

# Annual Report 2001



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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.*

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This report gives an account as of 31 December 2001 of the activities undertaken by the Provisional Technical Secretariat (PTS) of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization during 2001, in fulfilment of the Preparatory Commission's programme for establishing the verification regime provided for in the Comprehensive Nuclear-Test-Ban Treaty and undertaking the necessary preparations for the implementation of the Treaty.

The report is presented in the order of the seven Major Programmes contained in the Programme and Budget of the Commission. In implementing the work programme, the PTS has established the necessary synergies within and between its Divisions and Sections responsible for the respective Major Programmes with a view to ensuring that advancement in the implementation of the various elements of the Commission's overall mandate is properly coordinated and integrated.



## Foreword

by the Executive Secretary

On 10 September 2001, the Comprehensive Nuclear-Test-Ban Treaty saw the fifth anniversary of its adoption and I am very pleased to submit herewith an annual report of the Provisional Technical Secretariat (PTS) of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization for the same year, which shows significant additional progress made in establishing the verification regime in all its aspects. Since the adoption of the Treaty, the international community has attached a high priority to it and invested significant personnel, financial and technological resources to support it. It is my pleasure to report that intensive work by the staff of the PTS and the cooperation of people working for the Treaty all over the world have brought tangible results.

During 2001, considerable achievements were made in the establishment of the International Monitoring System (IMS), which consists of a network of 321 seismic, hydroacoustic, infrasound and radionuclide stations and 16 radionuclide laboratories situated in some ninety countries around the world. By the end of the year 84% of the site surveys for the stations had been completed. Altogether 122 stations in all four technologies have been incorporated into the verification system and 104 additional stations are under construction or in the stage of contract negotiation.

The build-up of the International Data Centre (IDC), which is responsible for processing, analysing and reporting on the data received from IMS stations, is proceeding according to a seven phase Progressive Commissioning Plan. In 2001 the IDC completed Phase 4, Initial Testing, and began preparations for full scale testing. The third and last package of the IDC applications software coming from the prototype IDC was installed and entered into operational use, allowing IMS data and high quality IDC products to be provided continuously to the 387 currently authorized users from 53 States Signatories.

The installation of the Global Communications Infrastructure – a worldwide, secure satellite communications network – accelerated in 2001 with 43 new very small aperture terminals (VSATs) installed. At the end of the year, a total of 87 VSATs were operational and 150 site surveys had been completed, while 65 additional VSAT installations were at various stages of preparation.

The year 2001 saw further preparations for the on-site inspection (OSI) regime. The major achievement was the completion of the initial draft rolling text of the OSI Operational Manual. In cooperation with host countries, the PTS also organized an OSI workshop, a field experiment and an experimental advanced training course on radionuclides, which provided important contributions to the elaboration process of the OSI Operational Manual and to development of inspection methodology and procedures, equipment specifications and the inspector training programme.

## Foreword by the Executive Secretary

With regard to the promotion of the Treaty's entry into force, a major highlight of 2001 was the Conference on Facilitating the Entry into Force of the Comprehensive Nuclear-Test-Ban Treaty, held in November in New York. A total of 118 States, including 9 non-signatory States, participated in the conference and around fifty Ministers addressed the conference. The participating States reaffirmed their commitment to the Treaty. The PTS provided support and focused its outreach activities throughout the year on the conference. The year 2001 brought five new signatures and 19 ratifications, including a ratification by one of the 44 States listed in Annex 2 to the Treaty, whose ratification is required for entry into force.

Although much remains to be done to advance the universality of the Treaty and its entry into force, political support for the Treaty in 2001 was reflected in the financial support for the Commission, with payment of assessed contributions remaining high. With the regulatory framework of the Commission firmly in place, 2001 was a year of consolidation of the administrative and support functions of the PTS, with improvements being made to existing procedures and systems.

The year 2001 was also a year in which the international community experienced the unprecedented tragic terrorist attacks in New York. Since 11 September the world has been doing its utmost to secure international peace and security and to pursue measures to strengthen regimes for non-proliferation of weapons of mass destruction. I firmly believe that the work of the Commission is of particular significance in this regard and the PTS will continue to advance in its work with determination in 2002.

Wolfgang Hoffmann  
Executive Secretary

Preparatory Commission  
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Nuclear-Test-Ban Treaty  
Organization

Vienna  
March 2002

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*Cover:* Installation vessel being prepared for cable laying operations  
for hydroacoustic station HA1, Cape Leeuwin, Australia.

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# Abbreviations

CIF	Capital Investment Fund
DMS	Document Management System
DOTS	Database of the (Provisional) Technical Secretariat
ECS	Experts Communication System
GCI	Global Communications Infrastructure
GSETT-3	Group of Scientific Experts Third Technical Test
IDC	International Data Centre (Vienna)
IDRT	initial draft rolling text
IMS	International Monitoring System
IT	information technology
NDC	National Data Centre
NGO	non-governmental organization
O&M	operation and maintenance
OSI	on-site inspection
pIDC	prototype International Data Centre (Arlington, Virginia, USA)
PKI	Public Key Infrastructure
PMO	Policy-Making Organ
PTS	Provisional Technical Secretariat
QA	quality assurance
REB	Reviewed Event Bulletin
SAMS	Seismic Aftershock Monitoring System
VIC	Vienna International Centre
VSAT	very small aperture terminal
WGA	Working Group A
WGB	Working Group B
WMO	World Meteorological Organization



## Major Programme 1: International Monitoring System



## Major Programme 1: International Monitoring System

The year 2001 saw a significant consolidation and further advancement in the implementation of the International Monitoring System (IMS). All tasks that are part of the process of installing a monitoring station showed an important increase in number. In the case of site surveys, for example, this part of the programme is rapidly approaching conclusion, with 84% of the sites now finished. Installations were finished at 24 additional stations and 13 more facilities were certified as meeting all the technical requirements of the Commission, bringing the total number of certified stations to 24. In addition, the first radionuclide laboratory was certified. The number of stations certified during 2001 fell short of the goal, for reasons beyond the control of the PTS. From a technical point of view the main reason was that some types of stations and instruments were being certified for the first time, and various technical issues needed to be corrected and resolved prior to certification. This experience will help both the PTS and its IMS contractors in the future and will lead to a smoother and faster certification process.

The work and preparations undertaken in previous years started to come to fruition in 2001. A significant figure in this respect is the number of stations currently being built around the world. A total of 55 stations in the four technologies and 20 addi-

tional auxiliary seismic stations are now under construction. Excluding the auxiliary stations, the first number represents approximately one quarter of the IMS. This shows that after the necessary period of consolidation, the build-up of the IMS stations is now a more mature and structured process. It is also worth mentioning that during 2001 the IMS Division began to lay the groundwork for what will be one of its main responsibilities in the future: the operation and maintenance of IMS stations.

### ■ IMS ESTABLISHMENT

A brief summary of the status of the establishment of the IMS in each of the monitoring technologies, giving the main highlights for 2001, is presented below. The status of the site survey and station installation programmes at the end of 2001 is summarized in Tables 1 and 2. The site survey programme determines whether station locations given in the Treaty are suitable, and establishes vital information required in order to construct the stations. The installation programme encompasses site preparation, equipment purchase, installation, testing and evaluation, leading to certification that the station meets all requirements of the Commission.

IMS Station Type	Complete/ Not Required	Under Way	Contract Pending	Not Started
Primary seismic	46	0	0	4
Auxiliary seismic	113	4	0	3
Infrasound	43	7	2	8
Hydroacoustic	8	2	1	0
Radionuclide	60	5	6	9

TABLE 1. STATUS OF THE SITE SURVEY PROGRAMME AS OF 31 DECEMBER 2001

IMS Station Type	Complete/ Substantially Meets Specifications	Under Way	Contract Pending	Not Started
Primary seismic	25	16	1	8 <sup>a</sup>
Auxiliary seismic	70	20	5	25 <sup>b</sup>
Infrasound	13	11	9	27
Hydroacoustic	3	2	3	3
Radionuclide	11	25	12	32

TABLE 2. STATUS OF THE STATION INSTALLATION PROGRAMME AS OF 31 DECEMBER 2001

<sup>a</sup> Two of these stations are operational but require a major upgrade. The remaining six do not yet exist.

<sup>b</sup> Eleven of these stations exist but require a major upgrade. The remaining 14 do not yet exist.



UPGRADE OF PRIMARY SEISMIC ARRAY PS40, SONSECA, SPAIN.



COVER ON 40 METRE BOREHOLE CONTAINING SENSOR AT PS40.



WORK ON CENTRAL RECORDING FACILITY COMPUTERS AT PS40.

### Seismological Monitoring System

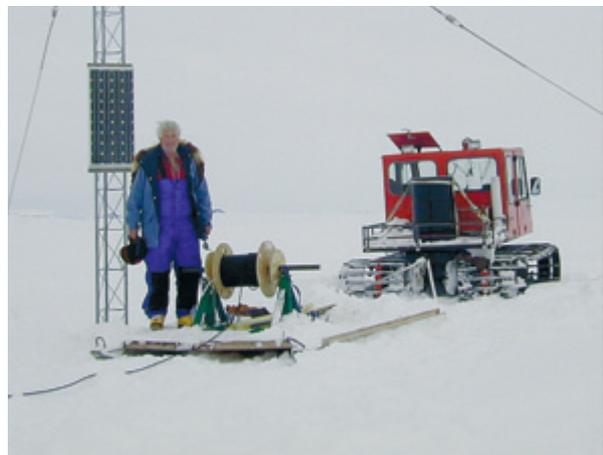
During 2001, one new site survey was completed for a primary seismic array. Installations were completed for 7 primary seismic arrays and 4 three-component stations. Six primary seismic stations were certified. Site preparation or installation was in progress for 13 primary seismic arrays and 3 three-component stations, either under contract to the PTS or under conditions of reduced assessment or national funding.

In the auxiliary seismic network, inspection visits were conducted for 10 stations and site surveys were completed for 7 stations. Installations were completed for 1 auxiliary seismic array and 7 three-component stations. Site preparation or installation was proceeding for 3 auxiliary seismic arrays and 17 three-component stations, either under contract to the PTS or under conditions of reduced assessment or national funding.

### Infrasound Monitoring System

During 2001, the infrasound monitoring programme began site survey fieldwork at isolated and difficult sites in Antarctica and on a remote island. A team of officers from all four IMS technologies undertook site surveys for three IMS stations on Tristan da Cunha in November. The first IMS station to be built by the PTS in Antarctica, IS55 at Windless Bight, was completed in 2001. A certification visit to IS55 had been planned for January 2002.

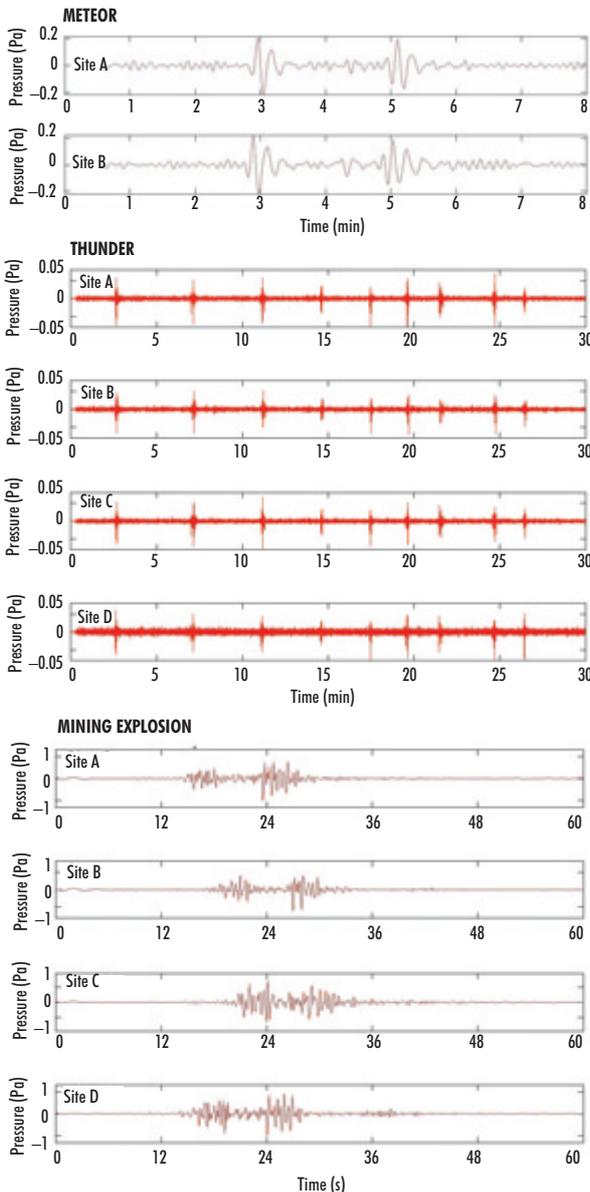
Six additional infrasound stations were completed and 5 stations were certified. Construction of 11 stations is under way and six contracts for site preparation and construction are under procurement. Two call-off contracts for provision of infrasound equipment and support services were negotiated in 2001 and orders have been placed for instruments for 7 stations.



INSTALLATION OF INFRASOUND STATION IS55, WINDLESS BIGHT, ANTARCTICA.



VIEW OF WIND NOISE REDUCING PIPE ARRAY AT AN ARRAY ELEMENT OF INFRASOUND STATION IS33, ANTANANARIVO, MADAGASCAR. INSET: INLET PORTS OF PIPE ARRAY.



EXAMPLES OF INFRASOUND SIGNALS.

A total of 62 participants from States Signatories and the PTS attended the Infrasound Technology Workshop organized by the Infrasound Laboratory of the University of Hawaii, Manoa, United States of America, in November 2001. The objectives of the workshop were to discuss results of recent developments in the field of infrasound research and to exchange ideas on techniques for modelling and analysis of infrasound data. Infrasound is not a well developed technology, and workshops of this kind assist greatly in improving the design of the stations and in advancing the infrasound data processing at the International Data Centre (IDC).

## Hydroacoustic Monitoring System

During 2001, a major achievement of the hydroacoustic monitoring programme was the completion and certification of another new hydrophone based hydroacoustic station, the most expensive type of station in the IMS. There are now two of this type of station completed and certified. Work continued on the installation of a third hydrophone based station, and a contract was signed for the manufacture and installation of a fourth. On the basis of work carried out in 2001, the site survey work on the remaining hydrophone based stations was expected to be completed by mid-2002.

The other type of hydroacoustic station, the T-phase station, uses seismometers as sensors. The certification process is almost complete for the first T-phase station. Equipment was delivered for a second such station and procurement action began for manufacture



LOADING CABLE FOR INSTALLATION OF HYDROACOUSTIC STATION HA1, CAPE LEEUWIN, AUSTRALIA.



LAYING CABLE AT HA1.

and installation at a further two stations of this type. The fieldwork was completed for the site survey of the remaining fifth T-phase station.

The PTS began work on the calibration of the Indian Ocean region for performance of the hydroacoustic stations. This work was the subject of a successful CTBTO Hydroacoustic Workshop hosted by the Scripps Institution of Oceanography in La Jolla, California, USA, in October 2001.

### Radionuclide Monitoring System

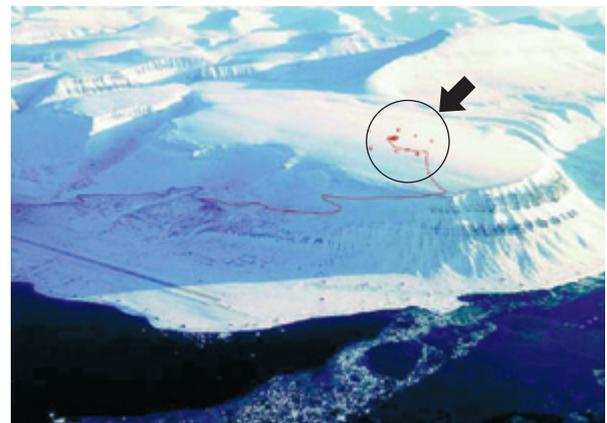
During 2001, 10 radionuclide site surveys were completed and the sites accepted; 5 additional site surveys were under way at the end of the year. Eight new stations were installed and 16 installations were in progress. Four certification visits to stations were made near the end of the year and certification of these stations is expected during the first quarter of 2002. To date, only manual radionuclide particulate stations have been certified. Procedures are now ready for the certification of automatic particulate stations.

Performance tests for two of the noble gas detection systems under consideration for deployment

in radionuclide noble gas stations were proceeding under Phase III of the noble gas experiment; the other two systems will be deployed to stations early in 2002. A noble gas workshop, conducted at the IDC in December 2001, covered topics on noble gas data processing using available software, with the aim of preparing the IDC to process the data from the two stations already installed.

The first certification of a radionuclide laboratory was completed in 2001: this was RL3 in Seibersdorf, Austria. A contract with RL3 to perform radionuclide analysis of filter samples was signed in December. A laboratory proficiency test conducted in collaboration with the National Physics Laboratory, United Kingdom, was nearing completion by the end of the year.

An informal Workshop on Radionuclide Laboratories was held in Aldermaston, United Kingdom, in January 2001. Discussions focused on the results



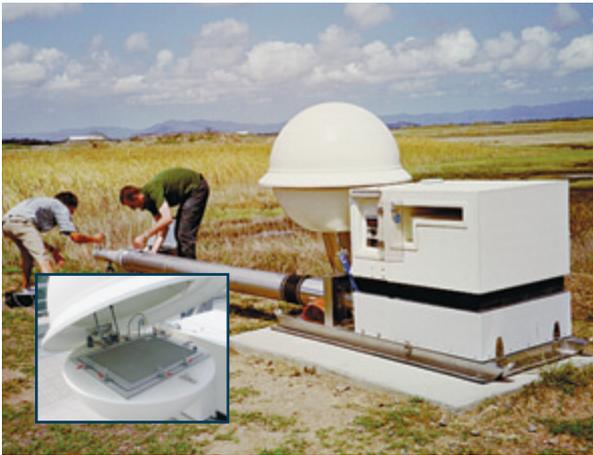
AERIAL VIEW OF SITE OF RADIONUCLIDE STATION RN49, SPITSBERGEN, NORWAY.



AUTOMATIC AIR SAMPLER AT RN49.



VIEW OF SITE OF RADIONUCLIDE STATION RN6, TOWNSVILLE, AUSTRALIA.



MANUAL AIR SAMPLER AT RN6. INSET: AIR SAMPLER OPEN TO CHANGE FILTER.

of the first laboratory proficiency test performed in the previous year. The basis for the certification of radionuclide laboratories was accepted, and the fee structure for laboratory services was established, a matter that had been under discussion for four years.

### ■ DELAYS CAUSED BY LACK OF GCI CONNECTIONS

A growing concern for the PTS is the delay in connecting some completed IMS stations to the IDC caused by the lack of a connection to the Global Communications Infrastructure (GCI). The GCI connection is lacking either because there are licensing problems with the very small aperture terminal (VSAT) at the station or because

the independent subnetwork is not yet ready. This is preventing the PTS from entering into testing and evaluation contracts with the station operators and, therefore, from bringing the stations to certification and bringing new data into the IDC. The PTS will continue to seek solutions to these problems.

### ■ TRAINING

Two Technical Training Programme courses for station operators were held in the first and third quarters of 2001. Each course contained a first part in Vienna and a second part in various institutions or firms in Australia, Austria, Canada, Finland, France, New Zealand and the USA, depending on the technology and the type of equipment installed in the stations. For the first time, firms that provided equipment were involved in training, which became more diversified according to the types of equipment used. In addition, installation contractors conducted on-site training during and after installation as part of their contracts. In total, 81 station operators from 63 IMS facilities attended one or another form of the IMS training programme in 2001.

### ■ PLANNING

#### Provisional Operation and Maintenance of Stations

A comprehensive report of the workshop on the operation and maintenance (O&M) of IMS stations held in October 2000 was presented to the Commission in 2001. The Commission adopted a number of recommendations based on the workshop report, and these are being implemented by the PTS to prepare for the provisional O&M of the IMS network. Some of these activities are described below.

A dedicated IMS group was created to coordinate O&M activities within the IMS Division. The O&M group meets periodically to address a number of tasks from the perspective of O&M.

Common operational procedures have been developed for use by the IMS Division in preparing written documentation, reporting formats and software.



These include configuration management procedures and report templates, consistent station, site and channel naming conventions, and a reporting system for managing various reports from station operators.

To develop an integrated logistics support system for the IMS, the PTS has been seeking expressions of interest from qualified organizations willing to assist in network sustainment studies and other actions.

### **Information Systems**

The IMS Division took over project management responsibility for developing specific application modules of the Database of the (Provisional) Technical Secretariat (DOTS) related to the management of the IMS network configuration and other IMS facility information. This is particularly important in the light of the increasing number of certified stations.

The IMS Division continued to develop, refine and maintain a number of interim, practical tools addressing various information issues. In cooperation with the Procurement Section, contract management tools were further enhanced for tracking the development and implementation of IMS contracts. This has helped accelerate the procurement process and thereby the build-up of the IMS.

### **EXTERNAL EVALUATION OF THE IMS MAJOR PROGRAMME**

In accordance with a decision of the Commission, an external evaluation of the IMS Major Programme was carried out in Vienna in November. All necessary preparations were made by the IMS Division in cooperation with other parts of the PTS to facilitate the work of the multidisciplinary team of experts. The evaluation report was issued in December. The PTS began to study the findings in preparation for the presentation of the report to Working Group B in February 2002.

### **FACILITIES PROPOSED BY STATES SIGNATORIES FOR DESIGNATION AS COOPERATING NATIONAL FACILITIES**

According to Article IV of the Treaty, States Parties may make available to the IDC data from national monitoring stations that are not part of the IMS once these facilities have been certified as meeting the requirements specified in the IMS Operational Manuals. The Technical Secretariat would maintain a list of such Cooperating National Facilities (CNFs). In 2001 the PTS received nominations for CNFs from a State Signatory. These will be transmitted to the Policy-Making Organs in 2002.





## Major Programme 2: International Data Centre



## Major Programme 2: International Data Centre

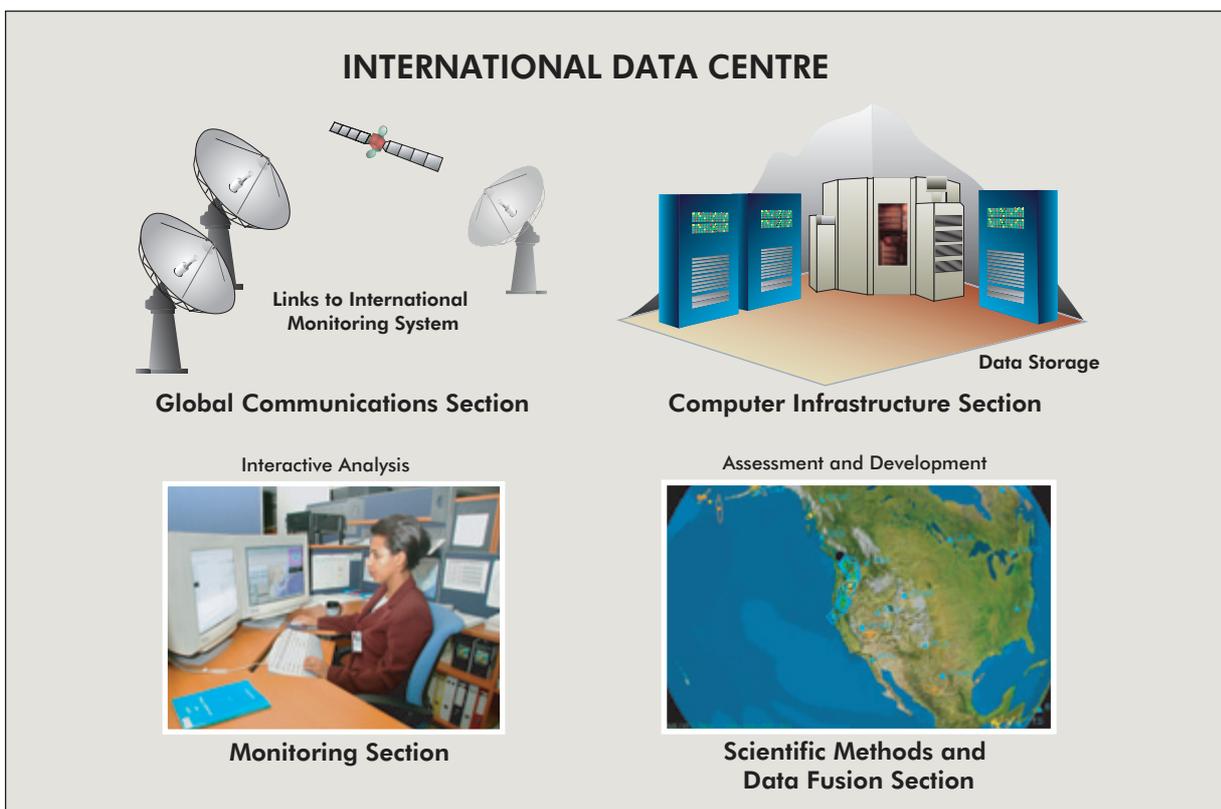
The build-up of the IDC is proceeding according to a seven phase Progressive Commissioning Plan. In 2001 the IDC completed Phase 4, Initial Testing, and started Subphase 5a, Preparation for Full Scale Testing. The IDC addressed most of the recommendations made by the team for external evaluation of the IDC. The third and last package (Release 3) of the IDC applications software coming from the prototype IDC (pIDC) in Arlington, Virginia, USA, was installed and began operational use, allowing the continuous provision of IMS data and high quality IDC products. Data from about 80 waveform technology stations (including 11 new or upgraded IMS stations admitted to operations in 2001) were analysed to produce Reviewed Event Bulletins (REBs): these contained an average of 61 events per day. Radionuclide monitoring involved the processing of spectral data from 9 stations by the end of the year, of which 4 were admitted to operations during 2001. The IDC provided 387 authorized users from 53 States Signatories with data and products. The IDC Division formed the Software Integration Unit, hiring and reallocat-

ing the necessary staff, to take full responsibility for all aspects of the IDC applications software.

### ■ MANAGEMENT, TECHNICAL COORDINATION AND TRAINING

#### Releases of Applications Software

Release 3 of the applications software was transferred from the pIDC to the IDC in December 2000. The software was installed on the IDC test bed and, after testing, on the IDC operational system. The validation test of the new release was completed on the operational system in June 2001. This is the first release for which the IDC, rather than the pIDC, has led the installation and testing processes. All work has progressed according to the plan developed by the IDC. New features of Release 3 include support for the initial version of the continuous data protocol (CD-1.1), the archiving of data at the IDC and a





new style for the secure signatory Web interface. The PTS was informed in August 2001 that Release 4 would not be provided by the pIDC, which would send only a Release 3 upgrade.

The Commission agreed that the PTS should assume full responsibility for owning, maintaining and developing IDC applications software. A Software Integration Unit was formed in February 2001 for this purpose.

### Response to External Evaluation of the IDC

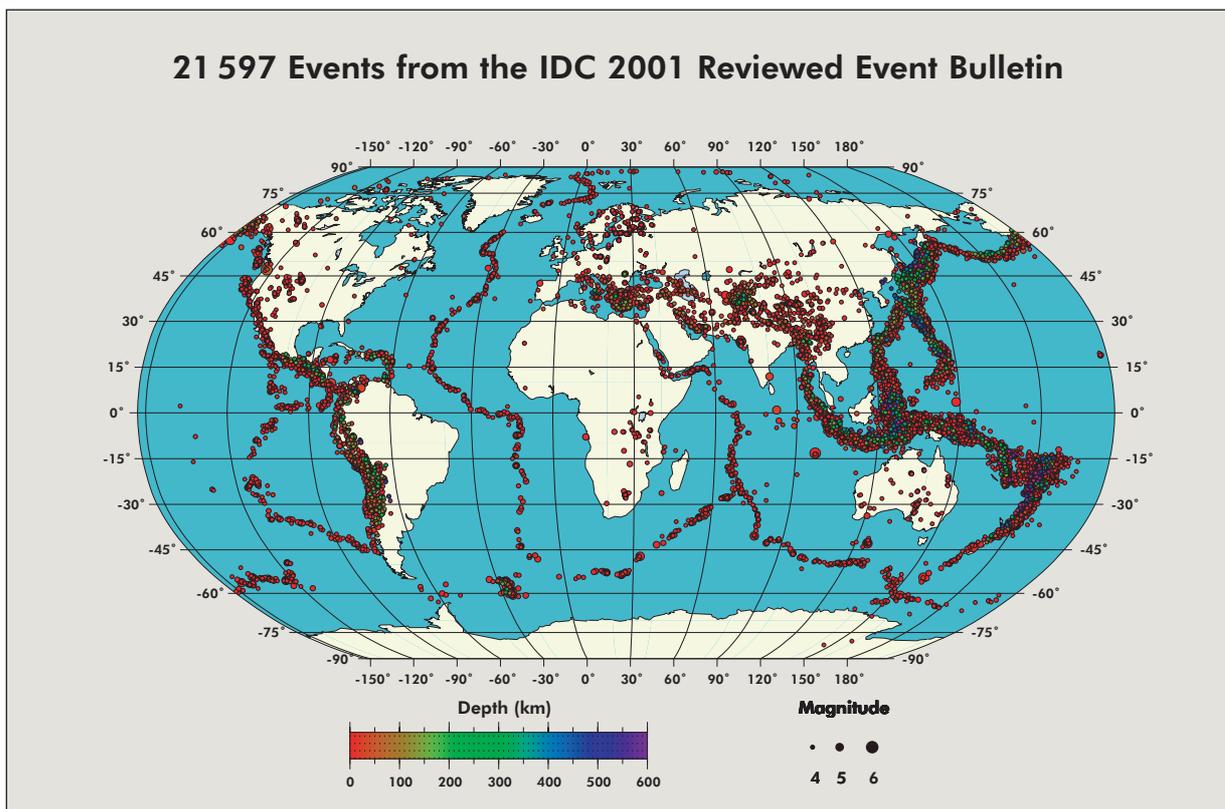
The PTS continued to address many of the recommendations made by the external evaluation team in its assessment of the IDC. One response was the development of a Medium Term Plan for the IDC, which includes objectives, requirements, strategy, specific projects, resource needs, and areas where coordination is critical to success. The plan was to be submitted to the Policy-Making Organs in early 2002.

The Directorates of the IDC and IMS Divisions also started monthly coordination meetings to consider

issues that require cooperation between the Divisions. One outcome of these meetings so far was agreement on a process for integrating the flow of data from new IMS stations, through the GCI, into the IDC test bed and the operational system. Also agreed was the use of a spreadsheet on station connection status, now available on the Experts Communication System, which shows progress in the integration of new data streams.

### Inter-Divisional Information Systems and Security Projects

The IDC Division led a number of projects that supported other Divisions within the PTS. It worked together with the Public Information Section on the new version of the public web site (<http://www.ctbto.org>), which was made accessible in April 2001. Improvements to the Experts Communication System were completed in October 2001. Working with the IMS Division, the Evaluation Section and the French authorities, the IDC Division tested the second release of the CRISTAL NG system for monitoring the state of health of the verification system. Development continued on the DOTS, which will hold information





on the IMS, GCI, National Data Centres (NDCs), Permanent Missions and points of contact.

After the new Public Key Infrastructure (PKI) was accepted in May 2001, the IDC Division began operational testing of IMS data authentication procedures that are supported by the PKI in cooperation with the IMS Division. A project to assess the overall information security of the verification system started in February and a set of security requirements was proposed. A firewall penetration test was performed and vulnerabilities discovered were reduced.

## Training

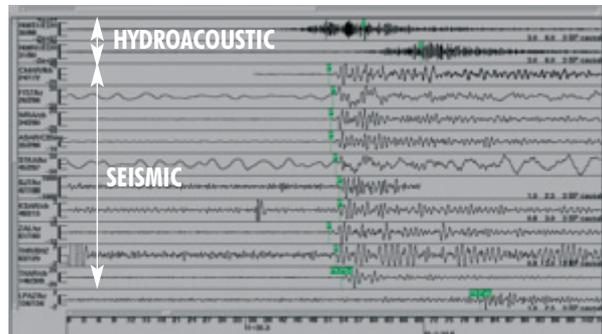
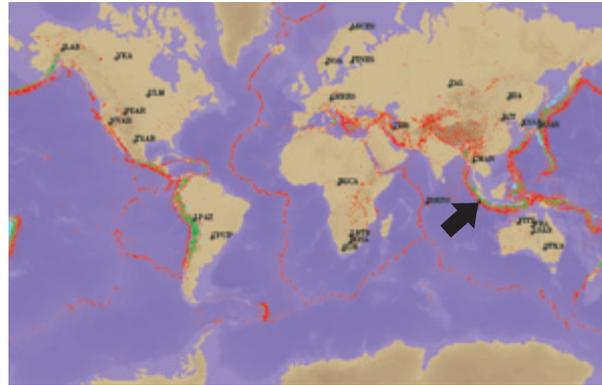
The objectives of IDC training courses are to increase the number and geographical distribution of possible candidates for posts in the IDC Division and to support the operation of NDCs. Five persons were selected for the Sixth IDC Training Course, held from February to July 2001. Four of the trainees were subsequently hired by the PTS. The fifth trainee returned to her national facility.

The objective of NDC training courses is to provide the information and instruction necessary for States Signatories to take greater advantage of the data, products and services of the IDC. Twenty-five persons from 25 States Signatories participated in the Introductory Training Course for NDC Managers, which took place in Vienna from 8 to 12 October 2001. Eleven persons from 11 States Signatories participated in the Introductory Training Course for NDC Technical Staff, which was held from 5 to 16 November. For the second week of the course, the four trainees with expertise in radionuclide technology went to the Finnish National Data Centre in Helsinki to complete their technology-specific training.

## ■ MONITORING

### Seismic, Hydroacoustic and Infrasonic Data Processing and Analysis

Testing of Releases 2.1 and 3 was carried out under near operational conditions with the participation of States Signatories. During a four week experiment in January, REBs were issued successfully within 54 hours of the end of the data day for five data days per week. Subsequent to the experiment, the IDC



SIGNALS PRODUCED BY AN EARTHQUAKE IN INDONESIA AND RECORDED BY STATIONS FROM DIFFERENT MONITORING TECHNOLOGIES.

reverted to compiling REBs for all seven data days per week, issuing these between four and six days after the end of the data day. During 2001, on average 153 and 61 events per day were compiled within the automatic Standard Event List 1 and the REB, respectively. The average number in the REB in 2000 was 52 events per day. These averages are expected to increase as new and more reliable stations and communication links are established.

In 2001 the number of new or upgraded waveform technology stations in IDC operations increased by 11 and reached 16, out of a total of about 80 stations contributing to REB production.

### Radionuclide Data Processing and Analysis

By the end of 2001, nine radionuclide stations were in IDC operations; four of these were admitted during 2001. These stations contributed approximately 2600 radionuclide spectra per month, including 270 sample spectra which were interactively reviewed. During 2001, there were seven radionuclide spectra displaying multiple anthropogenic nuclides (Level 5):



six from station ARP01 (Buenos Aires) and one from station SEP63 (Stockholm). All involved radiopharmaceutical technetium-99m in conjunction with other nuclides (iodine-131, ruthenium-103 or caesium-137). There were 75 radionuclide spectra during the year that showed a single anthropogenic nuclide (Level 4).

### Data Fusion, Review and Services

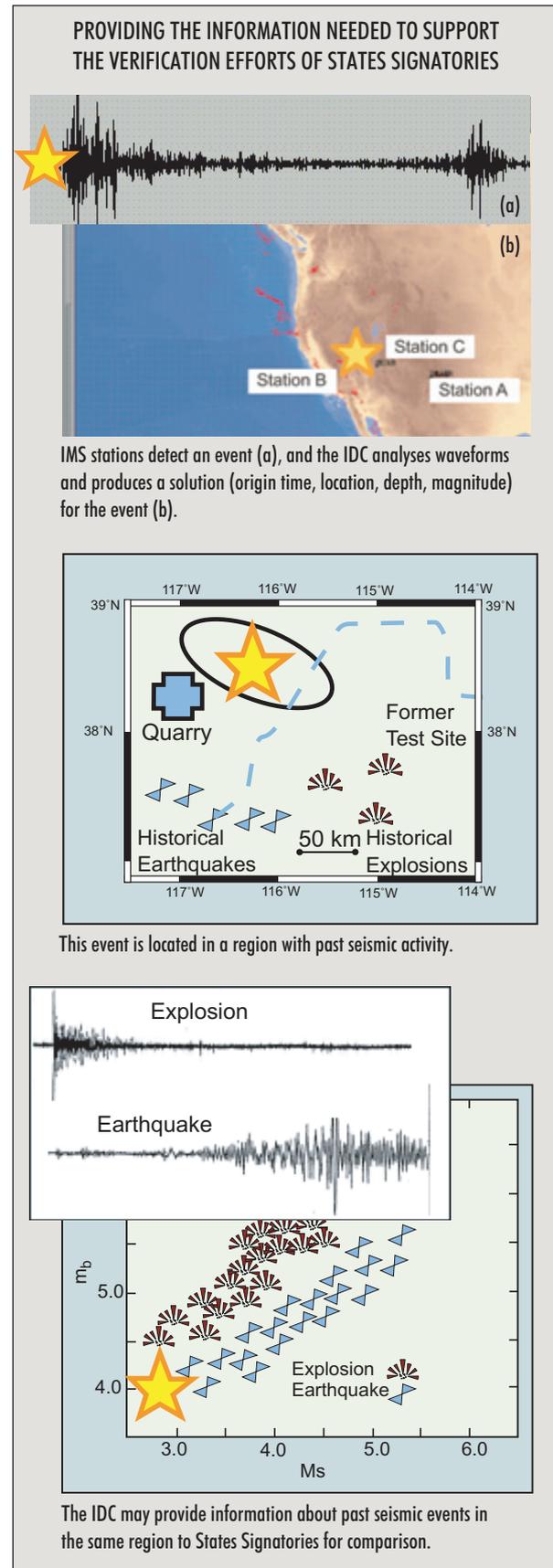
At the end of the year, 53 secure signatory accounts (one for each requesting State Signatory) had been established, with a total of 387 users authorized to access data and products and receive technical support from the IDC.

A 'five data day' exercise was conducted from 28 October to 1 November 2001 in cooperation with interested NDCs. In addition, bulletins were compared for the period from 21 October to 4 November. The goals of the exercise were to compare computations of data availability for waveform technology stations obtained by NDCs and the IDC, and to compare processing results related to specific events and spectra in order to determine the repeatability of processing and identify areas for improvement. It was planned to present preliminary conclusions to Working Group B in February 2002.

In 2001 the IDC received and resolved over 750 requests, primarily from authorized users in States Signatories but also from Permanent Missions, other PTS Divisions and the pIDC. Requests were made for technical information about the IDC, the Automatic Data Request Manager and accessing data and products, as well as for the 'NDC in a box' software. This software has been distributed to 37 States Signatories and gives NDCs the capability to process and analyse data.

### SCIENTIFIC METHODS AND DATA FUSION

As Release 4 of the applications software will not be received, the IDC shifted its focus towards independent management of software and to improvement of scientific methods. The Medium Term Plan was being used to identify critical processes and devise a framework for sustainable software development.





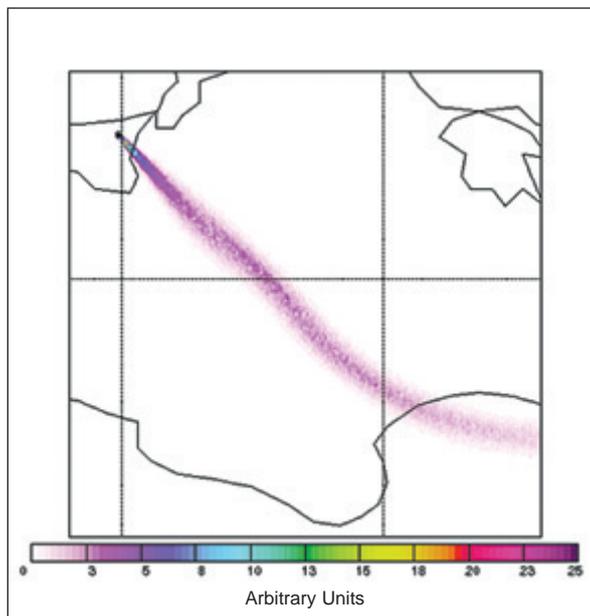
SATELLITE IMAGE OF AN ASH PLUME FROM AN ERUPTION OF MOUNT ETNA EXTENDING SOUTH-EAST OVER THE MEDITERRANEAN SEA. [COURTESY OF NOAA]

Requirements relating to overall responsibility that were unfulfilled have been identified. An ad hoc expert group convened and determined that the current IDC atmospheric transport modelling system was not performing to IDC standards. The group concluded that its recommendations could most easily be implemented by introducing state of the art transport and dispersion models available from States Signatories or from the scientific community (see also “Synergy of QA and Evaluation” in Major Programme 5). Steps were being taken to replace the existing system.

### Seismic, Hydroacoustic and Infrasonic Methods

Detailed assessments of seismoacoustic methods in Releases 2.1 and 3 examined automatic signal detection and phase identification algorithms. The automatic association and the influence of azimuth and slowness accuracy on automated event building were studied. Around sixty software patches to Release 3 were provided by the pIDC, analysed, tested, installed and transferred to the IDC test bed and operations. Verification of new functionality was started, as was the assessment to identify which of the more than two hundred software problems reported for earlier releases had been addressed in these patches.

Under the IDC calibration programme to improve the location of events based on the best available regional travel time information, eight contracts had previously been awarded to scientific organizations dealing with calibration for Eurasia and Australia. Annual reports for these contracts were



SIMULATION BY THE PTS ATMOSPHERIC TRANSPORT MODELLING TOOL OF THE PLUME CONCENTRATION FOR THE TIME AT WHICH THE SATELLITE IMAGE WAS TAKEN.

delivered and gave information on well located calibration events and improvements in the regional travel time curves.

### Radionuclide and Data Fusion Methods

The study on isotopic ratios was finalized. The Virtual Gamma Spectroscopy Laboratory, which is under development, was benchmarked through experiments carried out jointly with the National Radiation Laboratory in Christchurch, New Zealand. A convenient human-machine interface was also being developed. A study was carried out on the lead-212 chain and its manifestation in IMS spectra. Analysis of primary gamma rays and of different types of coincidence summation problems revealed the causes of a number of peculiarities in the spectra, and promises to increase the efficiency of routine analyses.

The cooperative agreement between the Commission and the World Meteorological Organization (WMO), which was signed on behalf of the Commission late in 2000, began to be applied provisionally after endorsement by the WMO Executive Council in June 2001. The Agreement will enter into force upon its approval by the World Meteorological Congress in 2003. PTS representatives participated in a meeting in September



with the WMO Commission for Basic Systems and its Emergency Response Activities Coordination Group in Washington, D.C., USA, where a more detailed cooperation plan was laid for the near future.

### **Software Integration**

The Software Integration Unit was established on 1 February 2001. While there had long been a plan to establish this Unit, its creation was accelerated in the light of the recommendation of the external evaluation team and the altered software delivery schedule from the pIDC. The importance of this organizational change was demonstrated by the prompt transfer of staff from within the IDC Division to the new Unit. The Unit is tasked to be responsible for ownership, maintenance and development of the IDC applications software.

Within the Software Integration Unit work was done to integrate the PKI within the IDC and IMS station hardware and software, improve the archiving subsystem, maintain software, manage software configuration, and develop software tools to measure data availability, timeliness and mission capability for IMS seismoacoustic stations. Several of these projects were being carried out in cooperation with other PTS Sections. A project for transferring historical GSETT-3 waveform data from the pIDC to the IDC began.

The Software Integration Unit made use of external expertise in a wide range of topics, including software assessment, development of a comprehensive software documentation framework, management of software requirements, and development of software to fill gaps in the current applications software. As part of the work to establish the framework for sustainable software development, progress was made in establishing programming, testing and documentation standards.

### **■ INFRASTRUCTURE**

During 2001, significant efforts were devoted to the administration, maintenance and operation of the computer infrastructure. Since 1999, the IDC has provided computing support for the entire PTS. Activities in this area have grown with the number of information systems deployed by the PTS. As of December 2001, an average of 15 user requests per working day were being processed, covering over 600 internal and external users and an installation base of about 1000 computers and related peripherals.

Major upgrades were made in a timely manner to the operating system, database management system and hardware systems in order to host Release 3, first on the test bed and then on the operational system. The infrastructure to support reliable and secure development, testing and operation of the PKI and the new Web and database systems mentioned above was put in place.

The mass storage system became fully operational in August, providing a platform for long term archiving of verification data. It is also used for fully automatic back-up and restoration of system configurations for all computing platforms operated by the PTS. The capacity of the mass storage system is currently 125 terabytes but is expandable. In the third quarter of 2001 the IDC made it possible for authorized users to access a synchronized copy of the IDC archive database using secure Internet access.

A monitoring tool was introduced for use in network management. It will help to increase the availability and reliability of the computer infrastructure. During the year special emphasis was put on technical documentation, with over twenty manuals being created to support users, system specialists, contractors and operators in their daily work.





## Major Programme 3: Communications



## Major Programme 3: Communications

**M**anaged by the Global Communications Section of the IDC Division, Major Programme 3 has as its main component the transport of data from the facilities of the IMS to the IDC in Vienna through the GCI, including independent subnetworks. The GCI also provides for the distribution of IMS data and IDC products from the IDC to the States Signatories, as well as the transport of ancillary data needed to satisfy those functions specified in the Protocol to the Treaty.

### ■ GCI MANAGEMENT

Building upon the quality programme developed for GCI installations, a second project was started to develop a similar quality programme for O&M. This project improved the operational framework and procedures of the Global Communications Section. On the completion of the O&M procedures, a CD-ROM was issued to points of contact for GCI remote sites that contains the specifications of the GCI equipment deployed at remote sites. It also includes procedures for the site operator to follow when assisting the PTS in diagnosing outages or in replacing GCI equipment. A follow-up project was started to measure, review and improve the quality procedures in place in both the installation and O&M programmes. This quality improvement process was expected to be completed in the first quarter of 2002.

Since November, two tables have been available on the Experts Communication System for States Signatories to review. One shows the status of the installation process for all stations and NDCs that

are part of the GCI, and the other gives the status of licensing related to each site. The tables are updated each month at the same time as the station connection table, which provides monthly figures on GCI link availability.

### ■ GCI TOPOLOGY

For the only area of serious operational concern, the Pacific Ocean region, a decision was made to move the C band communications hub from California in the USA to Sydney, Australia. This transition was planned for the second half of 2001 and was completed successfully in December. Significant progress was also made in connecting three polar region stations to the GCI through the use of shared resources with the polar region agencies of each of the countries concerned. The three stations were expected to start sending data to the IDC in the first half of 2002.

The PTS continued to work to conclude agreements or arrangements with States Signatories that are currently operating independent subnetworks. Three such agreements were signed in 2001, bringing the total to four (see also “Agreements for Independent or Partitioned Subnetworks and Host Country Agreements for Technical Meetings of the Commission” in Major Programme 7).

### ■ GCI IMPLEMENTATION

The year 2001 saw the GCI coverage continue to expand, with 43 additional VSATs installed. As of



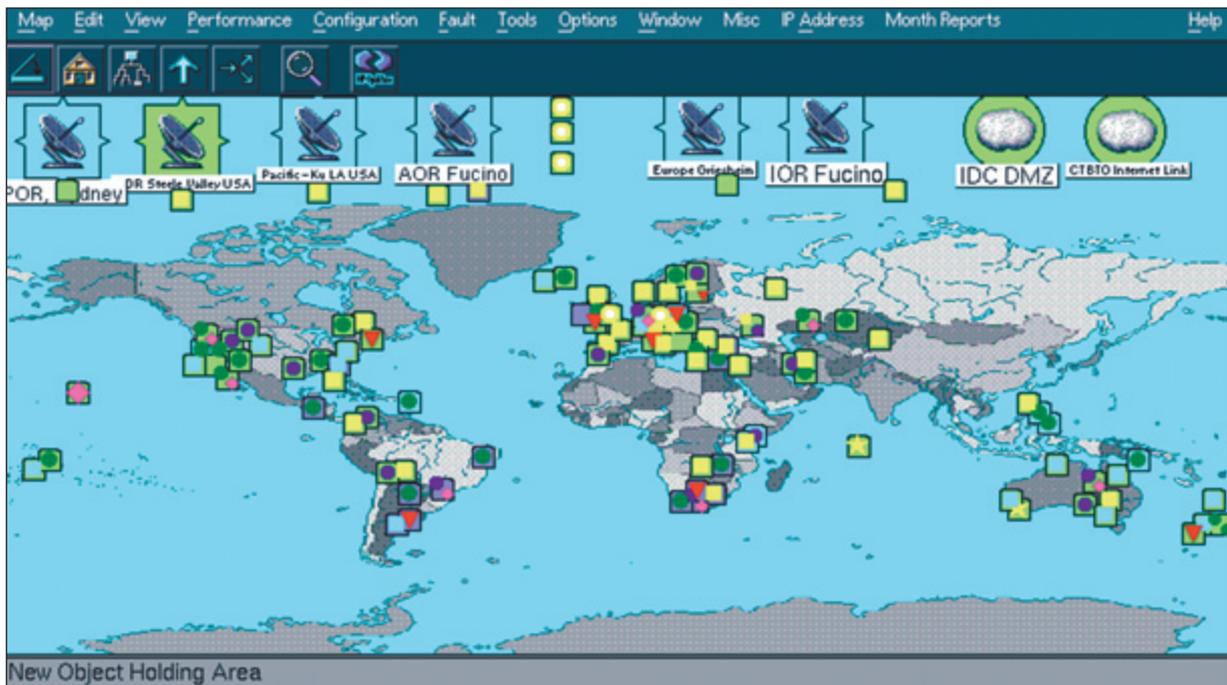
AS116, SAN JUAN, PUERTO RICO, USA.



AS81, MUNTELE ROSU, ROMANIA.



HA1, CAPE LEEUWIN, AUSTRALIA.



NETWORK MANAGEMENT SYSTEM FOR THE GCI (SCREENSHOT).

31 December, 150 GCI site surveys had been completed and VSATs had been installed at 87 sites. Significant advances included the installation of a new VSAT hub to provide Ku band coverage in the USA, and the above mentioned transfer of the Pacific Ocean region C band hub. A new subcontractor to the GCI contractor will be able to provide the necessary coverage of 24 hours a day and seven days a week. Also, a higher powered Intelsat satellite was selected, resulting in a significant improvement in the satellite link quality.

Difficulties in the licensing of VSATs continued to be the most significant obstacle to installation of new sites. Throughout the year the Commission appealed

to States Signatories for their continued support in the issuing of licences, with limited success.

Development work continued on the network management system (NMS), which provides availability and performance reports for all GCI connections. The GCI contractor was also developing a more comprehensive call tracking system, to be linked with the NMS and to provide systematic reporting of incidents and corrective actions taken. An outside consultant was retained to review the proposed design for the final domain name system (DNS). The Global Communications Section, in view of the DNS and security requirements, began reviewing the Internet protocol networking design of the GCI.



AS69, AS75 DUAL SITE, GRACEFIELD, NEW ZEALAND.



AS101, HAGFORS, SWEDEN.



PS14, EL ROSAL, COLOMBIA.



The Global Communications Section completed studies to assess the possibilities for sharing the GCI with third parties and forwarding primary data from the IDC to the NDCs of all States Signatories. The results were presented to States Signatories, which requested additional work on these matters. Experiments to verify the concept of data sharing began, and several States Signatories expressed interest in the data forwarding concept.

### ■ INTERNET COMMUNICATION

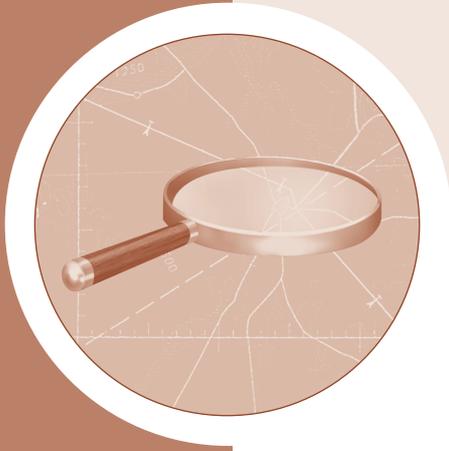
The performance of the current Internet link (2 megabytes per second) was consistent during 2001, with an average availability of 99.73%. However, one major incident occurred which adversely affected the availability of the CTBTO link to the Internet, causing a denial of service for about 10 hours. To prevent this from happening again, plans were made to install a second Internet link using a second service

provider in 2002 and the new diverse fibre connection to the Vienna International Centre (VIC) that was installed in the final quarter of 2001.

### ■ WORKSHOP

A workshop on GCI Related Topics was held from 1 to 3 October at the VIC for the purpose of training and technical discussion of the GCI. There were 57 participants representing the PTS, the GCI contractor and subcontractors and 30 participants from 19 States Signatories. The workshop focused on “Security and Networking with the GCI” as well as “GCI Design and IMS Data over the GCI”. Presentations were given on GCI performance measurement, data forwarding, disaster recovery, operations licensing, comparison of the GCI with comparable networks, and experiences of station operators. Valuable input was provided by the participants.





## Major Programme 4: On-Site Inspection



## Major Programme 4: On-Site Inspection

The primary objective of Major Programme 4 is to establish the on-site inspection (OSI) regime by the time of entry into force of the Treaty. The major elements of OSI are inspectors, equipment and the OSI Operational Manual, together with supporting infrastructures.

The year 2001 saw a continuous build-up of the OSI regime. The major achievement was the completion of the initial draft rolling text (IDRT) of the OSI Operational Manual, which was followed by the start of the elaboration phase.

### ■ DOCUMENTATION

#### Elaboration of Draft OSI Operational Manual

The elaboration of the draft OSI Operational Manual began in 2001 on the basis of the IDRT. The PTS produced a CD-ROM of the IDRT with references and hyperlinks to all contributions to the manual and distributed it together with a configured text of the IDRT to States Signatories. The PTS also provided legal consultations during the elaboration meetings of Working Group B and assisted the Task Leader in the collection, processing and distribution of States Signatories' comments on the IDRT.

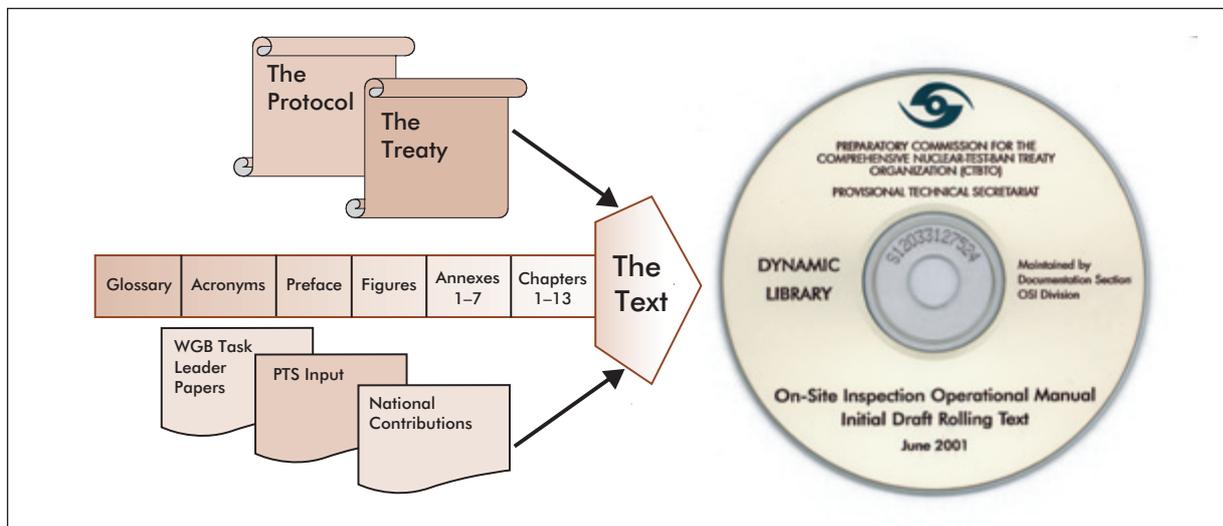
### Workshops

To assist the elaboration of the OSI Operational Manual, the PTS organized, in cooperation with the Ministry of Foreign Affairs of China, OSI Workshop-7, entitled OSI Methodology, Equipment and Operations. The workshop, held in Beijing from 15 to 19 October 2001, focused on OSI field experiments and tabletop exercises, the conduct of OSI under the managed access regime, techniques, concepts and procedures associated with additional overflights, and major inspection equipment issues.

Preparations started for OSI Workshop-8, which will take place in Vienna in June 2002. The workshop will concentrate on OSI procedures, unique equipment and field data analysis.

### ■ METHODOLOGY, INFRASTRUCTURE AND FIELD EXPERIMENTS

During 2001, methodology activities focused on field experiments aimed at furthering the elaboration of the OSI Operational Manual, and the development of plans and concepts related to the infrastructure and arrangements necessary to launch, support and conduct effective OSIs.





A



B

A, B, C: FIELD ACTIVITIES IN SLOVAKIA.

D, E: EXPERIMENTAL ADVANCED COURSE IN FRANCE.



C



D



E

## Field Experiments

To support the drafting of text for the Operational Manual and strengthen practical, experience based knowledge about OSI activities in the field, the PTS conducted a field experiment in Slovakia with the collaboration of several Slovak Government organizations. The experiment tested the effectiveness of several configurations of small arrays of the Seismic Aftershock Monitoring System (SAMS) in detecting and locating small chemical explosions that simulated aftershocks that might follow an underground nuclear explosion (see also “Testing” below). In addition, it examined numerous practical, technical and procedural aspects of transporting equipment and inspectors to the point of entry on the territory of the inspected State Party and then to the inspection area.

Building on the lessons learned from the 2001 field experiment and equipment testing, as well as the 1999 field experiment in Kazakhstan, the PTS began to work with a host country on plans for a proposed field experiment for the second half of 2002.

In simulating certain aspects of preparing an initial inspection plan, the PTS continued to develop its capability to produce maps combining data from several sources for an inspection area. With access to geographical information system databases and commercially available high resolution imagery, the PTS developed a basic capability to merge such diverse information in order to produce unique maps to assist an inspection team in planning its initial deployment of inspectors and equipment.



## Defining Infrastructure Requirements

During 2001, the PTS issued two papers describing infrastructure and logistical preparations that will be crucial to the successful launching of an OSI on the stringent time lines prescribed in the Treaty. The key logistical planning includes the prior conclusion of standing arrangements with commercial firms and other external organizations for such services as short-notice airfreight, trucking and inspector travel; maps, images and other data; auxiliary or support equipment for the inspection team; standby emergency evacuation or other support; and financial arrangements and procedures that allow the rapid provision of funds for inspectors during an OSI.

Because an inspection team must be prepared to operate in remote areas posing significant risks and hazards, the PTS drafted an initial concept for addressing all aspects of inspector health and safety. Subject to approval by States Signatories, the concept would be realized as a programme that included necessary medical monitoring and surveillance, medical capabilities available within an inspection team, standby emergency medical evacuation and other support that might be needed, and health and safety training.

## ■ TRAINING AND OPERATIONS

The aim of the OSI training activities of the PTS continued to be the development of a programme of training for future inspectors and inspection assistants and testing of its elements by means of experimental courses and tabletop exercises.

The fifth OSI Introductory Course took place from 2 to 6 July 2001 with 38 participants, consisting of experts in OSI technologies and representatives of National Authorities, from 28 States Signatories. The main topics covered were the phenomenology of nuclear explosions and the rights and obligations of inspectors and of the inspected State Party. Teamwork assignments focused on important aspects of the OSI process. To date, 180 trainees have taken introductory courses, creating a cadre of potential candidates for advanced training activities, field experiments and testing of equipment.

The second OSI Experimental Advanced Course (EAC) was conducted near Paris during 12–20

November 2001 with the cooperation of the French authorities. There were 30 participants from 16 States Signatories. The aim was to test the concept of a Technology Tracked Advanced Course and develop its curriculum for future OSI inspectors, taking radionuclide technology as the test case. As a result of practical experience gained through the EAC it was concluded that the curriculum of the full scale course should be a balanced combination of instructions to the radionuclide sub-team of an inspection team, based on radionuclide phenomenology and related parts of the OSI Operational Manual, familiarization with specific radionuclide equipment for OSI, and field exercises in gamma monitoring and radionuclide sampling and analysis.

During 2001, the PTS worked on the development of a proposal for the Long Range Plan (LRP) for the training of inspectors. For this purpose the PTS commissioned a study by an external contractor. The PTS proposal dealt with the required qualifications of the trainees and inspectors, the training courses and exercises, their curricula and training cycle, possible trainers (including their required qualifications and capabilities), costs and an implementation plan. The LRP was expected to be made ready for review by the Policy-Making Organs in early 2002.

## ■ EQUIPMENT

Table 3 summarizes the status of PTS work on the development of a list of OSI equipment, indicating the stage of approval of the initial specifications. During 2001, functional requirements and initial specifications were defined, agreed and approved for equipment for four additional techniques: magnetic field mapping, gravitational field mapping, ground penetrating radar and electrical conductivity measurement. In addition, the PTS presented for the Commission's further consideration functional requirements and technical specifications for multispectral (including infrared) imagery, resonance seismometry and active seismic surveys. Approval of these requirements and specifications is pending. As items consistent with the approved technical specifications for the handheld video camera (consumer grade) could not be obtained owing to the rapid evolution of this technology, the PTS proposed changes to the specifications initially approved.



TABLE 3. STATUS OF LIST OF OSI EQUIPMENT AND INITIAL 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 <sup>a</sup>	
		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: <sup>37</sup> Ar, <sup>95</sup> Zr, <sup>95</sup> Nb, <sup>99</sup> Mo, <sup>103</sup> Ru, <sup>115m</sup> Cd, <sup>131</sup> I, <sup>132</sup> I, <sup>132</sup> Te, <sup>131m</sup> Xe, <sup>133m</sup> Xe, <sup>133g</sup> Xe, <sup>135</sup> Xe, <sup>140</sup> Ba, <sup>140</sup> La, <sup>141</sup> Ce, <sup>144</sup> Ce, <sup>144</sup> Pr, <sup>147</sup> Nd, <sup>99</sup> Tc, <sup>106</sup> Rh	High resolution gamma spectrometer tool for field and laboratory use – ‘blinded’ or measurement restricted		
	Equipment for xenon sampling, separation and measurement		
	Argon-37 equipment for sampling, separation and measurement – not yet considered		
	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		
	Gravitational field mapping equipment		
	Ground penetrating radar		
	Electrical conductivity measurement equipment		
Drilling (para. 69(h))	Not yet considered		
Communication equipment (para. 62)	Not yet considered		

<sup>a</sup> 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).



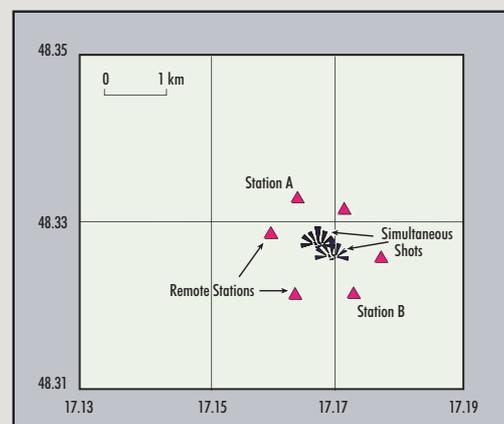
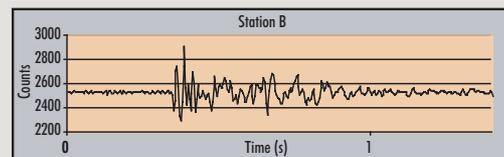
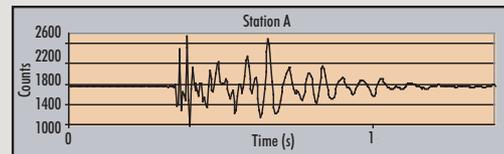
## Procurement

The types of equipment currently in the custody of the PTS are shown in Table 3. The PTS continued to devote significant effort towards obtaining a 'blinded' high resolution gamma spectrometer tool for field and laboratory use, and xenon sampling, separation and measurement equipment that matches the approved functional requirements and specifications. At the end of the year the issue remained outstanding, primarily since assessments by the PTS indicated that significant re-engineering and/or modifications are essential for both equipment items. The PTS continued to pursue efforts to acquire these items, including requesting assistance from States Signatories to make the equipment available on loan or lease, or as a donation to the PTS.

## Testing

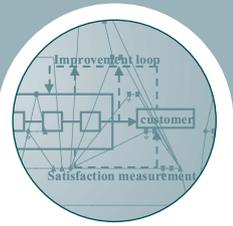
The PTS, with the assistance of experts from States Signatories, satisfactorily undertook the initial field testing of the passive SAMS as part of the field experiment in Slovakia. This afforded a further opportunity for the participants to familiarize themselves with the technical and system functionality of the SAMS and provided testing transparency as requested by the Commission. Results were being evaluated by the PTS for presentation in a technical report.

SEISMOGRAMS RECORDED AT DIFFERENT STATIONS AFTER TWO TEST EXPLOSIONS WERE FIRED SIMULTANEOUSLY TO EXAMINE SIGNAL DISCRIMINATION CAPABILITY, AS PART OF THE INITIAL FIELD TESTING OF THE PASSIVE SEISMIC AFTERSHOCK MONITORING SYSTEM IN SLOVAKIA IN OCTOBER 2001.





## Major Programme 5: Evaluation



## Major Programme 5: Evaluation

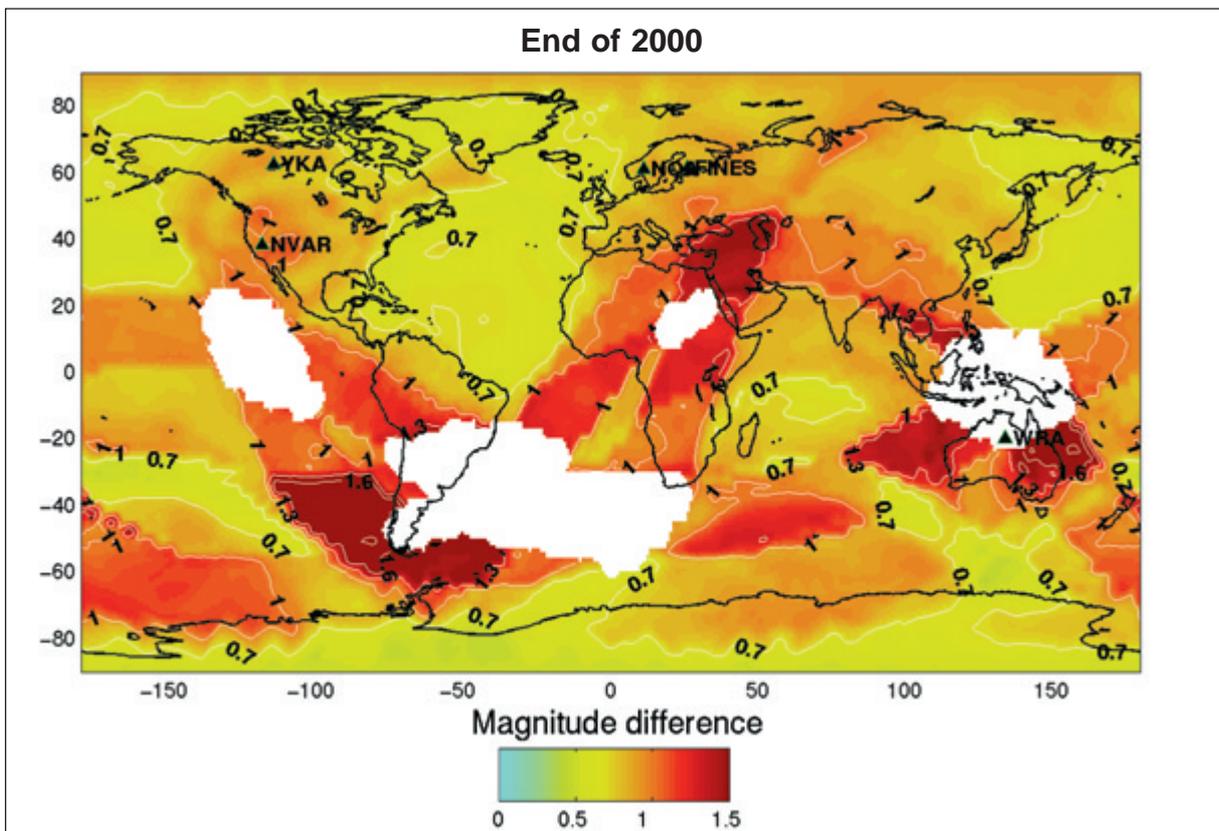
During 2001, significant progress was made in developing and implementing within the PTS an evaluation framework and a quality assurance (QA) system for the verification regime. As the implementing body for Major Programme 5, the Evaluation Section conducted its work on these two basic components in a balanced manner, while increasing the emphasis on their interactive use. New approaches were undertaken, especially through the development of synergies between evaluation and QA. Specific capabilities were further refined for contributing to an overall evaluation of the verification system and for focusing on issues related to key components and subcomponents of this system as it evolves.

ESTIMATED AUTOMATIC DETECTION CAPABILITY OF CERTIFIED IMS PRIMARY SEISMIC STATIONS AT THE END OF 2000 (BELOW) AND 2001 (OPPOSITE) RELATIVE TO THAT OF THE 49 CURRENTLY KNOWN STATIONS OF THE PRIMARY SEISMIC NETWORK UNDER IDEAL CONDITIONS (FULL STATION AVAILABILITY AND LOW BACKGROUND NOISE).

### ■ EVALUATION

Refinements were made to the Threshold Monitoring (TM) software tool, designed for interactive assessment of the performance of the IMS seismic network, especially its detection capabilities under various circumstances. These refinements included incorporation of additional functionalities, improvement of coding and preparation of documentation for the software product. For ease of comparison with TM results, various options for presenting the graphical outputs of a complementary software for seismic network simulation (NetSim) were explored. Future work on the two tools will concentrate on enhancements and routine use for evaluation purposes.

*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. The shadow zones (white) and areas with large magnitude differences (dark red) in the map for the end of 2001, when there were 11 certified stations, show a marked decrease in size relative to the end of 2000, when there were 5 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.*





Upgrade work started on another software tool (Bulcmp), which is used in comparing a seismological bulletin with a reference bulletin.

Improvements were made to the data processing and reporting capabilities of a software tool called Aatami, which is used for evaluating radionuclide technology. Efforts focused on the usability, maintainability and documentation of the software as well as on its automated usage. Technical documentation was developed on the basis of an automated system which extracts relevant technical information directly from the source code. Comprehensive tools are now available to assess the performance of IMS radionuclide stations and the quality of data processing by the IDC. A first evaluation using these tools suggested changes in the data processing that could improve the quality of automated spectrum analysis. This would reduce the need for human intervention and increase the analysis capabilities of the PTS.

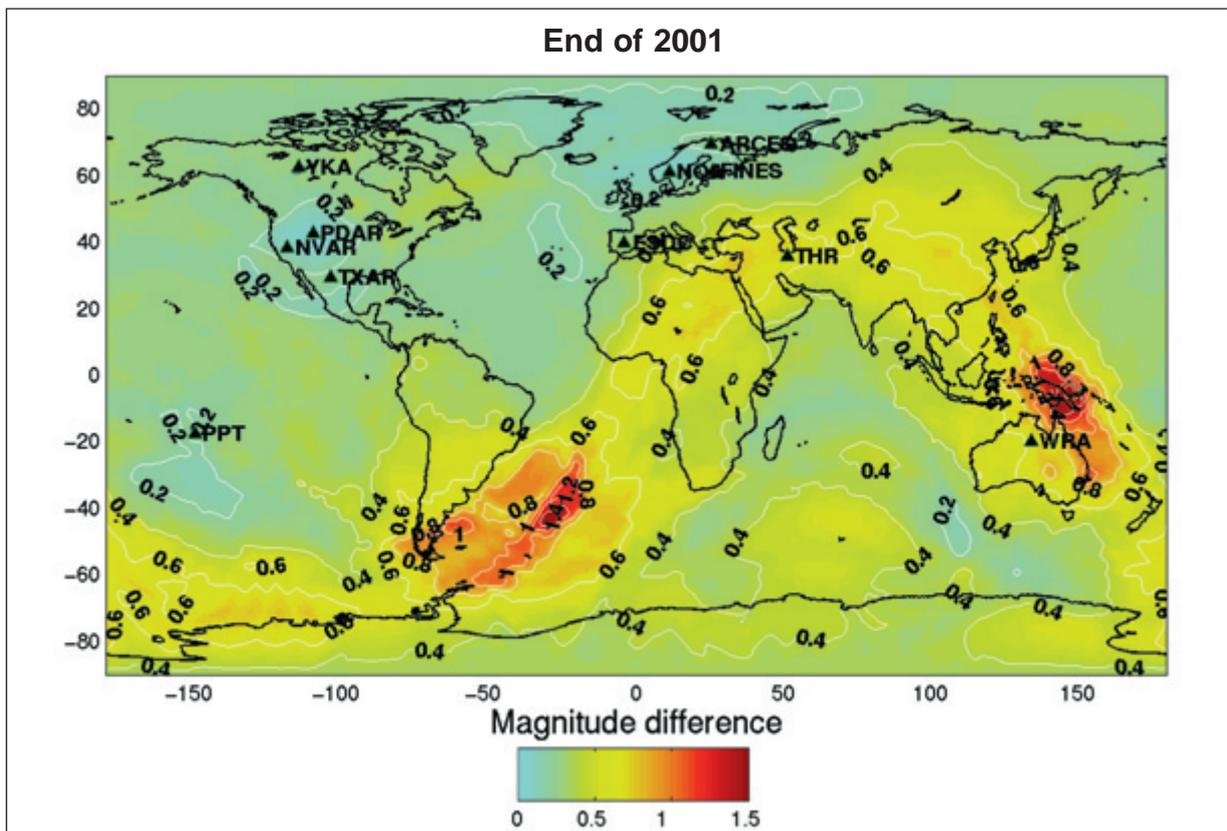
The Evaluation Section participated in the development of metrics used during the 2001 OSI field experiment in Slovakia for assessing the performances of

specific processes (e.g. the time to set up equipment). The analysis of the collected data could provide a basis for planning future work, especially in relation to time constraints and resource requirements.

## ■ QUALITY ASSURANCE

The Evaluation Section performed an evaluation of the IDRT of the OSI Operational Manual and highlighted features that could be drawn upon during the elaboration of the manual. During OSI Workshop-7 in October 2001, presentations were made of internationally agreed QA standards potentially relevant to various issues covered by the manual.

On the basis of suggestions from the Evaluation Section, Working Group B considered the possible restructuring of the draft IMS Operational Manuals. Work was then undertaken in parallel by the Task Leader for the IMS Operational Manuals and the Evaluation Section to cross-check the concepts for restructuring. Results were presented during a QA workshop (see “Workshops” below) with a view to supporting further discussions in Working Group B.





The Evaluation Section contributed to the development of the quality management system for the Global Communications Section. The work in 2001 focused on the management, operation and maintenance of the GCI, the mechanisms of coordination with all parties involved and the quality inspections of VSATs.

In cooperation with the Seismic Monitoring Section of the IMS Division and using external expertise, work was undertaken to draft a Quality Assurance Manual and technical procedures for this Section. The new manual complies with the PTS Quality Manual, the decisions of the Commission on quality matters and the latest international standards.

During 2001, work was also initiated on QA inputs for the certification of IMS stations. To date, the certification reports have consisted of high level documents referring to certification worksheets, which in turn mention voluminous technical documents in hard copy. Although this system is considered efficient, the Evaluation Section and the Seismic Monitoring Section began the study of a complementary approach using electronic documents with hyperlinks. It is considered that such an approach could lead to cost savings.

### ■ SYNERGY OF QA AND EVALUATION

The synergy component of Major Programme 5 reflects a conceptual and practical interaction between QA and evaluation as complementary means to achieve the best possible verification capabilities in terms of efficiency and value for money.

An example of this is the quality assessment of IDC applications software (Release 3). Apart from the general testing by the IDC Division of the functionality of the software, the Evaluation Section organized specific assessments of its long term maintainability based on standardized evaluation modules for tasks such as code complexity measurement and checking of programming rules. Such 'static analysis' initiated with the C programming language was extended to include other programming languages. A 'dynamic analysis' of the C software was also

undertaken. These activities led to the definition of general programming rules that may be applied to future software development.

The QA and evaluation synergy was also employed in offering specific inputs for the IMS and IDC State of Health Monitoring. The Evaluation Section contributed to the assessment of the CRISTAL NG software, especially for characteristics such as maintainability and reliability. On the basis of specific PTS software requirements, a comprehensive software acceptance test plan was developed, resulting in the formalization of reproducible test cases.

Combined QA and evaluation inputs were offered during 2001 for the evaluation of atmospheric models used at the PTS for radionuclide transport. The Evaluation Section formed an ad hoc expert group of external and PTS specialists to provide an assessment report on the performance of the atmospheric transport modelling system available at the PTS (see also "Scientific Methods and Data Fusion" in Major Programme 2).

### ■ WORKSHOPS

A workshop on Evaluation of the CTBTO Verification System by States Signatories: Enlarging Participation and Increasing Contributions was organized in cooperation with the Canadian NDC and held in Vancouver in April 2001. The participants provided recommendations for access to the IDC database and processing parameters, the follow-up of evaluation activities, and the organization of a joint evaluation exercise by the NDCs and the PTS in 2001 focusing on data availability and data product comparison. Conclusions were also drawn regarding standardized evaluation of IDC products and the exchange of software.

A workshop on Quality Assurance Issues in the Context of IMS Operational Manuals was held in Vienna in November 2001. The workshop offered QA recommendations on the drafting process, structures, outlines and contents of the IMS Operational Manuals. QA issues related to the certification and operation of IMS stations according to the provisions of the manuals were also discussed.



## Major Programme 6: Policy-Making Organs



## Major Programme 6: Policy-Making Organs

**T**he Commission was chaired for the first six months of 2001 by H.E. Ambassador Jaap Ramaker, Permanent Representative of the Netherlands, and for the second half of the year by H.E. Ambassador R.I. Rhousdy Soeriaatmadja, Permanent Representative of Indonesia. The Commission held three sessions in 2001.

The Commission's subsidiary bodies, Working Group A (WGA), Working Group B (WGB) and the Advisory Group, each met three times in 2001. WGA, chaired by H.E. Ambassador Tibor Tóth (Hungary), made recommendations, subsequently adopted by the Commission, on administrative and budgetary matters, including the legal basis for post-certification costs. WGB, chaired by

Mr. Ola Dahlman (Sweden), considered verification related issues. The duration of WGB sessions was extended to three weeks in 2001, commencing with the Fifteenth Session in June. The first week of each three week session was devoted to discussions on the draft OSI Operational Manual. The recommendations of WGB, subsequently adopted by the Commission, addressed, inter alia, the content of the 2001 and 2002 verification work programmes and the evaluation by external experts of the implementation of the IMS, IDC and Communications Major Programmes. The Advisory Group, chaired by Mr. André Gué (France), considered and provided advice on financial, budgetary and administrative issues, including financial issues relating to the Capital Investment Fund (CIF).



## Major Programme 7: Administration, Coordination and Support



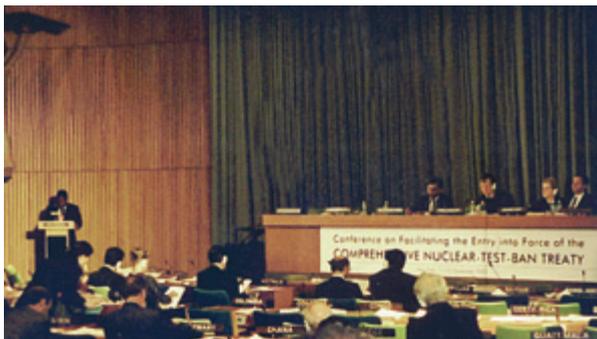
## Major Programme 7: Administration, Coordination and Support

**T**he Office of the Executive Secretary directed and managed the activities of the PTS. The Division of Administration supported the work of the PTS and the Commission in the areas of budget preparation, conference services, financial services, general services, personnel and procurement. The Legal and External Relations Division provided legal advice and services, and continued its efforts to coordinate relations with the international community, including outreach to the general public and non-governmental organizations (NGOs), to promote deeper understanding of the Treaty and the activities of the Commission, and to foster international cooperation in the exchange of verification related technologies.

### ■ ARTICLE XIV CONFERENCE

The Article XIV conference was held at the headquarters of the United Nations in New York from 11 to 13 November under the presidency of Mexico. A total of 118 States, including 74 ratifiers and 35 Signatories as well as 9 non-Signatories, participated. Ministers from around 50 countries addressed the conference. The conference adopted a Final Declaration, stressing the importance of a universal and internationally and effectively verifiable comprehensive nuclear-test-ban treaty as a major instrument in the field of nuclear disarmament and non-proliferation. States renewed their commitment to work for universal ratification of the Treaty and its early entry into force.

A PTS task force, headed by the Chief of Conference Services and comprising members from the Conference Services, External Relations, Legal Services



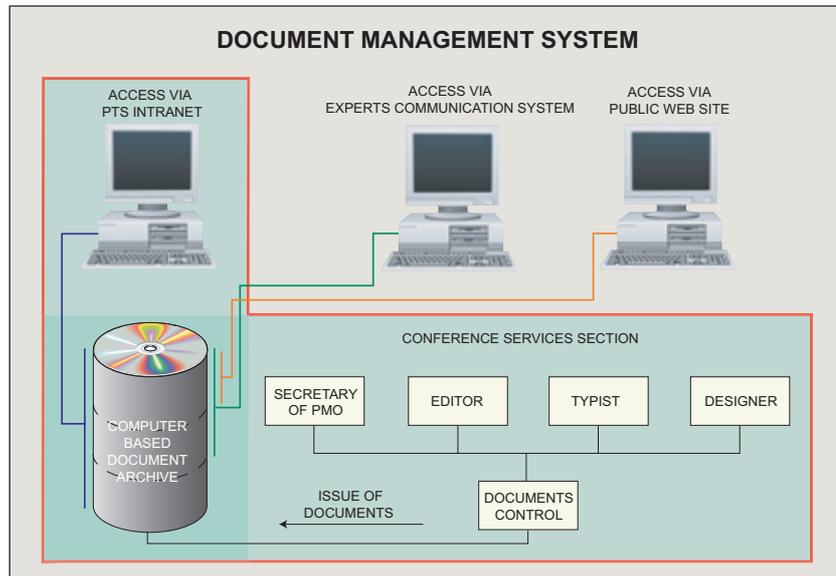
ARTICLE XIV CONFERENCE, NEW YORK, NOVEMBER 2001.

and Public Information Sections and the Office of the Executive Secretary, assisted in preparations for and the running of the conference. The provision of support to the conference was an important focus for these Sections during 2001. In particular, Conference Services provided overall coordination, supported informal consultations of States Signatories, liaised with the United Nations Secretariat in New York and prepared the PTS background document and the report of the conference. In collaboration with the United Nations Department of Public Information, the Public Information Section provided press and information support, including preparation of a press kit, press releases and press briefings, and global distribution of information materials, organized a briefing for NGOs in New York, and supported a lunchtime panel discussion organized by the Verification Research, Training and Information Centre (VERTIC). A special Article XIV conference section on the web site was developed and updated regularly.

### ■ CONFERENCE SERVICES

Staff of the Conference Services Section assisted the Chairpersons of the Policy-Making Organs (PMOs) throughout 2001 in the preparation and conduct of their meetings. Activities included provision of substantive and clerical support, drafting and editing of conference documents, including the report of each session, and operation and maintenance of equipment. During 2001, a total of 471 conference documents were prepared and distributed to States Signatories. In addition, the publishing unit, comprising two editors and a layout designer, worked to maintain high standards in the content and presentation of documents. The unit produced, inter alia, the 2000 Annual Report in the six official languages of the United Nations, the Programme and Budget Performance Report, workshop reports and technical reports.

A highlight for the Conference Services Section in 2001, achieved with the technical support of the IDC Division, was the launch of the extended Document Management System (DMS), comprising a workflow system, by means of which the conference documents of the Commission are processed online, a secure documents database and an optical storage system ('jukebox'). The system allows different levels



of access to users of the DMS Intranet client (PTS staff members), registered users of the enhanced Experts Communication System (ECS) and users of the Commission's public web site. Important advantages of the DMS are the security and reliability of the system, the fact that once documents are saved to the documents database, they can be accessed instantaneously by DMS/ECS users, and the comprehensive search function, allowing users to search for documents under several criteria.

All official Commission documents produced since the system was launched in 2001 are archived on the system. Progress has also been made in archiving pre-existing documents. To date, approximately 87% of English language documents have been archived. Work on this project continues, with the ultimate goal of providing the capability to archive and retrieve documents in all six official languages of the Commission.

A new version of the Electronic Document Archive CD-ROM, containing the reports of the First to the Fourteenth Session of the Commission, as well as other background information and documents, was distributed to States Signatories.

The Protocol Office in the Conference Services Section assisted States Signatories in accrediting their Permanent Representatives to the Commission. In 2001, 26 new Permanent Representatives were accredited, bringing the total number to 95, as compared with 93 at the end of 2000.

## ■ FINANCIAL SERVICES

The budget for 2001, at an exchange rate of 1 US dollar to 14.20 Austrian schillings, amounted to US\$83 499 500, which represented an increase of 4.4% over 2000. This increase was largely related to the continuation of the build-up of the IMS network, including increases for the GCI. Of the total budget, 83% was allocated to verification related activities, including an allocation of \$34 863 000 to the CIF. A breakdown of the 2001 Programme and Budget by Major Programme is shown in Figure 1.

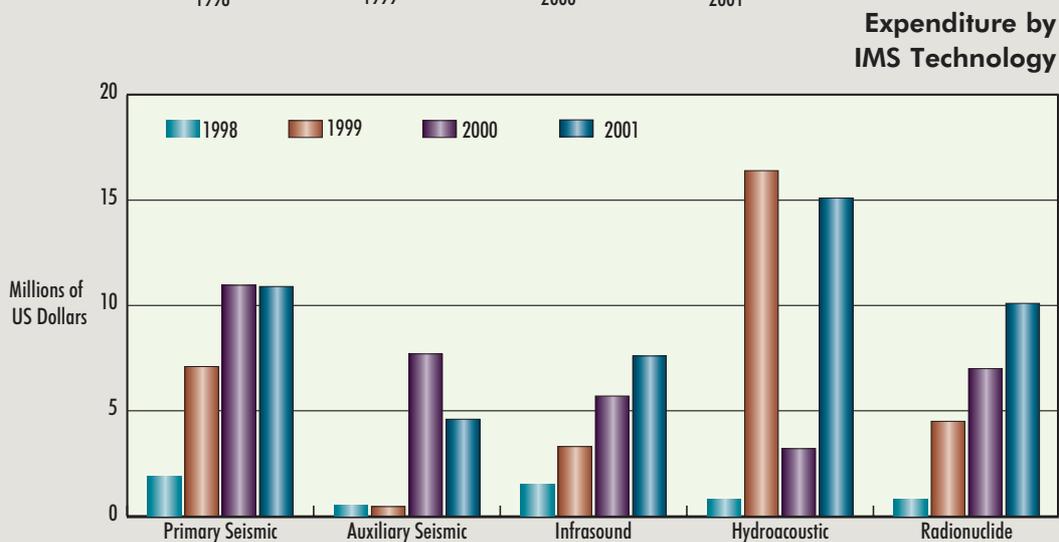
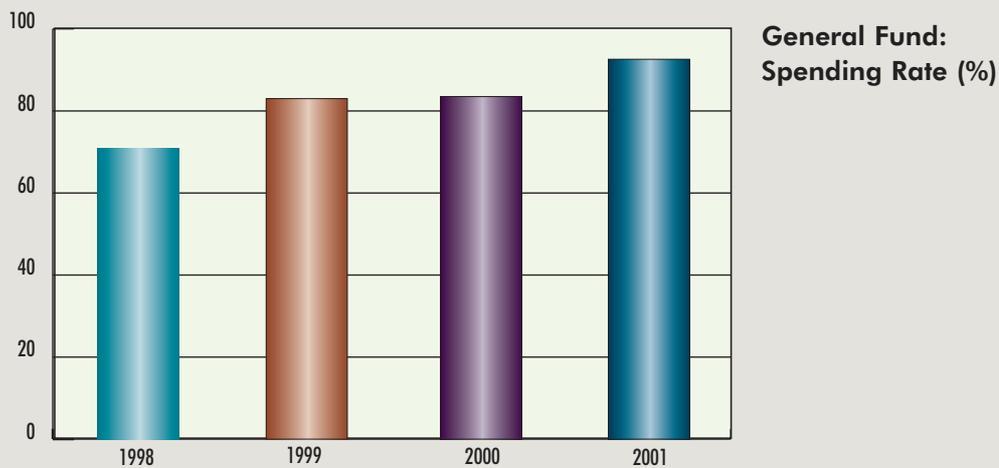
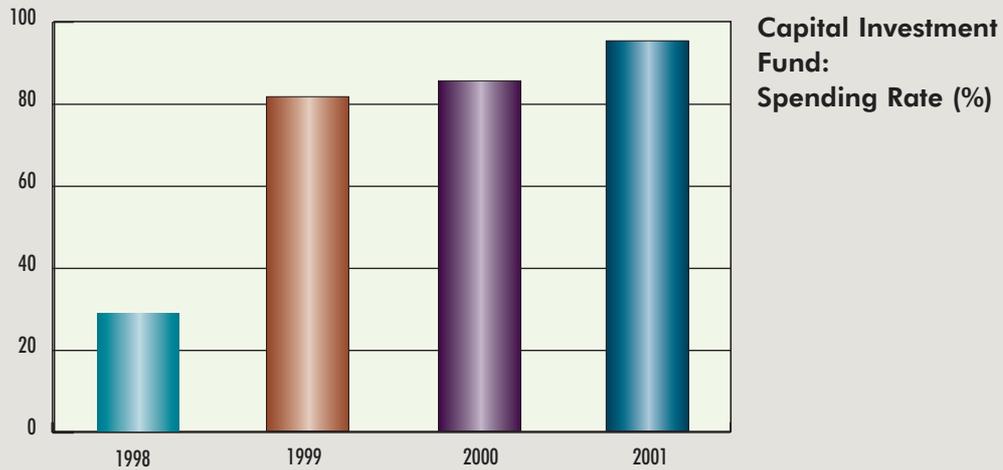
By 31 December 2001, 68 States Signatories had made full payments and 11 had made partial payments of assessed contributions for 2001, amounting to 90.03% of the total 2001 assessed contributions.

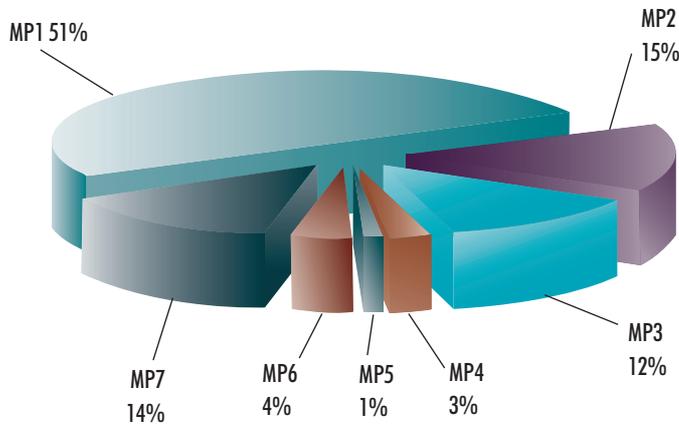
The expenditures<sup>1</sup> for the Programme and Budget in 2001 amounted to \$93.3 million, of which \$48.2 million was from the CIF. For the General Fund, the expenditure amounted to \$45.1 million<sup>1</sup>, or 92.7% of the total amount approved for the year. For the CIF, 95.1% of the allotment of \$50.7 million, which included \$17.7 million carried forward from 2000, was executed by the end of 2001, which compared well with the 85.3% implementation rate achieved in 2000. More detailed information on budget implementation can be found in the 2001 Programme and Budget Performance Report. In 2001, disbursements in the amount of \$153 768<sup>1</sup> and obligations in the amount of \$253 612<sup>1</sup> in indirect taxes were recorded by the PTS.

<sup>1</sup>The figures provided are not yet audited.



### OVERVIEW OF SPENDING IN THE PERIOD 1998–2001





Major Programme	US\$(millions)
MP1: International Monitoring System	43.0
MP2: International Data Centre	12.9
MP3: Communications	10.1
MP4: On-Site Inspection	2.3
MP5: Evaluation	0.9
MP6: Policy-Making Organs	3.0
MP7: Administration, Coordination and Support	11.3
<b>Total</b>	<b>83.5</b>

FIGURE 1. 2001 PROGRAMME AND BUDGET BY MAJOR PROGRAMME.

## ■ PROCUREMENT

The Procurement Section executed the procurement requirements of the verification and administrative Divisions, processing about 280 procurements in 2001, for a total amount of more than \$43 million. Under the GCI contract, payments for a total amount of \$6.1 million were made. Following internal discussions, market research and negotiations with the contractor, the Section concluded a contract for purchasing a Procurement Management System in December.

The Procurement Section continued to work on a draft model contract for operation and maintenance of IMS stations, in consultation with the IMS Division and the Legal Services Section.

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 the aforementioned Rule had been invoked. In 2001, 27 contracts falling into this category were concluded, with a total value of approximately \$13.2 million.

## ■ PERSONNEL

The Personnel Section secured the human resources for the operations of the PTS with a view to geographical distribution and a policy of equal employment opportunity. The Section continued to contribute to maintaining highly motivated, quality staff for all programmes. As of 31 December 2001,

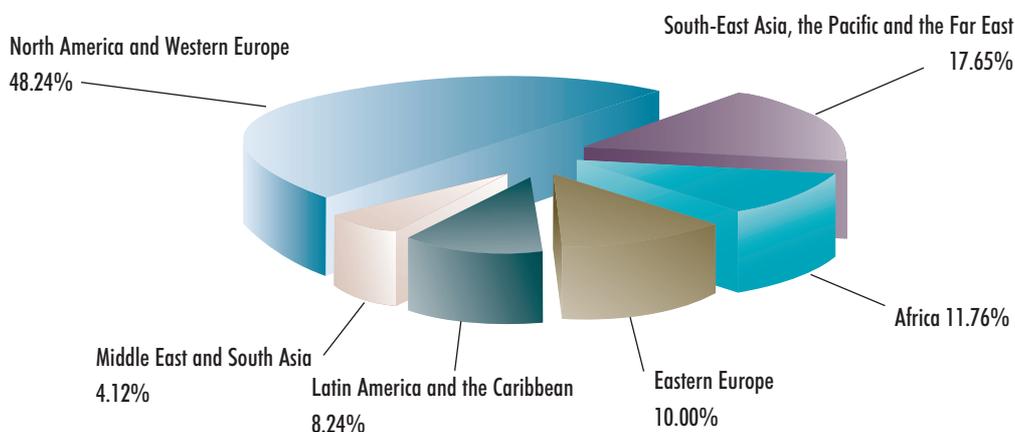


FIGURE 2. STAFF MEMBERS IN THE PROFESSIONAL CATEGORY BY GEOGRAPHICAL REGION (AS SET OUT IN ANNEX 1 TO THE TREATY).



the PTS had 268 staff members from 69 countries, as compared with 248 staff members at the end of 2000. Figure 2 provides information on the distribution of staff members in the Professional category by geographical region. Table 4 provides a breakdown of regular staff members by field of work.

The PTS continued its efforts to improve the representation of women in positions of the Professional category, which reached 27.38% at the end of 2001, as compared with 24% at the end of 2000. These efforts continued to take place against the background of low numbers of female applicants for the majority of vacancies for scientific and information technology related posts.

In addition to its responsibility for the recruitment of regular staff members in all categories, the Personnel Section took care of short term staff, consultants, cost-free experts, junior professional officers and interns. The Section also assisted in the selection of candidates of the various technical training programmes offered by the Commission. With the initial build-up of the PTS having been completed, there was a shift in the focus of the Section's work from recruitment to specific issues of staff development and staff administration. In particular, a detailed programme of staff training courses, ranging from staff orientation for newcomers to training in office, computer and information technology (IT) skills to project management, staff development and management training, was developed and implemented.

In the staff administration field, the framework provided by the Staff Regulations and Rules was refined by further developing and improving administrative practices. In particular, a new investment scheme for the Provident Fund of the Commission was introduced in cooperation with BNP Paribas/Parvest. The new scheme provides staff members the opportunity to manage their individual portfolios and to invest in euros and/or US dollars, as well as a limited range of

TABLE 4. REGULAR STAFF MEMBERS BY FIELD OF WORK

Field of Work	Professional	General Service	Total
Evaluation Section	4	1	5
International Monitoring System Division	36	16	52
International Data Centre Division	72	27	99
On-Site Inspection Division	14	5	19
<b>Total, Verification</b>	<b>126 (75%)</b>	<b>49 (49%)</b>	<b>175 (65.3%)</b>
Office of the Executive Secretary	3	3	6
Internal Audit	2	1	3
Division of Administration	23	38	61
Legal and External Relations Division	14	9	23
<b>Total, Non-verification</b>	<b>42 (25%)</b>	<b>51 (51%)</b>	<b>93 (34.7%)</b>
<b>Total</b>	<b>168 (100%)</b>	<b>100 (100%)</b>	<b>268 (100%)</b>

risk options for investing the share of their contributions not paid by the Commission.

## ■ GENERAL SERVICES

The General Services Section continued to manage and coordinate the areas of records, non-verification-related communications, maintenance and other general services, including travel and transportation documentation and services, insurance, and control of non-expendable property. The Section also had responsibility for office allocation and space management.

In 2001 the General Services Section upgraded its services, becoming the focal point for PTS security with emphasis on security of staff on duty travel, especially those travelling to dangerous areas. Public liability and cargo insurance policies were implemented.

The General Services Section was involved with the other VIC based organizations and the Austrian Government in the Asbestos (removal) Task Force. The goal is to remove all the asbestos from the VIC with utmost regard for staff health and safety. The next emphasis will be on ensuring continued PTS operations during the removal phase.

The General Services Section continued its close cooperation with the other organizations based at the VIC in the following committees: the Buildings Management Advisory Committee, the Buildings Management Working Group, the Childcare Centre Committee, the Commissary Advisory Committee



and the Joint Advisory Group on Garage Operations. The Section was also involved in completing negotiations on the Major Repair and Replacement Fund with representatives of the Government of Austria.

## EXTERNAL RELATIONS

### Signatures and Ratifications

Five States (Belize, Cameroon, Central African Republic, Libyan Arab Jamahiriya and Yugoslavia) signed and 20 States (Benin, Costa Rica, Croatia, Ecuador, Guyana, Holy See, Jamaica, Latvia, Malta, Namibia, Nauru, Nigeria, Paraguay, Philippines, Saint Lucia, Sierra Leone, Singapore, Uganda, Ukraine and Uruguay) ratified the Treaty in 2001. Ukraine is one of the 44 States listed in Annex 2 to the Treaty, whose ratification is required for entry into force. Other Annex 2 States, Algeria, China, Colombia, Indonesia and Viet Nam, informed the Commission about progress made in their national ratification processes, as did Kazakhstan, Malaysia,

Thailand and Venezuela. As of 31 December 2001, as depicted in Figures 3 and 4, the Treaty had 165 signatures and 89 ratifications, including 31 by States listed in Annex 2.

### Relations with States

The External Relations Section worked in close cooperation and coordination with the technical Divisions to enhance understanding of the Treaty and its verification regime. The Executive Secretary and staff contacted States regularly, through their Permanent Missions in Vienna, Bonn, Brussels, Geneva, New York and Missions to the Organization of American States (OAS) in Washington, D.C.; as well as through bilateral and multilateral missions. Briefings were held for the Permanent Missions in Vienna. As regards bilateral outreach, priority was given to outstanding Annex 2 States, of which the Executive Secretary visited Algeria, China, Indonesia and Viet Nam. In addition, the Executive Secretary travelled to Cambodia, Mexico, Nepal, Senegal, Singapore, Slovakia, Thailand and Turkey. Pakistan maintained observer status with the Commission and also participated as an observer at the Article XIV conference. Dialogue with India continued. Efforts at further developing contacts with the Democratic People's Republic of Korea did not meet with success in 2001.

As of 31 December 2001, 75 States had notified the Commission of their designation of National Authorities or focal points, in accordance with the provisions of Article III, paragraph 4, of the Treaty.

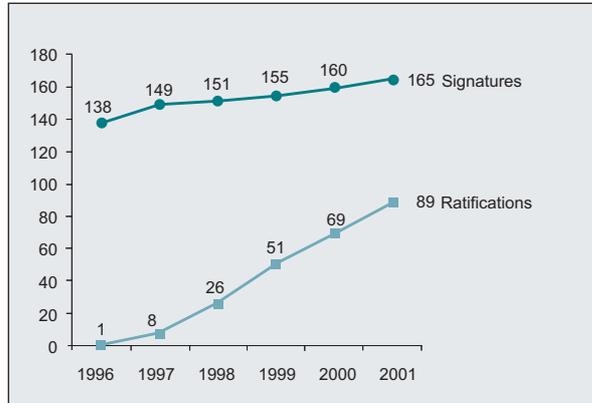


FIGURE 3. OVERALL STATUS OF SIGNATURES AND RATIFICATIONS.

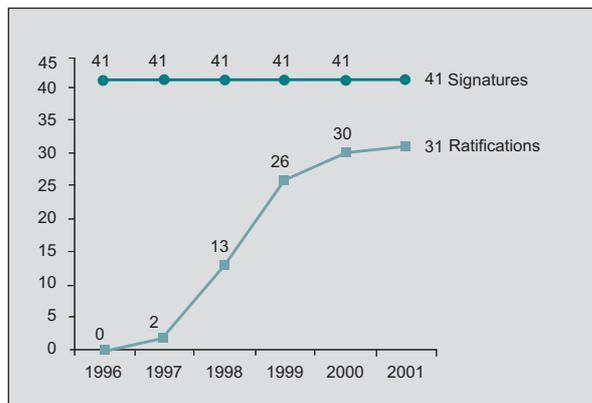


FIGURE 4. STATUS OF SIGNATURES AND RATIFICATIONS BY ANNEX 2 STATES.

### Relations with International Organizations

The Executive Secretary addressed the fifty-sixth session of the United Nations General Assembly and the forty-fourth session of the General Conference of the International Atomic Energy Agency (IAEA). He also made a presentation to the Eleventh Annual International Arms Control Conference at the Sandia Laboratories in Albuquerque, New Mexico, USA, and contributed to the seminar on Human Security and Science and Technology at the International Institute for Applied Systems Analysis (IIASA), Laxenburg. Secretariat staff attended the United Nations Asia Pacific Regional Disarmament Conference in Wellington; the



sixth Conference of the States Parties of the Organisation for the Prohibition of Chemical Weapons (OPCW) at The Hague; the fifty-third session of the WMO Executive Council in Geneva; the thirty-second Pacific Island Forum in Nauru; the thirty-seventh session of the summit of the Organization of African Unity (OAU) in Lusaka; the first Defense Threat Reduction Conference in Norfolk, USA; the annual meeting of the Legal Sector of the Southern African Development Community (SADC) in Gaborone; the thirty-first session of the General Assembly of the OAS in San José; and the seventeenth session of the General Conference of the Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (OPANAL) in Panama City.

The External Relations Section continued to develop contacts with relevant international and regional organizations and fora, so as to deepen understanding of the Treaty regime and the activities of the Commission. Contacts were initiated with the African, Caribbean and Pacific Group of States (ACP), the Association of Caribbean States (ACS), the Association of Southeast Asian Nations (ASEAN), the Commonwealth, the Economic Community of West African States (ECOWAS), the League of Arab States and the Organization for Security and Co-operation in Europe (OSCE).

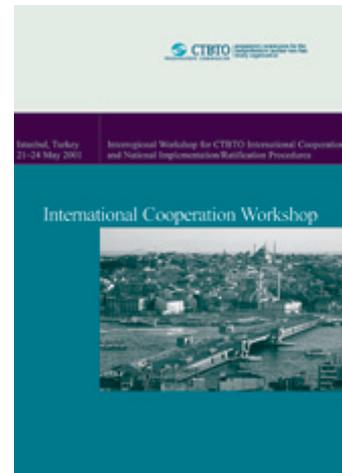
### ■ INTERNATIONAL COOPERATION

The International Cooperation Section continued to assist in promoting cooperation among States Signatories to facilitate exchanges related to technologies used in the verification of the Treaty, thereby assisting in furthering their understanding and capabilities in the Treaty technologies. Within the PTS, the Section liaised with the verification Divisions so as to provide States with effective and reliable international cooperation services.

#### Workshops

With the strong support of the Governments of New Zealand, Turkey and Senegal, the International Cooperation Section was involved in the organization of three workshops, two subregional and one inter-regional, on CTBTO International Cooperation: in Wellington in March; in Istanbul in May; and in

PROCEEDINGS OF  
ISTANBUL WORKSHOP,  
MAY 2001.



PARTICIPANTS OF DAKAR  
WORKSHOP,  
NOVEMBER 2001.



Dakar in November 2001. The workshops successfully reviewed and discussed a wide range of issues, and suggested various measures to facilitate the early establishment of the verification regime as well as to enhance national verification capabilities. The Section also held preliminary discussions with States on workshops planned for 2002.

#### Support for the Establishment of the Verification Regime

Several technologically advanced States provided support through the International Cooperation Section to States to enhance their national technical capabilities and to facilitate IMS station installations, as well as for the establishment of NDCs.

The International Cooperation Section coordinated the implementation of a Finnish training course on



NDC operation for experts from developing countries. The Section also worked on the realization of projects in coordination with other donor governments. The French Government offered a technical training programme for IMS station operators from a developing country in Africa. The Government of the Netherlands made a voluntary contribution to support information visits for representatives from developing countries.

In addition, at the request of a developing country from the African region, the International Cooperation Section provided basic IT equipment and software for the establishment and operation of its NDC, and responded to requests from two developing countries for support in the translation of the Treaty into their national languages.

## Database

The International Cooperation Section continued to refine its database capability on the basis of inputs from States, including the database of scientific meetings of interest for researchers in verification related technologies.

## ■ LEGAL SERVICES

During 2001, the Legal Services Section provided advice to the Commission, States Signatories and the PTS on issues related to the establishment of the verification regime and on administrative, financial, contractual and personnel matters. With regard to agreements and arrangements concluded by the Commission, the main activities were as follows.

### IMS Facility Agreements or Arrangements and Interim Exchanges of Letters

IMS facility agreements and arrangements regulate the activities of the Commission on the territory of States, including the conduct of site surveys, installation or upgrade work, the certification of facilities and provisional operation and maintenance. Four new IMS facility agreements or arrangements were concluded in 2001, bringing the total number of concluded agreements or arrangements to 19. Of these, as illustrated in Table 5, 12 have entered into force and 2 are being applied provisionally.

TABLE 5. STATES WITH WHICH IMS FACILITY AGREEMENTS OR ARRANGEMENTS HAVE BEEN CONCLUDED

Argentina <sup>a</sup>	Kenya	South Africa
Australia	Mongolia	Spain <sup>b</sup>
Canada	New Zealand	Sri Lanka <sup>a</sup>
Cook Islands	Niger	Ukraine
Finland	Peru <sup>a</sup>	United Kingdom <sup>a</sup>
France <sup>a</sup>	Senegal <sup>b</sup>	Zambia
Jordan		

<sup>a</sup> Agreement or arrangement has not entered into force.

<sup>b</sup> Agreement is being applied provisionally.

Six interim exchanges of letters were also completed authorizing the Commission to undertake activities in States hosting IMS monitoring facilities, pending the conclusion of a formal facility agreement or arrangement. At the end of 2001, appropriate legal arrangements were in place for a total of 303 facilities in 72 countries.

### Agreements for Independent or Partitioned Subnetworks and Host Country Agreements for Technical Meetings of the Commission

Following the approval by the Thirteenth Session of the Commission of a model agreement on the payment of allowances to States operating independent or partitioned subnetworks, agreements based on the model were concluded with Canada, France and Norway in 2001. The Legal Services Section assisted in the drafting and negotiation of 21 agreements or arrangements for technical meetings held in Austria, Canada, China, Finland, France, New Zealand, Senegal, Slovakia, Turkey, the United Kingdom and the USA on the basis of the model approved by the Eleventh Session of the Commission.

### Relationship Agreements with Other International Organizations

In accordance with the Agreement to Regulate the Relationship between the Preparatory Commission and the United Nations, the PTS continued to seek the full participation of the Executive Secretary in the coordinating body of the United Nations family



of organizations, the Administrative Committee on Coordination (ACC) or Chief Executives Board for Coordination, as it has been renamed. Pursuant to the provisions of the Support Services Agreement with the United Nations Development Programme, a review of that agreement was undertaken in December 2001, one year after the agreement had been concluded, and both parties agreed to the continued usefulness of the agreement in the implementation of their respective mandates.

Following the approval by the Commission in November 2000 of the Agreement between the Commission and the WMO, the WMO Executive Council endorsed the Agreement in June 2001 (see also "Radio-nuclide and Data Fusion Methods" in Major Programme 2). Until its entry into force, the secretariats of the two organizations will cooperate provisionally in accordance with the Agreement.

### Host Country Agreement

The Legal Services Section advised on the interpretation and implementation of the Host Country Agreement with Austria. In addition, a draft supplemental agreement to the Host Country Agreement regarding the application of Austrian radiation safety standards to relevant activities of the Commission at the VIC was prepared by the Section.

## PUBLIC INFORMATION

### Overview

In addition to the focus on the Article XIV conference, the Public Information Section continued its regular outreach work throughout 2001. Nine issues of *CTBTO News* were produced. Briefings were held for and contacts developed with NGOs, academics and diplomatic audiences. The Chief of the Section participated in the Joint United Nations Information Committee (JUNIC) annual meeting in Geneva, and represented the Commission on the United Nations Secretary-General's Group of Governmental Experts to Prepare a United Nations Study on Disarmament and Non-Proliferation Education. Over 3700 public information materials were distributed.

### Media Outreach

In 2001 the Public Information Section sent out 30 press releases and three media advisories. Four press conferences were arranged in Vienna. The Section also arranged for several media interviews with the Executive Secretary and other staff and prepared speeches for senior staff during the course of the year. A media visit to the OSI field experiment in Slovakia was arranged in October.

### Web Site, Publications and Outreach Materials

The redesigned and restructured public web site was launched in April 2001, and the home page was updated, on average twice a month. In addition, all outreach materials, press releases and media advisories were posted on the World Wide Web. The Public Information Section produced the six-booklet *Basic Facts* series and a brochure on the Treaty and the Commission. It also updated on a regular basis computer based presentations on the Treaty and the work of the Commission.

The screenshot shows the home page of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization. It features a navigation menu on the left with links to Press Centre, The Treaty, Signature and Ratification, Preparatory Commission, Verification Regime, Reference, and Opportunities. The main content area includes a 'Did you know?' section with a nuclear explosion image, a 'Highlights' section with a photo of the Executive Secretary, and a 'Treaty Status' table. The table lists 108 Member States, 66 Total Ratifications, and 38 Annex 2 Ratifications. It also identifies the latest State Signatory as Algeria (Senegal) and the latest Ratifying State as Kenya. Below the highlights, there are news items: one about the new Permanent Representative, H.E. Martin Wilkens, Sweden, presenting his credentials; and another about the certification of three International Monitoring System stations in Finland, Australia, and the British Indian Ocean Territory. At the bottom, there is a 'Who we are' section and a copyright notice for 2001.

Treaty Status	
Member States:	108
Total Ratifications:	66
Annex 2 Ratifications:	38
Latest State Signatory:	Algeria Senegal
Latest Ratifying State:	Kenya

HOME PAGE OF THE COMMISSION'S WEB SITE.



*BASIC FACTS SERIES.*

## Corporate Identity

The PTS has almost completed a project to develop a corporate identity which is intended to serve the Commission until entry into force, and, with appropriate modifications, in the years following. The Public Information Section led this project, organizing task force meetings and briefings, and liaising with the selected design company. The Commission approved an enhanced emblem as part of the corporate identity project.

## ■ INTERNAL AUDIT

In 2001 Internal Audit conducted audits and reviews on the following subjects: bank reconcilia-

tion statements prepared by the Financial Services Section (to ascertain accuracy and agreement of cash in bank balances as reflected in accounting books as of 31 December 2000 with the bank balances confirmed with depositary banks of the same date); imprest fund holders and the use of business credit cards in payment transactions; consultants and consultancy agreements; rental subsidy; and procurement transactions, with the focus on IMS contracts and purchase orders funded by the CIF. Internal Audit also began a follow-up review of payroll and payroll related transactions and calculated the distribution of the interest earned in the Provident Fund in 2001, as well as the establishment of balances of accumulated capital and interest for transfer to the new investment manager, BNP Paribas/Parvest. Internal Audit was involved in the selection of the investment manager for the Provident Fund, including reviewing the draft contract with BNP Paribas/Parvest.

Internal Audit rendered advice regarding proposed changes and amendments to the GCI contract. It also provided advice regarding the streamlining of invoice control and certain procurement functions, and submitted comments on CIF Multi-year Obligations and the Legal-Finance Review Team's role in ensuring adequate funding for proposed contracts. Internal Audit liaised with the External Auditor with regard to follow-up on the recommendations contained in the 2000 report of the External Auditor.





## Supplementary Information



**States Whose Ratification is Required for the Treaty to Enter into Force  
(31 December 2001)**

31	Ratified
10	Signed
3	Not signed

State	Date of Signature	Date of Ratification
Algeria	15 October 1996	
Argentina	24 September 1996	4 December 1998
Australia	24 September 1996	9 July 1998
Austria	24 September 1996	13 March 1998
Bangladesh	24 October 1996	8 March 2000
Belgium	24 September 1996	29 June 1999
Brazil	24 September 1996	24 July 1998
Bulgaria	24 September 1996	29 September 1999
Canada	24 September 1996	18 December 1998
Chile	24 September 1996	12 July 2000
China	24 September 1996	
Colombia	24 September 1996	
Democratic People's Republic of Korea		
Democratic Republic of the Congo	4 October 1996	
Egypt	14 October 1996	
Finland	24 September 1996	15 January 1999
France	24 September 1996	6 April 1998
Germany	24 September 1996	20 August 1998
Hungary	25 September 1996	13 July 1999
India		
Indonesia	24 September 1996	
Iran (Islamic Republic of)	24 September 1996	
Israel	25 September 1996	
Italy	24 September 1996	1 February 1999
Japan	24 September 1996	8 July 1997
Mexico	24 September 1996	5 October 1999
Netherlands	24 September 1996	23 March 1999
Norway	24 September 1996	15 July 1999
Pakistan		
Peru	25 September 1996	12 November 1997
Poland	24 September 1996	25 May 1999
Republic of Korea	24 September 1996	24 September 1999
Romania	24 September 1996	5 October 1999
Russian Federation	24 September 1996	30 June 2000
Slovakia	30 September 1996	3 March 1998
South Africa	24 September 1996	30 March 1999
Spain	24 September 1996	31 July 1998
Sweden	24 September 1996	2 December 1998
Switzerland	24 September 1996	1 October 1999
Turkey	24 September 1996	16 February 2000
Ukraine	27 September 1996	23 February 2001
United Kingdom	24 September 1996	6 April 1998
United States of America	24 September 1996	
Viet Nam	24 September 1996	



### Status of Signature and Ratification of the Treaty (31 December 2001)

State	Date of Signature	Date of Ratification
Afghanistan		
Albania	27 September 1996	
Algeria	15 October 1996	
Andorra	24 September 1996	
Angola	27 September 1996	
Antigua and Barbuda	16 April 1997	
Argentina	24 September 1996	4 December 1998
Armenia	1 October 1996	
Australia	24 September 1996	9 July 1998
Austria	24 September 1996	13 March 1998
Azerbaijan	28 July 1997	2 February 1999
Bahamas		
Bahrain	24 September 1996	
Bangladesh	24 October 1996	8 March 2000
Barbados		
Belarus	24 September 1996	13 September 2000
Belgium	24 September 1996	29 June 1999
Belize	14 November 2001	
Benin	27 September 1996	6 March 2001
Bhutan		
Bolivia	24 September 1996	4 October 1999
Bosnia and Herzegovina	24 September 1996	
Botswana		
Brazil	24 September 1996	24 July 1998
Brunei Darussalam	22 January 1997	
Bulgaria	24 September 1996	29 September 1999
Burkina Faso	27 September 1996	
Burundi	24 September 1996	
Cambodia	26 September 1996	10 November 2000
Cameroon	16 November 2001	
Canada	24 September 1996	18 December 1998
Cape Verde	1 October 1996	
Central African Republic	19 December 2001	
Chad	8 October 1996	
Chile	24 September 1996	12 July 2000
China	24 September 1996	
Colombia	24 September 1996	
Comoros	12 December 1996	
Congo	11 February 1997	
Cook Islands	5 December 1997	
Costa Rica	24 September 1996	25 September 2001
Côte d'Ivoire	25 September 1996	
Croatia	24 September 1996	2 March 2001
Cuba		
Cyprus	24 September 1996	

89	Ratified
76	Signed
28	Not signed



State	Date of Signature	Date of Ratification
Czech Republic	12 November 1996	11 September 1997
Democratic People's Republic of Korea		
Democratic Republic of the Congo	4 October 1996	
Denmark	24 September 1996	21 December 1998
Djibouti	21 October 1996	
Dominica		
Dominican Republic	3 October 1996	
Ecuador	24 September 1996	12 November 2001
Egypt	14 October 1996	
El Salvador	24 September 1996	11 September 1998
Equatorial Guinea	9 October 1996	
Eritrea		
Estonia	20 November 1996	13 August 1999
Ethiopia	25 September 1996	
Fiji	24 September 1996	10 October 1996
Finland	24 September 1996	15 January 1999
France	24 September 1996	6 April 1998
Gabon	7 October 1996	20 September 2000
Gambia		
Georgia	24 September 1996	
Germany	24 September 1996	20 August 1998
Ghana	3 October 1996	
Greece	24 September 1996	21 April 1999
Grenada	10 October 1996	19 August 1998
Guatemala	20 September 1999	
Guinea	3 October 1996	
Guinea-Bissau	11 April 1997	
Guyana	7 September 2000	7 March 2001
Haiti	24 September 1996	
Holy See	24 September 1996	18 July 2001
Honduras	25 September 1996	
Hungary	25 September 1996	13 July 1999
Iceland	24 September 1996	26 June 2000
India		
Indonesia	24 September 1996	
Iran (Islamic Republic of)	24 September 1996	
Iraq		
Ireland	24 September 1996	15 July 1999
Israel	25 September 1996	
Italy	24 September 1996	1 February 1999
Jamaica	11 November 1996	13 November 2001
Japan	24 September 1996	8 July 1997
Jordan	26 September 1996	25 August 1998
Kazakhstan	30 September 1996	
Kenya	14 November 1996	30 November 2000
Kiribati	7 September 2000	7 September 2000



State	Date of Signature	Date of Ratification
Kuwait	24 September 1996	
Kyrgyzstan	8 October 1996	
Lao People's Democratic Republic	30 July 1997	5 October 2000
Latvia	24 September 1996	20 November 2001
Lebanon		
Lesotho	30 September 1996	14 September 1999
Liberia	1 October 1996	
Libyan Arab Jamahiriya	13 November 2001	
Liechtenstein	27 September 1996	
Lithuania	7 October 1996	7 February 2000
Luxembourg	24 September 1996	26 May 1999
Madagascar	9 October 1996	
Malawi	9 October 1996	
Malaysia	23 July 1998	
Maldives	1 October 1997	7 September 2000
Mali	18 February 1997	4 August 1999
Malta	24 September 1996	23 July 2001
Marshall Islands	24 September 1996	
Mauritania	24 September 1996	
Mauritius		
Mexico	24 September 1996	5 October 1999
Micronesia (Federated States of)	24 September 1996	25 July 1997
Monaco	1 October 1996	18 December 1998
Mongolia	1 October 1996	8 August 1997
Morocco	24 September 1996	17 April 2000
Mozambique	26 September 1996	
Myanmar	25 November 1996	
Namibia	24 September 1996	29 June 2001
Nauru	8 September 2000	12 November 2001
Nepal	8 October 1996	
Netherlands	24 September 1996	23 March 1999
New Zealand	27 September 1996	19 March 1999
Nicaragua	24 September 1996	5 December 2000
Niger	3 October 1996	
Nigeria	8 September 2000	27 September 2001
Niue		
Norway	24 September 1996	15 July 1999
Oman	23 September 1999	
Pakistan		
Palau		
Panama	24 September 1996	23 March 1999
Papua New Guinea	25 September 1996	
Paraguay	25 September 1996	4 October 2001
Peru	25 September 1996	12 November 1997
Philippines	24 September 1996	23 February 2001
Poland	24 September 1996	25 May 1999



State	Date of Signature	Date of Ratification
Portugal	24 September 1996	26 June 2000
Qatar	24 September 1996	3 March 1997
Republic of Korea	24 September 1996	24 September 1999
Republic of Moldova	24 September 1997	
Romania	24 September 1996	5 October 1999
Russian Federation	24 September 1996	30 June 2000
Rwanda		
Saint Kitts and Nevis		
Saint Lucia	4 October 1996	5 April 2001
Saint Vincent and the Grenadines		
Samoa	9 October 1996	
San Marino	7 October 1996	
Sao Tome and Principe	26 September 1996	
Saudi Arabia		
Senegal	26 September 1996	9 June 1999
Seychelles	24 September 1996	
Sierra Leone	8 September 2000	17 September 2001
Singapore	14 January 1999	10 November 2001
Slovakia	30 September 1996	3 March 1998
Slovenia	24 September 1996	31 August 1999
Solomon Islands	3 October 1996	
Somalia		
South Africa	24 September 1996	30 March 1999
Spain	24 September 1996	31 July 1998
Sri Lanka	24 October 1996	
Sudan		
Suriname	14 January 1997	
Swaziland	24 September 1996	
Sweden	24 September 1996	2 December 1998
Switzerland	24 September 1996	1 October 1999
Syrian Arab Republic		
Tajikistan	7 October 1996	10 June 1998
Thailand	12 November 1996	
The former Yugoslav Republic of Macedonia	29 October 1998	14 March 2000
Togo	2 October 1996	
Tonga		
Trinidad and Tobago		
Tunisia	16 October 1996	
Turkey	24 September 1996	16 February 2000
Turkmenistan	24 September 1996	20 February 1998
Tuvalu		
Uganda	7 November 1996	14 March 2001
Ukraine	27 September 1996	23 February 2001
United Arab Emirates	25 September 1996	18 September 2000
United Kingdom	24 September 1996	6 April 1998
United Republic of Tanzania		



State	Date of Signature	Date of Ratification
United States of America	24 September 1996	
Uruguay	24 September 1996	21 September 2001
Uzbekistan	3 October 1996	29 May 1997
Vanuatu	24 September 1996	
Venezuela	3 October 1996	
Viet Nam	24 September 1996	
Yemen	30 September 1996	
Yugoslavia	8 June 2001	
Zambia	3 December 1996	
Zimbabwe	13 October 1999	



### Facilities of the CTBT International Monitoring System

State	Primary Seismic Stations	Auxiliary Seismic Stations	Radionuclide Stations	Radio-nuclide Labs	Hydro-acoustic Stations	Infrasound Stations	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 <sup>a</sup>		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

<sup>a</sup> Germany and South Africa will be jointly responsible for an auxiliary seismic station in Antarctica.



State	Primary Seismic Stations	Auxiliary Seismic Stations	Radionuclide Stations	Radio-nuclide Labs	Hydro-acoustic Stations	Infrasound Stations	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
<b>Total</b>	<b>50</b>	<b>120</b>	<b>80</b>	<b>16</b>	<b>11</b>	<b>60</b>	<b>337</b>



### Organizational Structure of the Provisional Technical Secretariat (31 December 2001)

