Facilities of the CTBT International Monitoring System

Annual Report 2007
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Message
from the Executive Secretary

In 2007, the CTBTO Preparatory Commission celebrated its 10th anniversary since it began preparations for the effective implementation of the Comprehensive Nuclear-Test-Ban Treaty (CTBT).

In those 10 years a great deal has been achieved. Concerted efforts by many dedicated people have led to the creation of a global network of monitoring stations, which continues to develop and grow. As a result, a comprehensive verification system spanning the earth and capable of detecting nuclear explosions underground, under water and in the atmosphere is nearing completion.

Political support for the Treaty continues to grow, as evidenced by the ever increasing number of countries that have signed up to its principles. As the Treaty approaches universality, a robust norm against testing has developed and is ready to be enshrined in international law upon entry into force.

For our part, we at the Provisional Technical Secretariat have striven over recent years to constantly develop and improve our own abilities and expertise with a view to enhancing the capabilities of the organization and, in turn, strengthening the international disarmament and non-proliferation effort.

International cooperation, dedicated training and improvements in science and technology have all played a key role. The importance of good governance through evaluation and oversight practices has remained at the forefront of planning and management. The dedicated efforts of States Signatories in guiding our efforts have been instrumental. Today the Preparatory Commission stands as “One Commission”, working together towards a common goal.

I am especially pleased to note the significant progress made by the Commission in 2007 in furthering the objectives of the Treaty. It was, as you will see from this annual report, a busy year for all involved.

Those of you who are already familiar with the work of the Commission will notice a change this year to the style and structure of the annual report. This is in order to make the work of the organization more accessible and the annual reports more user friendly for a broader readership.

For those of you who have only recently discovered the CTBT and the work of the Commission, I hope that you find this report both useful and informative.

Tibor Tóth
Executive Secretary

CTBTO Preparatory Commission

Vienna, March 2008
Treaty

The Comprehensive Nuclear-Test-Ban Treaty (CTBT) is an international treaty outlawing nuclear test explosions in all environments. In providing for a total ban on nuclear testing, the Treaty seeks to constrain the development and qualitative improvement of nuclear weapons and end the development of new types of nuclear weapon. In doing so, it constitutes an effective measure of nuclear disarmament and non-proliferation in all its aspects.

The Treaty was adopted by the United Nations General Assembly and opened for signature in New York on 24 September 1996. On that day, 71 States signed the Treaty. The first State to ratify the Treaty was Fiji on 10 October 1996.

Under the terms and provisions of the Treaty, the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) is to be established in Vienna, Austria. The mandate of this international organization is to achieve the object and purpose of the Treaty, to ensure the implementation of its provisions, including those for international verification of compliance with it, and to provide a forum for cooperation and consultation among States Parties.

Preparatory Commission

In advance of the entry into force of the Treaty and the establishment of the CTBTO proper, a Preparatory Commission for the organization was established by the United Nations on 19 November 1996. The Commission was given the mandate of preparing for entry into force and is located at the Vienna International Centre.

The Commission focuses its activities on two key areas. The first is establishment of a global verification regime to monitor compliance with the comprehensive ban on explosive nuclear testing. Such a regime must be capable of detecting nuclear explosions in all environments – underground, under water and in the atmosphere. The second key area is promotion of Treaty signature and ratification to achieve entry into force. The Treaty will enter into force 180 days after it has been ratified by all 44 States listed in its Annex 2.

The Commission consists of two organs: a plenary body responsible for directing policy and which is composed of all States Signatories; and a Provisional Technical Secretariat (PTS), which assists the Commission in its duties, both technically and substantively, and carries out such functions as the Commission determines. The PTS started work in Vienna on 17 March 1997 and is multinational in composition, with staff recruited from Member States on as wide a geographical basis as possible.
Summary

The Preparatory Commission invested considerable time and resources in promoting signature and ratification of the Treaty throughout 2007. As a result of extensive outreach efforts, four more countries ratified the Treaty, bringing the total number of signatures to 177 and the total number of ratifications to 141, including 34 of the 44 States listed in Annex 2 to the Treaty, whose ratification is required for it to enter into force. In September, a fifth Conference on Facilitating the Entry into Force of the CTBT was held in the Hofburg palace in Vienna. The conference adopted its Final Declaration by consensus – a rare commodity in today’s nuclear disarmament and non-proliferation climate.

The International Monitoring System (IMS) also saw significant progress in the course of the year. Eleven monitoring stations and five noble gas systems were installed or upgraded in 2007. This meant that, by the end of the year, 249 stations and 16 noble gas systems had been established, representing 78% and 40% respectively of the total planned. Thirty monitoring stations and one radionuclide laboratory were certified as fully operational in 2007, bringing the total number of certified stations to 214 (67% of the entire network) and the total number of certified radionuclide laboratories to ten (63% of the total). This included the Wake Island station in the middle of the Pacific Ocean, a certification milestone that leaves only one station in the hydroacoustic network to be completed.

The Provisional Technical Secretariat (PTS) set into motion several sustainment initiatives to define, develop, implement and continuously improve the life cycle support given to the IMS. One example was the creation of a section in the PTS specifically to handle support issues. In 2007, it saw the first full year of operation, strengthening the support and logistical aspects of IMS sustainment.

Work began on the transfer of the global network of communication terminals to a new technology platform – effectively the creation of a new Global Communications Infrastructure (GCI) – with 57 terminals transferred over the 12 month period. The terminals provide communication links between the International Data Centre (IDC) in Vienna and IMS sites around the world, as well as National Data Centres and station operators. Utilizing a commercial satellite constellation of 66 satellites, connectivity with the South Pole station doubled, meaning that this polar region is now under 24 hour coverage.

The new state of the art Operations Centre at the IDC saw its first full year of operations in 2007. Thirty-one IMS stations were introduced into IDC operations, increasing the total number of stations in operations to 219. Analysed data produced by the IDC in the form of bulletin products continued to be enhanced, with the introduction of infrasound data to the Reviewed Event Bulletins. In June, distribution to interested States Signatories of raw data from the first 14 stations to have noble gas systems installed began, and in October, distribution of automatic analysis results began for testing purposes.

By the end of 2007, 97 secure signatory accounts – one for each requesting State Signatory – had been created and a total of 859 users from these States Signatories had been authorized to access
IMS data and IDC products and receive technical support. This is an increase of more than 50 over the number of users in 2006. More than 1000 requests from authorized users regarding technical information were received and resolved during the year.

In December, a focused exercise based on a recorded seismic event in Turkey was successfully conducted by the PTS and the World Meteorological Organization (WMO). The exercise involved a hypothetical radionuclide release in order to test and evaluate atmospheric transport modelling software developed in-house by the PTS. The joint venture served as a prime example of how the harmonization of efforts by the PTS and WMO in this area is serving to benefit both organizations and their members.

Tsunami warning centres continued receiving data from the IDC throughout 2007, with 30 monitoring stations providing data to four such centres in or around the Pacific Ocean and South China Sea. While the purpose of the verification regime is to verify
the CTBT, tsunami warning is just one example of the potential civil and scientific applications for data that the organization produces.

In June, a special exercise was conducted in the Chernobyl Exclusion Zone in Ukraine, as part of ongoing preparations for on-site inspection readiness. This exercise was evaluated and lessons learned were fed into the preparation and design of a larger, more complete field exercise, to take place in Kazakhstan in 2008. Training programmes and equipment testing were also an integral element of progress made on this front during the year.

Capacity building through workshops and training courses continued in 2007. Workshops and courses were conducted for station operators, analysts and inspectors in Austria, Brazil, France, Hungary, Japan, Sweden, Ukraine and the United States of America. These dedicated training activities served to strengthen the technical capabilities and expertise of States Signatories as well as those of the Commission. The procurement of a new e-learning management system towards the end of the year significantly enhanced the potential learning opportunities available to States Signatories and PTS staff as the organization moves forward into 2008 and beyond.

Evaluation and oversight of the organization’s activities continued through the implementation of the Quality Management System. Key performance indicators were identified to measure progress made in those activities related to development of the verification system. A preliminary draft Process Metrics Manual, compiling the key performance indicators corresponding to PTS products and processes, and the methods to compute them, was issued and discussed during a Quality Management Workshop held in Vienna in May.

A pilot project to facilitate participation of experts from developing countries in official technical meetings of the Commission was successfully initiated at the beginning of the year. Voluntary contributions were made by Finland, Indonesia, Malaysia, Morocco, the Netherlands, New Zealand, Norway and South Africa. The project will continue in 2008, enhancing further the capacities of the organization and its technical expertise.

In 2004, a report reviewing the organizational structure of the PTS led to the formulation of a ‘road map’ to guide implementation of a restructuring process. The year 2007 witnessed provisional completion of this process, with the last step due to take place in the first quarter of 2008. This new structure has already delivered benefits for the organization, such as promoting efficiencies and optimizing investments already made. In line with the trend of previous years, the PTS continued and will continue to achieve more with the same level of resources.
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Abbreviations

CIF  Capital Investment Fund
GCI  Global Communications Infrastructure
IDC  International Data Centre
IFE  Integrated Field Exercise
IMS  International Monitoring System
IPU  Inter-Parliamentary Union
KPI  key performance indicator
NDC  National Data Centre
NGO  non-governmental organization
NPT  Treaty on the Non-Proliferation of Nuclear Weapons
OPCW  Organisation for the Prohibition of Chemical Weapons
OSI  on-site inspection
QMS  Quality Management System
PCA  post-certification activity
PMO  Policy Making Organ
PTS  Provisional Technical Secretariat
REB  Reviewed Event Bulletin
SEL  Standard Event List
SLSD  Standard List of Signal Detections
UNEG  United Nations Evaluation Group
VPN  virtual private network
VSAT  very small aperture terminal
WMO  World Meteorological Organization