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PREPARATORY COMMISSION

preparatory commission for the
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treaty organization

Annual Report 2003






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ARTICLE I
of the Treaty

Basic Obligations

1. Each State Party undertakes not to carry out any nuclear weapon test explosion or any other nuclear explosion, and to prohibit and prevent any such nuclear explosion at any place under its jurisdiction or control.

2. Each State Party undertakes, furthermore, to refrain from causing, encouraging, or in any way participating in the carrying out of any nuclear weapon test explosion or any other nuclear explosion.

This report serves as the first of the Executive Secretary's written reports to the Twenty-Second Session of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization. It gives an account as of 31 December 2003 of the activities undertaken by the Provisional Technical Secretariat of the Commission during 2003 in implementation of the seven Major Programmes. In relation to Major Programme 6, important agreements that the Commission reached in 2003 are also referred to.

Foreword
by the Executive Secretary

It gives me great pleasure to present herewith the annual report of the Provisional Technical Secretariat (PTS) of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization for 2003. I am proud that in 2003 the PTS could achieve further substantial progress in all aspects of its work in preparation for the entry into force of the Treaty.

The PTS continued to deploy the International Monitoring System (IMS), a worldwide network consisting of 321 stations (seismic, hydroacoustic, infrasound and radionuclide) and 16 radionuclide laboratories. During 2003, a further 33 stations and 3 radionuclide laboratories were certified as meeting the technical requirements of the Commission, bringing the total number of certified stations to 79 and that of certified radionuclide laboratories to 4. Thus, at the end of 2003, approximately 55% of the IMS network had been installed and met or substantially met specifications. States continued to express their legal commitment to hosting these facilities. At present, appropriate legal arrangements are in place for a total of 306 stations and 15 laboratories in 80 countries.

The International Data Centre (IDC) in Vienna received, analysed, reported on and archived the waveform and radionuclide data from a growing number of IMS stations. On the part of States Signatories, around 60 National Data Centres had been established at the end of 2003 and a total of 527 users from 70 countries had been nominated to access IMS data and IDC products.

Activities in 2003 to support the verification regime as well as to promote the understanding of the Treaty, such as training courses and workshops, were held all over the world with the participation of more than 450 experts. I am grateful to Austria, Azerbaijan, Fiji, France, Italy, Japan, Jordan, Malaysia, the Russian Federation and Uganda for successfully hosting events of the Commission.

In relation to the Treaty, one of the highlights in 2003 was the Conference on Facilitating the Entry into Force of the Comprehensive Nuclear-Test-Ban Treaty (Article XIV conference), which took place in the Austria Center Vienna on 3-5 September. A total of 102 ratifiers and States Signatories as well as 5 non-signatory States attended the conference. More than 20 States were represented at a political level. Strong support for the Treaty as well as for the work of the PTS was expressed in the statements delivered at the conference. The particular relevance

FOREWORD BY THE EXECUTIVE SECRETARY

of the CTBT as a cornerstone of the international nuclear non-proliferation and disarmament architecture was underlined. The final declaration adopted by consensus at the conference contains a series of concrete measures to promote early entry into force of the CTBT as well as an appeal to all States which have not yet done so to sign and ratify the Treaty without condition. A brief overview of the conference as well as of the related PTS activities is presented at the end of this report.

Signatures and ratifications of the CTBT continue to increase in 2004. As of 31 March 2004, the Treaty had 171 signatures and 110 ratifications, including ratifications by 32 of the 44 States listed in Annex 2 to the Treaty, whose ratification is necessary for entry into force. Thus the CTBT is now approaching the status of universality. The PTS, for its part, will continue to advance in its work with the aim of contributing to the peace and security of the international community.

Wolfgang Hoffmann
Executive Secretary

Preparatory Commission
for the Comprehensive
Nuclear-Test-Ban Treaty
Organization

Vienna
April 2004

Directors of the Provisional Technical Secretariat

Mr Gerardo Suárez
International Monitoring System Division

Mr Rashad Kebeasy
International Data Centre Division

Mr Vladimir Kryuchenkov
On-Site Inspection Division

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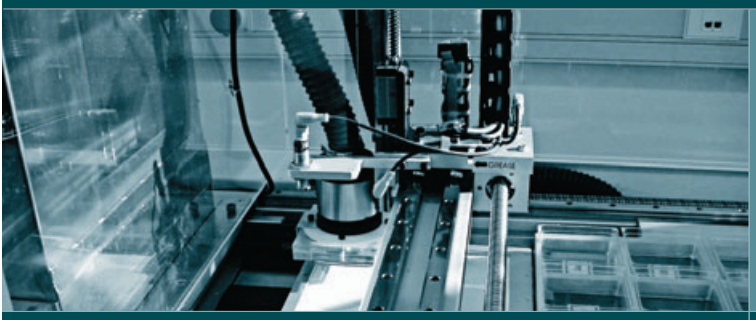

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International Monitoring System

Major Programme 1:
International Monitoring System

During 2003, significant progress towards the completion of the International Monitoring System (IMS) took place. Further build-up occurred in all four technologies (seismic, hydroacoustic, infrasound and radionuclide). Installations were completed at 26 additional stations. A further 33 stations and 3 radionuclide laboratories were certified as meeting the technical requirements of the Preparatory Commission, bringing the total number of certified stations to 79 (25 primary seismic, 11 auxiliary seismic, 4 hydroacoustic, 17 infrasound and 22 radionuclide stations) and the total number of certified radionuclide laboratories to 4. This equates to 34% of the primary IMS stations (primary seismic stations and hydroacoustic, infrasound and radionuclide stations), 9% of the auxiliary seismic stations and 25% of the radionuclide laboratories. Altogether 175 stations are now certified or installed or substantially meet specifications. Thus, at the end of 2003, approximately 55% of the IMS network had been installed and met or substantially met specifications.

Development by the Provisional Technical Secretariat (PTS) of the provisional operation and maintenance (O&M) process and procedures continued in 2003. The PTS-wide effort is being managed by the "Coordination for Provisional IMS Operation and Maintenance" group under the Director of the IMS Division. The group was bolstered in 2003 by the filling of the senior post of O&M Coordinator in August 2003. He is assisted by training, engineering, operations and planning officers. Additionally, various Sections throughout the PTS designated staff to work on the numerous projects associated with this complex task.

IMS ESTABLISHMENT

A summary of the status of the establishment of the IMS in each of the monitoring technologies is presented below. During 2003, 10 site surveys were completed. The site survey programme is nearing completion

Primary seismic station PS9, Yellowknife, Northwest Territories, Canada.

Primary seismic station PS23, Makanchi, Kazakhstan.

and currently only 15 site surveys remain for the entire IMS. The status of the installation programme is set out in Tables 1 and 2.

Seismological Monitoring System

The seismic monitoring network includes both primary and auxiliary stations. The primary stations provide continuous data to the International Data Centre

Table 1. Status of the Primary Seismic and Hydroacoustic, Infrasound and Radionuclide Station Installation Programme as of 31 December 2003

IMS Station Type	Installation Complete		Under Construction	Contract Under Negotiation	Not Started
	Certified	Not Certified			
Primary seismic	25	6	8	7	4
Hydroacoustic	4	1	5	0	1
Infrasound	17	6	14	5	18
Radionuclide	22	7	18	9	24
Total	**68**	**20**	**45**	**21**	**47**

Table 2. Status of the Auxiliary Seismic Station Installation Programme as of 31 December 2003

IMS Station Type	Installation Complete/ Substantially Meets Specifications		Under Construction	Contract Under Negotiation	Not Started
	Certified	Not Certified			
Auxiliary seismic	11	76	12	4	17

Auxiliary seismic station AS73, Jan Mayen, Norway.

Auxiliary seismic station AS43, Parapat, Sumatera, Indonesia.

(IDC), whereas the auxiliary stations provide data segments to the IDC when requested. Significant progress was made in the network in 2003, with 14 more stations certified. This brings the total number of certified primary seismic stations to 25, or 50% of the primary seismic network, while a total of 11 auxiliary seismic stations, equivalent to 9% of the auxiliary seismic network, have now been certified.

In the primary seismic network, 9 stations were certified in 2003, site preparation and installation were completed for 2 stations and site preparation and/or installation was under way for 9 more, either under contract to the PTS or under conditions of reduced assessment.

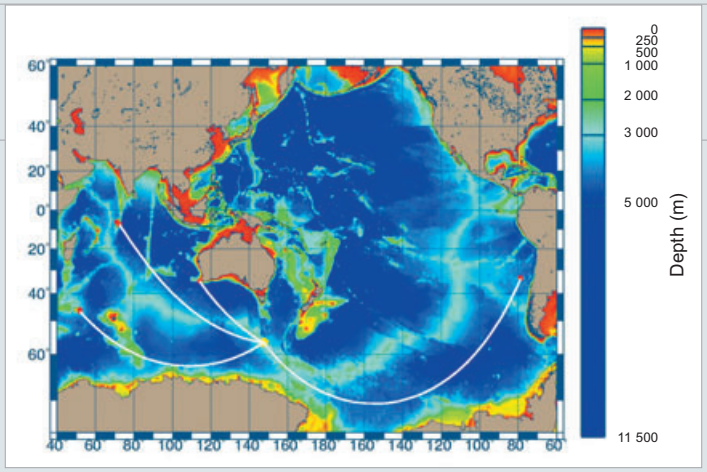
In the auxiliary seismic monitoring programme, site preparation and installation were completed for 7 stations and an additional 11 stations were connected to the IDC. Furthermore, site preparation and/or installation was in progress for 11 stations. Five more stations were certified during 2003.

Hydroacoustic Monitoring System

Further progress was achieved in the establishment and operation of the hydroacoustic monitoring network. An additional hydrophone based station was certified and by the end of the year 36% of the network had been certified.

One part of the hydroacoustic network comprises hydrophone based stations, for which the Treaty specifies a total of six. Two of these stations were installed in 2003, bringing the total installed to four. One of the newly installed stations was also certified, giving a total of three certified hydrophone based stations. All four completed stations are providing data to IDC operations. A contract was awarded for manufacture and installation of a fifth station, for which some preliminary work was done through a national contribution. The final design work for this station was completed and manufacture of equipment reached an advanced stage.

The second part of the hydroacoustic network is based on T phase stations, and the Treaty provides for a total of five such stations. One of these stations was certified prior to 2003 and is working well, providing data



Observation of a single event on all four installed hydrophone based hydroacoustic stations of the IMS. The event was a magnitude 5.1 earthquake occurring in the ocean area to the south of Australia on 11 August 2003.

Deployment of near shore cable at hydroacoustic station HA3, Juan Fernández Island, Chile. The floats holding the cable at the sea surface are later removed, allowing the cable to sink to the sea floor.

to IDC operations. For all four remaining stations, equipment was purchased, site preparations were commenced and installation was under contract.

In May, a CTBT hydroacoustics workshop was held in Hobart, Australia. The workshop covered the whole range of issues regarding the use of hydroacoustics for CTBT monitoring, from station design through to data processing.

Infrasound Monitoring System

Build-up of the infrasound monitoring network accelerated during 2003. Seven more stations were certified, bringing the total number of infrasound stations certified to 17, which equates to 28% of the network. Site preparation and installation were completed for 7 stations. Site preparation and/or installation was under way for an additional 14 stations, including the remote site of IS49 on the island of Tristan da Cunha. Installation of this station was expected to be completed by the end of March 2004.

In October 2003, an infrasound technology workshop was held in La Jolla, California, United States of America. Discussions focused on issues related to the use of instrumentation and analysis in the infrasound technology.

In response to a discussion with the Chairperson of Working Group B (WGB), international infrasound experts and PTS staff assessed the status of the infrasound network and considered ways to improve its capability by reviewing the data collected with the instruments installed to date. This group met in March 2003 in Vienna and initiated investigations. The results and recommendations from these investigations provided valuable guidelines for the design and construction of future infrasound stations.

Radionuclide Monitoring System

Two types of radionuclide station make up the radionuclide network – particulate and noble gas. Particulate stations can be manually operated or automatic. In addition, Annex 1 to the Protocol to the Treaty designates 16 radionuclide laboratories.

In 2003, 11 particulate stations were certified, of which 4 were manual and 7 were automatic, and thus

Shore facility for HA3, Juan Fernández Island. This facility, located on Robinson Crusoe Island, Chile, will also be used for infrasound station IS14.

Preparing the site for infrasound station IS49, Tristan da Cunha, United Kingdom.

28% of the radionuclide particulate network is now certified. Site preparation and installation were completed for 7 particulate stations and, at the end of the year, the construction of 18 additional particulate stations was in progress.

Tests of the manual particulate air sampler for polar conditions were continued during 2003 at the Sonnblick Observatory (elevation 3106 metres), near Salzburg, Austria. Station-specific manuals for automatic stations were drafted and distributed to the operators of certified stations. These manuals contain detailed instructions allowing a smooth interaction between the PTS and station operators and are intended to cover the gap between the high level draft IMS Radionuclide Operational Manual and the equipment documentation.

Phase III of the noble gas experiment continued during 2003 with the evaluation of noble gas systems already installed in Canada, China, Norway and Tahiti. The system initially foreseen for installation in Brazil was relocated to Argentina, where it was expected to be operational in early 2004. Installation commenced in 2003 of the noble gas system in Germany, purchased with 2002 funds, while the two systems purchased from the 2003 Budget will be installed in Dubna, Russian Federation, and Stockholm, Sweden; both systems will become operational during 2004. A noble gas workshop was held in October in Canada that focused on the review of Phase III of the noble gas experiment, meteorological modelling, event characterization and support given by radionuclide laboratories to the experiment.

Three radionuclide laboratories were certified in 2003. The regular laboratory proficiency test exercises were continued; the report on the 2003 exercise was to be completed in early 2004. The results will be used to assess the quality of analytical results of gamma spectrometry for certification purposes and for monitoring laboratory performance during post-certification activities. In August 2003, a laboratory workshop was held in Kranichberg, Austria. Discussions focused on specific metrological aspects of gamma spectrometry (uncertainty of measurement results, nuclear decay data, correction for true coincidence-summing effects and reporting according to the certification requirements).

Wind noise reducing pipe array at infrasound station IS32, Nairobi, Kenya.

Equipment set-up for checking meteorological data during certification visit at infrasound station IS35, Tsumeb, Namibia.

PROVISIONAL OPERATION AND MAINTENANCE OF IMS STATIONS

During 2003, the IMS coordination group made significant strides in the strategic development of the O&M process. The group continued work on developing several major tools to assist it in monitoring and reporting on the network O&M and to support the physical infrastructure. A provisional network management room, with computers, communications and multimedia equipment, was completed to assist in monitoring the operation of the IMS. Work continued on the development of a detailed set of procedures, including configuration management and the prioritization of the global communication links, to ensure efficient and effective delivery of O&M services and coordination within the PTS (see also "Quality Assurance" in Major Programme 5). Major project accomplishments during 2003 are described below.

Joint Reporting System

The joint reporting system is a PTS tool for logging and tracking operational problems in the IMS. It supports operational communications between the PTS and station operators and is based on email, Web pages and an Oracle database. The tool was developed on the basis of the draft IMS Operational Manuals and PTS experience with daily operations and has proved to be very robust. Version 2.0 of the joint reporting system was released in December 2003 and is now the PTS common reporting system for issues related to all IMS network operations. All operating groups within the PTS (IDC and IMS Divisions and Global Communications Section), as well as station operators, will use this system for reporting issues through a dedicated email address.

Database of the Technical Secretariat

The Database of the Technical Secretariat (DOTS) is an integrated database with custom built Web based applications to store and manage information pertinent to the PTS and the future Technical Secretariat. Separate application modules for entering, searching, viewing, reporting and exporting data were completed in 2003. All of these applications share the same database hardware and software infrastructure, technology and standards. DOTS will be used to archive information required for station certification, configuration management, and equipment and service providers. The entry of a station equipment inventory and station contact information into DOTS continued in 2003.

Airflow measurement check at radionuclide station RN74, Ashland, Kansas, USA.

Radionuclide station RN8, Cocos Islands, Australia.

Information contained in DOTS will be available to States Signatories in 2004.

Integrated Logistics Support Study

The Integrated Logistics Support study is designed to provide an assessment of the status of the IMS logistics support effort and to develop a strategy to provide long term logistical support for IMS station operations. The study will also provide recommendations on what information management tools are needed in order to predict more accurately the annual cost of operating the IMS. The logistics overview assessment part of the study was completed in December 2003 and the contractor was in the process of developing the logistics strategy.

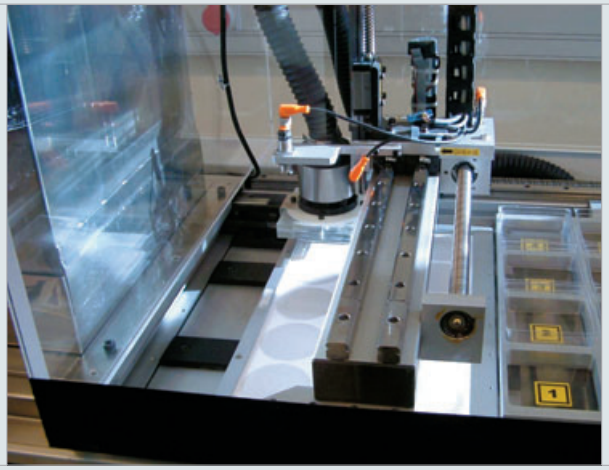
Training of Station Operators

Two technical training programmes (TTPs) were conducted in 2003. The first was from 17 to 27 March 2003, consisting of an introductory part in Vienna and a part for seismic station operators at the Conrad Observatory, Trafelberg, Austria. A second TTP took place from 7 to 17 October. The introductory part was held in Vienna, while specialized parts were held at the Conrad Observatory for seismic station operators and in Seibersdorf, Austria, for radionuclide station operators. In addition to the TTPs, training for infrasound station operators was conducted by an equipment provider in Les Ulis, France, from 12 to 16 May 2003. A total of 63 station operators or managers from 43 States Signatories attended these training sessions.

During 2003, most of the IMS training programmes were hosted by Austrian institutions located near Vienna, thus allowing more active scientific and technical collaboration between the PTS and the staff of these institutions and a reduction in cost of the overall training.

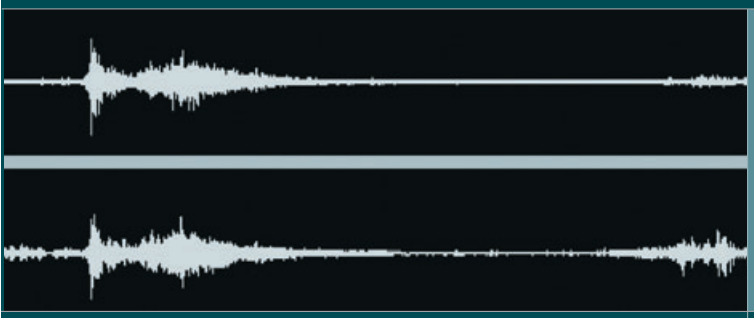
Operations Contracts

Application of the model contract for testing and evaluation and for post-certification activities that was developed in 2002 became more widespread in 2003. The PTS concluded contracts for testing and evaluation and for post-certification activities, based on the model contract, for 46 IMS stations in 2003. The model contract was being used for 63 stations by the end of the year.



Automatic handling of filter samples at radionuclide station RN34, Reykjavik, Iceland.

Receipt and handling of station sample at radionuclide laboratory RL7, the Centre for Radiation and Nuclear Safety, Helsinki, Finland.



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International Data Centre

Major Programme 2:
International Data Centre

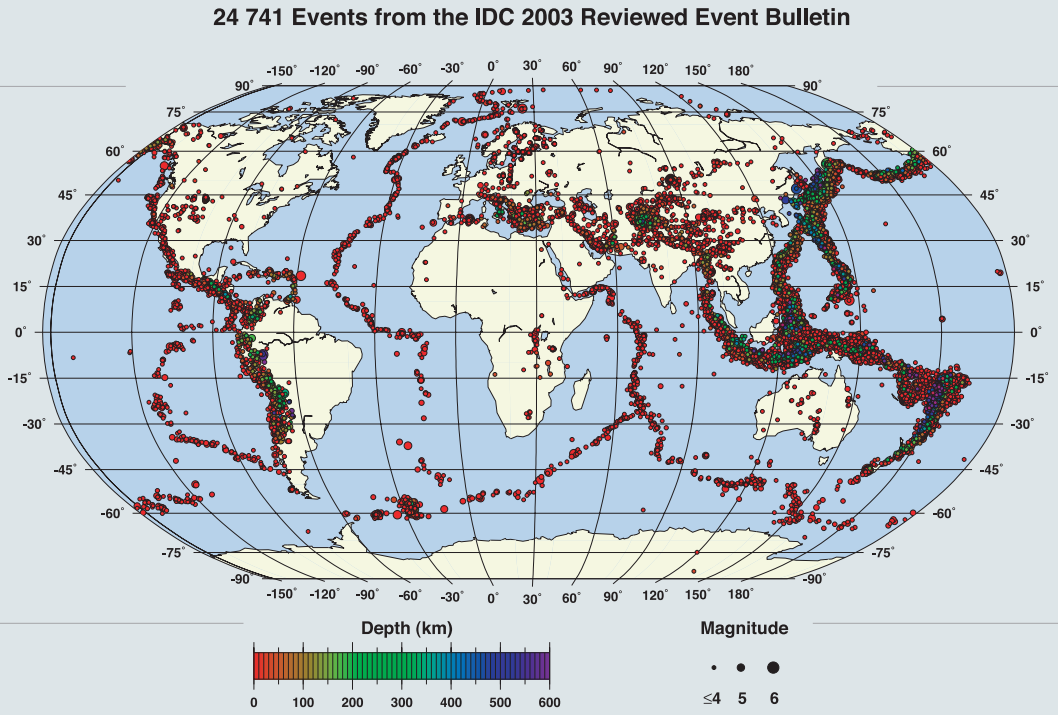
Build-up of the IDC continued in 2003 under Subphase 5a of the seven phase Progressive Commissioning Plan. Upgrade and new development of the IDC applications software took place in various areas. Testing of results from the calibration began, and development of the event screening programme and of noble gas processing software was initiated. During the year, 24 new or upgraded waveform monitoring stations were introduced into IDC operations; data from 74 such stations were processed continuously and contributed to Reviewed Event Bulletins (REBs). Altogether 24 radionuclide stations, including 9 new stations, contributed to the production of the Reviewed Radionuclide Report. The PTS also supported the work of various expert groups related to IDC activities.

MANAGEMENT, COORDINATION AND TRAINING

Technical Coordination

In conjunction with the Commission, a PTS-wide task force developed a draft plan for the first progressive system-wide performance test (SPT1). The plan specifies the goals of the test, requirements, procedures for implementation and methods of evaluation (see also "Synergy of QA and Evaluation" in Major Programme 5). It also contains an initial cost consideration of SPT1. Preparations are being made for the preliminary phase scheduled to take place in May–June 2004.

Various forms of support to States Signatories were provided. Presentations were given that described the Treaty and the work of the PTS, the services available at the IDC and the possibilities for technology trans-



fer. For existing National Data Centres (NDCs), the PTS encouraged interaction through data exchange and participation in SPT1. The establishment of new NDCs was also encouraged.

Information Security

In 2003, the PTS continued the work to embed the information security management process into its practices. Special attention was given to policy issues regarding the use of email by PTS staff and access to the PTS computer infrastructure by internal and remote users. Education of users started, with a focus on the PTS systems and procedures that support data authentication. Digital certificates, needed to authenticate digital signatures, were issued for new stations and stations that were failing authentication.

Training

The IDC training courses for analysts aim at increasing the number and geographical distribution of possible candidates for analyst posts in the IDC. Six participants from six States Signatories completed the eighth course, which was held from 3 March to 31 July.

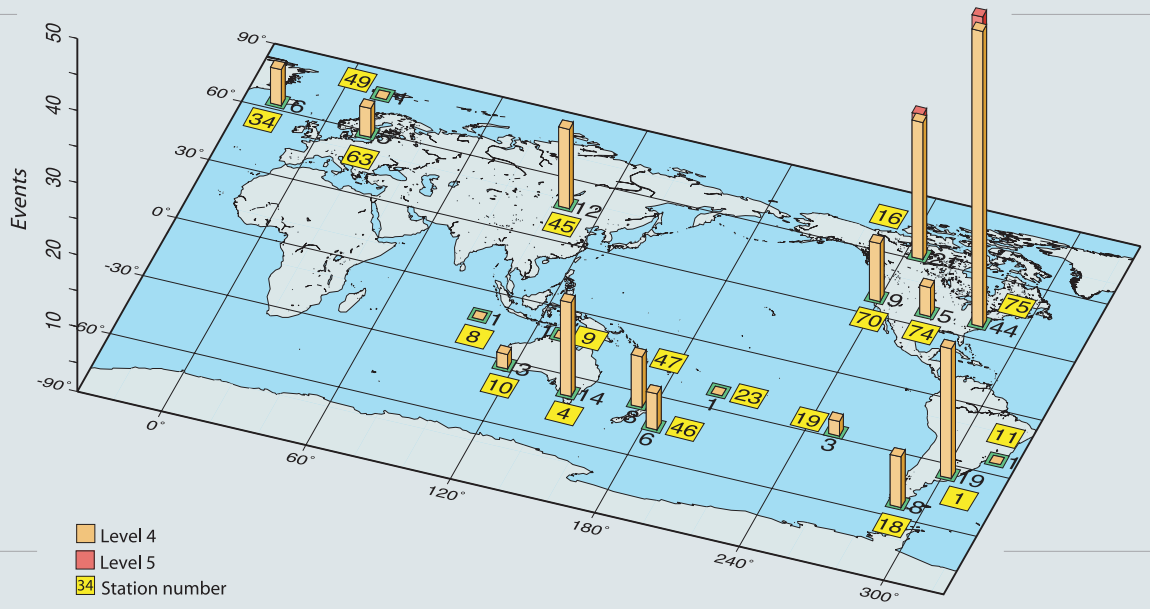
Training courses for NDCs are intended to provide information necessary for States Signatories to take greater advantage of IMS data and the products and services of the IDC. Twenty-one persons from 21 States Signatories participated in the Fourth IDC Training Course for NDC Managers, held from 3 to 7 November. The Fifth IDC Training Course for NDC Technical Staff took place from 17 to 28 November with 10 participants from 10 States Signatories.

Support to National Data Centres

Software was developed to enable NDCs to receive data in CD-1.0 and CD-1.1 formats. This software and associated documentation are now available to States Signatories as part of the 'NDC in a box' software. Also available as part of the NDC in a box are software and documentation for calculating waveform data availability and interactively reviewing waveform data. This software incorporates a number of new features that were suggested by experts from States Signatories.

In February, a document addressing frequently asked questions about NDCs was issued to States Signatories in order to facilitate understanding of the role of NDCs and the support available from the PTS for their establishment.

168 Level 4 and Level 5 Radionuclide Events Recorded During 2003 by 24 IMS Stations in IDC Operations



PROCESSING AND ANALYSIS

Waveform Data

Testing of upgrades to the IDC applications software continued under near-operational conditions with the participation of States Signatories. Standard products, including REBs, were issued for each day. On average 144 and 68 events per day were compiled within the automatic Standard Event List 1 and the REB respectively, compared with 151 and 64 in 2002.

The PTS started addressing the recommendations provided by an expert group established by the Commission to review REB production. As a first action, the PTS reduced the number of steps involved in the interactive review of the data prior to issue of the REB.

Radionuclide Data

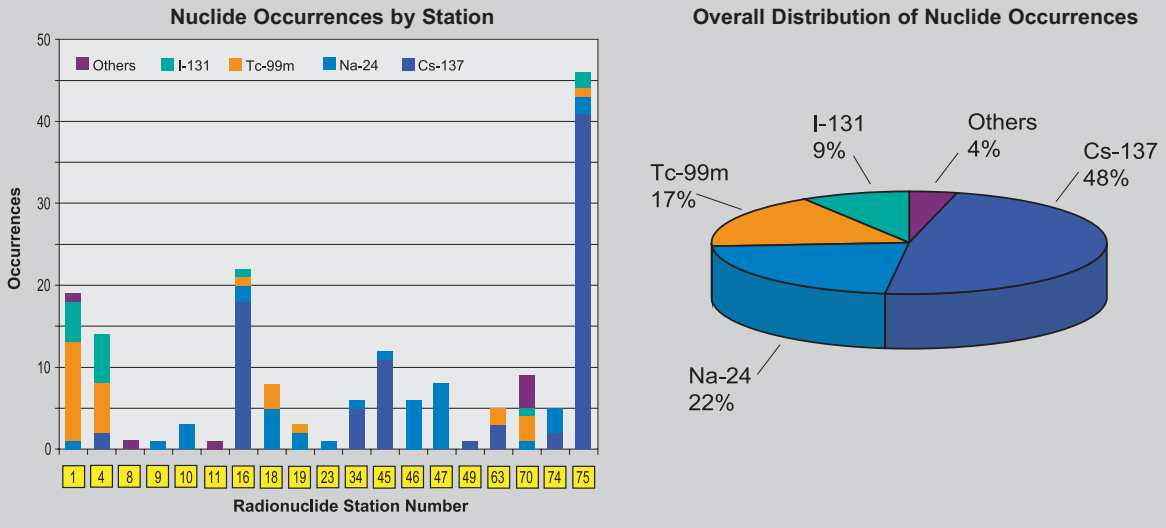
The emphasis in both particulate and noble gas data analyses continued to be on the design, improvement and testing of software, in addition to providing standard products of data processing. The number of radionuclide particulate monitoring stations in IDC operations increased by 9 during 2003, bringing the total to 24 stations. These stations contributed approximately 80 000 gamma spectra during the year, of which 6400 were full-sample spectra subjected to interactive review and categorized according to nuclides detected. The distribution of spectra among the five categorization levels comprised 87.8%, 7.6%, 1.7%, 2.9% and 0.1% at Levels 1 to 5 respectively. The three Level 5 spectra involved detection of caesium-137 in all cases, together with either sodium-24 or iodine-131.

Data for the noble gas experiment (see also "Radionuclide Monitoring System" in Major Programme 1) were collected from four gamma spectroscopic (SPALAX) systems in Canada, Germany and Tahiti, and from two beta–gamma coincidence systems in China (ARSA) and Norway (SAUNA). One of the Canadian gamma spectroscopic systems is installed at a non-IMS station in Ottawa, close to one of the largest radiopharmaceutical producers in the world. At that station, all four relevant xenon isotopes are detected on an almost regular basis, providing an excellent benchmark for the development of screening procedures.

Data Fusion, Review and Services

At the end of 2003, 70 secure signatory accounts (one for each requesting State Signatory) had been established,

Distribution of Radionuclides Detected in Spectra of Levels 1 to 5 in 2003



and a total of 527 users from these States Signatories had been authorized to access IMS data and IDC products and receive technical support from the IDC. About 610 requests from authorized users regarding technical information were received and resolved during 2003.

In February, access to the IDC external database was provided to States Signatories. This allowed users from States Signatories to access all data in the IDC operations and archive databases. This system has proved extremely stable and effective.

The new IDC performance reports, redesigned to be consistent with the requirements of the draft IDC Operational Manual, were made available to States Signatories on a monthly basis from the beginning of 2003.

Quality assurance work involving one of the waveform technologies was carried out using the evaluation tool Bulcmp (see also "Evaluation" in Major Programme 5) to assess the relative accuracy of the REB. The high quality of the REB was demonstrated in two comparative studies that measured its performance against those of the Bulletin of the International Seismological Centre for 2000 and the Preliminary Determination of Epicenters bulletin of the US National Earthquake Information Center for 2001.

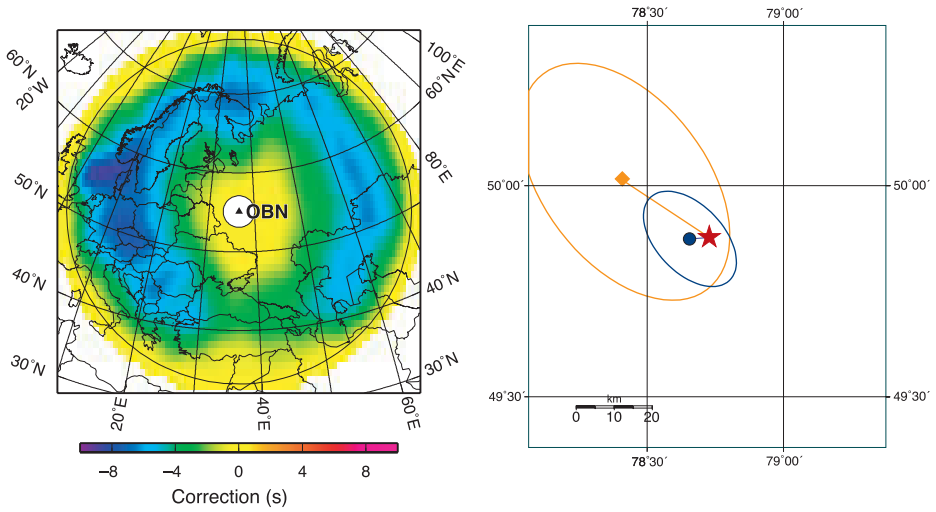
Fusion related work was mainly concerned with analysis of some ten large events that were detected by the IMS infrasound network and were of significance to the synergy of data from the different technologies. This work was carried out to improve automatic event formation and the training of analysts.

A special radionuclide review performed by an expert group established by the Commission focused on the analysis methods for resolving interferences between relevant anthropogenic and natural radionuclides. Xenon isotopic activity ratios were studied for event characterization and timing, and new methods were developed that make use of two different isotopic ratios in one algorithm.

SOFTWARE DEVELOPMENT

Waveform Development

Work on software for processing the seismic data continued in order to improve measurements of waveform parameters. In the area of hydroacoustic data processing, work progressed in response to an expert group recommendation to process automatically triplets of sensors. Travel time tables taking into account season-



Source-specific station corrections (SSSCs) for IMS auxiliary station AS84 at Obninsk, Russian Federation. SSSCs are used to improve the accuracy of travel time calculation and event location.
Right: Relocation of an event with well known coordinates (red star) using a standard Earth model (orange) and after applying SSSCs (blue). The position calculated using SSSCs is closer to the truth and has a smaller error ellipse.

al variations were completed and are now available. The new software for automatic processing of infrasound data was tested and the design of the interactive tool was started. A number of software defects and configuration issues for the automatic waveform data processing software were either fixed or were being addressed. Work was initiated under various contracts for further development of automatic and interactive data processing for the hydroacoustic and infrasound technologies. Some of these contracts were concluded by the end of 2003 and their results are being utilized.

Under the calibration programme, regional corrections for northern Eurasia were tested. Work was initiated for the African region. The event screening programme started in 2003 with work proposals focusing on a number of criteria as recommended by the expert group on event screening.

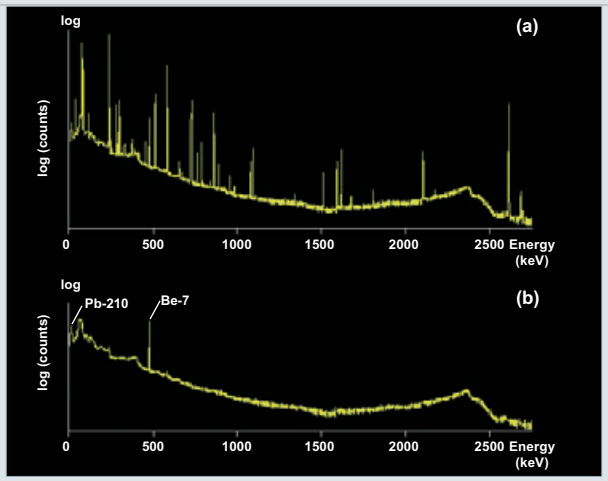
Radionuclide Development

Substantial developments took place during 2003 within all three radionuclide areas.

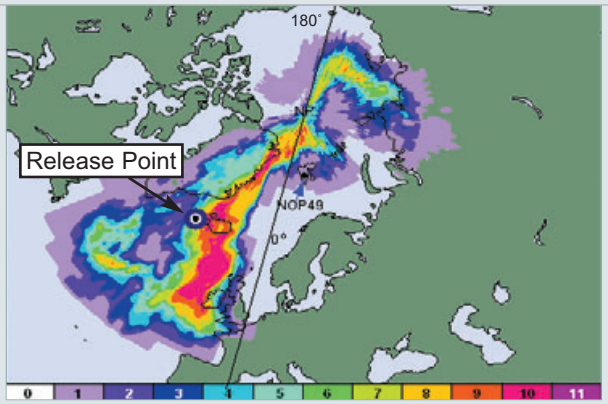
To streamline the analysis of particulate samples, a prototype interactive computer program, the "Lead-Picker", was created that uses detector-specific computer simulations to identify all spectral peaks related to natural lead-212. As there can be over one hundred such peaks in each spectrum, comprising typically 95% of all peaks, this significantly reduces the review time. Work started on adding automatic decision making support to minimize the human impact on whether weak signals should be considered true or false.

Radioactive xenon analysis is a new and developing technology and the current software tools for analysing the raw data are not mature enough. Taking into account views from analysts, developers and station operators, a plan and a design for a new software package were developed. The focus was on methodology, high quality results and a very ergonomic graphical user interface.

The Atmospheric Transport Modelling (ATM) software is used routinely to relate samples (by station and day) to regions of the globe from where particles in surface air (according to the model) have contributed to the samples. In the case of a serious detection of anthropogenic radionuclides, it is planned that parallel analyses will be done by independent meteorological centres to give a measure of the inherent modelling uncertainties and possibly also to alleviate any political concern. In March, the PTS and 10 centres around the world



A radionuclide spectrum from Townsville, Australia (AUP06), (a) as measured and (b) after the Lead-Picker algorithm has, in a quantitative and detector-specific manner, masked out the peaks due to lead-212 and progeny. After 'picking', only the lead-210 and beryllium-7 peaks are clearly seen.



In the March 2003 experiment performed in cooperation with the WMO, the coordinates of a virtual nuclear explosion were randomly selected and the corresponding measurements in the IMS radionuclide station network were simulated. A comparison is presented of the fields of regard (FORs) calculated by the PTS and the 10 meteorological centres for the detection at Spitsbergen (Norway) five days after the 'explosion' south-west of Iceland. The picture refers to the three hour FOR covering the true explosion time and shows for each point on the map how many centres have that point inside their FOR.

demonstrated that standardized ATM products could be delivered within a few hours to the PTS, where automatic preparation and formatting are performed prior to delivery to States Signatories. The experiment was carried out under the CTBTO–WMO cooperation agreement, which entered into force in May (see also "Relations with International Organizations" in Major Programme 7). Another agreement entered into force one month later with the European Centre for Medium-Range Weather Forecasts, which guarantees a secure and continuous source of the high quality meteorological data needed for generating the daily ATM products at the IDC (see also "Relations with International Organizations" in Major Programme 7).

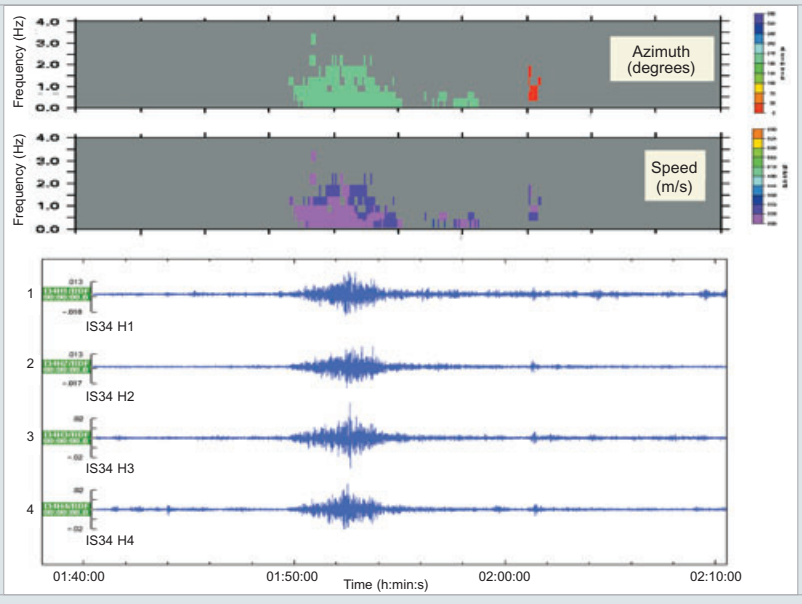
Software Integration

Software integration work continued in the areas of software development, maintenance and configuration management. The framework for sustainable software development was elaborated and is being used in new software development projects. Various groups within the PTS are using parts of the framework.

Several upgrade patches of the IDC applications software were put into operation in the IDC. These upgrades not only addressed deficiencies but also included a number of enhancements. Software to streamline the process of installing new IMS seismic and infrasound stations at the IDC was developed, as well as software to aid waveform analysts in scanning data for missed events. Software was also developed to integrate the PTS Public Key Infrastructure with the IDC applications software. This change allows the use of a phased approach in communicating with IMS stations using authenticated messages. Work continued to improve the interactive software used by the waveform analysts.

Most of the IDC applications software was tested with upgraded versions of the operating system, database software and relevant commercial software in order to prepare for their transfer to the IDC test bed in early 2004. Also, work was done to explore new hardware architecture and operating systems and to investigate their compatibility with the IDC applications software.

The project for transferring historical waveform data from GSETT-3 (Group of Scientific Experts Third Technical Test) from the former prototype IDC was completed. This data archive was expected to be available to States Signatories in early 2004.



An infrasound signal recorded by IMS station IS34 at Songino, Mongolia (plots are shown for the four detector channels H1 to H4), in a period during which a Long March rocket was launched from the Gobi Desert (15 October 2003). The detection attributes, azimuth and speed, are displayed in time–frequency plots calculated by the DFX-PMCC software.

COMPUTER INFRASTRUCTURE

The IDC Division provided various services to support the work and activities of the PTS and States Signatories, as described below.

Applications

Following anticipated advice from the expert group on computer technology refreshment, which was established by WGB in 2003, a beginning was made to introduce new technology to replace the ageing hardware purchased and installed in 1997 and 1998. The first phase of this replacement programme consisted of the purchase and installation of a storage area network that allows storage to remain unaffected by individual server failures. A transfer to the newest operating system and database management system was initiated. It is envisaged to move towards an environment in which open source software plays a more substantial role.

As part of the preparations for the relocation of the computer centre to a more secure, purpose built environment in the Vienna International Centre (VIC), the PTS developed initial design plans.

Office Automation

Technical support continued to be provided to all users in the PTS, maintaining and operating the desktop systems, printers and other peripheral equipment. Further improvements in this area are planned: a detailed planning and design paper for introduction in 2004 of the latest office software was prepared.

Networking, Internet and Security

The various network components were operated, maintained and, where necessary, replaced. In 2003, the firewall that safeguards the PTS from unauthorized access was upgraded. Several penetration attacks were performed by an external contractor and no severe vulnerabilities were detected. The Internet connection that is maintained by the PTS was upgraded to include redundancy, thereby ensuring high availability.

Information System Development

In 2003, a project office was created to facilitate project management. The projects in 2003 included the development of an on-site inspection (OSI) equipment database (see "OSI Equipment" in Major Programme 4) and further refinement of the PTS-wide Intranet. A beginning was made to redesign and overhaul the IDC Products and Services web site. Advice and support were provided on planning and implementing new information systems. The project office will be in full operation in 2004.

3

Communications

Major Programme 3:
Communications

Major Programme 3 has as its main components the transport of data from the IMS facilities, the distribution of IMS data and IDC products to States Signatories, and the transport of the necessary ancillary data using the Global Communications Infrastructure (GCI).

GCI MANAGEMENT

Discussions with the GCI contractor to identify cost savings that would allow additional GCI requirements to be fulfilled without having to increase the ceiling of the contract were completed successfully. These additional requirements include an enhanced network management system (NMS), a new firewall and a virtual private network (VPN) as an alternative to the installation of very small aperture satellite terminals (VSATs). The new NMS will provide enhanced reporting with graphical features, which are overlaid with real time global weather patterns. The firewall will allow improved management of data flow across the GCI.

GCI TOPOLOGY

GCI coverage of the polar regions is not possible using the standard VSAT infrastructure deployed for the GCI. Other satellite and Internet technologies are required to establish communications to these locations. New connections to the polar regions were achieved using customized configurations for each location. The infrasound station IS27 (Georg von Neumayer, Antarctica) was connected using a hybrid of both satellite and VPN technologies. Connectivity was also established in a similar manner to the primary seismic stations PS5 (Mawson) and PS50 (Vanda) and to the auxiliary seismic stations AS35 (SANAE Station) and AS114 (South Pole) in Antarc-

IS52/RN66, Diego Garcia, Chagos Archipelago, United Kingdom.

RN8, Cocos Islands, Australia.

tica. With these five new sites a total of seven sites are now connected in the polar regions.

VPNs functioned in a pilot configuration throughout 2003. The performance characteristics of these connections have been shown to exceed the GCI criteria used to benchmark the performance of VSAT connections. During Part II of the Twenty-First Session of WGB in September 2003, VPN technologies were accepted as a viable solution for continuous data transfer on an exceptional basis. By the end of 2003, 10 VPN circuits were installed and operating as part of the GCI.

GCI IMPLEMENTATION

GCI coverage continued to expand throughout 2003, with 20 VSATs being installed. As of 31 December, 204 GCI site surveys had been completed, and VSATs had been installed at 158 IMS, NDC and development sites. Of the total planned number of 248 VSATs, 63.7% are now installed. In 2003, 42 radio frequency licences, including several which had been outstanding for a long time, were obtained. However, 5 VSATs had to be turned off because they did not have a licence. Of the 248 licences needed, 173 (69.75%) had been obtained in 55 of 90 countries (62.5%) by the end of the year.

The sharing of the GCI with third parties and the forwarding of continuous data from the IDC to the NDCs of States Signatories were implemented. The rules adopted by the Commission for the provisional shared use of the GCI were also fully implemented.

INTERNET COMMUNICATION

The performance of the current Internet links (two links each of 2 megabits per second) was consistent during 2003, with an availability of greater than 99.9%. Since the second (optical fibre) link to the VIC was established in 2002, there has not been a major outage in Internet communication. The two links are now sharing the normal Internet traffic as well as the new VPN traffic for the GCI. The capability to monitor usage and load sharing for each Internet connection was to be added to the NMS in early 2004 to ensure that the quality of service is maintained.

AS65, La Paz, Mexico.

RN3, Bariloche, Argentina.

TECHNOLOGY REFRESHMENT

The current contract for the GCI will expire in 2008. To ensure continuity of GCI services, the PTS worked with a group, established by WGB, of experts of States Signatories to define future GCI performance requirements and technology options. The group held meetings in conjunction with the Twenty-First Session of WGB and as part of the GCI–Evaluation Workshop held in October (see "Workshop" below and "Workshops" in Major Programme 5). Further meetings will take place in 2004 during each of the WGB sessions, and interim observations and findings will be presented to WGB.

WORKSHOP

The second GCI–Evaluation Workshop took place from 20 to 23 October 2003 in Vienna and was attended by 100 participants from 30 States Signatories, United Nations and other international organizations, and the telecommunications industry. Apart from GCI technology refreshment, as mentioned above, discussions focused on the current O&M of the GCI. The ultimate goals are to facilitate optimal use of the GCI in its current form, adapt it to the needs of the station operators and ensure its sound and appropriate development. Participants made presentations on global networks, based on their experience in procuring, operating and maintaining such networks. (See also "Workshops" in Major Programme 5.)

GCI–Evaluation Workshop, Vienna, October 2003.

4

On-Site Inspection

Major Programme 4:
On-Site Inspection

The primary objective of Major Programme 4 is to make the necessary preparations for the establishment of the OSI regime at entry into force of the Treaty. The major elements of OSI are inspectors, equipment and the OSI Operational Manual, together with supporting infrastructures.

BUILD-UP OF THE OSI REGIME

The year 2003 saw a continuous build-up of the programme elements. A database of lessons learned was developed to facilitate the process of elaboration of the draft OSI Operational Manual and the application of the results obtained by field experiments, tabletop exercises, workshops and experimental advanced courses. The first demonstration and selection of equipment for some techniques used in the continuation phase of an OSI were conducted.

An external evaluation of the OSI Major Programme was conducted in May in order to assess progress in the build-up of the OSI regime. The evaluation team of five experts from five States Signatories, chaired by Ambassador Richard Starr of Australia, met in Vienna and produced a report for the Commission. Consideration of the report commenced in both WGB and the PTS and will continue in 2004. The PTS believes the report to provide useful guidance and recommendations for the efficient build-up of the OSI regime, while noting that the implementation of some of the recommendations would have budgetary and other resource implications. The PTS took steps for the early implementation of some of the recommendations. For example, development of a strategic planning process commenced and a coordination group for OSI was established.

Participants of OSI Workshop-9, Hiroshima, Japan.

Atomic Bomb Dome, Hiroshima Peace Memorial Park.

OSI OPERATIONAL MANUAL, OPERATIONAL EXPERIMENTS, INFRASTRUCTURE AND TRAINING

The elaboration of the draft OSI Operational Manual, which is to be presented to the initial session of the Conference of the States Parties, remains a major task of the Commission. Working on the basis of the initial draft rolling text, WGB had covered approximately two thirds of the main body of this document by the end of 2003. It is expected that consideration of all of the main chapters will be finished in 2004. In the interim, States Signatories have continued to explore possible ways of improving the manual drafting process. Issues receiving attention are possible supplementation of the manual with a series of subordinate documents that contain operational, technical and administrative details, entrusting the PTS with more drafting and related tasks and exploration of other options for continuing the elaboration process.

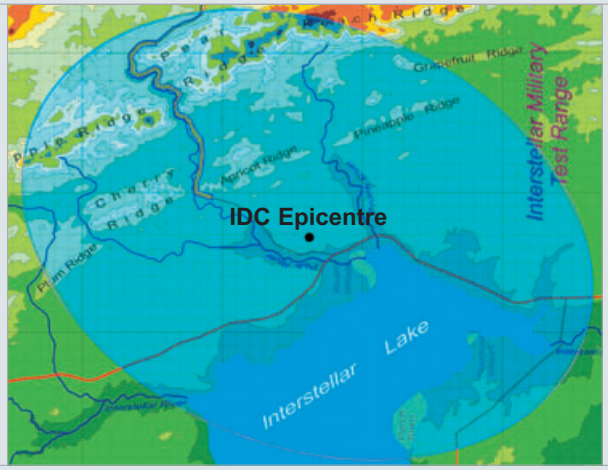
The Commission encouraged States Signatories to continue to contribute to the development of the manual. The PTS increased its efforts to provide relevant input to the elaboration process by preparing material based on results from field experiments, tabletop exercises and workshops. The PTS will continue to give priority support to this process.

At the request of the Task Leader for the draft OSI Operational Manual, the PTS submitted its view and comments on the search logic and other important topics on the basis of the results of field experiments, tabletop exercises and workshops. The PTS also presented important lessons learned from field experiments to improve procedures at the point of entry and base camp.

OSI Workshop-9, hosted by Japan from 30 June to 4 July 2003 at facilities provided by the City of Hiroshima, was conducted in order to contribute to the elaboration of the draft manual. The topics addressed at the workshop covered confidentiality issues, the results and lessons from field experiments and equipment testing. There were 50 participants from 14 States Signatories and the PTS.

Following the large scale field experiment in Kazakhstan (FE02) in 2002, the PTS made a comprehensive evaluation of the results. The more than 370 lessons formulated by the participants in FE02 were subsequently refined to approximately 140. More than 300 implementable actions were in turn derived. The majority of the actions are expected to be implement-

Third OSI tabletop exercise: the inspection team (IT, on the left) conducts negotiations for access to the inspection area with representatives of the inspected State Party (ISP), while the control team (CT) and the evaluators (at the far end) watch.



Third OSI tabletop exercise: map submitted by the requesting State Party with the request to conduct an on-site inspection on the territory of a (fictitious) State. The map depicts the virtual triggering event and the surrounding location error ellipse calculated by the IDC.

ed by the PTS, mainly within the OSI Division. Several of the actions would have implications for the financial, procurement or other administrative practices of the PTS. A few actions pertain to decision making by an inspection team leader or by the Director-General of the future Technical Secretariat, while others would require decisions by the Commission.

A special purpose database was designed by the PTS for monitoring and managing the implementation of these actions. States Signatories will be able to monitor the rate of progress in implementation through Internet access to the database.

One of the major results of FE02 was the recognition that field analysis of very small seismic events that follow a small underground explosion imposes requirements on the seismic equipment, processing computers and analytical software, and even on the seismologists who interpret the data, that are different from the requirements in the case of natural seismic events. As a result, in 2003 the PTS began to plan a directed exercise primarily to examine alternative seismic software for OSI purposes, but with attention also given to issues of communications, field navigation and seismic array geometry.

Although FE02 was conducted with no health or safety incidents, it reinforced the importance of a robust health and safety programme for OSI. To this end, the PTS began to develop a list of appropriate health and safety standards for inspectors and for the conduct of an OSI. The PTS plans to establish a small panel of health and safety experts in 2004 to propose and elaborate quantitative thresholds, where possible.

The main goal of OSI training activities continued to be the development of a programme of training and exercises for future inspectors and inspection assistants and testing of its elements by means of experimental courses and tabletop exercises. These activities were planned and conducted according to the Long Range Plan for the training and exercise programme, whose principles and objectives were discussed and agreed by the Policy Making Organs.

In order to examine the issues involved when an inspected State Party might employ managed access provisions, the PTS designed a tabletop exercise (TTE-3), which was conducted in close cooperation with the host institution, the Russian Federal Nuclear Center, Snezhinsk, from 29 September to 4 October. The main objectives of TTE-3 were to highlight possible managed access situations and methods of operation during

Fourth OSI Experimental Advanced Course, Paris: the visual inspection and survey sub-team calculating its position on the map during a navigation exercise.

Fourth OSI Experimental Advanced Course, Paris: demonstration of a multispectral instrument for the study of the environment.

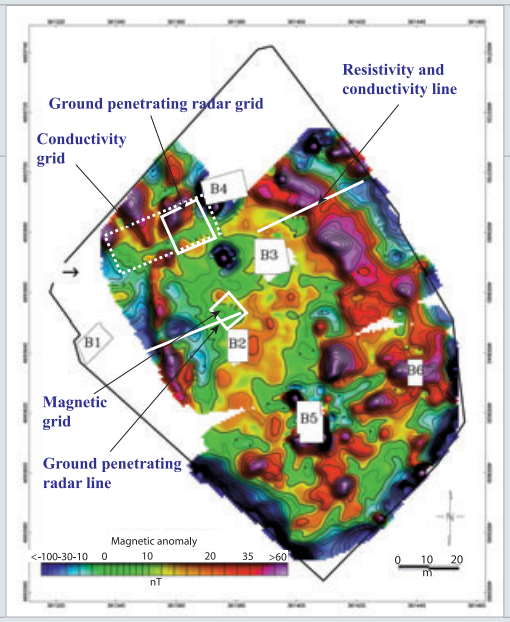
these situations. Technical and negotiation skills were tested in the resolution of various case studies. Eighteen experts from 11 States Signatories and the PTS participated in the event. Some States Signatories also sent observers and the PTS engaged two experts to observe and evaluate the exercise. The case studies and discussions yielded many lessons for the use of tabletop exercises in the training and exercise programme.

The fourth OSI Experimental Advanced Course (EAC4) was held from 22 to 30 October 2003 in Paris in cooperation with the host institution, the French Training Centre for the Prohibition of Chemical Weapons (CEFFIAC). EAC4 was dedicated to developing the curriculum of an advanced course for the future inspectors in the visual observation and survey sub-team. Twenty-seven experts from 15 States Signatories participated as trainees or lecturers. The course concentrated on signatures of nuclear explosions, multispectral imagery, map reading, visual observation, overflight and overflight planning, and included navigation field exercises and demonstration of equipment. Lessons learned from FE02 were included in the curriculum. It is expected that the recommendations of the participants will contribute to improvement of the curriculum of the future advanced course.

The seventh OSI Introductory Course took place in Vienna from 31 March to 4 April 2003 with 28 participants from 22 States Signatories and the PTS, consisting of experts in OSI technologies and representatives of National Authorities. The main topics covered were the phenomenology of nuclear explosions and the OSI process, including key elements such as managed access. By the end of 2003, 246 trainees had participated in introductory courses, contributing to a cadre of potential candidates for advanced training activities, field experiments and OSI equipment testing.

OSI EQUIPMENT

A list of equipment for use during OSIs must be considered and approved at the initial session of the Conference of the States Parties. The current status of the Commission's work on a list of equipment, including the status of approval of initial specifications, is summarized in Table 3. The Commission's mandate also requires it to acquire or otherwise make provisions for the availability of relevant inspection equipment, including communication equipment, and conduct technical tests of such equipment as necessary. The types of equipment currently in the custody of the PTS are indicated in the table. In 2003, efforts contin-



OSI equipment demonstration, Italy: map of total magnetic field at the test site in L'Aquila, showing the location of the survey area for each type of instrument demonstrated (B1 to B6: positions of buildings).

OSI equipment demonstration, Italy: magnetometers.

Table 3. Current Status of List of OSI Equipment and Technical Specifications Approved by the Commission for Testing and Training Purposes

Activities and Techniques Specified in Part II of the Protocol to the Treaty	Equipment Approved (or to be Further Considered) by the Commission	Equipment Obtained by the PTS[a]	
		In PTS custody	In State Signatory custody
Position finding (para. 69(a))			
• From the air	Analogue altimeter	✓	
• At the surface	Satellite based positioning system	✓	
	Handheld range finding equipment	✓	
	Pocket transit compass	✓	
	Analogue altimeter	✓	
Visual observation (para. 69(b))	Field glasses/binoculars	✓	
	Binocular microscope	✓	
	Magnifying glass	✓	
Video and still photography (para. 69(b))	Handheld 35 mm camera	✓	
	Handheld instant camera	✓	
	Media for camera	✓	
	Processor for photographic film	✓	
	Handheld video camera (analogue)	✓	
	Video cassette recorder	✓	
Multispectral imaging (including infrared measurements) (para. 69(b))	Not yet approved		
Measurement of levels of radioactivity – gamma radiation monitoring and energy resolution analysis (from the air and at or under the surface) (para. 69(c))	Handheld search and limited gamma identification tools	✓	
	Vehicle-portable search and limited gamma identification tool		
Current list of radionuclides of OSI interest: ^{37}Ar, ^{95}Zr, ^{95}Nb, ^{99}Mo, ^{103}Ru, ^{115m}Cd, ^{131}I, ^{132}I, ^{132}Te, ^{131m}Xe, ^{133m}Xe, ^{133g}Xe, ^{135}Xe, ^{140}Ba, ^{140}La, ^{141}Ce, ^{144}Ce, ^{144}Pr, ^{147}Nd, ^{99}Tc, ^{106}Rh	High resolution gamma spectrometer tool for field and laboratory use – 'blinded' or measurement restricted	Project ongoing	
	Equipment for xenon sampling, separation and measurement	Project ongoing	
	Argon-37 equipment for sampling, separation and measurement – not yet considered	Project ongoing	
	Aerial gamma spectroscopy equipment		
Environmental sampling and analysis of solids, liquids and gases (para. 69(d))	To be elaborated		
Passive seismological monitoring for aftershocks (para. 69(e))	Passive seismic equipment	✓	
Resonance seismometry and active seismic surveys (para. 69(f))	Resonance seismometry equipment – not yet approved		
	Active seismometry equipment – not yet approved		
Magnetic and gravitational field mapping, ground penetrating radar, electrical conductivity measurements at the surface and from the air (para. 69(g))	Magnetic field mapping equipment	Project ongoing	
	Gravitational field mapping equipment	Project ongoing	
	Ground penetrating radar	Project ongoing	
	Electrical conductivity measurement equipment	Project ongoing	
Drilling (para. 69(h))	Not yet considered		
Communication equipment (para. 62)	Not yet considered		

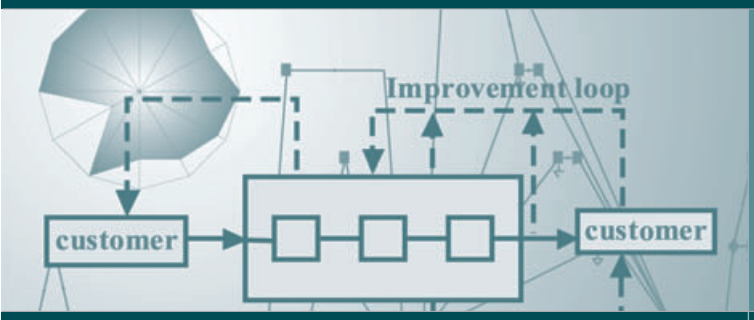
[a] Equipment 'obtained by the PTS' is categorized in accordance with paragraphs 39 and 40 of Part II of the Protocol and is obtained by the PTS through special procurement procedures in accordance with the decision of the Commission at its Eighth Session (CTBT/PC-8/1/Annex II).

ued towards the acquisition and technical testing of core OSI equipment in additional categories. This work focused on equipment for measuring levels of radioactivity and equipment used in geophysical methods during the continuation phase of an OSI. No additional items were able to be obtained or added to the PTS custody or inventory in 2003, but nonetheless significant advances were made towards achieving the Commission's objectives.

A demonstration of continuation phase technologies was held in May 2003 in Italy, hosted by the Istituto Nazionale di Geofisica e Vulcanologia, Rome. Nine manufacturers demonstrated 12 different sets of equipment in three geophysical technologies. The suppliers of the data collection, analysis and visualization software package used by the PTS supported the event by processing, displaying and comparing data gathered during the demonstration. As a result of the demonstration and consideration of the results at the OSI workshop in Hiroshima, the PTS selected two types of magnetometer and two types of ground penetrating radar that fulfil the Commission's requirements, for use in further testing and in training activities during 2004. The display of equipment for shallow electrical conductivity measurement generated discussion among technical experts and the exact technical specifications needed will be considered further.

Steady progress was made towards obtaining, for testing and training purposes, measurement tools for the radioactive noble gases xenon and argon, which are on the list of radionuclides of interest for an OSI. The PTS initiated two separate projects for xenon and argon. Following discussions between the PTS and the technical institution of the State Signatory that has developed an argon-37 measurement system, a programme for possible demonstration during 2004 was developed. For xenon measurement, proposals were received from several national institutions. Consideration of the proposals, and of the programmatic implications, as requested by the Commission, commenced. The PTS also continued to keep abreast of current developments in the commercial radionuclide measurement equipment market for unique radionuclide survey and analysis tools. A survey showed that the commercial market continues to advance towards being able to supply equipment in configurations as originally envisaged by the Commission. For example, a version of the high resolution instrument that is portable and has removable memory media or PC cards is now commercially available. Thus the PTS anticipates further progress in the coming years in satisfying the Commission's requirements cost effectively in this area.

A multifunctional prototype database for equipment item inventory control and reporting was developed by staff of the PTS. Relevant information is being entered. When completed the database will be used to help monitor the status and location of all equipment items and to generate reports both for operational purposes and to meet Treaty requirements. It is anticipated that with further development this database will be integrated into DOTS.



5

Evaluation

Major Programme 5:
Evaluation

EVALUATION

During 2003, progress was made in enhancing the functionality of the threshold monitoring software (Tmtool), which is intended for interactive assessment of the performance of the IMS seismic network under various circumstances. Testing of the new functionality was conducted during the year and version 1.1 was delivered in September. The new features of the tool include 'average' and 'worst' case detection capability calculations, various scenarios that may be encountered and an improved approach to default noise estimation based on detailed studies of background noise behaviour of a number of seismic stations. All proposed changes to version 1.0 were implemented.

So far Tmtool has been used to prepare detection capability status maps for the network of certified primary seismic stations and for routine evaluation activities. Other uses will include assessment and evaluation activities during the proposed progressive system-wide performance test (SPT1).

Another software, Bulcmp, intended for comparison of seismological bulletins, was subjected by the PTS to more detailed evaluation and testing to identify its strengths and weaknesses. The outcome of this effort is to be used to plan for enhancements to the tool during 2004. (See also "Data Fusion, Review and Services" in Major Programme 2.)

Beta testing of version 3.0 of the radionuclide technology software, Aatami, was conducted with six interested institutions, including NDCs, station operators and one of the laboratories designated in Annex 1 to the Protocol to the Treaty. Most of the testers presented their preliminary results at a meeting held in Vienna on 10–11 November 2003 and their final reports were subsequently received.

Incorporating feedback from the testers received in the course of testing, a new version of Aatami, version 3.05, was developed. Aatami 3.05 has been generally enhanced in functionality, performance and reliability. A database collecting all the information on processed radionuclide spectra for use by Aatami is planned to be developed in 2004.

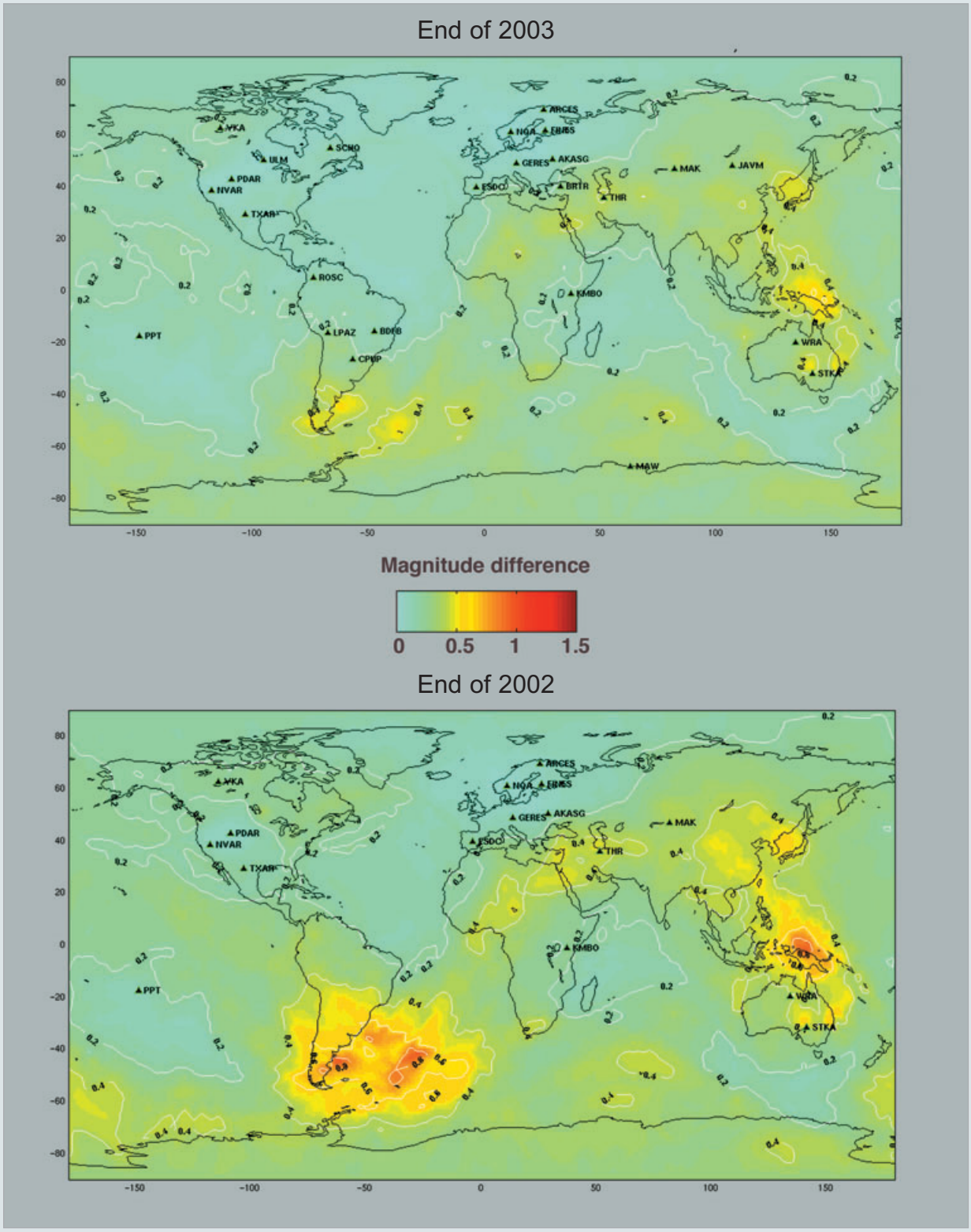
QUALITY ASSURANCE

During 2003, consistent with WGB priorities and guidance, particular emphasis was put on quality assurance (QA) in the context of provisional O&M issues. The main activity was the development and coordination of O&M procedures for IMS stations by the O&M coordination group, assisted by an external contractor. Important outcomes of this collaborative work from a QA perspective included a graphical guide to most of the O&M processes and a document analysing and classifying these processes (see also "Provisional Operation and Maintenance of IMS Stations" in Major Programme 1). The amount and complexity of the QA work related to these O&M issues were significantly higher than initially expected. For this reason, work is to continue in 2004.

SYNERGY OF QA AND EVALUATION

QA and evaluation considerations were an important element in the plan for SPT1 prepared by the PTS and presented to WGB in 2003. Particular objectives were development of an indicative list of metrics and identification of evaluation responsibilities within the PTS at the various stages of the activity. The plan for SPT1 was introduced to participants, including station operators and NDC representatives, at the evaluation workshop in Amman, Jordan (see "Workshops" below). Participants provided technical comments on the plan.

Further work related to SPT1 will be done in 2004 on metrics and development of simulation cases.



Estimated automatic detection capability of certified IMS primary seismic stations at the end of 2002 and 2003 relative to that of the 49 currently known stations of the primary seismic network under ideal station availability and low background noise).

Relative detection capability is shown as a difference in body wave magnitudes. An event is considered detected when its signal exceeds the noise level by a factor of 3 at three or more stations. Areas with large magnitude differences (red) in the map for the end of 2003, with 25 certified stations, show a marked decrease in size relative to the end of 2002, when there were 16 certified stations. Since only primary seismic data were considered in this evaluation, fusion with inputs from other IMS technologies would improve the overall picture even further.

WORKSHOPS

An evaluation workshop took place successfully in Amman from 30 November to 4 December 2003. The workshop was hosted by the Natural Resources Authority of Jordan. Thirty-nine participants from 17 States Signatories and the PTS attended. The workshop addressed topics related to the establishment of the verification system and to advanced interaction between the PTS and National Authorities and NDCs. Technical input and feedback were provided by NDCs.

The second GCI–Evaluation Workshop took place from 20 to 23 October 2003 in Vienna. Discussions focused on O&M and technology refreshment of the GCI. The QA issues discussed were related to O&M and quality management processes. Among the issues to be considered further by WGB are the placing of more effort in the coordination of O&M issues among NDCs, station operators and the PTS, and the planning of data traffic capacity to meet the needs arising from the simultaneous transfer of data by auxiliary seismic stations and radionuclide stations. (See also "Workshop" in Major Programme 3.)

Preparations commenced for an O&M workshop which is planned for October 2004. The focus of the workshop will be on O&M issues related to the IMS, IDC and GCI. Evaluation issues, especially those related to the overall performance of the IMS network and preparations for SPT1, are expected to form part of the agenda.

6

Policy Making Organs

Major Programme 6:
Policy Making Organs

The Commission held two sessions in 2003. It was chaired for the first six months by HE Ambassador Javier Paulinich, Permanent Representative of Peru, and for the second half of the year by HE Ambassador Thomas Stelzer, Permanent Representative of Austria. At its Twentieth Session, the Commission decided to extend the terms of office of the Chairperson and Vice-Chairpersons from six months to one year with effect from 1 January 2004.

The Commission agreed to consider reviewing the organizational structure of the PTS as well as the organization and methods of work of its subsidiary bodies. The Commission also agreed to begin preparing new modalities of tenure of a future Executive Secretary. The Commission decided that with effect from 2005 annual budgetary appropriations and assessments of States Signatories' contributions shall be split between United States dollars and euros, in order to protect the Commission from currency fluctuations.

The Commission's subsidiary bodies, Working Group A (WGA), Working Group B (WGB) and the Advisory Group, each held two sessions in 2003. To facilitate the timely consideration of matters related to the Programme and Budget, the Twenty-First Session of WGB and the Twentieth Session of the Advisory Group were each divided into two parts with an interval of several weeks.

WGA, chaired by HE Ambassador Tibor Tóth (Hungary), made recommendations, subsequently adopted by the Commission, on administrative and budgetary matters, including human resources issues.

WGB, chaired by Mr Ola Dahlman (Sweden), made recommendations, subsequently adopted by the Commission, on a range of verification related issues. Special attention was devoted to the draft OSI Operational Manual, to facilitate progress. A number of expert groups were established to address specific issues related to the IDC and GCI. An evaluation of the OSI Major Programme by a team of external experts was undertaken.

The Advisory Group, chaired by Mr André Gué (France), considered and provided advice on financial, budgetary and administrative issues.

7

Administration, Coordination and Support

Major Programme 7:
Administration, Coordination and Support

SUPPORT FOR MEETINGS

The PTS provided substantive support to the Chairpersons of the Commission, Working Groups A and B and the Advisory Group in the preparation and conduct of their meetings, as well as training courses and workshops of the Commission held in Vienna.

All official documents (624) of the Commission and its subsidiary bodies issued in 2003 were processed and stored on the automated Document Management System (DMS). By the end of 2003, a total of 4330 documents, including all documents relating to all previous sessions of the Commission in all of the official languages, had been archived on the DMS. Work continued to archive all of the documents relating to the sessions of the subsidiary bodies in the official languages. Also, the PTS issued an updated Electronic Document Archive CD-ROM containing reports of the Commission in 2003, as well as background information on the work of the Commission, to the States Signatories.

As a result of the increased in-house capacity for typesetting and layout in languages other than English, production of the 2002 Annual Report in all six official languages of the Commission was facilitated both in hard copy and in electronic form for placement on the public web site of the Commission. The first Technical Paper was issued following the decision of the Seventeenth Session of the Commission to establish this new category of document.

The PTS assisted States Signatories in accrediting their Permanent Representatives to the Commission. In 2003, 21 new Permanent Representatives were accredited, bringing the total number of accreditations to 107, compared with 100 at the end of 2002.

A book by a group of authors headed by HE Ambassador Jaap Ramaker (Netherlands) on the history of the CTBT negotiations was produced. The book, entitled *The Final Test*, is intended for use by delegations and PTS staff and was launched at the Twenty-First Session of the Commission.

Support staff at meetings.

The Government of Austria and the VIC based international organizations (VBOs) held discussions about additional conference facilities at the VIC. Additional premises would allow the Commission to have its own conference room and thus facilitate the efficient scheduling of meetings. The VBOs submitted their conference facility requirements to the Austrian Government, which began organizing an architectural competition to decide on the final design.

IMPLEMENTATION OF 2003 BUDGET

The Budget for 2003, based on an exchange rate of 1.0945 euros to 1 US dollar, amounted to US$88 581 700, representing zero real growth and 4.1% nominal growth over 2002. Of the total budget, 83% was allocated to verification related activities, including $30 100 000 to the Capital Investment Fund (CIF), established for the build-up of the IMS. A breakdown of the 2003 Programme and Budget by Major Programme is shown in Table 4.

By 31 December 2003, 79 States Signatories had made full payments and 12 had made partial payments of assessed contributions for 2003, amounting to 91.57% of the total 2003 assessed contributions.

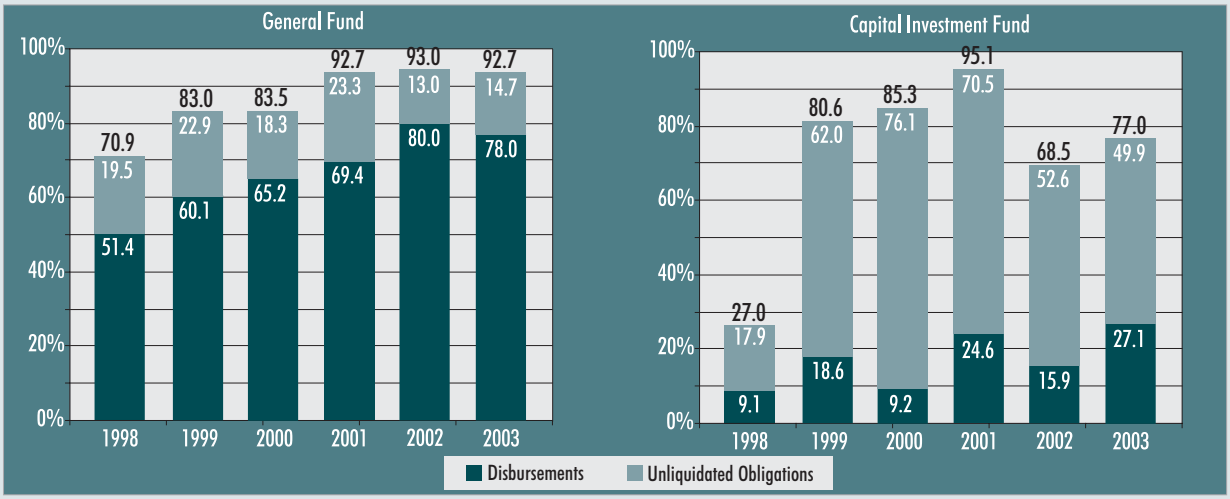
The expenditures in 2003 amounted to $86.7 million, of which $32.0 million was from the CIF. For the General Fund, the unused budget amounted to $4.2 million, or 7% of the total amount approved for the year. For the CIF, approximately 77% of the allotment, including the carry-forward balance from 2002, was executed by the end of 2003. More detailed information on budget implementation can be found in the *2003 Programme and Budget Performance Report* .

In 2003, disbursements amounting to $192 839 and obligations amounting to $657 986 in taxes were recorded by the PTS. The total cumulative amount of taxes disbursed as of 31 December 2003 was $832 971.

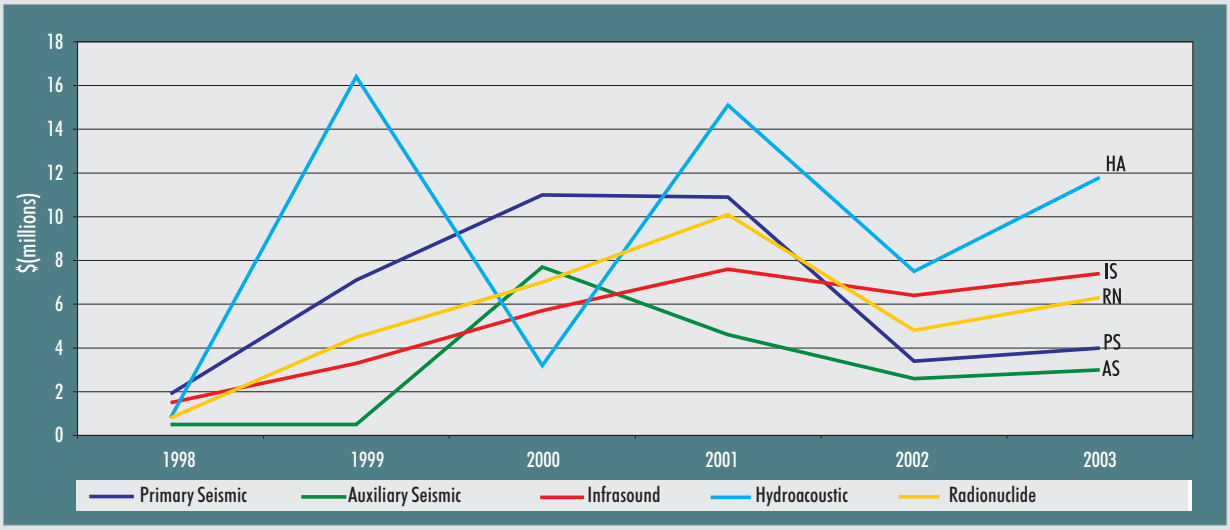
Table 4. 2003 Programme and Budget by Major Programme

Major Programme		$(millions)
MP1:	International Monitoring System	44.4
MP2:	International Data Centre	14.9
MP3:	Communications	10.6
MP4:	On-Site Inspection	2.8
MP5:	Evaluation	1.0
MP6:	Policy Making Organs	2.3
MP7:	Administration, Coordination and Support	12.6
Total		**88.6**

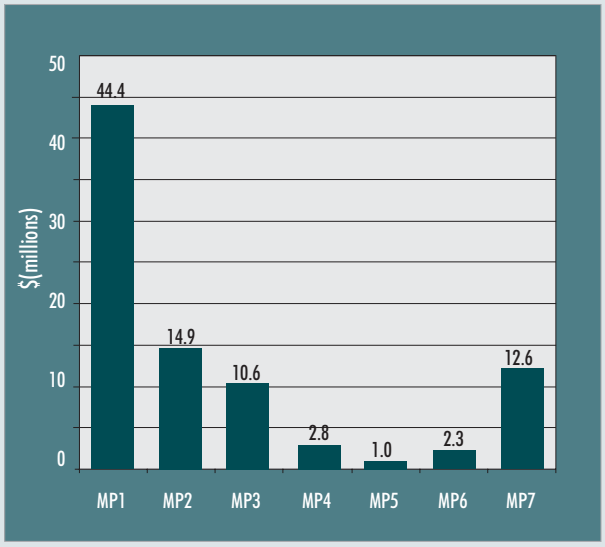
PTS publications issued in 2003.



Spending rates for the General Fund and Capital Investment Fund, 1998–2003.



CIF expenditure by IMS technology, 1998–2003.



2003 Programme and Budget by Major Programme (see also Table 4).

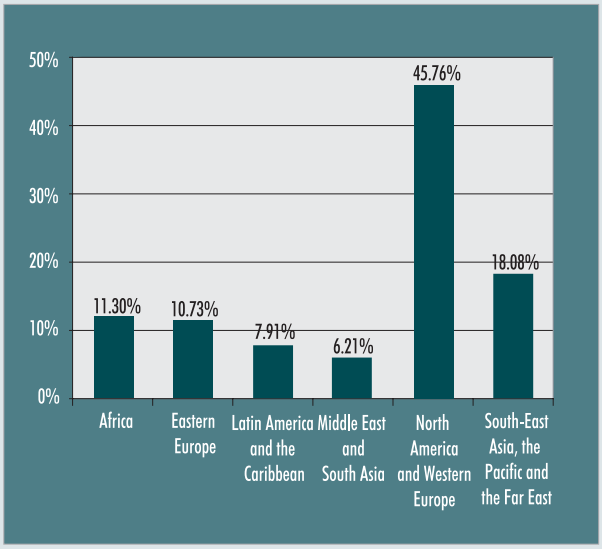


Figure 1. *Staff members in the Professional category by geographical region (as set out in Annex 1 to the Treaty).*

Table 5. Regular Staff Members by Field of Work

Field of Work	Professional	General Service	Total
Evaluation Section	3	1	4
International Monitoring System Division	41	14	55
International Data Centre Division	75	25	100
On-Site Inspection Division	13	6	19
Subtotal, verification related	***132 (74.58%)***	***46 (48.42%)***	***178 (65.44%)***
Office of the Executive Secretary	3	3	6
Internal Audit	2	1	3
Division of Administration	26	36	62
Legal and External Relations Division	14	9	23
Subtotal, non-verification-related	***45 (25.42%)***	***49 (51.58%)***	***94 (34.56%)***
Total	**177 (100%)**	**95 (100%)**	**272 (100%)**

PROCUREMENT

The PTS completed more than 315 procurement processes in 2003, compared with 270 in 2002. Application of the model contract for testing and evaluation and for post-certification activities for IMS stations became more widespread (see also "Operations Contracts" in Major Programme 1). In addition to contracts for testing and evaluation and for post-certification activities, the PTS conducted negotiations on various stages of work for 20 IMS stations.

Financial Rule 11.5.06, Exceptions to Competitive Procedures, stipulates that the Commission should be informed about all contracts over $150 000 which were awarded after one of the exceptions listed in this Rule had been invoked. In 2003, 23 contracts falling into this category were concluded (compared with 24 contracts in 2002), with a total value of approximately $18.2 million.

INTERNAL AUDIT

Three follow-up reviews to audit education grants for the school year 2001–2002, rental subsidy payments, and the GCI contract and subsequent amendments were concluded. Reviews of contracts for O&M and post-certification activities, and of training programmes administered by the Personnel Section began and are continuing.

By way of cooperation with the External Auditor, the actions taken by the management with regard to the recommendations contained in the 2002 Report and Management Letter of the External Auditor were reviewed.

HUMAN RESOURCES MANAGEMENT

The PTS secured the human resources for its operations by recruiting and maintaining highly competent and motivated staff for all programmes. Recruitment was based on securing the highest standards of professional expertise, experience, efficiency, competence and integrity. Due regard was paid to the principle of equal employment opportunity and to the importance of recruiting staff on as wide a geographical basis as possible.

As of 31 December 2003, the PTS had 272 staff members from 69 countries, compared with 266 staff members at the end of 2002. Figure 1 provides information on the distribution of staff members in the Professional category by geographical region. Table 5 provides a breakdown of regular staff members by field of work.

The PTS continued its efforts to increase the representation of women in the Professional category, which stood at 49, or 27.68%, at the end of 2003, compared with 46, or 27.06%, at the end of 2002. In this connection it should be noted that in the non-verification-related Divisions, of a total of 45 Professional staff members

19 (42.22%) were women, some of whom are in managerial positions. The recruitment efforts continued against the background of low numbers of female applicants for the majority of scientific and information technology related vacancies. Discussions were held with some States Signatories regarding the modalities of encouraging female candidates to apply for vacant positions in the PTS.

In 2003, the PTS appointed 22 regular staff members. In addition, the PTS processed contracts for 48 consultants, 13 interns and 6 linguists, and 111 contracts for short term staff, including 49 for short term staff assigned to meetings.

The PTS organized various training courses in computer and information technology, office and project management, staff development and cross-cultural communication and management. During the year, 84 staff members participated in internal and external training.

The framework provided by the Staff Regulations and Rules was refined by further developing and improving administrative practices. In particular, a revised Administrative Directive was issued in which the working hours were reduced to be consistent with those at the other VBOs and the time recording methods were streamlined.

The PTS continued to devote considerable effort to addressing the matters raised in the report, issued in January 2002, by an external consultancy firm on PTS personnel and management practices. Significant issues addressed in 2003 included recruitment procedures, career development and performance appraisals and rewards.

The tenure policy established by the Commission sets a maximum length of service of seven years for Professional and internationally recruited General Service staff members, subject to certain exceptions. Therefore some staff members would be expected to separate from service upon reaching this limit in 2004, the seventh year since the establishment of the PTS. In accordance with the established rules, in 2003 the Executive Secretary made exceptions to the tenure limitation and extended beyond seven years the period of appointment of four staff members and proposed to the Commission a similar extension for one Division Director, in order to retain essential expertise and memory. In connection with the implementation of the tenure policy by the Executive Secretary, appeals were made to the Administrative Tribunal of the International Labour Organization.

SAFETY AND SECURITY

As a result of PTS participation in the Inter-Agency Security Management Network, all staff travelling on behalf of the PTS are required to complete a training course on basic security in the field, provided by the Office of the United Nations Security Coordinator. By the end of 2003, over one hundred staff members had successfully completed this course.

The PTS continued to address policies and procedures on confidentiality. An Information Paper entitled Information and Confidentiality: PTS Policies and Procedures was produced for the consideration of WGB.

SIGNATURES AND RATIFICATIONS

In 2003, the Treaty was signed by four States (Afghanistan, Eritrea, the Gambia and Palau) and was ratified by eleven States (Afghanistan, Albania, Algeria, Côte d'Ivoire, Cyprus, Eritrea, Honduras, Kuwait, Kyrgyzstan, Mauritania and Oman), including one of the Annex 2 States (Algeria), whose ratification is necessary for entry into force of the Treaty. As of 31 December 2003, the Treaty had 170 signatures and 108 ratifications, including ratifications by 32 of the 44 Annex 2 States. The overall status of signatures and ratifications since the Treaty was opened for signature on 24 September 1996 is summarized in Table 6.

Table 6. Signatures and Ratifications by Year

	1996	1997	1998	1999	2000	2001	2002	2003	Total
Signatures	138	11	2	4	5	5	1	4	**170**
Ratifications	1	7	18	25	18	20	8	11	**108**

RELATIONS WITH STATES AND INTERNATIONAL ORGANIZATIONS

The PTS continued efforts to enhance broad-based understanding and support of the Treaty. Emphasis was given to widening awareness of and participation in the work of the Commission, in order to facilitate the establishment of the verification regime and to promote signature and ratification. Particular attention was devoted to fostering cooperation among States in the exchange of verification related technologies and making available to them technical–legal assistance to strengthen national implementation of the Treaty. The PTS also maintained

its focus on developing relations with relevant international organizations.

The PTS continued to organize and to assist in the organization of various events, using voluntary contributions by States Signatories.

Relations with States

With the emphasis on Annex 2 States and States hosting IMS facilities, the PTS maintained dialogue through bilateral visits in capitals and interaction with their Permanent Missions in Vienna, Berlin, Bonn, Geneva and New York. Contacts were also made in the framework of multilateral fora at the global, regional and subregional levels. In this context the Executive Secretary visited Australia, Azerbaijan, Brazil, Chile, China, Fiji, Germany, Indonesia, Japan, Malaysia, the Netherlands, the Russian Federation and Timor-Leste. PTS staff undertook missions to Cuba, the Democratic Republic of the Congo, Malaysia, Mozambique, Suriname, Tunisia and Viet Nam.

The Executive Secretary also met in Vienna with Ministers for Foreign Affairs of Austria, Croatia, Finland, Japan, Saint Kitts and Nevis and Slovakia, the Minister for Disarmament and Arms Control of New Zealand, the Minister of State of Germany, the Minister of State of the United Kingdom, the State Secretary of France, and high-ranking officials of Belarus, Italy and the Republic of Korea.

In 2003, five new IMS facility agreements were concluded with Mauritania, Panama, Paraguay, the Philippines and Romania, bringing the total number of concluded agreements or arrangements to 28. Of these, 18 have entered into force and 1 is being applied provisionally pending its entry into force. (The IMS host States with which the Commission has concluded facility agreements or arrangements are listed at the end of this report.)

In addition, seven interim exchanges of letters were completed in 2003 authorizing the Commission to undertake activities in States hosting IMS facilities, pending the conclusion of a formal facility agreement or arrangement. At the end of 2003, appropriate legal arrangements were in place for a total of 306 stations and 15 laboratories in 80 countries.

As of 31 December 2003, 81 States had notified the Commission of their designation of National Authorities, or 'national focal points', in accordance with Article III, paragraph 4, of the Treaty.

Relations with International Organizations

The PTS continued to develop contacts and cooperation with relevant global and regional international organizations. The Executive Secretary addressed the fifty-eighth session of the First Committee of the United Nations General Assembly and the forty-seventh session of the General Conference of the International Atomic Energy Agency, and participated in the First Review Conference of the States Parties to the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (CWC).

PTS staff participated in the 13th Conference of Heads of State or Government of the Non-Aligned Movement in Kuala Lumpur, the Second Session of the Preparatory Committee for the 2005 Review Conference of the States Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) in Geneva, the Eighth Session of the Conference of the States Parties to the CWC in The Hague, the thirty-third regular session of the General Assembly of the Organization of American States (OAS) in Santiago, the thirty-ninth session of the Summit of the African Union in Maputo, the thirty-fourth Pacific Islands Forum (PIF) Summit in Auckland, New Zealand, the Special Conference on Security of the OAS in Mexico City, and the 18th Regular Session of the General Conference of the Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (OPANAL) in Havana.

The PTS further developed contacts with regional and other organizations such as the Association of Caribbean States, the Association of South-East Asian Nations, the Commonwealth and the European Union.

In 2003, the Agreement between the Commission and the World Meteorological Organization (WMO) was approved by the Fourteenth World Meteorological Congress on 23 May and entered into force on that date (see also "Radionuclide Development" in Major Programme 2). The Agreement between the Commission and the European Centre for Medium-Range Weather Forecasts entered into force on 24 June, the date on which it was approved by the Twentieth Session of the Commission (see also "Radionuclide Development" in Major Programme 2). (The

international organizations with which the Commission has concluded relationship and cooperation agreements are listed at the end of this report.)

Training, Workshops and Other Capacity Building Activities

Efforts continued to enhance PTS-wide coordination and consistency in the organization of training and capacity building activities for States. Preparation to introduce training management software at the beginning of 2004 was made to allow more efficient recording, handling and reporting of all information relevant to training.

In 2003, the PTS organized three international cooperation workshops: in Baku for States from central Asia and the Caucasus (25–27 March), in Nadi, Fiji, for States from the Pacific (16–17 June) and in Kuala Lumpur for States from South-East Asia (9–11 December). These workshops were attended respectively by 29 participants from 8 States and a representative of the Organization for Security and Cooperation in Europe, 25 participants from 15 States (including 3 non-signatory States) and representatives from the PIF Secretariat and the United Nations Department for Disarmament Affairs, and 24 participants from 8 States. The workshops explored, inter alia, ways and means to promote the establishment of the verification regime, national implementation measures and further cooperation among States of the regions concerned.

Using the voluntary contributions provided by the Governments of the Netherlands and Norway, three information visit programmes in support of international cooperation activities and the promotion of the early entry into force of the Treaty were organized by the PTS. Senior experts and Government officials from the Democratic Republic of the Congo, Palau, Suriname, Tunisia, Tuvalu and the United Republic of Tanzania participated in the programmes and visited the PTS.

As a follow-up to the international cooperation workshop in Nairobi in June 2002, the PTS organized an expert group meeting of the Eastern and Southern Africa Regional Seismological Working Group, held in Kampala on 23–24 September. The meeting was attended by 15 participants from eight States. It addressed modalities for the possible establishment and operation of Regional Data Centres in the region, which could be important means for promoting cooperation among States of the region.

The PTS also cooperated with the Japanese authorities in preparation of the training programme on global seismo-

Participants of international cooperation workshop in Nadi, Fiji, June 2003.

National seminar on the CTBT in Hanoi, December 2003.

logical observation organized by Japan for developing States in October–December. Eleven participants from 10 developing countries attended.

The PTS supported a national seminar on the CTBT organized by the Vietnamese authorities and held in Hanoi on 16–17 December. The objectives of the seminar were to facilitate discussion among relevant authorities on the Treaty as well as to prepare action plans for its ratification and implementation. Some sixty representatives of these authorities participated. Japan also supported the event by sending an expert, who made a presentation.

In relation to events organized outside of Vienna, such as training courses and workshops, in 2003 the Commission concluded 11 agreements or arrangements with 10 host States (Azerbaijan, Fiji, France, Italy, Japan, Jordan, Malaysia, the Russian Federation, Uganda and Viet Nam) on the basis of a model agreement approved by the Commission.

The PTS provided workstations equipped with software related to the operation of NDCs, together with peripherals, to one State in central Asia and two States in Africa in 2003. One State in the Caribbean was provided with computer equipment for upgrading its NDC. The PTS continued close interaction with a number of other States in relation to similar support.

CIVIL AND SCIENTIFIC APPLICATIONS OF VERIFICATION TECHNOLOGIES

The PTS supported the Government of Hungary in the organization of an experts' discussion on civil and scientific applications of CTBT verification technologies (seismological and radionuclide), held in Sopron on 6 September. Nine speakers from six States Signatories made presentations. The event was attended by observers from three States Signatories and the Verification Research, Training and Information Centre (VERTIC), a verification oriented non-governmental organization (NGO) based in the United Kingdom.

DISSEMINATION OF INFORMATION

The Commission's public web site, providing information for both the general public and specialized audiences, was expanded and regularly updated. In 2003, the web site recorded over 27.5 million hits, the highest number of any year since it was launched.

New information products in 2003.

In 2003, 42 press releases were issued on various topics, including the latest Treaty ratifications and developments in the establishment of the IMS. The PTS held six press conferences and provided, upon request, 17 briefings to academic and special interest groups, such as the Diplomatic Academy of Vienna. Over 2600 CTBT related press clippings were archived.

Information materials were produced for a variety of audiences and were distributed from headquarters or by staff on duty travel. Two issues of *CTBTO Spectrum* were produced, following the Twentieth and Twenty-First Sessions of the Commission. Electronic versions of the newsletter were also made available on the public web site, and an automatic Web based subscription facility was introduced.

New information products in 2003 included a leaflet in German that gives an overview of the work of the Commission and is expected to meet the needs of students and other visitors to the VIC. Two new brochures intended for specific geographical areas, entitled *Africa and the CTBT* (in Arabic, English and French) and *Latin America and the Caribbean and the CTBT* (in English and Spanish), were printed. A set of four posters designed for use by Permanent Missions, NDCs, IMS facilities and other institutions supporting CTBT related activities was also produced. Seven issues of *CTBTO News* covering meetings of the Commission and its organs were published.

The corporate identity introduced in 2002 became well established and was applied consistently to all PTS products. A review of information products throughout the PTS and the implementation of the corporate identity was carried out at the end of 2003.

LIAISON WITH NGOs

Liaison with NGOs remains important to the PTS. Close contact was maintained with the NGO communities based in Vienna, Geneva and New York, to promote the Treaty and the work of the Commission. The NGO community in Vienna was regularly briefed on major activities of the Commission. The Executive Secretary held breakfast meetings with NGO representatives in Vienna and in New York.

Supplementary Information

Conference on Facilitating the Entry into Force of the Comprehensive Nuclear-Test-Ban Treaty (Article XIV Conference)

The Conference on Facilitating the Entry into Force of the Comprehensive Nuclear-Test-Ban Treaty (Article XIV conference) took place in the Austria Center Vienna from 3 to 5 September 2003. The PTS assisted the President-elect in conducting preparatory consultations of States Signatories, issued a background document for the conference, provided logistical support for the conference in close cooperation with the United Nations Secretariat and liaised with the media and the NGO community. The Executive Secretary served as the Secretary of the conference. Prior to the conference, the Executive Secretary wrote letters encouraging early signature and ratification to Foreign Ministers of States that had not yet signed or ratified the Treaty.

A total of 102 ratifiers and States Signatories as well as 5 non-signatory States attended the conference. More than 20 States attended at a political level. With a view to promoting participation of least developed countries, the Government of Austria provided a voluntary contribution. Afghanistan, Haiti and Mozambique received this support and participated. Saint Kitts and Nevis, which is not a least developed country and had not signed the CTBT, was also supported by this contribution on an exceptional basis. The PTS assisted in the implementation of this voluntary contribution programme. Seven international organizations and 19 NGOs were also represented. Altogether 116 NGOs signed the NGO statement delivered at the conference.

HE Benita Ferrero-Waldner, Federal Minister for Foreign Affairs of Austria, giving a welcoming address at the Article XIV conference on behalf of the host country.

On the margins of the conference, the PTS organized a range of events to promote the understanding of the CTBT. On 3 September, the PTS mounted an exhibition of the Treaty verification technologies, entitled "CTBT: A Global Verification Regime". The exhibition was supported by a photographic exhibition of IMS facilities and is designed to be modular and mobile to support the work of staff on duty travel. On the same day, the PTS assisted in the organization of a seminar by VERTIC on the capability of the verification regime, entitled "Verifying the Nuclear-Test-Ban Treaty: Participation, Progress and Potential". On 4 September, the PTS facilitated a seminar on the benefits of CTBT regime membership. Two speakers provided regional perspectives. The seminar was attended by more than one hundred representatives of States and NGOs. The PTS also offered extensive support to the press in the form of briefings, interview facilitation and a press kit. About 140 press clippings concerning the conference were archived.

The conference adopted a "Final Declaration and Measures to Promote the Entry into Force of the Comprehensive Nuclear-Test-Ban Treaty" by consensus. The Final Declaration, inter alia, recommends that the PTS continue to provide States with legal assistance with respect to the ratification process and implementation measures and establish a contact point in this regard. The Final Declaration also requests the PTS to act as a 'focal point' where information about activities undertaken by States is collected in order to assist in promoting the entry into force of the Treaty. The Legal Services Section and the External Relations Section of the PTS were subsequently designated respectively as a contact point and a focal point on these matters.

"CTBT: A Global Verification Regime", the PTS exhibition at the Article XIV conference.

States Whose Ratification is Required for the Treaty to Enter into Force (31 December 2003)

41 Signed 32 Ratified 3 Not signed

State	Date of Signature	Date of Ratification
Algeria	15 Oct. 1996	11 Jul. 2003
Argentina	24 Sep. 1996	4 Dec. 1998
Australia	24 Sep. 1996	9 Jul. 1998
Austria	24 Sep. 1996	13 Mar. 1998
Bangladesh	24 Oct. 1996	8 Mar. 2000
Belgium	24 Sep. 1996	29 Jun. 1999
Brazil	24 Sep. 1996	24 Jul. 1998
Bulgaria	24 Sep. 1996	29 Sep. 1999
Canada	24 Sep. 1996	18 Dec. 1998
Chile	24 Sep. 1996	12 Jul. 2000
China	24 Sep. 1996	
Colombia	24 Sep. 1996	
Democratic People's Republic of Korea		
Democratic Republic of the Congo	4 Oct. 1996	
Egypt	14 Oct. 1996	
Finland	24 Sep. 1996	15 Jan. 1999
France	24 Sep. 1996	6 Apr. 1998
Germany	24 Sep. 1996	20 Aug. 1998
Hungary	25 Sep. 1996	13 Jul. 1999
India		
Indonesia	24 Sep. 1996	
Iran (Islamic Republic of)	24 Sep. 1996	
Israel	25 Sep. 1996	
Italy	24 Sep. 1996	1 Feb. 1999
Japan	24 Sep. 1996	8 Jul. 1997
Mexico	24 Sep. 1996	5 Oct. 1999
Netherlands	24 Sep. 1996	23 Mar. 1999
Norway	24 Sep. 1996	15 Jul. 1999
Pakistan		
Peru	25 Sep. 1996	12 Nov. 1997
Poland	24 Sep. 1996	25 May 1999
Republic of Korea	24 Sep. 1996	24 Sep. 1999
Romania	24 Sep. 1996	5 Oct. 1999
Russian Federation	24 Sep. 1996	30 Jun. 2000
Slovakia	30 Sep. 1996	3 Mar. 1998
South Africa	24 Sep. 1996	30 Mar. 1999
Spain	24 Sep. 1996	31 Jul. 1998
Sweden	24 Sep. 1996	2 Dec. 1998
Switzerland	24 Sep. 1996	1 Oct. 1999
Turkey	24 Sep. 1996	16 Feb. 2000
Ukraine	27 Sep. 1996	23 Feb. 2001
United Kingdom	24 Sep. 1996	6 Apr. 1998
United States of America	24 Sep. 1996	
Viet Nam	24 Sep. 1996	

Status of Signature and Ratification by States Listed in Annex 1 to the Treaty (31 December 2003)

States Signatories that have ratified

States Signatories yet to ratify

Non-signatory States

States whose ratification is required for the Treaty to enter into force

Status of Signature and Ratification by States Listed in Annex 1 to the Treaty (31 December 2003)

170 Signed 108 Ratified 23 Not signed

State	Date of Signature	Date of Ratification
Afghanistan	24 Sep. 2003	24 Sep. 2003
Albania	27 Sep. 1996	23 Apr. 2003
Algeria	15 Oct. 1996	11 Jul. 2003
Andorra	24 Sep. 1996	
Angola	27 Sep. 1996	
Antigua and Barbuda	16 Apr. 1997	
Argentina	24 Sep. 1996	4 Dec. 1998
Armenia	1 Oct. 1996	
Australia	24 Sep. 1996	9 Jul. 1998
Austria	24 Sep. 1996	13 Mar. 1998
Azerbaijan	28 Jul. 1997	2 Feb. 1999
Bahamas		
Bahrain	24 Sep. 1996	
Bangladesh	24 Oct. 1996	8 Mar. 2000
Barbados		
Belarus	24 Sep. 1996	13 Sep. 2000
Belgium	24 Sep. 1996	29 Jun. 1999
Belize	14 Nov. 2001	
Benin	27 Sep. 1996	6 Mar. 2001
Bhutan		
Bolivia	24 Sep. 1996	4 Oct. 1999
Bosnia and Herzegovina	24 Sep. 1996	
Botswana	16 Sep. 2002	28 Oct. 2002
Brazil	24 Sep. 1996	24 Jul. 1998
Brunei Darussalam	22 Jan. 1997	
Bulgaria	24 Sep. 1996	29 Sep. 1999
Burkina Faso	27 Sep. 1996	17 Apr. 2002
Burundi	24 Sep. 1996	

State	Date of Signature	Date of Ratification
Cambodia	26 Sep. 1996	10 Nov. 2000
Cameroon	16 Nov. 2001	
Canada	24 Sep. 1996	18 Dec. 1998
Cape Verde	1 Oct. 1996	
Central African Republic	19 Dec. 2001	
Chad	8 Oct. 1996	
Chile	24 Sep. 1996	12 Jul. 2000
China	24 Sep. 1996	
Colombia	24 Sep. 1996	
Comoros	12 Dec. 1996	
Congo	11 Feb. 1997	
Cook Islands	5 Dec. 1997	
Costa Rica	24 Sep. 1996	25 Sep. 2001
Côte d'Ivoire	25 Sep. 1996	11 Mar. 2003
Croatia	24 Sep. 1996	2 Mar. 2001
Cuba		
Cyprus	24 Sep. 1996	18 Jul. 2003
Czech Republic	12 Nov. 1996	11 Sep. 1997
Democratic People's Republic of Korea		
Democratic Republic of the Congo	4 Oct. 1996	
Denmark	24 Sep. 1996	21 Dec. 1998
Djibouti	21 Oct. 1996	
Dominica		
Dominican Republic	3 Oct. 1996	
Ecuador	24 Sep. 1996	12 Nov. 2001
Egypt	14 Oct. 1996	
El Salvador	24 Sep. 1996	11 Sep. 1998
Equatorial Guinea	9 Oct. 1996	

State	Date of Signature	Date of Ratification
Eritrea	11 Nov. 2003	11 Nov. 2003
Estonia	20 Nov. 1996	13 Aug. 1999
Ethiopia	25 Sep. 1996	
Fiji	24 Sep. 1996	10 Oct. 1996
Finland	24 Sep. 1996	15 Jan. 1999
France	24 Sep. 1996	6 Apr. 1998
Gabon	7 Oct. 1996	20 Sep. 2000
Gambia	9 Apr. 2003	
Georgia	24 Sep. 1996	27 Sep. 2002
Germany	24 Sep. 1996	20 Aug. 1998
Ghana	3 Oct. 1996	
Greece	24 Sep. 1996	21 Apr. 1999
Grenada	10 Oct. 1996	19 Aug. 1998
Guatemala	20 Sep. 1999	
Guinea	3 Oct. 1996	
Guinea-Bissau	11 Apr. 1997	
Guyana	7 Sep. 2000	7 Mar. 2001
Haiti	24 Sep. 1996	
Holy See	24 Sep. 1996	18 Jul. 2001
Honduras	25 Sep. 1996	30 Oct. 2003
Hungary	25 Sep. 1996	13 Jul. 1999
Iceland	24 Sep. 1996	26 Jun. 2000
India		
Indonesia	24 Sep. 1996	
Iran (Islamic Republic of)	24 Sep. 1996	
Iraq		
Ireland	24 Sep. 1996	15 Jul. 1999
Israel	25 Sep. 1996	
Italy	24 Sep. 1996	1 Feb. 1999
Jamaica	11 Nov. 1996	13 Nov. 2001
Japan	24 Sep. 1996	8 Jul. 1997
Jordan	26 Sep. 1996	25 Aug. 1998
Kazakhstan	30 Sep. 1996	14 May 2002
Kenya	14 Nov. 1996	30 Nov. 2000
Kiribati	7 Sep. 2000	7 Sep. 2000
Kuwait	24 Sep. 1996	6 May 2003
Kyrgyzstan	8 Oct. 1996	2 Oct. 2003
Lao People's Democratic Republic	30 Jul. 1997	5 Oct. 2000
Latvia	24 Sep. 1996	20 Nov. 2001
Lebanon		
Lesotho	30 Sep. 1996	14 Sep. 1999
Liberia	1 Oct. 1996	
Libyan Arab Jamahiriya	13 Nov. 2001	
Liechtenstein	27 Sep. 1996	
Lithuania	7 Oct. 1996	7 Feb. 2000
Luxembourg	24 Sep. 1996	26 May 1999
Madagascar	9 Oct. 1996	
Malawi	9 Oct. 1996	
Malaysia	23 Jul. 1998	
Maldives	1 Oct. 1997	7 Sep. 2000
Mali	18 Feb. 1997	4 Aug. 1999
Malta	24 Sep. 1996	23 Jul. 2001
Marshall Islands	24 Sep. 1996	
Mauritania	24 Sep. 1996	30 Apr. 2003
Mauritius		
Mexico	24 Sep. 1996	5 Oct. 1999
Micronesia (Federated States of)	24 Sep. 1996	25 Jul. 1997
Monaco	1 Oct. 1996	18 Dec. 1998
Mongolia	1 Oct. 1996	8 Aug. 1997
Morocco	24 Sep. 1996	17 Apr. 2000
Mozambique	26 Sep. 1996	
Myanmar	25 Nov. 1996	
Namibia	24 Sep. 1996	29 Jun. 2001
Nauru	8 Sep. 2000	12 Nov. 2001
Nepal	8 Oct. 1996	

State	Date of Signature	Date of Ratification
Netherlands	24 Sep. 1996	23 Mar. 1999
New Zealand	27 Sep. 1996	19 Mar. 1999
Nicaragua	24 Sep. 1996	5 Dec. 2000
Niger	3 Oct. 1996	9 Sep. 2002
Nigeria	8 Sep. 2000	27 Sep. 2001
Niue		
Norway	24 Sep. 1996	15 Jul. 1999
Oman	23 Sep. 1999	13 Jun. 2003
Pakistan		
Palau	12 Aug. 2003	
Panama	24 Sep. 1996	23 Mar. 1999
Papua New Guinea	25 Sep. 1996	
Paraguay	25 Sep. 1996	4 Oct. 2001
Peru	25 Sep. 1996	12 Nov. 1997
Philippines	24 Sep. 1996	23 Feb. 2001
Poland	24 Sep. 1996	25 May 1999
Portugal	24 Sep. 1996	26 Jun. 2000
Qatar	24 Sep. 1996	3 Mar. 1997
Republic of Korea	24 Sep. 1996	24 Sep. 1999
Republic of Moldova	24 Sep. 1997	
Romania	24 Sep. 1996	5 Oct. 1999
Russian Federation	24 Sep. 1996	30 Jun. 2000
Rwanda		
Saint Kitts and Nevis		
Saint Lucia	4 Oct. 1996	5 Apr. 2001
Saint Vincent and the Grenadines		
Samoa	9 Oct. 1996	27 Sep. 2002
San Marino	7 Oct. 1996	12 Mar. 2002
Sao Tome and Principe	26 Sep. 1996	
Saudi Arabia		
Senegal	26 Sep. 1996	9 Jun. 1999
Serbia and Montenegro	8 Jun. 2001	
Seychelles	24 Sep. 1996	
Sierra Leone	8 Sep. 2000	17 Sep. 2001
Singapore	14 Jan. 1999	10 Nov. 2001
Slovakia	30 Sep. 1996	3 Mar. 1998
Slovenia	24 Sep. 1996	31 Aug. 1999
Solomon Islands	3 Oct. 1996	
Somalia		
South Africa	24 Sep. 1996	30 Mar. 1999
Spain	24 Sep. 1996	31 Jul. 1998
Sri Lanka	24 Oct. 1996	
Sudan		
Suriname	14 Jan. 1997	
Swaziland	24 Sep. 1996	
Sweden	24 Sep. 1996	2 Dec. 1998
Switzerland	24 Sep. 1996	1 Oct. 1999
Syrian Arab Republic		
Tajikistan	7 Oct. 1996	10 Jun. 1998
Thailand	12 Nov. 1996	
The former Yugoslav Republic of Macedonia	29 Oct. 1998	14 Mar. 2000
Togo	2 Oct. 1996	
Tonga		
Trinidad and Tobago		
Tunisia	16 Oct. 1996	
Turkey	24 Sep. 1996	16 Feb. 2000
Turkmenistan	24 Sep. 1996	20 Feb. 1998
Tuvalu		
Uganda	7 Nov. 1996	14 Mar. 2001
Ukraine	27 Sep. 1996	23 Feb. 2001
United Arab Emirates	25 Sep. 1996	18 Sep. 2000

State	Date of Signature	Date of Ratification	State	Date of Signature	Date of Ratification
United Kingdom	24 Sep. 1996	6 Apr. 1998	Vanuatu	24 Sep. 1996	
United Republic of Tanzania			Venezuela	3 Oct. 1996	13 May 2002
United States of America	24 Sep. 1996		Viet Nam	24 Sep. 1996	
Uruguay	24 Sep. 1996	21 Sep. 2001	Yemen	30 Sep. 1996	
Uzbekistan	3 Oct. 1996	29 May 1997	Zambia	3 Dec. 1996	
			Zimbabwe	13 Oct. 1999	

Facilities of the CTBT International Monitoring System

Primary seismic stations | Auxiliary seismic stations | Radionuclide stations | Radionuclide laboratories | Hydroacoustic stations | Infrasound stations

State	PS	AS	RN	RL	HA	IS	Total
Argentina	1	2	3	1		2	9
Armenia		1					1
Australia	4	3	7	1	1	5	21
Austria				1			1
Bangladesh		1					1
Bolivia	1	1				1	3
Botswana		1					1
Brazil	1	2	2	1		1	7
Cameroon			1				1
Canada	3	6	4	1	1	1	16
Cape Verde						1	1
Central African Republic	1					1	2
Chile		2	2		1	2	7
China	2	4	3	1		2	12
Colombia	1						1
Cook Islands		1	1				2
Costa Rica		1					1
Côte d'Ivoire	1					1	2
Czech Republic		1					1
Denmark		1				1	2
Djibouti		1				1	2
Ecuador			1			1	2
Egypt	1	1					2
Ethiopia		1	1				2
Fiji		1	1				2
Finland	1			1			2
France	1	2	6	1	2	5	17
Gabon		1					1
Germany	1		1			2	4
Germany and South Africa[a]		1					1
Greece		1					1
Guatemala		1					1
Iceland		1	1				2
To be determined	1	1	1			1	4
Indonesia		6					6
Iran (Islamic Republic of)	1	2	1			1	5
Israel		2		1			3
Italy		1		1			2
Japan	1	5	2	1		1	10
Jordan		1					1
Kazakhstan	1	3				1	5
Kenya	1					1	2
Kiribati			1				1
Kuwait			1				1
Kyrgyzstan		1					1
Libyan Arab Jamahiriya			1				1

State	PS	AS	RN	RL	HA	IS	Total
Madagascar		1				1	2
Malaysia			1				1
Mali		1					1
Mauritania			1				1
Mexico		3	1		1		5
Mongolia	1		1			1	3
Morocco		1					1
Namibia		1				1	2
Nepal		1					1
New Zealand		3	2	1		1	7
Niger	1		1				2
Norway	2	2	1			1	6
Oman		1					1
Pakistan	1					1	2
Palau						1	1
Panama			1				1
Papua New Guinea		2	1			1	4
Paraguay	1					1	2
Peru		2					2
Philippines		2	1				3
Portugal			1		1	1	3
Republic of Korea	1						1
Romania		1					1
Russian Federation	6	13	8	1		4	32
Samoa		1					1
Saudi Arabia	1	1					2
Senegal		1					1
Solomon Islands		1					1
South Africa	1	1	1	1		1	5
Spain	1						1
Sri Lanka		1					1
Sweden		1	1				2
Switzerland		1					1
Thailand	1		1				2
Tunisia	1					1	2
Turkey	1						1
Turkmenistan	1						1
Uganda		1					1
Ukraine	1						1
United Kingdom		1	4	1	2	4	12
United Republic of Tanzania			1				1
United States of America	5	12	11	1	2	8	39
Venezuela		2					2
Zambia		1					1
Zimbabwe		1					1
Total	**50**	**120**	**80**	**16**	**11**	**60**	**337**

[a] Germany and South Africa will be jointly responsible for an auxiliary seismic station in Antarctica.

Facility Agreements or Arrangements with States Hosting IMS Facilities (31 December 2003)

State	Date(s) of Signature	Date(s) of Entry into Force
Argentina[a]	9 December 1999	
Australia	13 March 2000	17 August 2000
Canada	19 October 1998	19 October 1998
		(Articles 6, 8 and 9 on 1 March 2000)
Cook Islands	31 March 2000	14 April 2000
	14 April 2000	
Czech Republic[a]	13 November 2002	
Finland	12 May 2000	6 June 2000
France[a]	13 July 2001	
Guatemala[a]	26 November 2002	
Jordan	11 November 1999	11 November 1999
Kenya	14 October 1999	29 October 1999
	29 October 1999	
Mauritania	16 September 2003	17 September 2003
	17 September 2003	
Mongolia	5 June 2000	25 May 2001
New Zealand	13 November 1998	19 December 2000
Niger	20 November 2000	24 November 2000
	24 November 2000	
Norway	10 June 2002	10 June 2002
Palau	16 April 2002	29 April 2002
	29 April 2002	
Panama	26 November 2003	26 November 2003
Paraguay[a]	4 April 2003	
Peru	14 March 2001	8 July 2002
Philippines[a]	14 April 2003	
Romania[a]	13 June 2003	
Senegal[b]	22 May 2001	
South Africa	20 May 1999	20 May 1999
Spain	14 September 2000	12 December 2003
Sri Lanka[a]	14 June 2000	
Ukraine	17 September 1999	20 April 2001
	27 September 1999	
United Kingdom[a]	12 November 1999	
Zambia	18 September 2001	20 October 2001
	20 October 2001	

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

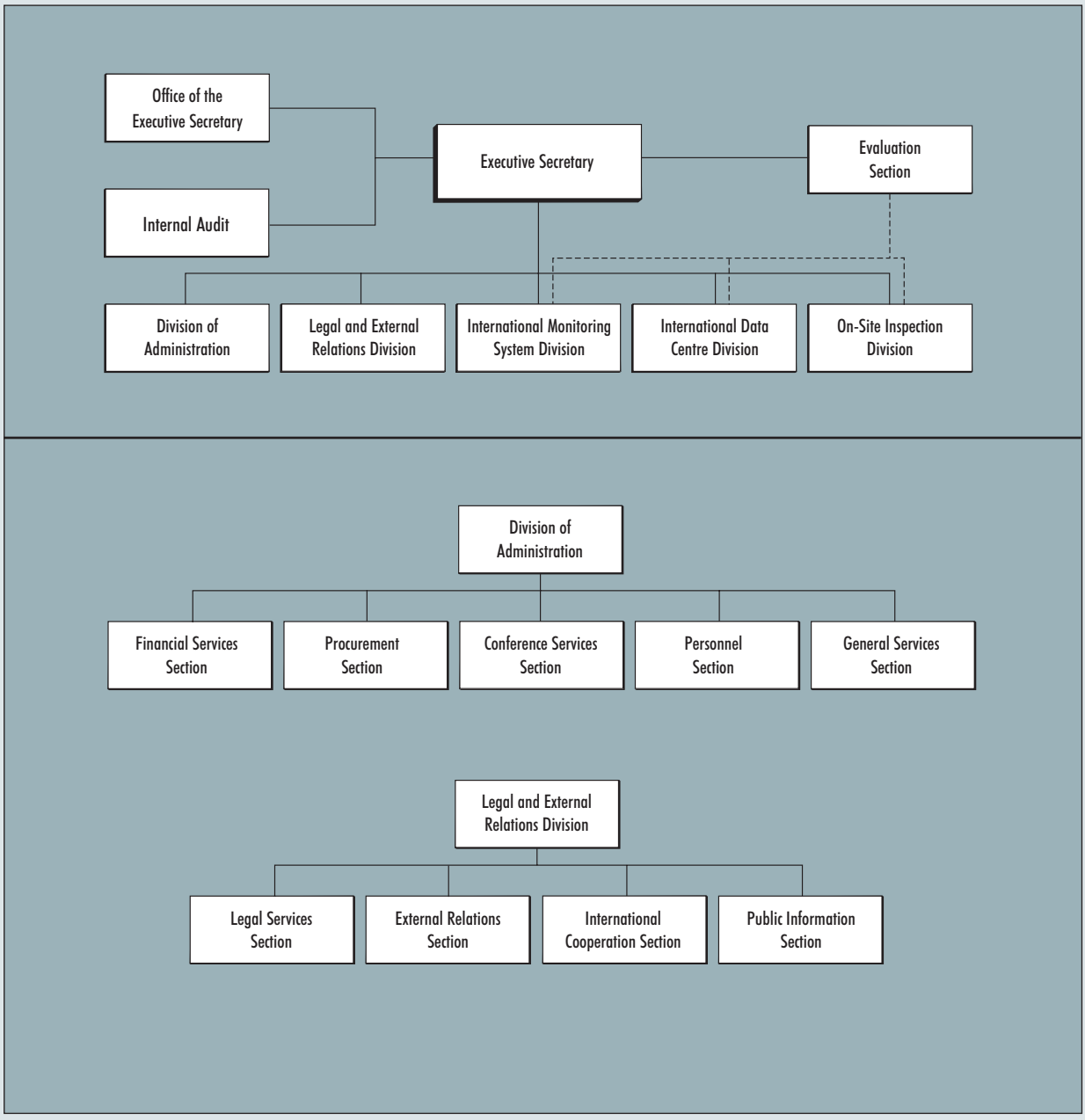
[b] Agreement has been applied provisionally since 22 May 2001.

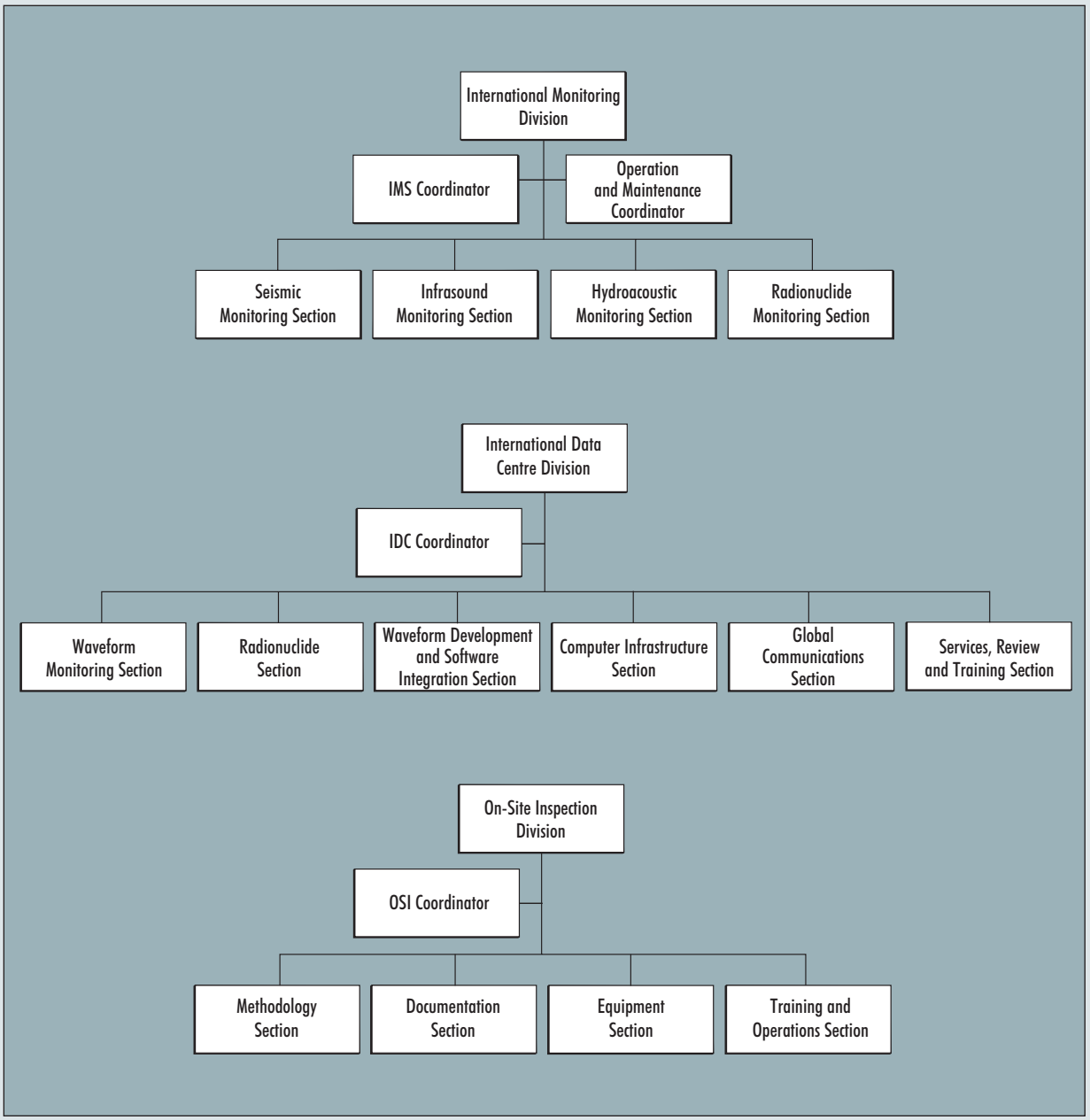
Relationship and Cooperation Agreements with Other International Organizations (31 December 2003)

International Organization and Agreement	Date of Signature	Date of Entry into Force
Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (OPANAL) Agreement between the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization and the Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean	18 September 2002	18 September 2002
European Centre for Medium-Range Weather Forecasts Agreement between the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization and the European Centre for Medium-Range Weather Forecasts	[a]	24 June 2003
United Nations Agreement to Regulate the Relationship between the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization and the United Nations	26 May 2000	15 June 2000
United Nations Development Programme Agreement between the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization and the United Nations Development Programme on the Provision of Support Services	7 December 2000	7 December 2000
World Meteorological Organization Agreement between the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization and the World Meteorological Organization	[a]	23 May 2003

[a] A protocol recording the date of entry into force was signed after that date.

Organizational Structure of the Provisional Technical Secretariat (31 December 2003)




International Monitoring Division
IMS Coordinator
Operation and Maintenance Coordinator
Seismic Monitoring Section
Infrasound Monitoring Section
Hydroacoustic Monitoring Section
Radionuclide Monitoring Section
International Data Centre Division
IDC Coordinator
Waveform Monitoring Section
Radionuclide Section
Waveform Development and Software Integration Section
Computer Infrastructure Section
Global Communications Section
Services, Review and Training Section
On-Site Inspection Division
OSI Coordinator
Methodology Section
Documentation Section
Equipment Section
Training and Operations Section

Abbreviations

ATM	Atmospheric Transport Modelling
CIF	Capital Investment Fund
DMS	Document Management System
DOTS	Database of the Technical Secretariat
EAC	Experimental Advanced Course
FE02	OSI field experiment in 2002
GCI	Global Communications Infrastructure
GSETT-3	Group of Scientific Experts Third Technical Test
IDC	International Data Centre
IMS	International Monitoring System
NDC	National Data Centre
NGO	non-governmental organization
NMS	network management system
O&M	operation and maintenance
OPANAL	Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean
OSI	on-site inspection
PIF	Pacific Islands Forum
PTS	Provisional Technical Secretariat
QA	quality assurance
REB	Reviewed Event Bulletin
SPT	system-wide performance test
TTE	tabletop exercise
TTP	technical training programme
VBO	VIC based international organization
VERTIC	Verification Research, Training and Information Centre
VIC	Vienna International Centre
VPN	virtual private network
VSAT	very small aperture terminal
WGA	Working Group A
WGB	Working Group B
WMO	World Meteorological Organization

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Throughout the document, countries are referred to by the names that were in official use in the period for which the text was compiled.

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