

CTBT verification: technical progress versus political stasis

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In 2001–2002 the Comprehensive Nuclear Test Ban Treaty (CTBT) continued to be faced with contradictory developments. The number of states that had signed and ratified the treaty continued to rise. As of 15 October 2002, 166 states had signed, while 96 had ratified it. Many of the new signatories and ratifiers were African or Latin American.¹ At the same time, good progress was made in setting up the CTBT Organisation (CTBTO) and the treaty's verification system. The Preparatory Commission (PrepCom) continued to meet in Vienna and work towards full implementation of the regime. The Provisional Technical Secretariat (PTS) for the future CTBTO continued to grow and the International Monitoring System (IMS) came closer to completion. All the states that had tested nuclear weapons in the past continued to observe test moratoria and there was no evidence that any other state was contemplating nuclear testing in the near future.

Paradoxically, despite these positive developments, the prospects for entry into force of the CTBT did not improve. Instead, the clouds over the test ban treaty darkened further. The only truly significant new member states were Kazakhstan, a former nuclear weapon state and host to a former Soviet nuclear test site, and Libya, which has been suspected of having nuclear ambitions in the past. Worse still, since 23 February 2000, when Ukraine ratified, not one of the remaining 13 countries of the 44 required to ratify before the treaty can enter into force has signed or ratified.² The US, which in August 2001 had announced its partial withdrawal from the PrepCom, distanced itself further from the treaty. Indeed, there remains a danger that the US will repudiate its 1996 signature, sever all connections to the PrepCom and stop all support for the PTS. Such a decision could be made either to signal complete disapproval of the treaty or in the context of a move to

increase American readiness to resume nuclear tests or in the event of an actual resumption.

How the widening gap between practical progress and political support can be bridged remains the unsolved puzzle for diplomats in Vienna, PTS staff and treaty supporters around the world. The second Conference on Facilitating the Entry into Force of the CTBT (foreseen by Article XIV of the treaty in case of slow entry into force), which took place in New York on 11–13 November 2001, provided an opportunity to discuss possible ways forward.³ In his opening statement, UN Secretary-General Kofi Annan urged those who believe that the CTBT had been ‘marginalized by the events of 11 September and their aftermath’ to ‘think again’.⁴

If this was directed at the administration of George W. Bush, it fell on deaf ears. The US was the only signatory state not represented at the meeting. Its boycott of the conference, in which 118 states (including 74 ratifiers, 35 signatories and 9 non-signatories) took part, was only one of a number of actions designed by the Bush administration to distance itself from the treaty.

- On 21 August 2001, during the 15th session of the PrepCom, the US announced that it would continue to participate in and fund only those PrepCom activities ‘directed to establishing and supporting the International Monitoring System’. Specifically, the US announced its complete withdrawal from discussions on the development of arrangements for on-site inspections (OSIs) to be conducted once the treaty enters into force.⁵
- Accordingly, in its budgetary request to Congress the Bush administration sought a reduction of US\$1.8 million in the American contribution to the funding of PrepCom activities in fiscal year (FY) 2003.⁶ This is equivalent to the proportion of the American contribution that the PrepCom would have spent on OSI-related activity.
- The Bush administration also requested US\$15 million as part of the FY 2003 budget to increase readiness at its Nevada nuclear test site. The Defense Department’s Nuclear Posture Review calls for enhancing test site readiness to be able to resume testing within 18 months, compared with 24–36 months previously.⁷
- The US Nuclear Posture Review, released in January 2002, endorsed research into new nuclear weapon capabilities. It particularly recommended increased efforts to assess concepts for low-yield nuclear weapons (‘mini-nukes’) to destroy

underground targets.⁸ Such research might eventually be deemed to require nuclear tests.

- At a closed briefing for members of the US Congress in May, Bush administration officials accused Russia of preparing to conduct a nuclear test. Officials reportedly alleged that the pattern of work at the former Soviet test site on Novaya Zemlya (presumably observed by American satellites) is similar to that observed in preparation for past nuclear tests.⁹

The implications of the American move away from the CTBT overshadowed events marking the fifth anniversary of the PTS on 17 March 2002, which were meant to highlight the progress made towards completion of the verification system. Speakers at these events emphasised the need to keep the US involved in the CTBT PrepCom, while also convincing other states to ratify the treaty.¹⁰

Progress in setting up the CTBT verification system

The International Monitoring System

The IMS, which is intended to monitor compliance with the CTBT, will consist of 321 monitoring stations and 16 radionuclide laboratories located in some 90 countries. Before an IMS station is set up, the PrepCom and the host state must agree on a legal framework for co-operation. By June 2001, 21 states had concluded formal facility agreements. However, some kind of legal arrangement was in place for more than 300 facilities in 72 countries.¹¹

As of 31 July 2002, 30 IMS stations and one radionuclide laboratory were certified. One hundred and thirty-five stations were completed, 66 were under construction

Table I Progress in primary station certification¹

	2000	2001	2002 ²	Total
Primary seismic	5	6	2	13
Infrasound	-	5	-	5
Hydroacoustic	1	1	1	3
Radionuclide	5	-	4	9
Total	11	12	7	30

NOTES 1 As of 31 July 2002 2 Covers the period 1 January–31 July 2002

SOURCE Private communication

and for 32 stations there was a contract pending. For 88 stations, construction had not yet started. Site surveys had been completed for 87 percent of all stations. Progress in certification of stations depends on a number of factors that are difficult to predict, but the PTS hopes to certify an additional 23 by the end of 2002 and approximately 40 more in 2003.

Now that an increasing number of stations are being completed, the PrepCom is putting additional efforts into establishing legal and financial rules for their operation and maintenance. As a first step, Working Group B (WGB), responsible for verification, has made recommendations for provisional operation and maintenance. This includes the development of rules for staff and operators.¹² Following a workshop on the subject, the PTS has established a working group in the IMS Division to discuss issues related to IMS station operation and maintenance.¹³

The International Data Centre and Global Communications Infrastructure

The PTS is also establishing a Global Communications Infrastructure (GCI) to securely transmit all IMS data to the International Data Centre (IDC) in Vienna. The IDC receives, processes and distributes the information to authorised users, such as national authorities in member states. All CTBT member states can receive raw data and/or screened information from IMS stations, as they wish.

IMS stations are being equipped with Very Small Aperture Terminals (VSATs) which relay data to communications satellites. The satellites transmit information to one of three hubs on the ground, from where data are sent to the IDC by terrestrial link. During 2001, 42 additional VSATs were installed and at the end of May 2002 the 100th VSAT started operating in Namibia.¹⁴ As of February 2002, 150 GCI sites had been surveyed.¹⁵ By August 2002, 114 VSATs out of a planned total of 234 had been installed.¹⁶

Four states have concluded agreements on the establishment of independent in-country sub-networks for data transmission to the IDC.¹⁷ Such networks are an alternative to the PTS establishing the communications links itself. Independent sub-networks give states greater control over data released to the IDC because information is first sent to their national data centres and transmitted from there to Vienna. However, such networks are more expensive for the host state and more problematic than transmitting data directly from stations to the IDC. The problems associated with independent sub-networks have been illustrated by the case of

China, which has not yet completed its own network. This has led to allegations that China has 'stopped' data transmission to the IDC.¹⁸

During 2001, approximately 80 IMS seismic, hydroacoustic and infrasound stations transmitted to the IDC near-real-time data, which were used to compile so-called reviewed event bulletins (REBS). (Data were delivered from 16 of the 19 certified waveform stations as well as from a number of other stations that are substantially complete.) REBS are a compilation of events which are screened using automatic filters and human analysts to exclude events that are clearly not nuclear tests. During 2001, on average 61 events per day were listed in REBS.

In contrast to waveform data, information from radionuclide stations has to be analysed before it is transmitted to the IDC. At the end of 2001, nine radionuclide stations had provided 270 sample spectra to the IDC. As of July 2002, 397 users in 55 CTBT member states received IDC data via a secure account.¹⁹

Since the American decision to support only IMS-related elements of the CTBT verification system, the PTS has completely taken over the development of IDC software. In February 2001, a Software Integration Unit was set up to handle ownership, maintenance and development of IDC software. In June 2001, Release 3 of the IDC's application software was validated. This was the first time the provisional IDC in Arlington, Virginia, US (which had provided all previous versions of the IDC software free) was not involved. The PTS will develop Release 4 independently.²⁰

On-site inspections

Working Group B has continued to elaborate procedures for OSIs. After Ambassador Arend Meerburg of the Netherlands was appointed Task Leader for the OSI Operational Manual (OM),²¹ discussions continued on the Initial Draft Rolling Text (IDRT) but made little progress. The IDRT has 13 chapters and 7 annexes, and was distributed to PrepCom delegates on CD-ROM in June 2001. It contains hundreds of brackets indicating areas of disagreement. The complexity of the text has grown with the introduction of different kinds of brackets, indicating at what stage participants disagreed on which sections of the text. Agreement has not even been reached on the 'hierarchy' of the different documents governing the future OSI regime.²²

These discussions are now taking place without the US. Talks on the OM were extremely slow even with the US fully participating and it is not clear what effect the absence of the US has had. However, the current format is unlikely to lead to a

successful conclusion. At the time of writing, the chairman was expected to begin tabling compromise proposals ('Chairman's text') for certain sections of the manual, but expectations were low that this approach will lead to a breakthrough.

The American withdrawal has not only removed an important proponent of a strong and effective on-site regime from the OM discussions, but has also cast doubt on the value of the endeavour. The stringency of OSI provisions has always been an important criterion for US support for verification. It remains unclear whether the US Senate would give advice and consent to an inspection regime that had been developed without US input.

Some states have argued that, given the remote likelihood of early entry into force, the lack of progress may not be such a bad thing because it will allow for a thorough discussion of the issues at stake. Others maintain that at the current speed of discussions a manual will not even be in place by the current IMS completion target date of 2007.

Meanwhile, practical progress is being made on a number of related issues. A second large OSI field experiment took place in Slovakia in September and October 2001. (The first field experiment was in 1999 in Kazakhstan.) The exercise was used to test the Seismic Aftershock Monitoring System (SAMS), which can detect seismic activities indicative of previous underground tests. For its third large OSI field experiment, planned for the second half of 2002, the PTS had intended to keep the location secret so as to simulate the conditions of an actual short-notice inspection, but it later announced that Kazakhstan would again be the location.²³ Several workshops were also held in 2001–2002 to discuss OSI issues. One was held in Beijing, China, from 15–19 October 2001. Another was held from 24–28 June 2002, in Vienna, Austria, in which 35 experts from 17 signatory states (but not the US) participated. By the end of 2001, 180 potential future CTBT inspectors had taken part in introductory courses.

Procurement of OSI equipment is being hampered by the lack of progress in the talks on the OM. As long as the procedures for OSIs are not agreed, it is difficult (sometimes impossible) to define specifications for equipment. Thus, it is mainly equipment for the less intrusive aspects of OSIs (such as visual observation and orientation) that has been procured, while other items, such as drilling and active seismic survey equipment, has not been approved or even considered.²⁴ The PTS

continued to try to procure a 'blinded' high-resolution gamma spectrometer tool for field and laboratory use.²⁵

Other issues facing the Preparatory Commission

Discussions in the PrepCom on most issues proceeded smoothly. The lack of controversy was reflected in the fact that several PrepCom sessions ended early. This led to proposals to reduce the number of PrepComs from three to two annually. Such a move would bring the CTBTO closer to the practice of other international treaty regimes which have only one meeting of states parties each year. Some developing countries were keen to cut the number of meetings to save costs. Others, including some European countries, wanted at least to maintain three WGB meetings, arguing that much work remained to be done on verification.

Funding

PrepCom budgets continued to rise (see table 2). The 2002 budget of US\$85.1 million was 1.9 percent higher than that of the previous year. For 2003, the PTS proposed a budget of US\$86.4 million, a 1.5 percent increase.²⁶ The PTS argued that at least for the next two or three years budgets need to continue to grow, ideally by 10–15 percent annually, to pay for the operation of installed stations and the installation costs of the remaining facilities. Thereafter budgets could be scaled back to approximately US\$84 million annually.²⁷ Meanwhile, the collection rate for assessed state contributions is still good, but not as good as it used to be. By August 2002, 90.9 percent of contributions for financial year 2001

Table 2 Regular budget of the PrepCom, 2002

International Monitoring System	US\$44 million
International Data Centre	US\$13.7 million
Communications	US\$9.6 million
On-site inspections	US\$2.5 million
Evaluation	US\$0.9 million
Polymaking organs	US\$2.8 million
Administration	US\$11.4 million
Total	US\$85.1 million

SOURCE CTBT/PC-16/11/Annex VII, Vienna, 4 December 2001, p. 7

and 81.3 percent of those for 2002 had been paid. This compares to collection rates in 2001 of 97.5 percent for 2000 and 84.1 percent for 2001.²⁸

Prolonged discussions in the PrepCom on the application of the new United Nations scale of assessments formally ended when it was adopted for the 2002 financial year.²⁹ Some developing countries, however, protested. China expressed its 'strong reservations' by disassociating itself from the consensus. China made clear that it intends to continue to support the CTBT by paying its full assessment on time but opposes simply applying the revised UN scale to the CTBTO. Its representative expressed his hope that Chinese 'kindness would be returned on certain occasions and concerning other issues'.³⁰

The PTS has benefited from several voluntary contributions by member states, both in cash and in kind. On 22 November 2001, the Netherlands contributed €15,882 to support participation of experts from developing countries in PTS information programmes to promote the treaty.³¹ Finland organised a training course for experts from developing countries on the operation of national data centres, while France sponsored a training programme for IMS station operators from an African country.³² Austria, Japan and Norway also made extra-budgetary contributions to the work of the PrepCom by supporting training and outreach.³³

Station operation

With a substantial number of IMS stations certified, the PTS and states parties for the first time face the challenge of operating the IMS. Like so many PrepCom issues, this is uncharted territory. No international organisation has ever operated such an elaborate network of monitoring stations. Discussions so far have focused on costs and availability of data. These issues, however, point to the larger question of the status of the IMS before the CTBT has entered into force.

For stations which are part of the primary network, the PTS will pay for operational and maintenance costs.³⁴ Thus, states parties collectively have to foot the bill. As the expenses for operating stations rise, discussions about the purpose of operating a monitoring network to verify a treaty that has not yet entered into force, and may not do so for some years, grow more acute. China reportedly took the lead on this issue in the February session of WGB, with the support of Iran.³⁵ China argued that: 'We should have a realistic view on the prospects of the Treaty's entry into force rather than seeking speed for the sake of speed, so as to avoid imposing

unnecessary financial burdens on member states of the PrepCom or giving rise to unnecessary political or legal problems'.³⁶ This line has been echoed by other developing countries, notably some from Latin America. At the Article XIV conference, Australia, reflecting the views of many Western states, urged treaty supporters 'to ensure that adequate resources are provided to establish the monitoring and verification system, so that we can start reaping its benefits even before the Treaty enters into force'. Australia argued that the IMS can detect (and thus presumably deter) nuclear testing regardless of the legal status of the CTBT.³⁷

Ominously, while China and Iran were raising questions about the operation of IMS stations, neither was transmitting live data to Vienna from stations on its territory. China was reportedly not doing so because it has not completed its domestic data infrastructure. Data from its stations, none of which is certified, were apparently being sent by diskette to Vienna. Iran stopped transmission of IMS data to the IDC on 27 January 2002, citing difficulties with its national implementation legislation. A spokesperson was quoted as saying that 'the Iranian constitution does not allow the government to undertake any commitment for the implementation of treaties prior to the ratification by the parliament', including the obligation to transmit IMS data continuously to the PTS.³⁸

A long-standing and related issue is whether the PTS will be responsible for the operational and maintenance costs for the 120 auxiliary seismic stations. These are operated for scientific purposes unrelated to the CTBT and will only transmit data to the IDC when there is a need to clarify a suspicious event. However, auxiliary stations need to be certified to the same standards as stations in the primary network. Papua New Guinea is the first state to request the PTS to shoulder the operational costs of such a station.³⁹ Other developing countries are expected to make similar requests, but the PrepCom intends to deal with them case by case.

Growth and transparency

The PTS continues to evolve into a fully-fledged international organisation. In July 2002, it had 271 staff from 69 member states.⁴⁰

Three external and independent evaluations of different aspects of PTS operations have taken place over the past two years. In October and November 2000, six experts, led by the former head of the Preparatory Commission for the Organisation for the Prohibition of Chemical Weapons (OPCW), Ian Kenyon, evaluated the

operations of the IDC. In 2001, IMS operations were evaluated by a team led by Dr Michael J. Berry: the report was issued in December 2001.⁴¹ However, it was an external report on 'human resources' by the German consultancy firm Cedar which received most public attention. According to press reports, it sharply criticised the PTS,⁴² claiming that there was a 'high degree of fear and mistrust in the decision-making processes' in the PTS and that the organisation suffered from a 'lack of transparency' and 'inflexibility of rules'.⁴³

The PrepCom debated these reports and the PTS began to implement their recommendations. Reacting to the suggestions in the IDC report, the PTS developed a Medium Term Plan for the IDC. In addition, the IDC and IMS directorates instituted monthly co-ordination meetings, reflecting the recommendation that the IMS and IDC should improve co-ordination.

Creating an open organisation

No solution has been found for the problem of using IMS data for purposes other than test ban monitoring. Some states, including China, argue that the confidentiality provisions of the treaty prohibit the distribution of IMS data to non-states parties. Some Western states and others favour a more open policy, arguing that IMS data have little national security relevance. The US argues for the immediate and complete release of all IMS data.

The treaty itself only obliges the Technical Secretariat to 'make available all data, both raw and processed, and any reporting products, to all States Parties'.⁴⁴ It is unclear whether this excludes the possibility of making information available to others. Unlike other verification regimes, data available to the IMS have not been provided by governments in confidence. Rather, they are scientific data that have been collected and analysed by the organisation itself.

IMS data could be used in various ways. Scientific and humanitarian relief organisations, for example, have expressed an interest in receiving it. Data from the seismic network are of interest to seismologists in improving their ability to predict earthquakes and other natural phenomena. Hydroacoustic stations could give early warning of tsunamis, while infrasound stations could warn of volcanic eruptions.⁴⁵

In order to evaluate the data confidentiality rules, the PTS has been planning a phased release of certain types of data to a limited number of non-state recipients. Thus, humanitarian organisations could promptly receive IMS data for disaster

relief operations, while others would only have delayed access. Another option would be to make IMS data available to everyone, possibly with a built-in delay for certain types of data. The proposed test of a delayed release of certain types of IMS data has not happened because of the continued resistance of at least one state party. However, during its 17th session, the PrepCom approved a request by a British non-governmental organisation (NGO), the International Seismological Centre (ISC), to receive old IMS seismological data. The data are for 2000 and 2001 and will be used in the ISC's catalogue and bulletin. The PrepCom decided that future discussions will 'focus on guidelines for a draft model agreement between the PTS and scientific organizations, before addressing any further requests'.⁴⁶

Options for civil and scientific applications of CTBT verification technologies were discussed by international experts at a two-day workshop in London in May 2002, sponsored jointly by the PTS and the UK Foreign and Commonwealth Office. Experts identified a wide range of potential civil and scientific applications and agreed that the potential usefulness of IMS data merits further study.⁴⁷ A follow-up seminar sponsored by Australia, Japan, the Netherlands and the United Kingdom took place at the PTS in October 2002.⁴⁸

As part of becoming a fully fledged international organisation, the CTBTO PrepCom is establishing itself as part of the network of such bodies. It acceded to the 1986 Vienna Convention on the Law of Treaties and established a formal relationship with the UN by concluding an Agreement to Regulate the Relationship between the United Nations and the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization, which entered into force on 15 June 2000. Finally, it concluded agreements with the United Nations Development Programme (UNDP). In addition to signing such formal agreements, the PTS has also begun real co-operation with the World Meteorological Organization (WMO) which involves sharing data and weather models with it. The CTBTO uses this information to model the dispersal of radionuclides which could be indicative of nuclear tests.⁴⁹

The way forward

Over the past 12 months, the work of the PrepCom has been characterised by conflicting signals. On many issues, the PTS and PrepCom have been conducting

‘business as usual’. Political support for the CTBTO has remained generally high. On some controversial issues, bureaucratic and political inertia has prevailed. At the same time, there have been worrying signs that the regime could ‘unravel from within’, as one diplomat has been quoted as saying.⁵⁰ The deteriorating political climate for the test ban has unfortunately begun to affect the PrepCom’s work. Whether the gap between political support for the CTBT and technical progress will continue to widen and how it could be bridged are likely to remain the dominant questions for CTBT supporters.

Concretely, states will have to decide at what speed the IMS is to be completed. Treaty supporters argue in favour of undiminished efforts towards completion. However, making progress in the setting up the IMS dependent on progress towards entry into force is short-sighted for a number of reasons:

- A (nearly) complete IMS can demonstrate the verification system’s capabilities, convincing treaty sceptics that the CTBT is indeed verifiable.
- If the implementation phase is drawn out there is a risk that support for the treaty will decline as it slips down political agendas.
- Completing the IMS at an early date will minimise the time in which the PrepCom has to cope with the double burden of establishing and operating the IMS.
- IMS data can be better used for scientific and civil purposes if a (nearly) complete IMS is in place.

Progress in Vienna needs to be accompanied and supported by political progress toward entry into force. Several challenges need to be tackled in parallel. It remains important to convince more states to sign and ratify the CTBT. Continued progress towards universality and strong political support from signatory states will demonstrate the treaty’s continued relevance. At the time of writing, discussions on a possible third Article XIV conference in 2003 were continuing. In the past, such events have proved useful for governments and NGOs in rallying support for the treaty.

In addition, the international community should continue to press the US to support the CTBT. Outside the Bush administration, there is broad public and scientific support for the test ban. A study on *Technical Issues Related to the Comprehensive Nuclear Test Ban Treaty* released in July 2002 by the US National Academy

of Sciences is illustrative. The report was written by a 19-member scientific committee which included former nuclear weapon scientists, nuclear weapon laboratory directors and military officers. The group concluded that the US could maintain safe and reliable nuclear weapons without testing and that the CTBT was effectively verifiable.⁵¹ The Bush administration needs to be encouraged to take such voices seriously. More public declarations of support for the CTBT like the joint ministerial statement of 18 foreign ministers on the sixth anniversary of the treaty's opening for signature⁵² are needed. In the medium term, much will depend on the outcome of the American presidential elections in 2004 and whether Washington reconsiders its current hostility to the CTBT.

In the long run, and if no progress is made towards entry into force, CTBT signatory states may want to consider provisional application or provisional entry into force of the treaty. Such options come with both risks and opportunities. While they would allow the verification system to gain full legal status and be fully implemented, they could also lessen the pressure on key states to join the treaty. Ultimately, if the current situation persists for much longer, provisional entry into force would simply constitute legal recognition of a political reality—a treaty that enjoys broad international support and is being verified by a fully-functioning international organisation and global monitoring system, but which is unable to enter into force simply because of the opposition of a few nuclear weapon states that stubbornly want to keep their nuclear testing options open.

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Endnotes

¹ Among the signatories were Botswana, Cameroon, the Central African Republic and Libya, while ratifiers included Burkina Faso, Costa Rica, Ecuador, Georgia, Jamaica, Latvia, Nauru, Niger, San Marino, Paraguay, Uruguay and Kazakhstan. Up-to-date and detailed information about the status of CTBT signatures and ratifications can be found on the website of the CTBTO Preparatory Commission at www.ctbto.org.

² These states, which have the most advanced nuclear industries, are listed in Annex 2 to the treaty.

³ The conference had originally been planned for 25–27 September, 2001 to mark the fifth anniversary of the opening for signature of the CTBT, but was postponed following the terrorist attacks on New York and Washington, DC, on 11 September 2001.

⁴ Kofi Annan, 'Opening remarks to the Conference on Facilitating the Entry into Force of the Comprehensive Nuclear-Test-Ban Treaty (CTBT)', New York, 11 November 2001.

⁵ 'US statement regarding CTBTO PrepCom participation', Vienna, 21 August 2001.

⁶ US\$18.2 million compared to the fiscal year (FY 2002) allocation of US\$20 million. Phillip C. Bleek, 'White House to seek partial funding; plans to drop support for on-site inspections', *Arms Control Today*, September 2001; and 'Bush requests funds for CTBT monitoring', *Arms Control Today*, March 2002, www.armscontrol.org.

⁷ Walter Pincus, 'Report finds shortcomings in Energy Dept. arms testing', *Washington Post*, 3 January 2002, p. A15; and David Ruppe, 'US testing 1: no live testing needed for now, US official testifies', *Global Security Newswire*, 15 February 2002, www.nti.org.

⁸ Excerpts from the Nuclear Posture Review can be viewed on the *Global Security Newswire* website at www.globalsecurity.org/wmd/library/policy/dod/npr.htm. The Bush administration's nuclear weapons policy is analysed in Mark Bromley, David Grahame and Christine Kucia, 'Bunker busters: Washington's drive for new nuclear weapons', BASIC Research Report 2002.2, British American Security Information Council, London and Washington, July 2002.

⁹ Tom Shanker, 'US says Russia is preparing nuclear tests', *New York Times*, 12 May 2002, www.nytimes.com; and Cristina Chuen and Charles Ferguson, 'Renewed US–Russian controversy over nuclear testing', Research Story of the Week, Center for Nonproliferation Studies, Monterey Institute of International Studies, 27 May 2002, www.cns.miis.edu.

¹⁰ VERTIC in co-operation with the PTS organised a public event in Vienna on 18 March 2002 to discuss the challenges facing the treaty. The presentations made at the seminar can be found at www.vertic.org/current/ctbtverseminar/ctbtverisem.html. A report of the event is available at www.ctbto.org/press_centre/featured_articles/vertic_report.pdf.

¹¹ 'New agreements and accessions', www.ctbto.org, 10 June 2002; and CTBT/PC-17/1/Annex III, Vienna, 15 April 2002, p. 27.

¹² CTBTO Preparatory Commission document CTBT/PC-14/1/Annex IV/Appendix V, Vienna, 24–26 April 2001, p. 32.

¹³ CTBTO Preparatory Commission, Provisional Technical Secretariat, *Annual Report 2001*, Vienna, March 2002, p. 6.

¹⁴ 'One hundredth satellite earth station installed in International Monitoring System', 30 May 2002, www.ctbto.org.

¹⁵ CTBTO Preparatory Commission, Provisional Technical Secretariat, 'Background note for the fifth anniversary of the Provisional Technical Secretariat', Vienna, 15 March 2002.

¹⁶ CTBT/PC-18/1/Annex IV, Vienna, 21 August 2002, p. 3.

¹⁷ CTBT/PC-17/1/Annex III, Vienna, 15 April 2002, p. 11.

¹⁸ Carol Giacomo, 'China, Iran said balking at test ban pact cooperation', Reuters, Washington, DC, 8 March 2002.

¹⁹ Provisional Technical Secretariat, *Annual Report 2001*, pp. 12–13; and CTBT/PC-18/1/Annex IV, Vienna, 21 August 2002, p. 2.

²⁰ CTBT/PC-17/1/Annex III, Vienna, 15 April 2002, pp. 9–10.

²¹ Previously known as the OpsMan.

²² There is agreement among states parties that the CTBT and its protocols are ‘untouchable’. It seems likely that the final version of the OM will be presented to the PrepCom and adopted after entry into force by the first Conference of States Parties. The OM (including its protocols) could later be altered and adapted by the Executive Council of the future CTBTO.

It has been suggested that Standard Operating Procedures determining the details of future on-site inspections can be drafted by the (Provisional) Technical Secretariat and will be issued by the future Director-General after consultation with states parties.

²³ ‘Planning underway for 2002 on-site inspection (OSI) field experiment’, February 2002, www.ctbto.org; and CTBT/PC-18/1/Annex IV, Vienna, 21 August 2002, p. 3.

²⁴ CTBTO PrepCom, Provisional Technical Secretariat, *Annual Report 2001*, Vienna, March 2002, p. 25.

²⁵ CTBT/PC-17/1/Annex III, Vienna, 15 April 2002, p. 16.

²⁶ CTBT/PC-18/1/Annex I, Vienna, 21 August 2002, p. 5.

²⁷ IMS coordinator Peter Basham quoted in David Ruppe, ‘CTBT: progress mixed on organization’s five-year anniversary’, *Global Security Newswire*, 19 March 2002, www.nti.org.

²⁸ CTBT/PC-18/1/Annex IV, Vienna, 21 August 2002, p. 4.

²⁹ CTBT/PC-16/1/Annex VIII, Vienna, 29 November 2001, p. 13. This new scale slightly reduces the US contribution to 22 percent of the total budget and redistributes the reduction to other countries. See UN General Assembly Resolution A/RES/55/B-F, 22 January 2001; and Oliver Meier, ‘Entering rough waters? The CTBT verification system’, VERTIC Briefing Paper 01/04, The Verification Research, Training and Information Centre (VERTIC), London, September 2001.

³⁰ ‘Statement of China’, CTBT/PC-16/1/Annex IX, Vienna, 29 November 2001, p. 2. Other countries which disagreed to varying degrees with the decision to adopt the new scale of assessment were Brazil, Chile, Colombia and the Republic of Korea.

³¹ ‘Kingdom of Netherlands cash contribution’, Vienna, 22 November 2001, www.ctbto.org.

³² CTBT/PC-17/1/Annex 3, Vienna, 15 April 2002, p. 26.

³³ CTBT/PC-18/1/Annex IV, Vienna, 21 August 2002, p. 6.

³⁴ The treaty states that the Technical Secretariat shall agree and co-operate to establish, operate, upgrade, finance and maintain monitoring facilities and radionuclide laboratories. Protocol to the CTBT, Part I, para. 4. However, the treaty does not oblige the CTBTO to pick up costs for auxiliary seismic stations. See CTBT, Article IV, paras 19 and 20.

³⁵ CTBT/PC-18/1/Annex I, Vienna, 21 August 2002. Some observers suspect that China may have been motivated by a desire to retaliate for reduced US support for the PTS.

³⁶ ‘Speech by Vice Foreign Minister Wang Guangya at the Opening Ceremony of the Regional Workshop for CTBTO International Cooperation and National Implementation/Ratification Procedures’, Beijing, 6 June 2000, www.fmprc.gov.cn/eng/5196.html.

³⁷ Statement by H.E. Mr John Dauth, Ambassador and Permanent Representative of Australia to the United Nations at the Conference on Facilitation the Entry Into Force of the Comprehensive Nuclear-Test-Ban-Treaty, New York, 11 November 2001.

³⁸ Stephen Fidler, ‘Experts warn on risk if nuclear treaty collapses’, *Financial Times*, 1 August 2002, p. 7.

³⁹ CTBT/PC-15/1/Annex I, Vienna, 21–23 August 2001, p. 8.

⁴⁰ CTBT/PC-18/1/Annex III, Vienna, 21 August 2002, p. 12.

⁴¹ CTBT/PC-17/1/Annex II, Vienna, 15 April 2002, p. 17. The team consisted of six experts from Algeria, Canada, China, France, Iran and the US.

⁴² Carol Giacomo, 'China, Iran said balking at test ban pact cooperation', Reuters, Washington, DC, 8 March 2002.

⁴³ Julian Borger and John Gittings, 'China and Iran threaten test ban treaty', *The Guardian*, 26 March 2002, www.guardian.co.uk.

⁴⁴ CTBT, Article IV, para. 14.e.

⁴⁵ Debora MacKenzie, 'Someone to watch over us,' *New Scientist*, no. 2346, 8 June 2002, pp. 12–13.

⁴⁶ CTBT/PC-17/1/Annex II, Vienna, 15 April 2002, p. 5.

⁴⁷ 'Senior experts' discussion on civil and scientific applications of CTBT verification technologies: London, United Kingdom, 9–10 May 2002', www.ctbto.org.

⁴⁸ 'Seminar on potential civil and scientific applications of CTBT verification technologies', 15 October 2002, www.ctbto.org.

⁴⁹ In return, the CTBTO will provide weather data from its monitoring stations to the WMO. The agreement between the two organisations is expected to come into force in 2003. Provisional Technical Secretariat, Press Centre, 'CTBTO agrees to provide weather data to the World Meteorological Organization', Vienna, 2 April 2002, www.ctbto.org.

⁵⁰ 'CTBT: China and Iran are slow with reports', *Global Security Newswire*, 8 March 2002, www.nti.org.

⁵¹ US National Academy of Sciences, Committee on Technical Issues Related to Ratification of the Comprehensive Nuclear Test Ban Treaty, *Technical Issues Related to the Comprehensive Nuclear Test Ban Treaty*, National Academy of Sciences, Washington, DC, September 2002, available from www.books.nap.edu.

⁵² On 14 September 2002, the foreign ministers of Australia, Canada, Chile, France, Hungary, Japan, Jordan, the Netherlands, New Zealand, Republic of Korea, Nigeria, Peru, the Philippines, Russia, South Africa, Sweden, Turkey and the United Kingdom stated their support for early entry into force of the CTBT and promised to 'make representations as appropriate, individually or together, including at regional and multilateral meetings, in order to make the Treaty a focus of attention at the highest political levels'. 'Joint ministerial statement on the CTBT', New York, 14 September 2002.