CONFERENCE ON FACILITATING THE ENTRY INTO FORCE OF THE COMPREHENSIVE NUCLEAR-TEST-BAN TREATY

CTBT – Art.XIV/2007/3
30 July 2007

ORIGINAL: ENGLISH

Vienna, 17-18 September 2007

BACKGROUND DOCUMENT BY THE PROVISIONAL TECHNICAL SECRETARIAT OF THE PREPARATORY COMMISSION FOR THE COMPREHENSIVE NUCLEAR-TEST-BAN TREATY ORGANIZATION PREPARED FOR THE CONFERENCE ON FACILITATING THE ENTRY INTO FORCE OF THE CTBT (Vienna, 2007)

This document provides an overview of measures taken by the Preparatory Commission and the Provisional Technical Secretariat in accordance with their mandate since the issuance of the background document prepared for the Conference on Facilitating the Entry Into Force of the CTBT held in 2005 (CTBT – Art.XIV/2005/3/Rev.1). The present document should therefore be read in conjunction with CTBT – Art. XIV/2005/3/Rev.1[1].

THE TREATY

1. The Comprehensive Nuclear-Test-Ban Treaty (CTBT) prohibits all nuclear test explosions, whether for a military or any other purpose, as well as nuclear explosions for peaceful purposes. It covers all environments and does not set a threshold from which the prohibitions should apply. The preamble of the Treaty states that its primary objective is "to contribute effectively to the prevention of the proliferation of nuclear weapons in all its aspects" and "to the process of nuclear disarmament".

2. The CTBT is now approaching the status of a universal Treaty, with 177 signatories. It has been ratified by 138 States, including 34 of the 44 States listed in Annex 2 to the Treaty whose ratification is required for entry into force[2].

3. Since September 2005, the CTBT has been signed by one State (Montenegro) and ratified by thirteen States (Andorra, Antigua and Barbuda, Armenia, Bosnia and Herzegovina, Cameroon, Cape Verde, Ethiopia, Haiti, Moldova, Montenegro, Suriname, Viet Nam and Zambia), including one of the Annex 2 States (Viet Nam).

[1] Further detail on activities of the Provisional Technical Secretariat is available in the following documents: Report of the Executive Secretary on Major Programmes 1-7 for 2005 (CTBT/PC-26/INF.2), Report of the Executive Secretary on Verification Related Activities in 2006 (CTBT/WGB-28/INF.2, CTBT/PC-28/INF.1), Report of the Executive Secretary on Non-Verification-Related Activities in 2006 (CTBT/WGA-31/INF.2, CTBT/PC-28/INF.2) and Report of the Executive Secretary for the Period January-April 2007 (CTBT/WGA-31/INF.3, CTBT/PC-28/INF.3).

[2] Annex 2 to the Treaty lists States that formally participated in the 1996 session of the Conference on Disarmament, and that possess nuclear research and nuclear power reactors according to data compiled by the International Atomic Energy Agency.

THE PREPARATORY COMMISSION

4. The Preparatory Commission's purpose is to carry out the necessary preparations for the effective implementation of the CTBT and to prepare for the first session of the Conference of the States Parties to the Treaty. Altogether 122 States are accredited to the Commission and 134 have designated their National Authorities or focal points.

2005 ARTICLE XIV CONFERENCE

5. The fourth Conference on Facilitating the Entry into Force of the CTBT, convened under Article XIV of the Treaty[3], was held on 21-23 September 2005 in New York with 117 ratifying States and States Signatories participating. This conference adopted a Final Declaration calling upon all States which had not done so to sign and/or ratify the Treaty (document CTBT – Art.XIV/2005/6). The declaration includes Measures to Promote the Entry into Force of the CTBT.

6. In the course of the follow-up to the 2005 conference, and in accordance with paragraph 11(c) of the Final Declaration, Austria and Costa Rica were selected in July 2007 "to promote cooperation, through informal consultations with all interested countries, aimed at promoting further signatures and ratifications". In addition, in accordance with paragraph 11(e), Ambassador Jaap Ramaker of the Netherlands continued to act as a Special Representative "to assist the coordinating State in the performance of its function in promoting the entry into force of the Treaty".

VERIFICATION REGIME

7. The CTBT provides for the establishment of a unique global verification regime that consists of an International Monitoring System (IMS), a consultation and clarification process, on-site inspections (OSIs) and confidence building measures. Data from IMS stations are to be sent via a closed and secure global satellite network known as the Global Communications Infrastructure (GCI) to an International Data Centre (IDC) for processing and analysis, and IMS data and IDC products are to be made available to States.

INTERNATIONAL MONITORING SYSTEM

8. The IMS is to consist of a network of 321 monitoring stations and 16 radionuclide laboratories. After entry into force of the CTBT, these facilities will produce data to detect possible nuclear explosions and provide evidence thereof to States Parties for verification of Treaty compliance.

[3] Under Article XIV, if the Treaty has not entered into force three years after the date of the anniversary of its opening for signature, a conference of those States that have already ratified it may be held to decide by consensus what measures consistent with international law may be taken to accelerate the ratification process and to facilitate entry into force. States Signatories will also be invited to attend the conference.

Establishing Monitoring Stations

9. Since 2005, significant progress has been made towards the completion of the IMS network in all four technologies – seismic, hydroacoustic, infrasound and radionuclide. To date, 248 facilities have been installed, an increase of 39. This represents 74% of the total number of facilities envisaged by the Treaty. Of these, 201 stations (63%) as well as 9 radionuclide laboratories (56%) have been officially certified as meeting the specifications of the Commission. This is an increase of 71 stations and 4 laboratories. More than 50% of auxiliary seismic, infrasound and radionuclide facilities have been certified and the network of hydroacoustic stations is virtually complete, with 10 of the 11 envisaged stations now certified.

Post-Certification Phase

10. Once certified, most of the IMS stations are operated by local institutions under contract with the Commission. Currently, 115 such contracts for post-certification activities are in place and more than 30 contracts are under negotiation.

IMS Facility Agreements and Arrangements

11. To date, 36 formal IMS facility agreements or arrangements between the Provisional Technical Secretariat (PTS) and States have been concluded in accordance with models adopted by the Commission (Table 1). Of these, 29 have entered into force. Legal arrangements in the form of facility agreements or arrangements, or interim exchanges of letters, have been concluded to regulate the Commission's activities at 327 of the 337 IMS facilities, hosted by 84 of the 89 host States. These activities include site surveys, installation or upgrading work, certification of facilities and post-certification activities.

Table 1. States with Which IMS Facility Agreements or Arrangements Have Been Concluded

Argentina	Guatemala	New Zealand	Romania
Australia	Iceland	Niger	Russian Federation
Cameroon[a]	Israel[a]	Norway	Senegal
Canada	Italy[a]	Oman[a]	South Africa
Cape Verde[a]	Jordan	Palau	Spain
Cook Islands	Kazakhstan[a]	Panama	Sri Lanka[a]
Czech Republic	Kenya	Paraguay	Ukraine
Finland	Mauritania	Peru	United Kingdom
France	Mongolia	Philippines	Zambia

[a] Agreement or arrangement has not yet entered into force.

INTERNATIONAL DATA CENTRE

12. The mission of the IDC is to support the verification responsibilities of States by providing products and services necessary for effective global monitoring after entry into force of the Treaty. Prior to entry into force, its task is to establish and test the facilities that will handle the data from the IMS stations.

13. The build-up of the IDC continues to proceed according to an initial plan adopted by the Commission in 1997. As of June 2007, 215 IMS facilities (including 9 radionuclide laboratories) were included in the IDC operational system (about 64% of the total). Of these, 191 stations are sending data to the IDC for use in testing and provisional operation of the verification system. In addition, noble gas data from 15 stations are being acquired, stored at the IDC and distributed to States Signatories upon request.

14. A total of 840 users in national institutions such as National Data Centres (NDCs), nominated by 96 States Signatories, currently have access to IMS data and IDC products as well as technical support. This represents an increase over September 2005 of 137 users and 8 States Signatories. During 2006, around 1 584 000 products or data segments were sent to users, compared with around 740 000 in 2005. Moreover, 1960 gigabytes of continuous IMS data were supplied to NDCs in 2006, compared with 630 gigabytes in 2004.

15. Since 2005, essential improvements have been made to IDC processing methods and software for the four verification technologies. For example, new software has been developed for both particulate and noble gas data analysis. This new software, together with new atmospheric transport modelling software, showed its strength during the PTS response to the event in the Democratic People's Republic of Korea in October 2006 (see paragraph 27). In addition, significant consolidation and expansion capabilities have been introduced in the IDC, with the move of critical computer and network infrastructure to a new computer centre. Moreover, the storage capacity within the IDC has been expanded from 8 to 20 terabytes.

GLOBAL COMMUNICATIONS INFRASTRUCTURE

16. The GCI ensures the transport of data from IMS facilities to the IDC as well as access by States to IMS data and IDC products. Once fully operational, the GCI is expected to carry daily some 13 gigabytes of data. Substantial progress has been achieved over the last two years in expanding the connectivity of the GCI, with a further 17 of the 248 planned very small aperture terminals at IMS facilities installed, bringing the total number to 213, or 85.8% of the total.

17. The current GCI is in its ninth year of operation under a ten year contract. A key achievement in 2007 was the successful conclusion of the procurement process for the next GCI. The next GCI makes use of the latest satellite and security technology, ensuring even greater volumes of data as well as greater reliability and security.

SUSTAINING AND MAINTAINING THE IMS

18. As the construction of the IMS advances, the task of provisional operation and maintenance (O&M) and sustainment of the existing facilities assumes greater importance. This is a complex task with significant logistical and technical challenges, involving a global network of stations, many of which are in remote locations.

19. Provisional O&M is still being carried out under relaxed guidelines, as approved by the Commission until the end of 2008. At the same time, particular efforts are being made in the development of the draft IMS and IDC Operational Manuals, which provide requirements for performance following entry into force of the Treaty.

20. A key development was the formal establishment in March 2007 of an Operations Centre within the PTS. State of the art technology is being applied to monitor every step in the movement of data: generation at the IMS station, transmission to the IDC, processing at the IDC and, finally, distribution to States Signatories.

21. The Commission is focusing on the development of procedures and mechanisms associated with IMS sustainment, which involves maintenance and repair activities to protect the initial investment in the IMS. Sustainment involves collaboration with operators and maintenance managers of IMS stations. The PTS is paying greater attention to continuous life cycle management of IMS equipment and systems. The life cycle extends from initial design and installation through in-service life to replacement or recapitalization.

ON-SITE INSPECTIONS

22. As a final verification measure, an OSI is provided for in the Treaty. The purpose of an OSI will be to clarify whether a nuclear weapon test or any other nuclear explosion has been carried out in violation of the Treaty and to gather facts, as far as possible, which might assist in identifying any possible violator. Inspections are likely to consist of field activities with use of visual, seismic, geophysical and radionuclide analysis techniques. The Commission has continued to build up the OSI regime as part of the CTBT verification system in accordance with Treaty requirements. In the past two years, important achievements have been made in this regard.

23. A key priority has been planning and preparation for an Integrated Field Exercise (IFE) in Kazakhstan in 2008. This exercise will constitute a significant step towards achieving OSI operational readiness at the time of entry into force of the Treaty. The preparations are now well advanced. The two OSI directed exercises in 2006 and 2007 provided important lessons that will be incorporated into planning for the IFE.

24. The PTS has also continued to give priority support to the Commission’s elaboration of the draft OSI Operational Manual, which is a key component of the OSI regime. In this regard, an important milestone in 2006-2007 was the finalization by the Commission of an OSI Test Manual for use in the IFE.

25. Another important element of the OSI regime is equipment. In this regard, for example, in 2006 the PTS selected, tested and evaluated noble gas (xenon) equipment in various field activities.

SYSTEM-WIDE PERFORMANCE TEST OF THE VERIFICATION NETWORK

26. In 2004 and 2005, a system-wide performance test (SPT1) was carried out to test the performance of the verification system in an integrated way. Altogether 163 IMS stations and 5 certified radionuclide laboratories (about 50% of the network) were included in SPT1. The test was useful in providing baseline information on the performance of the verification system under current guidelines for provisional operation and in identifying various areas that require further development. The results and the experience gained during SPT1 will be used in technical and budgetary planning and in supporting the future development of the verification system.

NUCLEAR EVENT IN THE DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA

27. The nuclear event in the Democratic People's Republic of Korea in October 2006 represented an important opportunity to demonstrate the provisional capacity of the verification system being built by the Commission. Even under conditions of provisional operation and using data from less than 60% of the IMS stations, the PTS could make available to States Signatories a high quality location of the event within two hours. In addition, the PTS was able to produce a bulletin reviewed by IDC analysts within the time line anticipated for operation after entry into force. Noble gas data made an important contribution to the PTS response to the event. Moreover, PTS experience with this event emphasized the importance of the synergy among Treaty verification technologies, and in particular also the importance of OSIs as a key pillar of the verification regime. After entry into force, OSIs will provide the final measure to obtain clarity about the nature of an event.

TRAINING AND CAPACITY BUILDING ACTIVITIES

28. An important priority of the PTS is to conduct training and capacity building courses and workshops in verification related disciplines. These courses enable trainees from States Signatories to acquire skills to facilitate implementation of the Treaty at the national level as well as to contribute to the enhancement of their country's scientific capacity.

29. The focus of IMS training is to train personnel involved in IMS station operation from different geographical regions. About 700 trainees from around 90 States Signatories have participated in these courses so far. Training courses, including regional courses where feasible, for NDC personnel (analysts, managers and technical staff) are intended to provide information necessary for States Signatories to take greater advantage of the data, products and services available from the IDC. They are also intended to provide training in the use of the software package that the IDC distributes to NDCs. So far, NDCs in over 100 States Signatories have acquired this package.

30. The PTS also conducts training and workshops to address technical matters related to the OSI regime. In addition, since September 2005 one workshop on evaluation as well as two workshops on quality assurance issues have been held.

31. The PTS has initiated a project, financed by voluntary contributions, to provide e-learning opportunities to States Signatories, with the aim of broadening participation in PTS training. E-learning will also increase the capacity of a greater number of States Signatories to take further advantage of the data and products offered by the PTS.

32. In November 2006, the Commission agreed on a pilot project, financed by voluntary contributions, for the participation of technical experts from developing countries in official technical meetings of the Commission. Its aim is to strengthen the universal character of the Commission and capacity building in developing countries. The pilot project has been running since the beginning of 2007.

EVALUATION

33. Evaluation of the establishment and provisional operation of the CTBT verification regime is an integral component of the regime. The PTS evaluation policy is aimed at systematic self-assessment and continuous improvement through external evaluation. An important component of recent evaluation work by the PTS was the external evaluation of the OSI directed exercises in 2006 and 2007.

34. NDC evaluation workshops organized by the PTS represent a fundamental external evaluation mechanism for obtaining feedback from States Signatories, as 'customers' of the PTS, on PTS products and services. The NDC evaluation workshop in 2006 defined a set of tests to be conducted by system users to assist in verifying and validating the provisional operation of the verification system.

35. Quality assurance is also a key element of the evaluation activities of the PTS. Specific milestones in this area in 2006 and 2007 included the approval by the Executive Secretary of the Quality Policy and the Quality Manual.

PROVISIONAL TECHNICAL SECRETARIAT

Staffing and Budgetary Resources

36. As of 30 June 2007, the PTS comprised 254 staff members from 66 countries. The number of staff in the Professional category was 163. The PTS is committed to a policy of equal employment opportunity, aiming in particular at improving the representation of women, especially in the Professional category. As of 30 June 2007, there were 51 women in Professional posts, corresponding to 31.3% of the Professional staff (compared with 25.7% in September 2005).

37. Once an engineering function has been embedded in the IMS Division by the beginning of 2008, the restructuring of the PTS that was recommended by an external review team in 2005 will be fully implemented. At the same time as this period of restructuring, approximately 25% of PTS staff were affected by the Commission's service limitation policy.

38. The approved Budget for the Commission for 2007 amounts to US$48.3 million and €48.6 million. As of 23 July 2007, 51.1% of the dollar component and 48.6% of the euro component of the 2007 assessed contributions had been received. The collection rates reached 72.2% (dollar component) and 75.4% (euro component) as of this date in 2006. While the number of countries that have fully paid their assessed contributions has increased by 24.1%, the volume of outstanding assessed contributions as well as uncertainty about future payments forced the PTS in mid-2007 to introduce a number of austerity measures.

39. From 1997 up to and including the financial year 2007, total budgetary resources approved for the Commission amounted to $742.5 million and €135.5 million. In equivalent US dollars this corresponds to a total of $912.8 million[4]. Of this total, $724.6 million, or over 79.4%, has been dedicated to verification related programmes, including $275.7 million for the Capital Investment Fund for the installation and upgrade of IMS stations. The PTS has made constant efforts to maintain non-verification-related funds at a low level (20.7% of budgetary resources in 2007).

Outreach Activities

40. The outreach activities of the PTS fulfil a number of purposes. These include: to enhance understanding and implementation of the Treaty; to promote signature and ratification of the Treaty, and thereby its universality and entry into force; to assist States Signatories in their national implementation of verification measures and to benefit from the peaceful applications of the verification technologies; and to assist in promoting States Signatories' participation in the work of the Commission. The PTS has recently been undertaking efforts to reshape strategically these outreach activities. The PTS is increasingly focusing on special target audiences, and uses its participation at international seminars, conferences and meetings to raise awareness about the CTBT and the work of the Commission.

41. In its bilateral interactions to assist States in promoting the entry into force and the universality of the Treaty, the PTS has placed emphasis on those States listed in Annex 2 to the Treaty as well as on the 89 States hosting IMS facilities. Within this context, the Executive Secretary has visited seven Annex 2 States since 2005: Brazil, France, Hungary, Japan, the Republic of Korea, the Russian Federation and Ukraine.

42. Eight regional international cooperation workshops have been held since 2005: in Abuja (Nigeria), Guatemala City (Guatemala), Kuala Lumpur (Malaysia), Manila (Philippines), Mexico City (Mexico), Seoul (Republic of Korea), Vienna (Austria) and Wellington (New Zealand). These workshops have stressed the importance of national implementation measures and the signature and ratification of the Treaty.

43. Using voluntary contributions provided by States Signatories, the PTS has organized several pilot projects and information visits to its premises in Vienna for policy and decision makers, scientific experts, and diplomatic representatives of signatory and non-signatory States. It has also assisted in the organization of national seminars in a number of non-ratifying States. Such activities have been financed thus far by Canada, the Czech Republic, Finland, Hungary, Indonesia, Malaysia, the Netherlands, New Zealand,

[4] Calculated using the 2007 budgetary rate of exchange of US$1:€0.796.

Norway and South Africa. Many other States have also provided contributions in kind to enhance States' understanding of the Commission's work, applications of the verification technologies and the benefits accruing from Commission membership.

44. Since 2005, the Commission has strengthened its working relations with all of the organizations with which it has relationship agreements. In addition, the Commission was granted observer status with the Inter-Parliamentary Union in 2007.

45. The PTS continued promoting preparations for national implementation of the CTBT through its programme of legislative assistance to States on the measures to be taken in accordance with Article III of the CTBT. PTS model legislation and commentary have been widely distributed and are available on the Commission web site.

46. The sixty-first session of the United Nations General Assembly included an item on its agenda entitled "Cooperation between the United Nations and the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization" (agenda item 108s). The Executive Secretary addressed the General Assembly under this agenda item in October 2006. He gave a report on the activities of the Commission and on cooperation with the United Nations and its funds, programmes and agencies. He also underlined the importance of international verification regimes in light of heightened concern about the proliferation of weapons of mass destruction.

Multilateral Conferences and Meetings

47. The PTS encourages and participates in multilateral conferences and meetings at the global, regional and subregional levels to support the Treaty.[5] For example, the Executive Secretary addressed the First Committee meeting of the sixtieth session of the United Nations General Assembly, regular sessions of the General Conference of the International Atomic Energy Agency and meetings of the Non-Aligned Movement (NAM). At the regional level, the PTS participated actively in meetings of, for example, the Organization of American States, the Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean and the Pacific Islands Forum.

48. Several multilateral bodies have undertaken initiatives at the global or regional level to back the Treaty. At the global level, a Joint Ministerial Statement in support of the CTBT was launched by a group of countries on 20 September 2006 at the United Nations Headquarters in New York and has been submitted to the Secretary-General of the United Nations to be recorded as a United Nations document. To date, ministers from 72 countries have associated themselves with the statement. Moreover, the Fifteenth Ministerial Conference of NAM in 2006 expressed, in its Final Document, its support for the CTBT.

49. During the first Preparatory Committee meeting for the Treaty on the Non-Proliferation of Nuclear Weapons in April-May 2007, the PTS gave several presentations on the functioning of the CTBT verification regime, in particular after the October 2006 event in the Democratic People's Republic of Korea, and displayed its exhibition on the verification regime.

[5] Further detail about the range of PTS activities in this area can be found in documents CTBT/PC-26/INF.2; CTBT/WGA-31/INF.2, CTBT/PC-28/INF.2; and CTBT/WGA-31/INF.3, CTBT/PC-28/INF.3.

50. To coincide with the tenth anniversary of the adoption and opening for signature of the CTBT in September 1996, the PTS organized a scientific symposium entitled "CTBT: Synergies with Science 1996-2006 and Beyond" in Vienna from 31 August to 1 September. This symposium was attended by several hundred participants, including leading supporters of international efforts towards nuclear non-proliferation and disarmament, renowned scientists and representatives of States Signatories.

Civil and Scientific Benefits of the Treaty

51. The PTS continues to stress the benefits of participation in the Treaty, not only from the security aspect but also in relation to the civil and scientific applications of the verification technologies, in accordance with Treaty provisions. In this regard, the PTS assisted the organization of a fourth senior experts' meeting on civil and scientific applications of CTBT verification technologies, which was held in Budapest in 2006.

52. As an example of the civil and scientific applications of the verification technologies, in November 2006 the Commission agreed on terms under which IMS seismic and hydroacoustic data can be made available to recognized tsunami warning organizations. Four such organizations are currently receiving IMS data. Tsunami warning organizations have confirmed that the use of IMS data, which is more timely and reliable than from other sources, increases their ability to identify potentially tsunamigenic earthquakes and to give more rapid warnings.

Public Web Site

53. The PTS continues to place great importance on the role of the public web site (*www.ctbto.org*) as a key public information tool. The PTS has developed a new concept for the web site and plans for the realization of this project, and is also improving the current web site.

CONCLUSION

54. The information provided in this background document indicates that significant progress has been made since 2005 by the Commission and the PTS in all areas of their respective mandates. This includes with respect to development of the Treaty's verification system, in areas such as establishment and sustainment of the IMS, improvements to IDC processing methods and capabilities, development of a more integrated and effective approach to provisional O&M of the IMS, and further steps towards achieving OSI operational readiness, including preparations for the IFE. An additional significant development since 2005 has been agreement by the Commission on providing IMS data to tsunami warning organizations. Finally, outreach activities have been pursued more strategically with the aim of promoting, among other things, entry into force and greater universality of the Treaty, as well as broader participation by States Signatories in the work of the Commission and enhanced access to IMS data and IDC products.