them.

Meanwhile, in February, a preliminary search was conducted for CW on the Panamanian island of San José. Chemical weapons were tested there during and shortly after the Second World War by the US, with the participation of British and Canadian specialists. Panama has declared to the OPCW that CW was abandoned on its territory, but no country has been officially designated as the 'abandoning state party', and the

nature and scope of the problem remains unclear. Some chemical munitions have apparently been discovered in the past, but no chemical fill thus far. In any event, given Panama's difficult jungle terrain, it will be impossible to guarantee that every single munition is accounted for.

Source 'Workers stumble on Italian chemical weapons cache in Ethiopia', Panafrican News Agency, 6 May 2001, quoted in *The African Environmental Newsletter*, www.newafrica.com; 'Ethiopia accuses Italy over weapons', *BBC News Online*, 3 May 2001, www.news.bbc.co.uk; David Pugliese, 'Canada's toxic wartime secret', *The Ottawa Citizen*, 22 April 2001; David Pugliese, 'Deadly American legacy lingers in Panama', *The Ottawa Citizen*, 23 April 2001; David Pugliese, 'Canada may be part of Panama bomb menace', *The Ottawa Citizen*, 24 April 2001.

One down, one to go: Russia ratifies the Open Skies Treaty

On 24 April the Russian Duma ratified the 1992 Open Skies Treaty, nine years after the agreement was signed by the country. Open Skies is a transparency and confidence-building regime, giving state parties the right to conduct co-operative flights over each others' territory to ensure that no untoward military activity is taking place. Open Skies will help to monitor compliance with arms control agreements and to assist in conflict prevention and crisis management by the Organisation for Security and Co-operation in Europe (OSCE) and other bodies. All members of NATO and the former Warsaw Treaty Organization are signatories. Belarus is now the last of these 27 states that has to ratify the treaty before it can enter into force. After entry into force, membership will be open to all OSCE members and, eventually, to any other state.

Source 'Russia ratifies Open Skies treaty on spy plane flights', *AP Worldstream*, Moscow, 18 April 2001. For background see *Trust & Verify*, May 2000.

Prising the EU open

A number of recent European Union (EU) agreements and activities demonstrate a determination to improve access to information, including that related to EU implementation of international agreements. The 'EU Legal Instrument on Public Access to Official Documents' was adopted by the European Parliament on 3 May and will enter into force within six months. It provides public access to documents submitted to and drawn up by the Parliament, the Council of Europe and the European Commission, and covers all categories, inclu-

ding internal working material and defence papers. Although there are exemptions, these are exhaustive, meaning that no other grounds for secrecy other than those expressly allowed may be used to prevent the release of documents. Even the exemptions may be overruled if public interest is deemed to be of greater importance than the harm caused by releasing the papers. The new agreement will replace arrangements drawn up in 2000 by Javier Solana, the EU High Representative for Common Foreign and Security Policy, which curbed public access to documents on security and defence issues.

Meanwhile, the Commission is cracking down on member states that have not provided information on their implementation of MEAs. The Commission is to launch infringement proceedings against five member states (Finland, France, Greece, Ireland and Italy) for failure to supply adequate data on implementation of the Natura 2000 wildlife protection process and the so-called 1979 Birds Directive.

In a separate move, the Commission has called for breaches of certain EU environmental laws to be classified as criminal rather than administrative. This would give the police and courts, as opposed to the regulatory authorities, responsibility for enforcing many aspects of MEAs. Finally, industrial pollution inspectors from EU countries are to begin a series of peer reviews of national environmental inspection systems.

Source 'EU inspection reviews agreed', *ENDS Daily*, 2 April 2001; 'EU Commission pursues states over information', *ENDS Daily*, 3 April 2001; 'EU unveils crack-down on "eco-crime"', *ENDS Daily*, 13 March 2001; 'EU reaches deal on disclosure', *International Herald Tribune*, 26 April 2001, p. 7; 'Important decision on regulations on public access to EU official documents' and 'New EU rules on openness—a description' at the *Swedish Presidency*, www.eu2001.sw.

Indicators of sustainable development

The Ninth Session of the Commission on Sustainable Development (CSD9), held in New York between 16 and 28 April, made recommendations relating to monitoring and reporting on sustainable development, following intense debate in the 'Information for Decision Making and Participation' group. Controversy was sparked by the Secretariat, which suggested that parties endorse a set of indicators developed by a number of Western countries for measuring their own progress in achieving sustainable development. The developing nations interpreted this as an attempt to introduce new 'conditionality' for the disbursement of development assistance and complained that the indicators had been developed by only 22 countries. In fact, many developed states are equally opposed to compulsory use of indicators, as this would open the way to formal assessments of their own performance. The compromise, while encouraging work on these and other indicators, emphasises

that they are being developed for voluntary national use, are country-specific and should not lead to further conditionalities.

At the international level, the Commission encouraged multilateral environmental agreement (MEA) secretariats to rationalise their information requests. While this may seem negative, changes are needed, since states are being overwhelmed by the reporting requirements of the growing number of MEAs. To help further to overcome this, the Commission recommended the strengthening of, and co-ordination and data-sharing among, global monitoring systems, and encouraged the provision of assistance to developing countries for improving national systems.

Governments are also being encouraged to consider measures to ensure access to environmental information nationally and to develop partnerships with non-governmental organisations (NGOs) and the private sector in order to stimulate innovative data generation, collection and analysis methods. These recommendations are the result of an active campaign by the European Union to promote Principle 10 of the 1992 Rio Declaration on access to information and public participation in decision-making.

Source 'Summary of the CSD Intersessional *Ad Hoc* Working Group on Information for Decision Making and Participation and on International Cooperation for an Enabling Environment', *Earth Negotiations Bulletin*, 19 March 2001; 'Summary of the Ninth Session of the Commission on Sustainable Development', *Earth Negotiations Bulletin*, 30 April 2001.

Non-proliferation in the former Soviet Union: US funding threatened . . .

US President George W. Bush's administration is considering severely cutting American non-proliferation efforts in Russia and other Soviet successor states. The US\$800 million allocated to the Extended Threat Reduction Initiative under former President Bill Clinton's administration is being reviewed. A proposed Fiscal Year 2002 Department of Energy budget has been submitted to Congress, which would:

- reduce funding for nuclear disarmament and verification efforts in the former Soviet Union (FSU) by about US\$100m (32%) compared to 2001;
- cut funding for the nuclear materials protection, control and accounting programme for the safe and secure storage of weapons-capable materials by 18% from US\$169.7m to US\$138.8m; and
- slash funding for the Nuclear Cities Initiative by 75% from US\$26.6m in 2001 to US\$6.6m in 2002.

The cuts would end six out of nine long-term non-proliferation projects funded in 2001, including efforts to develop an FSU plutonium registry, improve safeguards for civil plu-

tonium at the Mayak nuclear storage sites, provide security for naval nuclear fuel and warheads, and to assist Russia in closing down its nuclear weapon production facilities.

Source Bill Hoehn, 'Analysis of the Bush administration's fiscal year 2002 Budget Request for US-Former Soviet Union nuclear security: Department of Energy programs', Russian-American Nuclear Security Advisory Council, 18 April 2001, www.ransac.org.

... while the EU reviews its efforts

The European Union (EU) has organised the first Conference on Non-Proliferation and Disarmament Co-operation in the Russian Federation and in the Newly Independent States. Organised by the European Commission (EC) and co-hosted by the Swedish EU presidency in Brussels on 8-9 March, the meeting took stock of EU non-proliferation and disarmament efforts, without agreeing any new initiatives. It was revealed that, between 1992 and 2001, the EC and individual EU member states spent €550m on non-proliferation and disarmament programmes in Russia and other former Soviet states. The bulk (€309m) went on nuclear weapon destruction, while €115m was spent on 'stabilisation/re-conversion', €88m on chemical weapon destruction and €34m on 'control of non-proliferation'. Similar meetings are planned annually.

On 9 April, an International Working Group for a European Nuclear Cities Initiative (ENCI) was launched in Como, Italy. An ENCI would aim to develop new strategies and identify funding mechanisms to assist in the conversion and restructur-

ing of the Russian nuclear weapons complex. The project, whose composition, mandate and funding have not been determined, would be European-led, but would include representatives of the US and Russia, as well as of non-governmental organisations.

Source 'Non proliferation and disarmament: EU to host Brussels conference on progress 8-9 March 2001', *Press Release IP/01/329*, European Commission, Brussels, 7 March 2001; 'Russian-American experts endorse Working Group on European Nuclear Cities Initiative to Redirect Russian Nuclear Expertise', *Press Release*, Russian-American Nuclear Security Advisory Council, 16 April 2001, www.ransac.org.

Laying down the law on small arms

A workshop was convened in Geneva on 17-19 May by the International Law Association's Arms Control and Disarmament Law subcommittee and the Swiss government to examine the legal aspects of national and international regulation of small arms and light weapons. Sessions examined the state of current instruments and also drew lessons from material control regimes in other fields. Verification issues included the use of permits in controlling the export, import and third party transfers of weapons, the use of markings to monitor the flow of weapons and the importance of interagency information sharing to detect potential violations of existing political and legal agreements. The workshop proceedings will be published as volume IX in the United Nations' Series on the Legal Aspects of Arms Control.

Verification Quotes

... monitoring is the great hope of the anti-sweatshop movement.

Leslie Kaufman and David Gonzalez, on the use of independent monitors by multinational clothing company Gap to help improve working conditions in the garment industry in Central America, 'Labor standards clash with global reality', International Herald Tribune, 24 April 2001, p. 2.

Legally-binding agreements—or even agreements that have information about what the other side is doing that you can rely on to make your assumptions—can help set the limits that you need in order to accommodate what you think the other side has. But the concept of verification is not just what we get in an agreement. It's about any source of information that we can use to measure the progress of other countries against the norm that we have established. If the norm is getting down to lower levels of strategic forces, we have to have information about the other side's strategic forces. You can provide that type of information. It's not difficult to find. So that's something that allows for verification, either through open source information, through intelligence, or through legally-binding arrangements.

Owen Sheaks, US Assistant Secretary of State for Verification and Compliance, interviewed in Washington File, 29 March 2001, www.usinfo.state.gov.

The Secretary-General believes that, in promoting respect for the rule of law in international affairs, there is a need to consolidate and build upon existing disarmament and non-proliferation agreements, specifically to prevent a new arms race and to maintain the non-weaponized status of outer space. In this context, the Secretary-General appeals to all States to engage in negotiations towards legally binding disarmament agreements that are both verifiable and irreversible.

Statement by spokesman for UN Secretary-General Kofi Annan, New York, 1 May 2001.



Artificial intelligence and verification

Recent articles in the popular science journals suggest that verification organisations may benefit in the near future from great advances in the ‘intelligence’ of computers and the Internet. *New Scientist* has described how computers equipped with Inductive Logic Programming can digest large volumes of information and use it to advance new ideas and theories. The computers then look for further implications that arise from the theories, coming up with notions that are different to the initial input. Scientists at the University of Oxford have, for example, used Inductive Logic Programming to analyse data on a range of chemicals known to block ACE, an enzyme associated with high blood pressure. The programme was able to describe the feature common to them all, and suggest other molecules that could inhibit the enzyme and comply with criteria such as low toxicity. A chemical suggested by the computer is being developed as a treatment for high blood pressure. Because the computer language is transparent to humans, they can see how the ideas came about. The technology might have applications for short-staffed international verification agencies tasked with assimilating and assessing large amounts of data regarding implementation of international agreements. It may also be used to develop new verification methodologies.

A separate article in *New Scientist* described software developed to patrol the Internet and to trace gossip to its source. The RumorBot software, developed by Agence Virtuelle in Geneva, Switzerland, trawls through all available search engines and Usenet databases searching for keywords. By analysing the time and location of each posting it can work out where a rumour first occurred. Organisations can use the software to track issues relevant to them, meaning that international verification organisations might be able to trace the source of stories on non-compliance with international agreements.

Meanwhile, *Scientific American* has explored the development of the ‘Semantic Web’, an extension of the Internet in which information from one site is automatically augmented with explanatory information from other sites. Systems are being developed for computers to find the meaning of data by following hyperlinks to definitions of key terms and rules for the logical reasoning behind them. The resulting infrastructure will allow software to tackle complicated questions, for which the answers cover more than a single website. Verification agencies could develop software to scour the Web for data on implementation of an international agreement and to deliver it in a standard format. Another feature of the Semantic Web will be digital signatures: encrypted blocks of

data that computers and software agents can use to verify that the attached information has been provided by a specific trusted source. This would clearly be useful in using digital information to assess treaty compliance.

Others are already using the Web as a verification tool—to detect and track potential biological weapons (BW) attacks. The US Center for Disease Control and Prevention set up a website during the Democratic Party Convention in Los Angeles in August 2000, which allowed hospitals to feed symptom reports to a secure website, and health officials to analyse the data in near real time. Such a system would allow a BW attack to be identified at an early stage, thus contributing to formal and informal verification measures for identifying unusual outbreaks of disease or infection under a future BW protocol. The US army’s Chemical and Biological National Security Program has also developed a Rapid Syndrome Validation Program—a networked software package that allows doctors to report patients’ symptoms, compares that information with other data it has received and identifies any patterns that might indicate an epidemic.

Source ‘Machine head’, *New Scientist*, 24 February 2001, pp. 27–29; ‘Web-based terrorist surveillance eyed’, *The Washington Post*, 26 April 2001; ‘Robot nails online gossips’, *New Scientist*, 3 February 2001, p. 15; Tim Berners-Lee, James Hendler and Pra Lassila, ‘The Semantic Web’, *Scientific American*, May 2001, pp 29–37; Glen Warchol, ‘Mean us up Scotty: ‘Tricorder may fight biological threats’, *The Salt Lake Tribune*, 7 May 2001.

Hand-held rocket

A microrocket so small that it can be launched from a fingertip has been successfully tested in the US. The rocket, developed at the University of California, Berkeley, is just two millimetres across and nine millimetres high and is made entirely of silicon. It can fly up to 50 metres above the ground and is capable of carrying a payload of tiny sensors, each no bigger than a grain of sand. Researchers hope that, in the future, hundreds of these rockets could be launched in order to detect chemical weapons. It is hoped that the sensors would detach from the rocket as they fell to earth and record data that would be relayed to a base station. Presently the rocket carries only enough propellant to fly a couple of seconds, but it is hoped new pyrotechnic materials will burn more slowly, allowing longer flights. The microrocket is a cheap and non-intrusive way of carrying tiny sensors into dangerous places, like war zones, for monitoring peace agreements or compliance with arms control agreements and the laws of war.

Source 'Microrocket will blast off into the heart of a twister', *New Scientist*, 28 April 2001, p. 24.

Spray to detect explosives

Researchers in the US have developed a new test for explosives that is 50 times more sensitive than current techniques. The test uses fluorescent quenching, and it works using the normal chromatography method to separate the explosive compounds from the sample. A fluorescent chemical called pyrene is then added and illuminated with a laser to detect the nitrates. The nitrates interact with the pyrene, stopping them fluorescing, and show up black under the laser light. Existing methods use ultraviolet light on the chromatographic sample, which has the disadvantage of highlighting other organic compounds, like soil, making the test less reliable. The new method can detect concentrations of nitrate between 10 and 100 parts per billion. More research is needed, however, because the pyrene is carcinogenic, restricting the test's use. Researchers are testing a common dye called fluorescein, but this test is giving false positives. Researchers hope to develop spray-on detection for explosives, which would provide a powerful verification tool for use in airports and public buildings.

Source 'Dye hard', *New Scientist*, 21 April 2001, p. 19.

Verification by dim-witted scorpion?

Researchers at Northeastern University in Boston, sponsored by the US Defense Advanced Research Projects Agency, have developed a 50 centimetre dim-witted robotic 'scorpion'. It relies on simple programmed automatic reflexes rather than more complex problem-solving techniques, which researchers argue can lead to system failure. In 2002, the researchers will test the scorpion by seeing if it can travel to a target 40 kilometres away and return across the Mojave Desert. The military believes that the robot's autonomy will prove useful for reconnaissance, particularly in cluttered battlefields. They are planning to fit the scorpion with a camera and the ability to relay data to a ground station. This autonomous capability could also be particularly useful for conducting verification tasks independently of direct human control.

Source 'Walk like a scorpion', *New Scientist*, 21 April 2001, p. 18.

Magnetic sensing to detect and track military vehicles

Quantum Magnetics, a subsidiary of InVision Technologies, has successfully completed the first phase of a US army contract, demonstrating that magnetic sensing can detect and track military vehicles, including lighter vehicles, such as armoured

personnel carriers and trucks, under battlefield conditions. Quantum has shown that it is possible to detect tanks within 50 metres using magnetic field gradiometry. Such technology could be used to verify compliance with conventional force agreements.

Source 'Quantum Magnetics helps US army to detect and track enemy vehicles in battlefield conditions', *Business Wire*, 19 April 2001 (see biz.yahoo.com/bw).

Tracking ships . . .

The International Maritime Bureau has created a new ship tracking system using a transmitter so small (about the size of a shoe box) that not even the crew will know where it is. Such systems contact ships throughout the day and receive an automated signal from each vessel giving position, speed and direction. They will be useful for verifying the location of ships subject to international shipping and fisheries agreements. Current models can be disabled, not only by the crew but also by pirates.

Source 'Repel boarders', *New Scientist*, 12 August 2000, p. 14.

. . . and rhinos

Conservationists Zoe Jewell and Sky Alibhai, in conjunction with the business management company, SAS, have developed software that can accurately identify individual rhinoceroses from scanned photographs of their footprints. The research was driven by concern that the fitting of radio collars to monitor rhinos in Zimbabwe has been partly responsible for a decline in their population. It is hoped that, because this new system is less physically intrusive than collars, it will help to monitor endangered animals without affecting their breeding patterns.

Source 'Stopped in its tracks', *New Scientist*, 24 February 2001, p. 17.

Longest non-stop robotic flight

The US *Global Hawk* unmanned air vehicle (UAV)—the world's first long-range, high-altitude, pilotless surveillance drone—has successfully flown non-stop for 8,600 miles across the Pacific Ocean between Edwards Air Force base in California and the Royal Australian Air Force base at Edinburgh, South Australia. The UAV, which has a wingspan of a 737 jet aircraft, completed the flight in 22 hours and travelled at an altitude of 12.5 miles. *Global Hawk* has thus demonstrated its ability to deploy long distances from the continental US. After planned upgrades it will have sensor systems approaching those of the U-2 spy plane.

Source 'Robotic spy jet crosses the Pacific', *London Metro*, 25 April 2001, p. 11.

VERTIC landmine projects

VERTIC has completed a draft guide to assist states parties with their reporting obligations under Article 7 of the 1997 Landmine Convention. The guide illustrates best practice for completing Article 7 report forms, including recommendations on the type, format and amount of data that should be provided, as well as examples of voluntary information. It should be of use both to officials completing the forms and those assembling the necessary data. The draft guide is available on the VERTIC website at www.vertic.org.

Angela Woodward, assisted by Deborah McGrath and David Lloyd of Landmine Action UK, presented VERTIC's draft to states parties to the Landmine Convention at their inter-essional meeting in Geneva, Switzerland, on 11 May. The draft was well received and is already being used by states parties. A final version will be prepared for presentation to the Third Conference of States Parties in Managua, Nicaragua, in September 2001. VERTIC is grateful to the Belgian government for providing funding for this project and to Landmine Action for its assistance in drafting the guide.

VERTIC has commissioned Laurence Baxter, formerly of the Department of Public Works and Government Services in Ottawa, Canada, and the Center for International and Security Studies, York University, Canada, to draft its contribution to the annual *Landmine Monitor*. VERTIC's submission to *Landmine Monitor 2001* is on national implementation legislation and is being supervised by Angela Woodward.

VERTIC BW briefing

On 2 May, a former BW inspector with UNSCOM, David Kelly, gave an in-house briefing to VERTIC staff on verification of biological weapons in Iraq. David is now Senior Advisor, Proliferation and Arms Control Secretariat, UK Ministry of Defence.

Joint verification conference in 2002

VERTIC is joining Wilton Park and Sandia National Laboratories of Albuquerque, New Mexico, in holding a conference on Verification and Non-Cooperation at Wilton Park from 22–24 February 2002. The conference will look at the difficulties facing verification when states offer little or no co-operation to verification agencies, their officials and their inspectors. Several case studies will be examined, along with possible solutions. For more details contact Heather Ingrey, Wilton Park Conferences, Wiston House, Steyning, West Sussex, BN44

3DZ, UK. Phone +44 (0) 1903 817764, fax. +44 (0) 1903 814217, e-mail heather.ingrey@wiltonpark.org.uk, or visit the Wilton Park website at www.wiltonpark.org.uk.

Staff changes

Thomas Withington has joined VERTIC as Information Officer & Networker. He has a BA (HONS) in History from the University of Leicester and an MA in Third World politics from Coventry University. He previously worked at the Centre for Defence Studies, King's College London, where he was an Administration and Research Assistant. At present, Thomas is finalising the compilation and editing of VERTIC's *Verification Organisations Directory 2001*, planning the launch of a new VERTIC publication series and updating the organisation's contacts list.

Ben Handley has joined the organisation as Assistant Administrator. He formerly worked for Office Angels and Metro Recruitment in London.

VERTIC regrets to announce that Clare Tenner, who has been Environment Researcher for just over two years, will leave the Centre on 1 June to work on the Millennium Seed Bank Project for the Royal Botanic Gardens, Kew. Her contribution to VERTIC's work on the Kyoto Protocol, in extending the organisation's links with the environmental community and in broadening VERTIC's environment agenda to cover other multilateral agreements, has been outstanding. VERTIC wishes Clare well in her new position.

Staff news

TREVOR FINDLAY attended a seminar organised by the United Nations Association and the Foreign and Commonwealth Office (FCO) on the Brahimi report on UN peacekeeping on 28 March. On 3 April he attended a screening of the movie *Thirteen Days* and a subsequent panel discussion at the International Institute for Strategic Studies (IISS). On 9 April he attended a talk at the IISS by the head of the International Independent Commission on Decommissioning in Northern Ireland, General John de Chastelain. On 11 April and 16 May he met with the Director of Wilton Park, Richard Latter, to talk about a joint conference with VERTIC in 2002. On 19 April he met with staff and trustees of the Joseph Rowntree Charitable Trust to discuss future funding. On 2 May he convened with Deborah Ozga of Dynmeridian Corporation, Virginia, US, to discuss verification technology. On 3 May, Trevor, along

with Oliver Meier, met with Peter Jenkins, UK Ambassador-designate to the CTBTO PrepCom in Vienna. Together with Angela Woodward, he met with Deborah McGrath and Richard Lloyd of Landmine Action UK on 3 May to discuss work on the Article 7 Landmine Convention reporting guide being produced by VERTIC. His publications during the period include a review of *Australia's Bid for the Atomic Bomb* by Wayne Reynolds for the May 2001 edition of the *Bulletin of the Atomic Scientists* and a chapter on Verification, Monitoring and Compliance for the UN Educational, Scientific and Cultural Organization's *Encyclopaedia of Life Support Systems*.

JOHN HART attended the NATO Advanced Study Institute's workshop on 'Scientific and technical aspects of the implementation of the BWC Protocol' on 19–29 March in Budapest, Hungary, where he gave a presentation on chemical industry inspections under the CWC. On 30 March, along with Oliver Meier, he participated in a 'Harvard Sussex Programme on CBW Armament and Arms Limitation' seminar at the FCO. On 18 April, he gave a presentation on a US scientific mission's analysis of the German Second World War BW programme at a conference in Almaty, Kazakhstan, on 'preventing health and proliferation problems stemming from the Soviet BW legacy in Central Asia'. John also delivered a paper on the Australia Group at the same conference, which was sponsored by the International Science and Technology Center and the Monterey Institute of International Studies (MIIS)'s Center for Nonproliferation Studies. John has produced a final draft of his research report for VERTIC on chemical industry inspections under the CWC and an initial draft of his on-site inspection research report, also for VERTIC.

OLIVER MEIER spoke on 19 March on 'The Role of Verification' at a seminar on the 'New Nuclear Arms Control Environment' at the Royal United Services Institute (RUSI) in London. On 20 March he met with Clifford Singer of the University of Illinois, Amy Sands of MIIS and Mistry Dinshaw of Stanford University, who had organised the RUSI seminar, to discuss the role of verification in nuclear disarmament. On 21 March, he attended a private discussion meeting with Michèle Flournoy at the NSS on 'Defence Priorities and Options for the New US Administration'. From 23–27 April Oliver attended the first week of the twenty-third session of the Ad Hoc Group of States Parties of to the Biological Weapons Convention in Geneva, Switzerland, as an NGO observer. During that week he jointly chaired a meeting between NGOs and European Union (EU) delegations, which VERTIC had helped to organise. While in Geneva, Oliver also met with several delegations,

as well as with the chairman of the negotiations, and attended several NGO-sponsored seminars. On 2 May, Oliver met with David Kelly of the Ministry of Defence to discuss verification of the BWC. From 8–10 May, he attended the twenty-third Annual Meeting of the European Safeguards Research and Development Association in Bruges, Belgium, where he gave a presentation on 'NGOs and verification: civil society monitoring and international institutions'. On 14 May he was interviewed for BBC television news on transparency in the UK bio-defence programme. Oliver has also begun editing the *Verification Yearbook 2001* and worked on his own chapter for the book.

JOHN RUSSELL continued to work with Jane Boulden on VERTIC's Verification and Compliance Handbook, as well as on his own research on the INF treaty. He produced a press release and VERTIC briefing paper to mark the end of INF inspections on 31 May. On 9 April John attended a public address by Sir Samuel Brittan at the London School of Economics and Political Science on economic arguments used to justify the arms trade and on 26 April he was present at a Pugwash lecture at King's College London by Professor John Garnett on Britain and nuclear disarmament. John attended a training course on co-operative monitoring run by the Cooperative Monitoring Center (CMC) at Sandia National Laboratories in Albuquerque, New Mexico, from 7–11 May.

Verification in cyberspace

www.ctbto.org The Preparatory Commission for the CTBTO has overhauled the site, which now contains extra information on the treaty's verification system, as well as highlighting a September 2001 conference designed to consider ways to bring the treaty into force.

www.iaea.org/worldatom/Programmes/ActionTeam The International Atomic Energy Agency (IAEA)'s Iraq Action Team provides background information on the UN Special Commission (UNSCOM) on Iraq and on its successor, the UN Monitoring, Observation and Verification Commission (UNMOVIC).

www.iraqwatch.org Comprehensively monitors Iraq's progress in building weapons of mass destruction.

www.osce.org/react Recruits experts in various fields to be put on standby to participate in Organisation for Security and Co-operation in Europe (OSCE) missions, including civilian and civilian police monitors.

CLARE TENNER attended an all-day meeting on 20 March organised by the United Nations Environment and Development Forum (UNED Forum) on UK Preparations for Earth Summit 2002. She also wrote an article for the UNED Forum on verification of multilateral environmental agreements, which was published in *Network 2001*, volume 11, no. 1, May 2001 (www.earthsummit2002.org). Clare has also been writing two chapters for VERTIC's *Verification Yearbook 2001*. On 9 April she was present at the Enforcing Environmental Policy Network's Young Researchers Workshop in London and gave a presentation on 'Monitoring and Verification of EU Greenhouse Gas Emissions'. On 17 April Clare attended a meeting organised by Climate Action Network UK to discuss recent developments relating to the Kyoto Protocol, and on 25 April, together with Trevor Findlay, she attended a meeting at the

London-based Royal Institute of International Affairs entitled 'Is Kyoto Dead?'

ANGELA WOODWARD began training Ben Handley in managing the organisation's administration and continued her research on monitoring compliance with the Landmine Convention. Angela participated in the Intersessional Standing Committee meetings of the Landmine Convention in Geneva on 10–11 May. At the meeting on the General Status and Operation of the Convention, she presented VERTIC's draft guide to reporting under Article 7 of the Convention. On 17–19 May she attended the 'Workshop on Small Arms and Light Weapons: Legal Aspects of National and International Regulations' at the Palais des Nations in Geneva.



VERTIC is the Verification Research, Training and Information Centre, an independent, non-profit making, non-governmental organisation. Its mission is to promote effective and efficient verification as a means of ensuring confidence in the implementation of international agreements and intra-national agreements with international involvement. VERTIC aims to achieve its mission through research, training, dissemination of information, and interaction with the relevant political, diplomatic, technical, scientific and non-governmental communities.

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ANNUAL SUBSCRIPTION RATES £20 (individual); £25 (organisation). To subscribe or to obtain a free e-mail copy, complete the coupon located on VERTIC's website.

CURRENT FUNDERS Ford Foundation, John Merck Fund, Joseph Rowntree Charitable Trust, Rockefeller Family Philanthropic Offices, Ploughshares Fund, W. Alton Jones Foundation, the John D. and Catherine T. MacArthur Foundation, Landmine Monitor.

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