



PREPARATORY COMMISSION FOR THE COMPREHENSIVE
NUCLEAR-TEST-BAN TREATY ORGANIZATION (CTBTO)
PROVISIONAL TECHNICAL SECRETARIAT



Annual Report
2000

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ARTICLE I of the Treaty

BASIC OBLIGATIONS

- 1. Each State Party undertakes not to carry out any nuclear weapon test explosion or any other nuclear explosion, and to prohibit and prevent any such nuclear explosion at any place under its jurisdiction or control.*
- 2. Each State Party undertakes, furthermore, to refrain from causing, encouraging, or in any way participating in the carrying out of any nuclear weapon test explosion or any other nuclear explosion.*

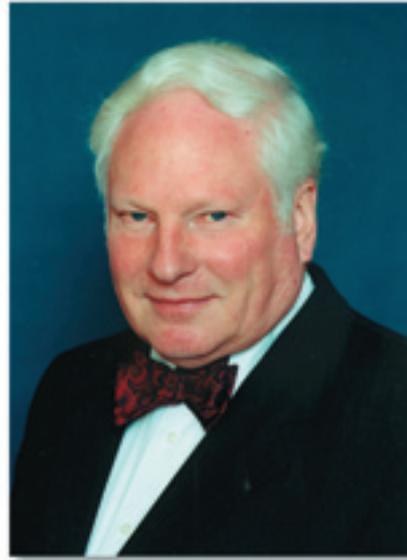
This report gives an account as of 31 December 2000 of the activities undertaken by the Provisional Technical Secretariat (PTS) of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization during 2000, in fulfilment of the Preparatory Commission's programme for establishing 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 budget and work programme of the Preparatory Commission. However, 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 1996, the General Assembly of the United Nations adopted the Comprehensive Nuclear-Test-Ban Treaty, which marked the conclusion of intensive negotiations in the Conference on Disarmament in Geneva. The Treaty bans all nuclear test explosions, for military or other purposes, and provides for the establishment of a global verification regime comprising an International Monitoring System, a consultation and clarification process, on-site inspections and confidence building measures. It is stipulated that the verification regime must be capable of meeting the verification requirements of the Treaty at its entry into force.



On 19 November 1996, the Secretary-General of the United Nations convened a meeting of States Signatories, which adopted a Resolution establishing the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization. Acting in conformity with the Resolution, the Commission established the Provisional Technical Secretariat (PTS) to assist it in carrying out the necessary preparations for the effective implementation of the Treaty.

The PTS, located in Vienna, has now been in existence for around four years and I am pleased to report that, within this period, the PTS has matured into a fully fledged international organization capable of fulfilling its mandate effectively and efficiently. Following the guidance of the Preparatory Commission and its subsidiary organs – Working Group A (on administrative and budgetary matters), Working Group B (on verification matters) and the Advisory Group (on financial, budgetary and administrative matters) – the PTS has achieved significant progress. This report provides coverage of the achievements during the year 2000 in the implementation of the Commission's seven Major Programmes: International Monitoring System; International Data Centre; Communications; On-Site Inspection; Evaluation; Policy-Making Organs; and Administration, Coordination and Support.

In regard to the International Monitoring System (IMS), the responsibilities of the Preparatory Commission include establishing a worldwide network of 321 stations (170 seismic, 60 infrasound, 11 hydroacoustic and 80 radionuclide stations) supported by 16 radionuclide laboratories. This network will be capable of registering vibrations underground, in the air and in the sea, as well as detecting radionuclides released into the atmosphere from a nuclear explosion. Much progress has been made in the IMS programme: about 31% of the stations have been installed or substantially meet the required specifications (compared with about 16% at the end of 1999); and 21 stations already send data to the International Data Centre over the Global Communications Infrastructure. A significant milestone was reached in 2000 with the first certification of stations as meeting all the technical requirements for IMS stations. By the end of 2000, the PTS had certified 11 stations.

The main function of the International Data Centre (IDC) is to continuously monitor the data received from IMS stations for events that have characteristics of nuclear explosions and to send the results to all States Signatories for their final analysis. The Global Communications Infrastructure (GCI) provides for a two way transmission of data through a satellite communications network between the IMS stations, the IDC in Vienna and the National Data Centres (NDCs) of States Signatories. The plan for the establishment of the IDC is based on the experience of the prototype IDC in Arlington, Virginia, USA, and the PTS has benefited extensively from working in close cooperation with the prototype IDC to implement the commissioning plan for the IDC.

We have now reached the stage of testing and evaluating the IDC and its data products. Since February 2000 the IDC has been distributing Standard Event Lists and Reviewed Event Bulletins to States Signatories for testing purposes. The IDC continues to work closely with the NDCs in order to develop their capacity to receive and utilize the IDC products. The implementation of the GCI is also progressing well, with a total of 44 satellite terminals having been installed, compared with 25 in 1999. The fifth GCI hub was installed and the frame relay infrastructure established to link the hubs to the IDC.

On-site inspection (OSI) is provided for in the Treaty as a final verification measure which may be requested by a State Party. In 2000 States Signatories, supported by the PTS, made steady progress in the development of a draft text for the OSI Operational Manual, and some progress was also made with regard to the procurement of OSI equipment and the development of elements of the inspector training programme.

As the PTS proceeded with the commissioning of the verification system, it also paid close attention to evaluation and quality assurance of activities related to the build-up of the verification regime and implemented measures to ensure appropriate integration of these activities within and between PTS Divisions.

The year 2000 saw the consolidation of improvements initiated in the areas of administration, coordination and support, resulting in increased efficiencies in PTS administrative systems, including the procurement, document management, accounting and personnel management systems.

Through a focused and coordinated outreach programme, the PTS was able to achieve practical results from its external relations, public information and international cooperation activities, as well as its legal services. Outreach efforts made by States Signatories as well as those of the PTS in cooperation with States Signatories contributed, among other things, to the additional 5 signatures and 18 ratifications of the Treaty in 2000.

I am deeply gratified by the efforts of the international community to promote the universality of the Treaty and its early entry into force, notably the acknowledgement by the 2000 Review Conference of the Parties to the Treaty on the

Non-Proliferation of Nuclear Weapons of the importance and urgency of signatures and ratifications, without delay and without conditions and in accordance with constitutional processes.

The Preparatory Commission's cooperation with other international organizations was significantly strengthened in 2000, and of particular importance in this regard was the conclusion of a relationship agreement with the United Nations. We are already deriving important benefits from this agreement. An administrative agreement has been concluded with the United Nations Development Programme setting out a framework for its provision of operational support services to the Commission, similar to that for other organizations in the United Nations system. For the first time, in 2000 an item on cooperation between the United Nations and the Preparatory Commission was included in the agenda of the fifty-fifth session of the General Assembly, and I addressed the General Assembly on the status of the Treaty and the work of the Commission.

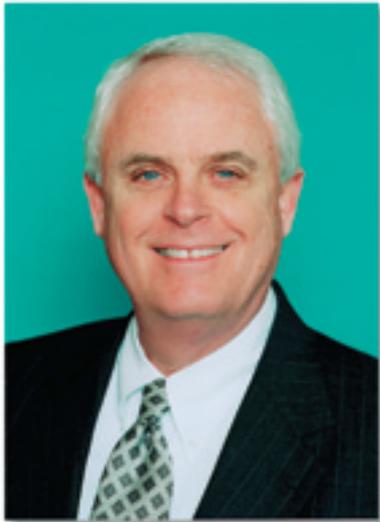
The PTS continues to perform its tasks with the guidance and support of States Signatories. One significant challenge is the implementation of a planning process that will ensure readiness to meet future requirements to deliver a verification regime at the Treaty's entry into force – a challenge which is further complicated by the political uncertainty regarding the time of entry into force. In this respect the second Conference on Facilitating the Entry into Force of the Comprehensive Nuclear-Test-Ban Treaty to be held pursuant to Article XIV of the Treaty, on 25–27 September 2001 in New York, gives us further encouragement. The efficiency and resolve with which the Preparatory Commission considered and approved the 2001 Programme and Budget also give me confidence that we are on the right course to meet this challenge. With the dedication, skill and hard work of the staff of the PTS and the continued commitment and support of States Signatories, we are set to measure up to the challenges of carrying out our mandate.

Wolfgang Hoffmann
Executive Secretary

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

Vienna
March 2001

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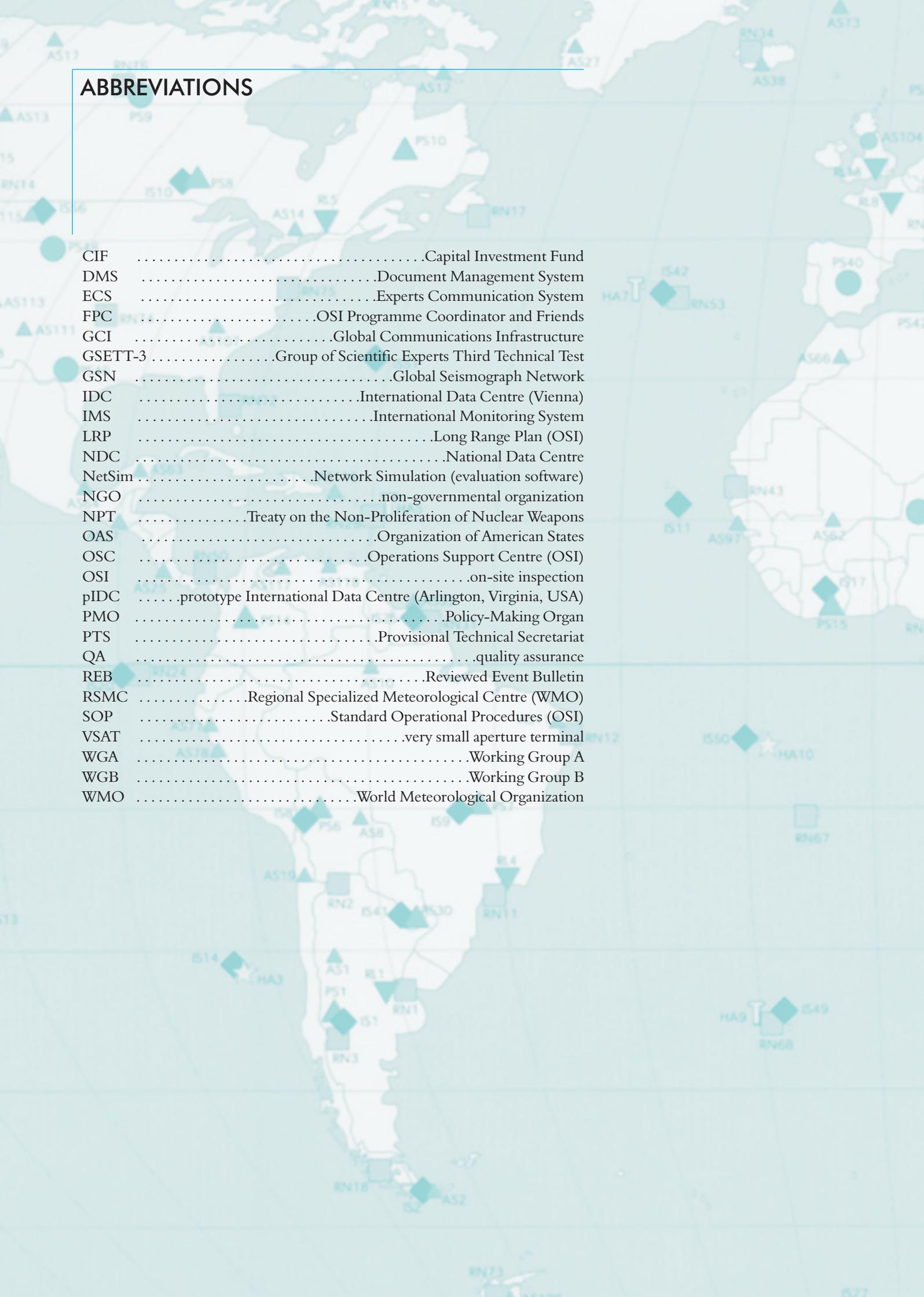
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ABBREVIATIONS



CIF	Capital Investment Fund
DMS	Document Management System
ECS	.....	Experts Communication System
FPC	.....	OSI Programme Coordinator and Friends
GCI	.....	Global Communications Infrastructure
GSETT-3	.....	Group of Scientific Experts Third Technical Test
GSN	.....	Global Seismograph Network
IDC	.....	International Data Centre (Vienna)
IMS	.....	International Monitoring System
LRP	.....	Long Range Plan (OSI)
NDC	.....	National Data Centre
NetSim	.....	Network Simulation (evaluation software)
NGO	.....	non-governmental organization
NPT	.....	Treaty on the Non-Proliferation of Nuclear Weapons
OAS	.....	Organization of American States
OSC	.....	Operations Support Centre (OSI)
OSI	.....	on-site inspection
pIDC	.....	prototype International Data Centre (Arlington, Virginia, USA)
PMO	.....	Policy-Making Organ
PTS	.....	Provisional Technical Secretariat
QA	.....	quality assurance
REB	.....	Reviewed Event Bulletin
RSMC	.....	Regional Specialized Meteorological Centre (WMO)
SOP	.....	Standard Operational Procedures (OSI)
VSAT	.....	very small aperture terminal
WGA	.....	Working Group A
WGB	.....	Working Group B
WMO	.....	World Meteorological Organization

MAJOR PROGRAMME 1: International Monitoring System

“The International Monitoring System shall comprise facilities for seismological monitoring, radionuclide monitoring including certified laboratories, hydroacoustic monitoring, infrasound monitoring, and respective means of communication, and shall be supported by the International Data Centre of the Technical Secretariat.”

(ARTICLE IV, PARAGRAPH 16)

The year 2000 saw an important advancement of the International Monitoring System (IMS). The site survey programme, which determines whether station locations shown in the Treaty are suitable, is nearing completion. Installations were completed at 27 additional stations, and the first 11 stations were certified as meeting all PTS technical requirements. A major effort was made to develop efficient procedures to connect stations to the data processing pipeline of the International Data Centre (IDC). From April 2000, the PTS assumed responsibility for routine station management, an activity that was previously carried out by the prototype IDC (pIDC) in the United States of America. Considerable effort was devoted to planning long term operation and maintenance of IMS stations.

IMS COMMISSIONING

A brief summary of the status of the commissioning in each of the IMS technologies, giving the main highlights for 2000, is presented below. The status of the site survey and station installation programmes at the end of 2000 is summarized in Tables 1 and 2.

IMS Station Type	Complete/ Not Required	Under Way	Contract Pending	Not Started
Primary seismic	45	0	0	5
Auxiliary seismic	104	7	0	9
Infrasound	41	5	4	10
Hydroacoustic	6	3	1	1
Radionuclide	50	10	8	12

Table 1. Status of the Site Survey Programme as of 31 December 2000

IMS Station Type	Complete/ Substantially Meets Specifications	Under Way	Contract Pending	Not Started
Primary seismic	20	9	0	21 ^a
Auxiliary seismic	60	8	5	47 ^b
Infrasound	7	16	6	31
Hydroacoustic	2	3	0	6
Radionuclide	9	15	18	38

Table 2. Status of the Station Installation Programme as of 31 December 2000

^a Thirteen of these stations are operational but require some upgrades. The remaining 8 do not yet exist.

^b Twenty-five of these stations exist but require a major upgrade. The remaining 22 do not yet exist.

In the primary seismic network, during 2000 site surveys were completed for a new array, for additional elements at an existing array and for a new location of a three component station; as of the end of the year 90% of the site surveys had been completed. Site preparations and installations were completed for two seismic arrays and were commenced under contract for four others. Installations were completed for two three-component stations.

Testing and evaluation contracts were concluded for three primary seismic arrays and two others were under procurement. Five primary seismic stations were certified and one post-certification operation and maintenance contract was awarded.

In the auxiliary seismic network, site surveys were completed for six stations and contracted for five others. Installations for three auxiliary seismic arrays and two three-component stations were contracted and three additional three component stations were under procurement.

Because of their unique dual-use status, making arrangements for IMS work at auxiliary seismic stations has been difficult to address. The PTS recently agreed to a plan of action with the Incorporated Research Institutions for Seismology (IRIS) Consortium, the parent network organization of the Global Seismograph Network

SEISMOLOGICAL MONITORING SYSTEM



(GSN), to install very small aperture terminals (VSATs) at 39 GSN auxiliary seismic stations. The plan addresses scheduling, coordination and responsibilities among the various organizations involved. This agreement is intended to ensure that GSN stations designated as part of the IMS can be used to carry out the Treaty related monitoring functions as well as for the intended scientific purposes of the GSN. Similar agreements are to be negotiated between the PTS and other international and national network operators. A separate contract was awarded to develop the software required to connect these stations through the Global Communications Infrastructure (GCI) to the IDC.

By the end of 2000, about 70% of the site surveys for the 60 station IMS infrasound network were completed. In order to ensure that there are no delays in the establishment of the infrasound network, the PTS has assumed direct responsibility for about 40% of the site survey fieldwork, data analysis work, and preparatory work required for the comprehensive site survey reports.

INFRASOUND MONITORING SYSTEM



The number of operational infrasound stations increased rapidly during the year. Seven stations are now transmitting data to the IDC. These stations are undergoing a period of testing and evaluation and should be ready for certification early in 2001. The requirements for the certification of infrasound stations were completed and the first certification visit was carried out by the PTS.

Construction of five other stations is in progress, either under contract or under conditions of reduced assessment.

Contracts were also completed for site preparation and station installation at nine other facilities and many of these stations are expected to be in operation by the end of 2001.

The commencement of work on stations in Antarctica represents a major advance in the commissioning of the IMS infrasound network. Site surveys were carried out at three of the Antarctic sites. Installation of the first station is under way and it is expected that this station will be in operation by the end of February 2001.

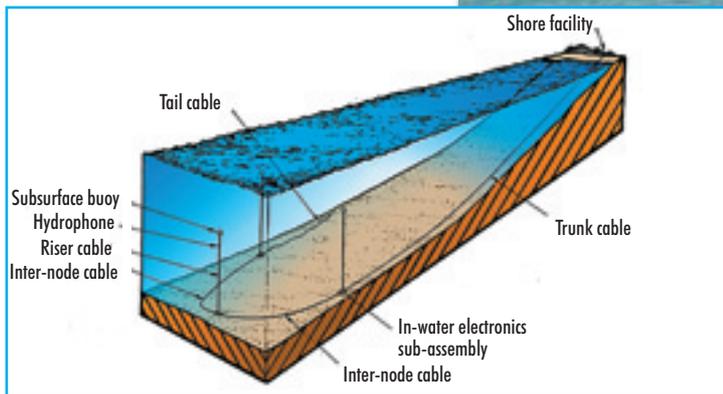
An infrasound workshop was held in Passau, Germany, in October. This very successful event was jointly organized by the German National Data Centre (NDC) and the PTS and was attended by 61 participants from 17 States Signatories. The report from the workshop highlights some of the remaining technical issues related to the establishment and operation of the global infrasound network. The report also provides a number of valuable suggestions for the resolution of these problems. Workshops of this type are very important to the work of the PTS since they help to resolve many of the difficult technical issues that are encountered in the establishment of the global IMS network.

HYDROACOUSTIC MONITORING SYSTEM

A major achievement of the hydroacoustic monitoring programme during 2000 was the completion of the first two new hydroacoustic stations, one a hydrophone based station, the other a T-phase station. The hydrophone based station is now certified; this was the first certification of an IMS hydroacoustic station. The certification process was commenced for the completed T-phase station. Three additional site surveys were completed during the year, bringing the total to 55% of the hydroacoustic network.

Progress was made on two other hydrophone based hydroacoustic stations (the most expensive type of station in the IMS). For one of these stations, work is well advanced. All equipment was manufactured and tested in preparation for the critical at-sea installation phase, which is scheduled to take place in March 2001. Difficulties arose during the at-sea installation of the second hydrophone based hydroacoustic station, leading to a delay in completion of the installation. During the delay some components will be redesigned, manufactured and extensively tested. The station is expected to be complete towards the end of 2001. A site survey for a further hydrophone based hydroacoustic station was recently commenced.

As well as one T-phase station being completed, progress was made on three other stations of this type. For two stations, site surveys were completed and for another station, the site survey is very well advanced. Equipment is on order for the construction of one of these stations.



Nine additional sites for radionuclide stations were accepted in 2000 following the evaluation of site survey reports; as of the end of the year 65% of the site surveys had been completed. Twenty stations were in various stages of completion, with considerable progress having been made in 2000; two other stations sending data to the IDC were close to being certified. Additionally five call-off contracts were signed to procure detectors, samplers and automatic particulate systems required for two programme years.

RADIONUCLIDE MONITORING SYSTEM

Five radionuclide stations were certified in 2000. This involved significant preparation, including the drafting of procedures and station certification visits. In addition, software to monitor the performance of stations during the testing and evaluation period was written.



Phase II of the continuing noble gas experiment in Freiburg, Germany, was performed and nearly finalized during the year. In this phase, four experimental noble gas systems were operated side by side in a laboratory environment. All four systems showed promising results.



A workshop was held in St Wolfgang, Austria, and a consultant was contracted to investigate difficulties at remote and polar regions in order to establish the basis for installation of radionuclide stations in such locations. The workshop participants identified specific problems linked to continuous collection of very large aerosol amounts under polar climatic conditions, and made some recommendations on how to minimize the station down time probability,

including the need for a dedicated risk assessment study. The goal of this study should be to obtain a reliable prediction of site-specific problems and the design of technical means to overcome them.

All 16 radionuclide laboratories designated in Annex 1 to the Protocol to the Treaty participated in a proficiency test exercise with the objective of assessing their analytical capability. The results of the exercise are being evaluated. Additionally filters from several providers were tested to examine their chemical and physical properties in order to determine their suitability for use in the IMS.

TRAINING

Two Technical Training Programmes for station operators were conducted in 2000. The first, in April–May, had 33 participants from 24 States Signatories, with specialized seismic training being given in Austria and infrasound training in France. The second, in November–December, had 48 participants from 26 States Signatories, with specialized seismic training being given in the USA and radionuclide training in Australia, Finland, France, Germany and New Zealand. The second programme included the first training of station operators in the operation of noble gas detection equipment. The IMS Division undertook a review of the training needs of station operators with a view to developing a proposal for a global training programme.

PLANNING

LONG TERM OPERATION AND MAINTENANCE OF STATIONS

A workshop on the operation and maintenance of IMS stations was held in Vienna between 23 and 26 October 2000. The objective of this workshop was to explore the logistical concepts and options for the operation and maintenance of the IMS network and to provide Working Group B (WGB) with information and recommendations for its consideration. Some 120 participants drawn from 18 States Signatories attended.

The workshop focused on the development of an overall IMS management model as well as operating requirements, reliability and availability, financing, logistics, and operation and maintenance models. The workshop participants concluded that for the IMS to meet the high data availability requirements of the Preparatory Commission, the PTS should operate the IMS as a unified global network using ‘natural operators’ where possible, incorporate a multi-tiered maintenance process, be provided with adequate financial and human resources, and develop an integrated, professionally prepared logistics plan.

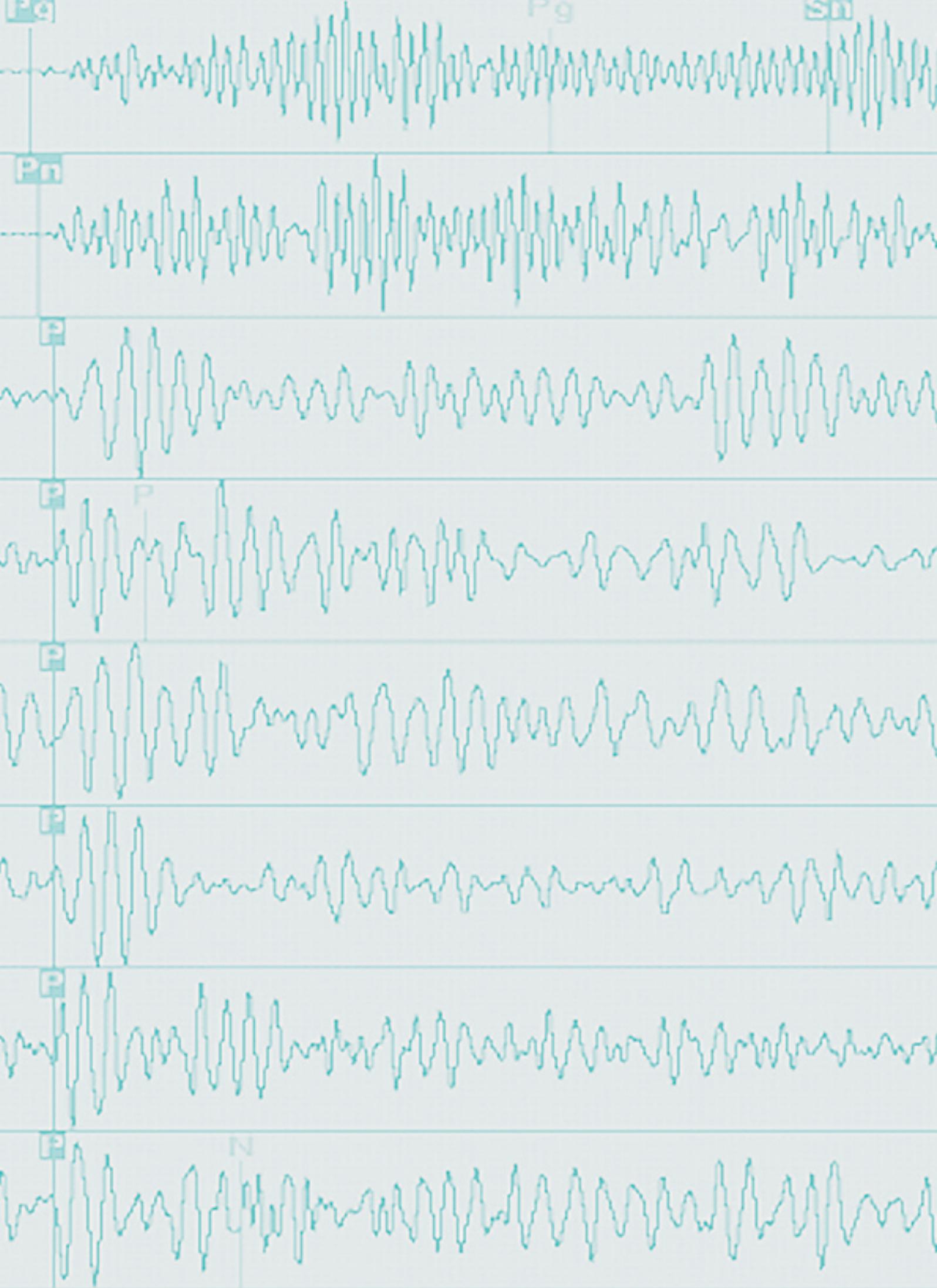


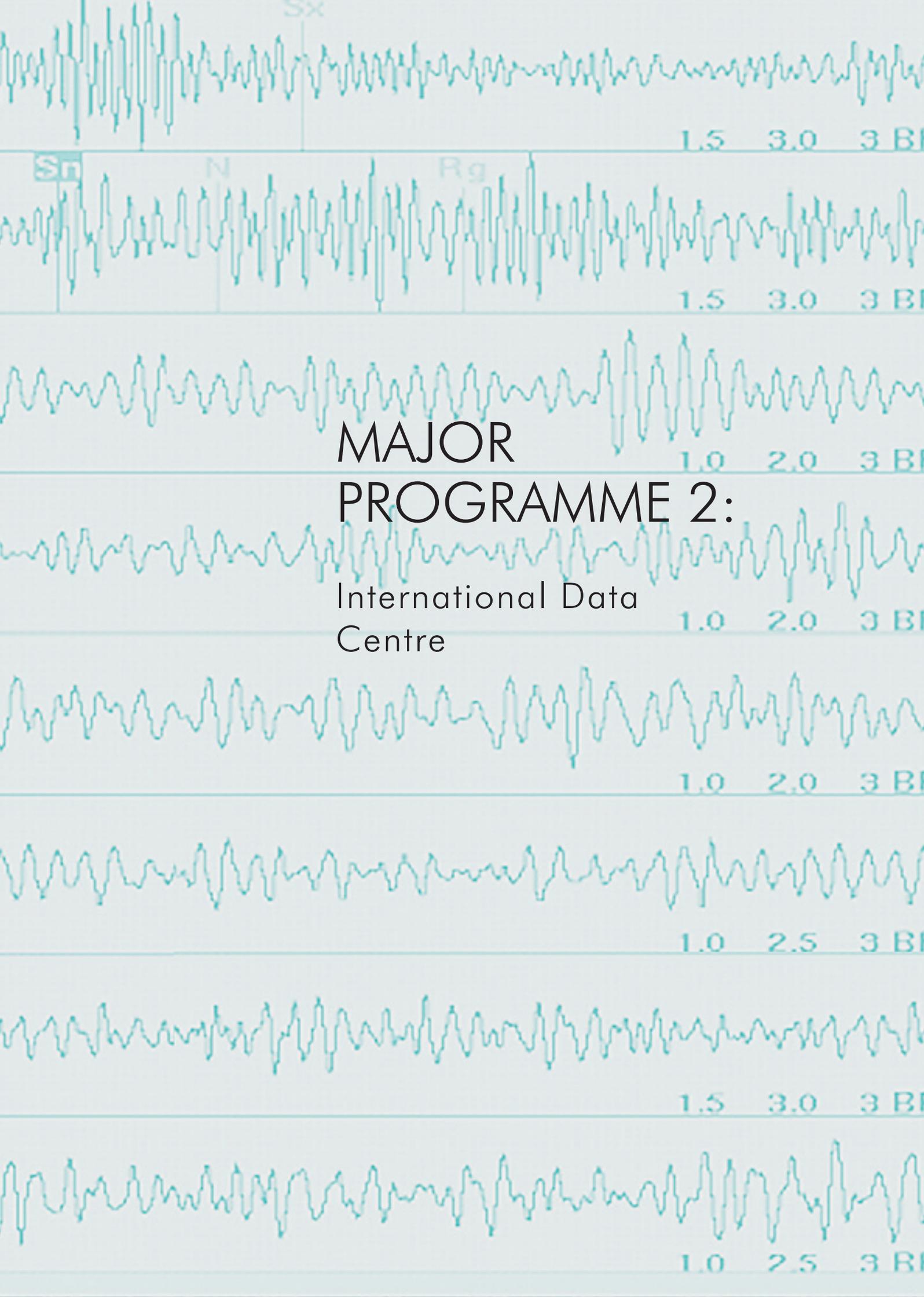
Examples of difficult or remote stations are those which are at high latitude, isolated and otherwise logistically challenging, possibly subject to extreme environmental conditions, and with difficult or infrequent access. A detailed plan of action was developed for the implementation of stations in Antarctica, which pays particular attention to critical issues such as design, communications, station staffing, supply and maintenance. Planning and coordination with the various governmental agencies responsible for these stations are continuing.

ESTABLISHMENT OF DIFFICULT STATIONS

The development of various management tools was initiated in view of the expected increase in the number, complexity and value of contracts to be managed by the IMS Division in the not too distant future. An electronic contract management tool is being developed which contains detailed information on contracts issued for stations, including data on costs and status. It allows tracking and monitoring of the progress of contracts and contains reporting and information updating features.

CONTRACT MANAGEMENT TOOLS AND CONCEPTS





MAJOR PROGRAMME 2:

International Data
Centre

MAJOR PROGRAMME 2: International Data Centre

“Each State Party shall have the right to participate in the international exchange of data and to have access to all data made available to the International Data Centre. Each State Party shall cooperate with the International Data Centre through its National Authority.”

(ARTICLE IV, PARAGRAPH 18)

The primary objective of this Major Programme is to establish the International Data Centre, which will provide States Signatories with IMS data and IDC products and services specified in the Treaty. The IDC also supports the computing infrastructure and information systems throughout the PTS.

The year 2000 saw a significant increase in the range of services as the progressive commissioning of the IDC continued. The IDC completed all milestones in Phase 4 (Initial Testing of the IDC Hardware and Software) of its Progressive Commissioning Plan. During the year, testing and scientific assessment of IDC systems resulted in nearly continuous provision of IMS data and high quality IDC products. On average, 52 seismoacoustic events a day were analysed in the Reviewed Event Bulletins (REBs) and 217 radionuclide spectra were processed and analysed each month. A total of 318 persons, nominated by 47 States Signatories, were given access to these data and products. New computer servers, a mass data storage system, commercial software and the Public Key Infrastructure were installed. Work on various projects, including seismic calibration, software for NDCs, improved radionuclide analysis techniques, the new Experts Communication System and the new public web site, were well under way. An agreement was negotiated with the World Meteorological Organization (WMO). Finally, the IDC Division cooperated with a team of external experts in an evaluation of the IDC and Communications Major Programmes.

Because of the nature of the work to be done, IDC personnel often worked in inter-Divisional teams to support efforts involving several Major Programmes, programmes and organizational units.

MANAGEMENT, TECHNICAL COORDINATION AND TRAINING

This programme supports planning, management and coordination of the programmes within the IDC and Communications Major Programmes, as well as coordination with other PTS Divisions and States Signatories.

RELEASES OF MONITORING APPLICATIONS SOFTWARE

Release 3 of the monitoring applications software was transferred from the pIDC to the IDC on 22 December, after a delay of approximately three months associated with the export process in the USA. The IDC and pIDC staffs began work on an update to the Release 3 Implementation Plan that foresees the software entering operation around the middle of 2001. IDC staff drafted a detailed plan for the Release 3 installation, and will use this to lead an installation for the first time.

The IDC Division cooperated in a review of the IDC and Communications Major Programmes that was conducted by an external evaluation team in October and November. The evaluation focused on four areas: policy and planning, coordination and cooperation, development of the IDC, and personnel. The IDC Division started consideration of many of the findings, and is preparing for discussions of these within WGB.

The recruitment of qualified staff members is critical to the success of the IDC Major Programme. The objective of the six month IDC training courses is to increase the pool and geographical distribution of potential candidates for future posts in the IDC. The Fifth IDC Training Course concluded in August. To date, 35 trainees from 30 States Signatories have participated in the five training courses. Seventeen of these trainees have subsequently been hired by the IDC. Five persons were selected for the Sixth IDC Training Course, scheduled to begin in February 2001.

The objective of the training courses for NDC personnel is to provide the information and instruction necessary for States Signatories to take greater advantage of the data, products and services from the IDC. Twenty-four persons from 24 States Signatories participated in the Introductory Training Course for NDC Managers, which took place in Vienna from 16 to 22 November 2000. Ten persons from 10 States Signatories participated in the Introductory Training Course for NDC Technical Staff, which was held from 6 to 17 November.

The IDC Division is leading a number of projects that support several Divisions within the PTS. Together with the Public Information Section, work on the development of a new CTBTO public web site was undertaken. The site will be made accessible by April 2001. A prototype of the new Database of the (Provisional) Technical Secretariat (DOTS), which will hold information on the IMS, the GCI, NDCs and points of contact, was developed during 2000 and the first release will be ready during the second quarter of 2001. Work started under contract to develop a new Experts Communication System (ECS2), with a planned launch during the second quarter of 2001. Initial planning took place for a PTS Intranet to be launched in the middle of 2001. The Public Key Infrastructure, which will allow for secure communication, was built throughout 2000 and will go online in early 2001. It will support the generation and management of authentication keys for the validation of IMS data and other information. A vendor was selected for phase 1 of a project to assess the overall information security of the verification system, and to recommend options for addressing security concerns.

This programme was established for conducting integrated operational testing of the IDC software and for providing services to States Signatories.

During 2000, 74 stations (including new or upgraded IMS stations, and many existing stations that will be upgraded in the future) contributed data used to prepare the IDC products. In a significant advance, data sent from IMS stations through GCI communication links were included into IDC operational data processing for the first time. By the end of 2000, 16 IMS stations were transmitting data over the GCI. Average data availability for all stations at the end of the year reached about 80%. Data availability for IMS stations transmitting

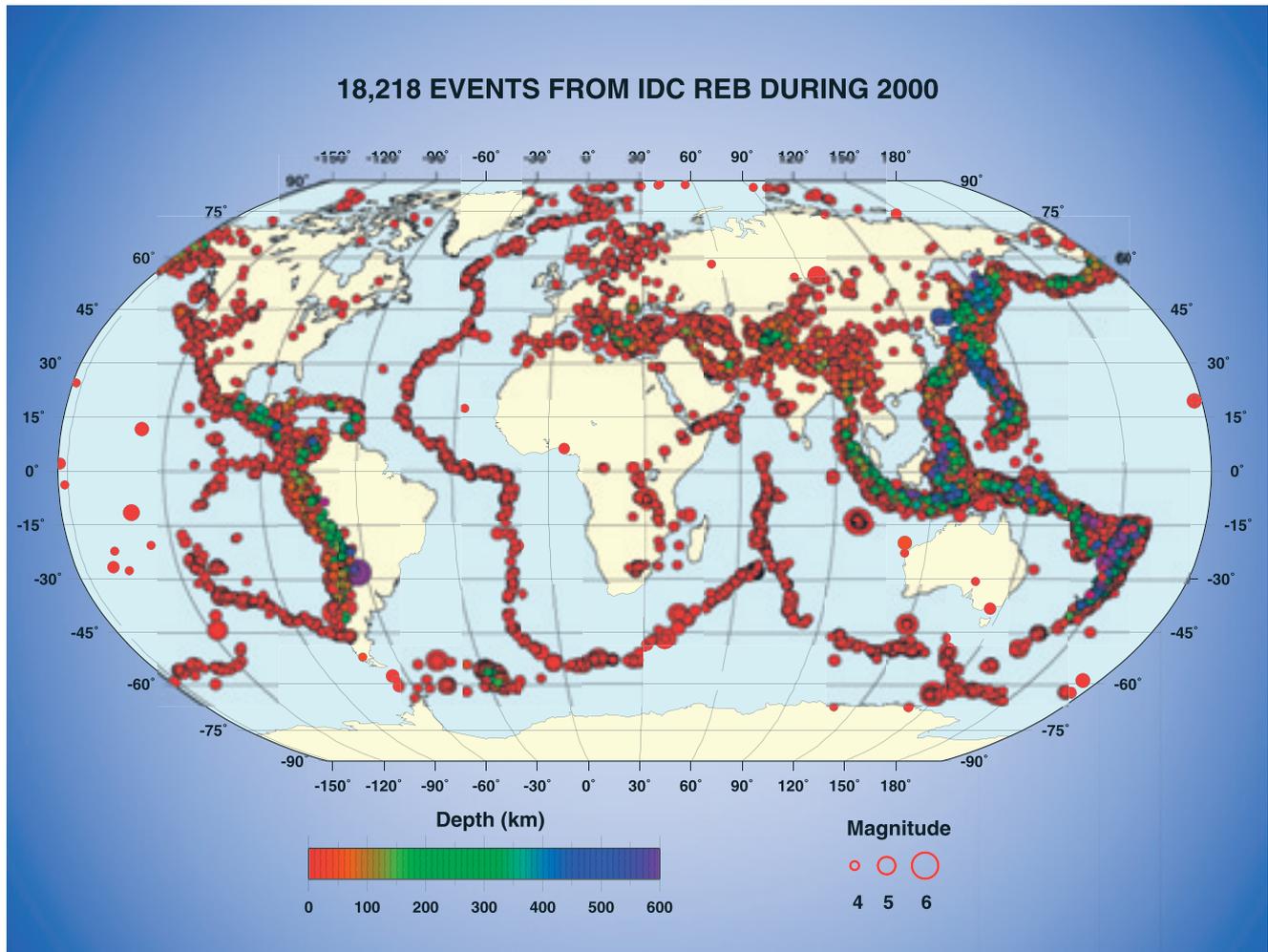
EXTERNAL EVALUATION OF IDC AND COMMUNICATIONS MAJOR PROGRAMMES

TRAINING

INTER-DIVISIONAL INFORMATION SYSTEMS AND SECURITY PROJECTS

MONITORING

SEISMIC, HYDROACOUSTIC AND INFRASOUND DATA PROCESSING AND ANALYSIS



over the GCI was higher, at about 91%, whereas that for stations transmitting through GSETT-3 communication links via the pIDC was about 69%. Of 11 stations with data availability exceeding 95%, only one is not sending data through the GCI. Total data availability should continue to improve as the number of stations transmitting over the GCI and the number of stations certified grow during 2001.

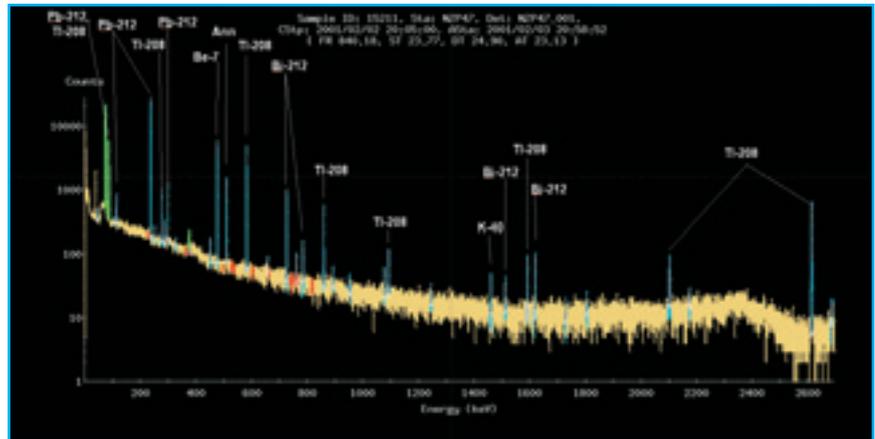
Automatic data acquisition and processing continued 24 hours a day and seven days a week following the last major hardware update in mid-January 2000. A high quality REB was produced on a continuous basis (except for one day) from mid-January to the end of the year. During this period, the automatic Standard Event Lists (SEL3) included 30,223 events and REBs included 18,218 events. On average, the REB contained 52 events a day, with a record number of 357 events on 16 November 2000 due to a series of large earthquakes and aftershocks.

During the second half of the year REBs were issued according to an approved target schedule within four to six days after the end of each data day. At its Thirteenth Session, WGB urged that the IDC test a more timely production schedule, during which REBs would be issued within 42 hours after the completion of the SEL3 for five data days a week. WGB acknowledged that new administrative arrangements would be required to support IDC staff members working outside of business hours and days. Administrative arrangements to support this request were developed, and then tested successfully over the Christmas and

New Year period. Preparations were made to conduct a four week experiment on timely REB production for five data days a week beginning on 7 January 2001.

During 2000 the first five radionuclide stations established by the PTS began contributing data for the radionuclide reports. The IDC supported the IMS in the connection, testing and certification of these stations. The overall number of contributing stations decreased from 18 in 1999 to 15 in 2000 because some non-IMS stations used for testing terminated their provision of data. However, the fact that the new IMS stations provided spectra on a daily (rather than weekly) basis resulted in a 25% increase in the volume of data processed during the year. The IDC processed all 2,601 spectra received in 2000. Forty of the spectra contained one of the nuclides from the list of relevant nuclides (Level 4), while one spectrum was found to contain two of these nuclides (Level 5).

RADIONUCLIDE DATA PROCESSING AND ANALYSIS

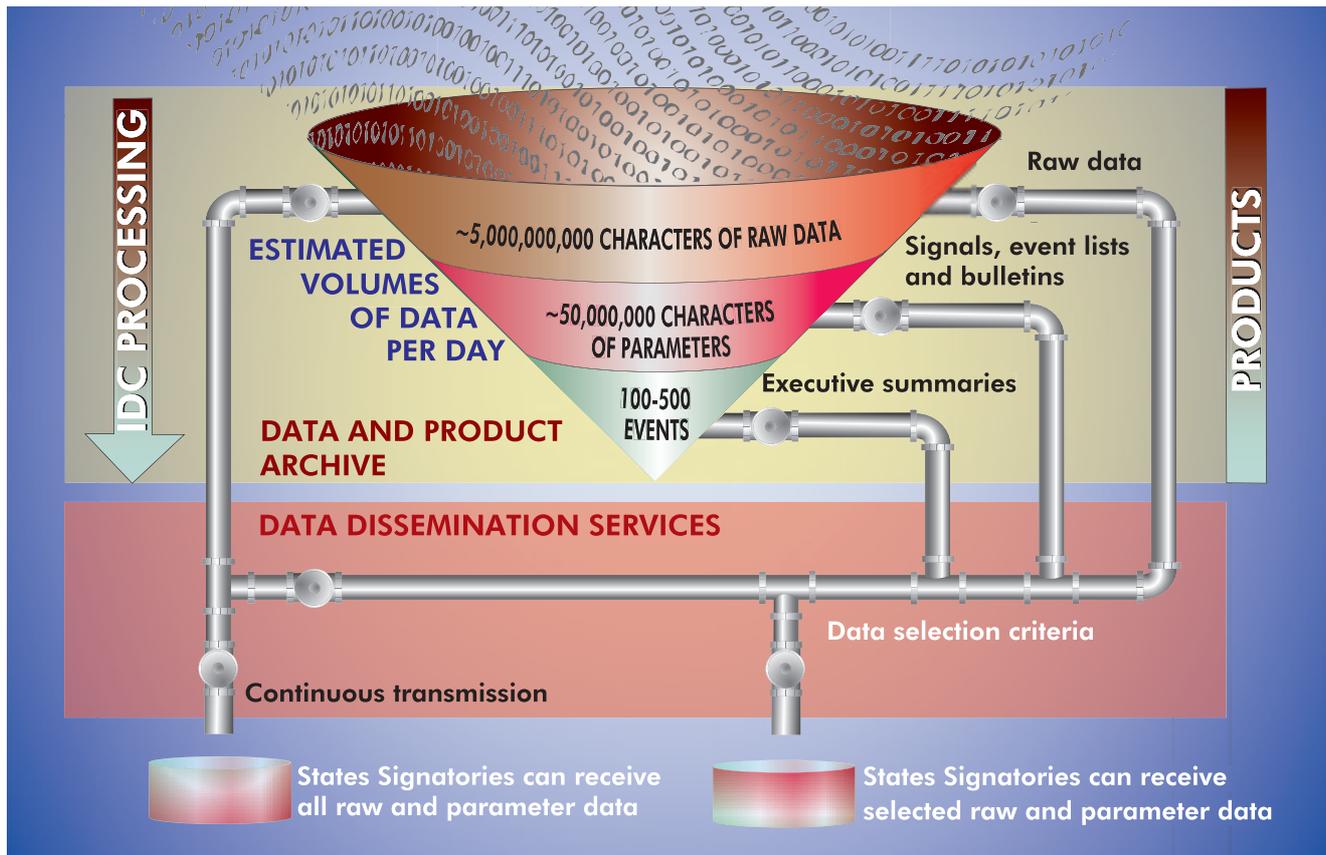


All IDC products underwent quality review before they were released to States Signatories. An additional element of the quality assurance programme was the comparison of automatic and reviewed products from the IDC against those from the pIDC. The results of this comparison provided useful information for a better understanding of operational software and for development of operational procedures.

DATA FUSION, REVIEW AND SERVICES

The atmospheric transport modelling software and the associated fusion and visualization tools available in Releases 2 and 2.1 of the monitoring applications software were tested and evaluated. Daily activities included the retrieval of meteorological data, system monitoring and estimation of the location of air masses sampled by radionuclide stations that were contributing to IDC test operations. Methods were developed and applied to assess the radionuclide network performance every month as well as to assess the impact of the proposed relocations of three stations. The first informal exercise undertaken jointly by the WMO Regional Specialized Meteorological Centres (RSMCs) and the IDC was conducted in May 2000, and tested methods for exchange and comparison of atmospheric transport modelling results between these centres and the IDC.

Since 21 February 2000, data, products and services have been provided to States Signatories on a regular basis. As of the end of 2000, 47 States Signatories had nominated a total of 318 authorized users to be given access to the data, products and services. Between February and the end of the year, approximately 12 gigabytes of data and products were requested and exported. Altogether 68,229 requests to the Automatic Data Request Manager (AutoDRM) for data and products were satisfied and 149,029 products were sent on the basis of established subscriptions. In addition, there were 4,549 visits to the IDC secure web site. About 96% of the data and products requested by means of AutoDRM and subscriptions were dispatched within 3 minutes of the requested time. During the year, 287 requests for assistance were responded to, and 60 tours of the IDC



were conducted. An updated draft of the IDC Users' Guide, describing how NDCs are able to access IMS data and IDC products, was posted on the ECS as well as on the IDC secure web site.

A 'one data day' exercise was conducted for 26 September 2000 in cooperation with interested NDCs. The goal of the exercise was to improve the quality of data and products delivered to the States Signatories. Comparisons of results at the NDCs and the IDC are under way, and will include availability of raw data from IMS stations, and automatic and interactive data processing. The results of the comparisons will be presented at an evaluation workshop in Vancouver, Canada, in April 2001.

SCIENTIFIC METHODS AND DATA FUSION

This programme covers the installation, management, understanding, assessment, progressive development, configuration and documentation of the IDC monitoring applications software. The focus is shifting from assessment of the software products delivered from the pIDC to more independent management and improvement of the scientific methods employed.

SEISMIC, HYDROACOUSTIC AND INFRASOUND METHODS

Detailed testing and assessment of Releases 2 and 2.1 continued from 1999 and several studies were finalized in 2000. The results, which have been documented in IDC technical reports and technical notes, provide many concrete proposals aimed at improving the IDC systems, procedures and products. These assessments covered topics such as automatic signal detection and association with events, event location and calibration, and analysis procedures. Scientific and technical assessments also resulted in the reporting of 200 software problems to the pIDC for resolution. It is expected that many of these will be resolved promptly

through patches to Release 2.1 or in Release 3. Twenty-eight software patches to Release 2.1 were delivered from the pIDC, analysed in detail and tested.

The IDC calibration programme was initiated with the goal of improving the location of events on the basis of the best available regional travel time information. The PTS awarded eight external contracts to scientific organizations as a first step towards implementing this new and important programme.

A number of efforts during 2000 focused on improving the ability of the IDC to analyse radionuclide spectra. One study was devoted to improving the detection and quantification of small peaks in gamma spectra and associated statistical errors, while another examined new types of peaks that have appeared in spectra from new IMS stations that utilize broad energy detectors. To support calibration of IMS germanium detectors, a virtual gamma spectroscopy laboratory based on Monte Carlo methods was developed and demonstrated. An in-depth study of isotopic ratios of fission products both in particulate debris and in the form of noble gases, specifically xenon isotopes, neared completion. The goal was to search for reliable ratios which may exist in connection with nuclear explosions.

The IDC and IMS Divisions organized an exercise to test interactions between the PTS and the radionuclide stations and laboratories for samples requiring laboratory analysis. The results suggested the need to develop specific policies, procedures and software, and to conduct further testing, to implement this important function within the verification regime.

A cooperative agreement between the Preparatory Commission and the WMO was negotiated and signed by the PTS during 2000. Under the agreement, the PTS will receive support for expert meteorological analyses when a Level 5 sample is detected. Also, arrangements were made for RSMCs of the WMO to provide the IDC with daily meteorological data needed to support atmospheric transport calculations.

In this area, one of the primary responsibilities of the IDC is configuration control, maintenance and improvement of software. A significant software modification made it possible for the IDC to receive and process data that conform to internationally recognized channel naming standards. Software for receiving continuous IMS data was further developed, and is currently used by the IMS, the IDC and some States Signatories. A prototype of the Geotool software, to be provided to NDCs to support data acquisition and analysis, was developed and an initial version was made available to 23 States Signatories for testing and review. In addition, the Geotool installation procedures were simplified. As the software engineering staff at the IDC grows, it will assume an increasing responsibility for software development and maintenance.

Preliminary work was done to establish a framework in which the source code at the IDC will be documented. The objective was to produce documentation that will help those responsible for maintaining the source code. The documentation will make use of hyperlinks, and for the most part will be automatically generated.

The IDC Division and the Evaluation Section completed joint projects to evaluate the quality of the IDC software and documentation. The results, coupled

RADIONUCLIDE AND DATA FUSION METHODS

SOFTWARE INTEGRATION

with the subsequently developed programming guide, provide a clear direction for future work in these areas.

Work was done to formulate a general software distribution policy for the IDC. The Preparatory Commission agreed on a policy for distributing software developed by the PTS to States Signatories.

It had been planned that the responsibility for the data services software would be transferred from the pIDC to the IDC in 2000, and that work would be contracted by the PTS to vendors to continue maintenance and development of this software. The plans were not realized, partly because the pIDC requested that it retain responsibility for the software and partly owing to difficulties in filling posts in the software engineering area. A new software development and integration unit is planned in 2001 to focus exclusively on assuming full responsibility for this and all IDC software.

INFRASTRUCTURE

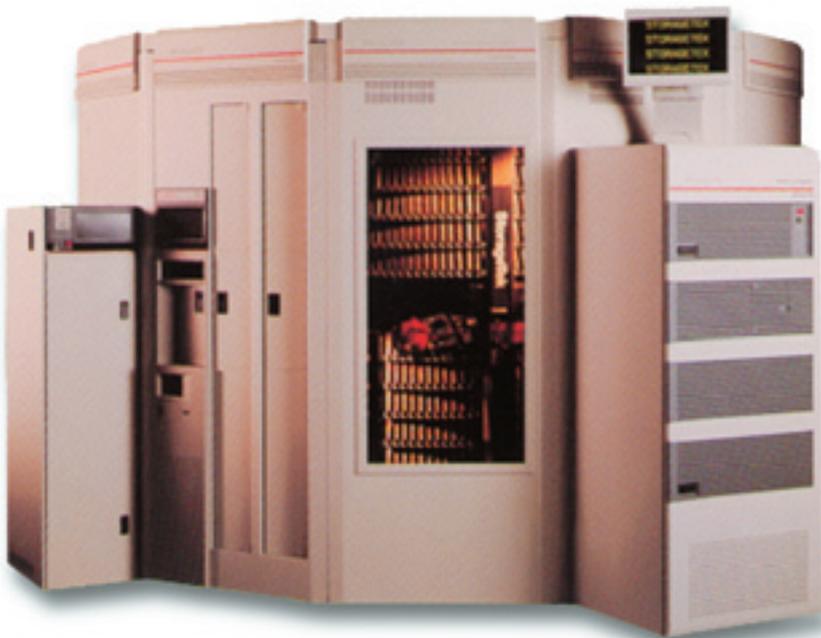
Under this programme the IDC provides, for the entire PTS, the installation, operation, maintenance and administration of the computer infrastructure, consisting of computer hardware, software, network and printing equipment and computer room facilities.

As the number of information systems being deployed increased during 2000, the activities in this area grew correspondingly (see “Inter-Divisional Information Systems and Security Projects”, page 11). As of December 2000, an average of 15 user requests were being processed each working day, covering over 250 users and an installation base of over 800 computer servers, Windows NT computers, Unix workstations, laptops, printers and other devices.

As a result of good planning to take account of the potential Y2K bug, the PTS did not experience any down time at the beginning of 2000. During the year, the computer infrastructure was the target of several virus attacks, of which the

‘love virus’ was the most dangerous. The implementation of appropriate technical measures ensured that none of the virus attacks caused significant loss of productivity for the PTS. During the middle of 2000, a critical database performance problem had a severe impact on the productivity of the IDC monitoring operations. After detailed analysis the problem was diagnosed and measures were applied to guarantee optimal performance.

In the third quarter, the IDC introduced an on-call duty scheme for the computer operators to ensure a 24 hours a day, seven days a week alerting mode for maintaining the technical continuity of the most crit-



ical PTS processing and information systems. Alerts are generated whenever a specific error condition is encountered in these systems. The computer operators can, either from home or within the IDC, diagnose, register and resolve the incident, if possible, or forward the problem to specialists for action. The alerting mechanism is currently in the prototype stage and will be replaced by a fully fledged scheme for monitoring the state of health of critical systems, for which the project planning, requirements study and initial technical preparation have been performed. A software product called CRISTAL NG, offered cost-free by the French Government, is currently under evaluation to support the PTS requirements for monitoring the state of health of IMS, IDC and GCI systems.

The PTS network was redesigned and additional network equipment installed to create a fully redundant network and environment, which dramatically reduced the number of instances of a single point of failure. As part of this process, a new local area network (LAN) for test and integration was implemented. At the end of 2000, the LAN was fully configured and made operational to receive the delayed Release 3. A 125 terabyte mass data storage system, which will provide archiving capacity for more than 10 years of verification data, was installed.

An independent team of consultants verified and validated the IDC facilities and reported on a range of shortcomings in the electrical, fire precaution, access control and air-conditioning installations. These results will be discussed with the service providers.



MAJOR PROGRAMME 3:

Communications

MAJOR PROGRAMME 3: Communications

“...Transmitting International Monitoring System data (raw or processed) to the International Data Centre by the most direct and cost-effective means available...”

(ARTICLE IV, PARAGRAPH 19)

This Major Programme, which is managed by the Global Communications Section of the IDC Division, has as its main component the transport of data from the facilities of the IMS to the IDC in Vienna through the Global Communications Infrastructure. The GCI also provides for the distribution of IMS data and IDC products from the IDC to States Signatories, as well as transport of ancillary data.

GCI MANAGEMENT

The Global Communications Section was reorganized in 2000 to focus resources more efficiently on two major components: installation and operations. To improve the installation process, a quality management system for VSAT installations was developed, documented and tested, with promising results.

In May, an amendment to the long term GCI contract was signed to accommodate the extended VSAT installation schedule, consolidate the management of installation and maintenance of the GCI, and strengthen the GCI service level agreement.

GCI TOPOLOGY

The PTS received a request from the USA to change its network topology from an independent subnetwork to the basic topology. A plan was developed to initiate the change order to the GCI contract and begin the implementation.



Following adoption by the Preparatory Commission of a model agreement/arrangement relating to the implementation of an independent subnetwork between governments and the Commission, the PTS began contract discussions with those States Signatories which have selected the independent subnetwork topology. The first such arrangement was signed towards the end of 2000. The model agreement sets out the procedures and the terms and conditions whereby the PTS will pay allowances to States which have opted for their own independent subnetworks.

GCI IMPLEMENTATION

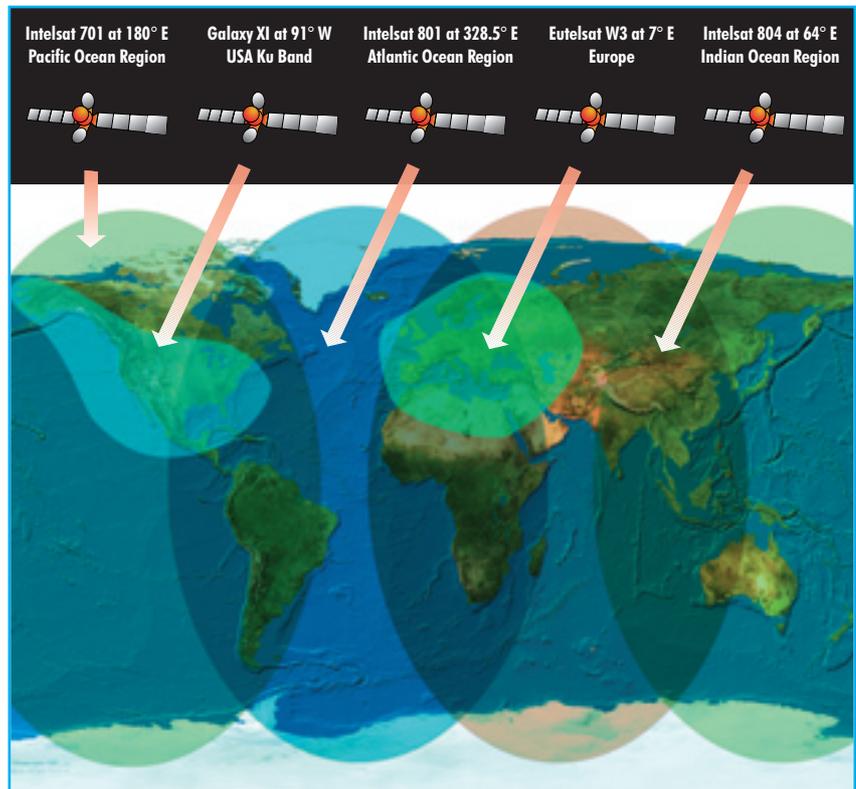
Further implementation of the GCI in 2000 included the installation of a new VSAT hub to provide Ku band coverage in the USA. In total, 44 VSAT stations had been installed as of 31 December, with 19 having been completed in 2000. A total of 107 GCI site surveys had been completed, 70 of them in 2000.

Problems in licensing of VSAT operations continued to be a significant hindrance to the implementation of the GCI. A number of licences were obtained following WGB deliberations and bilateral discussions between the PTS and States Signatories, but many licence applications remain problematic, in some instances owing to commercial interests in host countries.

The GCI design was enhanced with the inclusion of edge routers at NDC and IMS remote sites, to provide for the security of the GCI and to ease the network implementation constraints on the States Signatories. All new installations will include the routers, and a programme is under way to retrofit all 27 previously installed sites. Retrofits have been completed at 13 of these sites.

Development of the various services within the GCI system proceeded throughout 2000. Improvements to the network management system continued. The GCI contractor initiated implementation of a more comprehensive call tracking system to improve the reporting of incidents and corrective actions taken. Issues related to routing and addressing communications throughout the GCI were dealt with, and conclusions are expected during 2001. GCI performance metrics and proposed reporting formats were presented to WGB, and work to implement these will continue into 2001.

At the request of WGB, the Global Communications Section undertook two studies to assess the possibilities for sharing the GCI with third parties and forwarding to States Signatories data for IMS stations which they host. These studies were completed and the results



presented to WGB. Experiments to verify the concept of data sharing began, and several States expressed interest in data forwarding.

Continuing performance problems in the Pacific Ocean region were urgently addressed with the GCI contractor. By the end of 2000, it appeared that substantial progress had been made towards correcting these problems. A longer period of stability, to be followed by a specific set of performance tests, will be required by the PTS in order to conclude that the technical issues have been resolved. The PTS is continuing to work with the contractor to resolve the management and logistical issues, which, in the view of the PTS, were the root causes of the performance problems.

GCI WORKSHOP

A workshop on GCI Related Topics was held from 2 to 4 October in Vienna for the purpose of training and for technical discussion of the GCI. There were 64 participants representing 12 States Signatories, the GCI contractor and its subcontractors, and the PTS. The presentation topics included GCI performance measurement, data forwarding, disaster recovery, operations licensing, and comparison of the GCI with other communications networks. Valuable input was provided to the PTS by the workshop participants.

MAJOR
PROGRAMME 4:
On-Site Inspection



MAJOR PROGRAMME 4: On-Site Inspection

“The sole purpose of an on-site inspection shall be to clarify whether a nuclear weapon test explosion or any other nuclear explosion has been carried out in violation of Article I and, to the extent possible, to gather any facts which might assist in identifying any possible violator.”

(ARTICLE IV, PARAGRAPH 35)

The build-up of the on-site inspection (OSI) regime continued in 2000. The major elements of OSI are inspectors, equipment and the Operational Manual. In 2000, emphasis was placed on preparing the draft of the Operational Manual. Papers contributed by States Signatories and the PTS were combined and edited to form part of an initial draft rolling text. A workshop, a tabletop exercise, and introductory and experimental advanced training courses were conducted to develop the OSI elements, especially the draft manual. Equipment for passive seismic and low resolution gamma measurements was delivered in 2000 and the testing of the equipment began. Difficulties were identified in procuring high resolution gamma and radioactive xenon measurement equipment. A special account was established by the Preparatory Commission to facilitate procurement of equipment.

DOCUMENTATION

DEVELOPMENT OF OSI OPERATIONAL MANUAL: FPC PROCESS AND PTS CONTRIBUTIONS

In late 1999 the Preparatory Commission decided that the development of the draft OSI Operational Manual required a greater priority. Accordingly, in 2000 the PTS reallocated resources to support the process of editing by the OSI Programme Coordinator and Friends (FPC), a group established by the Commission. The FPC were tasked to objectively edit all available resource material from the States Signatories and the PTS for the compilation of the initial draft

rolling text of the manual. The PTS provided technical and substantive support to five FPC sessions. This work will lay the basis for the elaboration phase of the draft manual, which will begin in 2001. The PTS remains ready to support the States Signatories in this next phase. PTS priority will continue to be given to this important work.

The PTS also contributed to the development of the draft manual by producing some 25 papers in 2000 as resource input for the FPC process. By the end of 2000, inputs (from all sources) existed for about 75% of the manual.



The initial draft rolling text of the manual is a bulky document. To facilitate the elaboration of the manual, the PTS developed a CD reference tool which will contain the English version of the rolling text, all resource material and the Treaty text. The three parts will be hyperlinked for ease of cross-referencing. The CD is expected to be ready by June 2001.

COMPUTER REFERENCE
TOOL FOR ELABORATION OF
OPERATIONAL MANUAL

To assist the development of the Operational Manual, the PTS organized a sixth OSI Workshop, on OSI Technologies: Methodologies and Techniques for Application, which was held in Vienna from 26 to 30 June 2000. The workshop, attended by 45 experts from 15 States Signatories, focused on functional and operational requirements for OSI equipment in both the initial and continuation periods of inspection, logistical issues and standing arrangements. Results of past workshops were reviewed and processed into more easily usable resource input for the development of the manual. Recommendations on functional and operational requirements for OSI equipment and their specifications were also produced for consideration by WGB. Some of the recommendations were used during the FPC editing process. The final workshop report was distributed to States Signatories.

WORKSHOPS

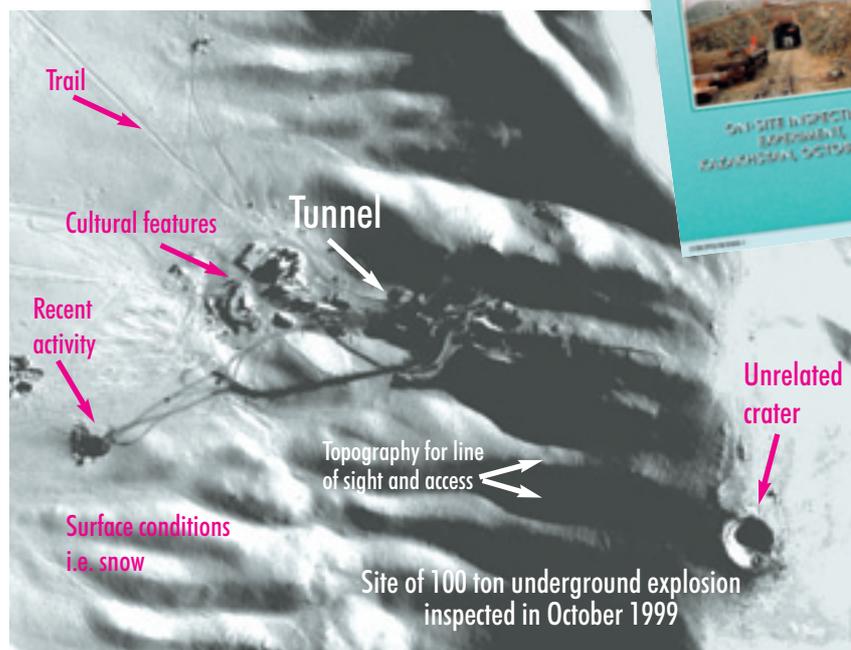
Preparations commenced for a seventh workshop, which will be hosted by China and held in Beijing in 2001. This workshop will also contribute to the development of the manual.

Methodology projects for 2000 were adjusted according to the Preparatory Commission decision to give priority to the development of the Operational Manual. In that regard, emphasis was placed on utilizing the lessons learned in the 1999 field experiment in Kazakhstan to develop concepts for activities to be covered by the manual and to prepare contributions to the manual on the basis of the field experiment.

METHODOLOGY AND FIELD
EXPERIMENTS

Studies were conducted on the logistical capabilities required and available at Vienna International Airport, and on a concept for health and safety support for OSIs. A prototype computer-based tool for the selection of inspection team members was developed and demonstrated to WGB, and acquisition of hardware and software for a geographical information system was initiated.

A technical report on the OSI experiment in Kazakhstan in 1999 was distributed to States Signatories. This report provides a comprehensive discussion of the planning and execution of the experiment and contains recommendations based on the lessons learned. There were 51 recommendations of relevance to the development of the manual, including health and safety



aspects. Of these recommendations, 37 were or are being addressed by the PTS and 14 are for possible action by the Preparatory Commission. The results of the experiment also formed the basis for planning field experiments proposed for 2001 and 2002.

TRAINING AND OPERATIONS

SECOND TABLETOP EXERCISE

The second OSI tabletop exercise (TTE-2) was held from 29 November to 1 December 2000. Its purpose was to test the operational procedures of the OSI Operations Support Centre (OSC). The OSC, staffed by eight OSI experts from States Signatories, was exercised by a control team of six simulating the OSI environment. TTE-2 followed closely the guidelines of WGB to conduct a brief, cost effective exercise, implementing lessons learned from the first tabletop exercise. The reports of the control team, the OSC team and a commentator independent of the other participants concluded that the Standard Operational Procedures (SOP) developed for this exercise and tested during its conduct provided a good basis for further development. It was recognized that keeping the SOP as a handbook for operating the OSC separate from the manual would have the merit of making their update easier. Nevertheless, with some refinement certain elements of the SOP might be considered for inclusion in the draft manual. The need for a dedicated OSC for OSI in the future was also recommended.

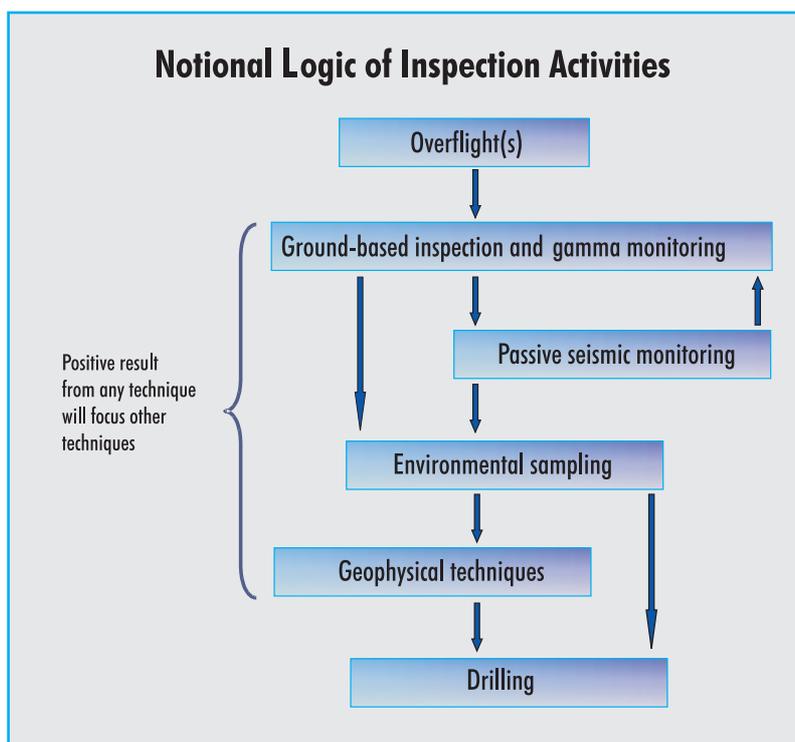
TRAINING

Following WGB approval, the PTS conducted a formal bid process during July–October to select a contractor to prepare a Long Range Plan (LRP) for the OSI Training and Exercise Programme. A contract was signed and the contractor is scheduled to deliver the plan by the end of September 2001. The LRP will set out the full range of possible training courses and exercise activities required to train inspectors and inspection assistants, as required by the Treaty. It will include detailed curricula for training courses and the planning of exercises, as well as a task analysis of all professions required in the inspection team and a cost analysis of the LRP.

es, as well as a task analysis of all professions required in the inspection team and a cost analysis of the LRP.

The fourth OSI Introductory Course took place in March 2000 and was attended by 36 trainees from 32 States Signatories. By the end of 2000, 141 persons had completed introductory training courses. This cadre of experts has already been used for selection of candidates both for OSI exercises and advanced courses and for testing OSI equipment.

The PTS, with close cooperation of Russian Federation authorities, conducted the first OSI Experimental Advanced Course in Snezhinsk, at the All-Russian Research Institute of Technical Physics (VNIITF) of the Russian Federal Nuclear Center, from 8 to 16 November 2000. The course participants included 13 OSI experts from States Signatories, 12 lecturers, including 9 cost-free



Russian lecturers, and 3 PTS staff members. Various approaches to developing the curriculum of the integrated type of advanced course were tested. Some ideas that could be reflected in additional contributions to the manual were presented (such as for phenomenology of nuclear explosions and for OSI personnel and training). The report on the course will be used for further development of advanced courses.

To facilitate the nomination of suitable trainees and potential inspectors by States Signatories to the Training and Exercise Programme, the PTS prepared a document describing a model of the status of OSI inspectors and inspection assistants, as tasked by WGB. It takes into account arrangements implemented for inspectors by the Organisation for the Prohibition of Chemical Weapons, the International Atomic Energy Agency and the United Nations Special Commission.

A list of equipment for use during OSIs must be considered and approved at the initial session of the Conference of the States Parties. The three core objectives for 2000 towards this goal were: to define a list of core and auxiliary inspection equipment and detailed technical requirements and specifications for this equipment; initiate the procurement of these equipment items, initially for testing and training purposes; and develop and implement plans for conducting technical tests, as necessary, for selected equipment items.



EQUIPMENT

Although equipment issues are complex, significant progress was made during 2000, built on achievements of previous years. The PTS acquired items of equipment on the basis of the initial technical requirements adopted by the Preparatory Commission, related to four OSI technologies: passive seismic equipment, still and video photography, visual observation and position finding, and low resolution gamma search equipment. Difficulties in acquiring the high resolution gamma spectrometer tool for field or laboratory use and xenon sampling, separation and measurement equipment were encountered, since these items are not available off the shelf. Consequently, the PTS pursued several strategies to acquire these items. The assistance of States Signatories was sought to make them available on loan or lease, or as a donation to the PTS.

PROCUREMENT

Initial technical and functional requirements for OSI techniques and activities (except drilling) in the period following Executive Council approval of the continuation of an inspection were developed for the further consideration of WGB. This completed the drafting by the PTS of initial technical requirements, for further consideration by WGB and the Preparatory Commission, for the principal techniques that may be employed during an inspection (except for drilling).

SPECIFICATIONS FOR CONTINUOUS PERIOD OF INSPECTION

TESTING

At the request of the Preparatory Commission, the PTS began to develop initial plans to conduct technical tests, as necessary, of OSI equipment that it had obtained. On this basis the PTS commenced technical testing of the passive Seismic Aftershock Monitoring System (SAMS) delivered to it in March 2000. The technical tests are being performed in three phases under direct PTS supervision. Phase A was undertaken at the Vienna International Centre in October, with the participation and assistance of 10 experts in field seismology and local aftershock monitoring from nine States Signatories, an observer and 5 PTS staff members. This also afforded an opportunity for the participants to become familiar with the technical and system functionality of the SAMS and ensured testing transparency as requested by the Commission. Results from these tests are being evaluated by the PTS and will be presented in a technical report.

SPECIAL ACCOUNT

The PTS proposed the establishment of a special account to facilitate the procurement of equipment, in recognition of the difficulties in completing the procurement process within the annual budget cycle. The Preparatory Commission approved the proposal and an account will be established to operate from 2001.

MAJOR PROGRAMME 5:

Evaluation



MAJOR PROGRAMME 5: Evaluation

During 2000, further progress was made in promoting the development and implementation within the PTS of an evaluation framework and a quality assurance system for the verification regime. Work on these two basic components of Major Programme 5 proceeded in a balanced manner. An increasingly important feature was the complementation of these components with new approaches, particularly by using the synergy between evaluation and quality assurance. As the implementing body for this programme, the Evaluation Section developed capabilities for contributing to an overall evaluation of the verification system, and for focusing in a timely fashion on issues related to key segments and components of this system as it develops.

EVALUATION

Work was conducted to further develop and promote evaluation tools and metrics, especially for the IMS and IDC activities.

With regard to waveform technologies, work was conducted on the development of software tools to assess the performance of the IMS seismic network, especially its detection and location capabilities, under various circumstances. The use of Network Simulation (NetSim) and Threshold Monitoring (TM) software tools for evaluation purposes specific to the verification system was explored. It was established in principle that there would be potential benefits in supplementing NetSim with an interactive version of TM, which would need to be modified to meet specific requirements. Following consultations within the PTS, work using external software expertise was initiated late in 2000 for this purpose.

Concerning radionuclide technology, the development of assessment tools for radionuclide monitoring related operations focused on software algorithms. For example, the software package known as Aatami, an advanced analysis tool to evaluate the quality of IMS data and IDC data processing, was almost completed. The data structures of Aatami are three dimensional and several spectra can be handled simultaneously. No commercially available software has such capabilities. Aatami is able to read several IMS spectra and IDC analysis results, and compare them with other analysis information for verification purposes.

QUALITY ASSURANCE

Consistent with guidance from WGB and the Preparatory Commission, increased emphasis was put in 2000 on quality assurance (QA) issues.

A revised version of the CTBTO Quality Manual was issued in April. Based on the latest international standards and 'best practices', this document contains general quality management requirements for processes and procedures to be implemented by the verification Divisions according to operational and technical manuals.

In interaction with the Global Communications Section, work continued on the development of a QA environment specific to the Section, including the drafting of technical procedures. The resulting quality manual for the Global Communications Section was completed by the end of 2000.

In accordance with WGB guidelines, particular emphasis was put on QA issues related to the draft operational manuals for the verification regime. In coordination with the IDC Division, and with the support of external expertise, the Evaluation Section provided quality management inputs which were taken into account in the preparation and content of an updated draft of the IDC Operational Manual. Work was also undertaken on QA issues related to the IMS Operational Manuals, leading to a report which was considered at a QA workshop in November. The workshop produced some recommendations which may be of significant benefit when drafting of the manuals resumes (see “Workshops”, page 32).

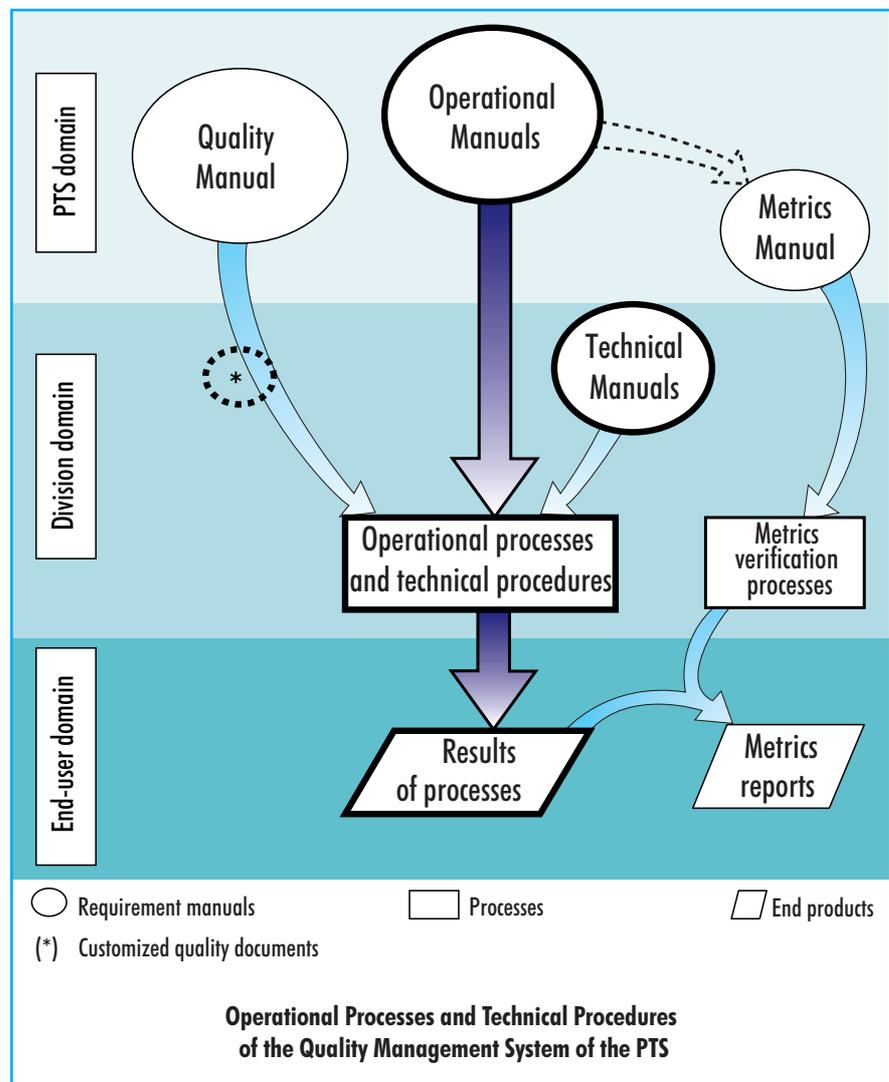
This relatively new component of Major Programme 5 reflects the fact that interaction between QA and evaluation, as two complementary means, enhances the capacity to achieve the best possible verification capabilities in terms of efficiency and value for money.

SYNERGY OF QA AND EVALUATION

The Evaluation Section, in cooperation with the IDC Division and using external expertise, conducted a quality assessment of Release 2 of the IDC monitoring applications software. The work related to various topics, including programming rules, evaluation modules and assessment of long term maintainability of software. Results are to be included in the further development of a comprehensive plan on software acceptance tests.

During the first part of 2000, the Evaluation Section, in interaction with the IDC Division and with external expertise inputs, also carried out a quality assessment of the documentation associated with the IDC software. The main findings and recommendations are to be implemented in the documentation for subsequent releases.

With regard to state of health monitoring for IMS, IDC and GCI systems, the Evaluation Section joined efforts aimed at developing a long term policy and procedures. The monitoring will be based on dedicated software tools. The Evaluation Section proposed methodology for the assessment of these tools.



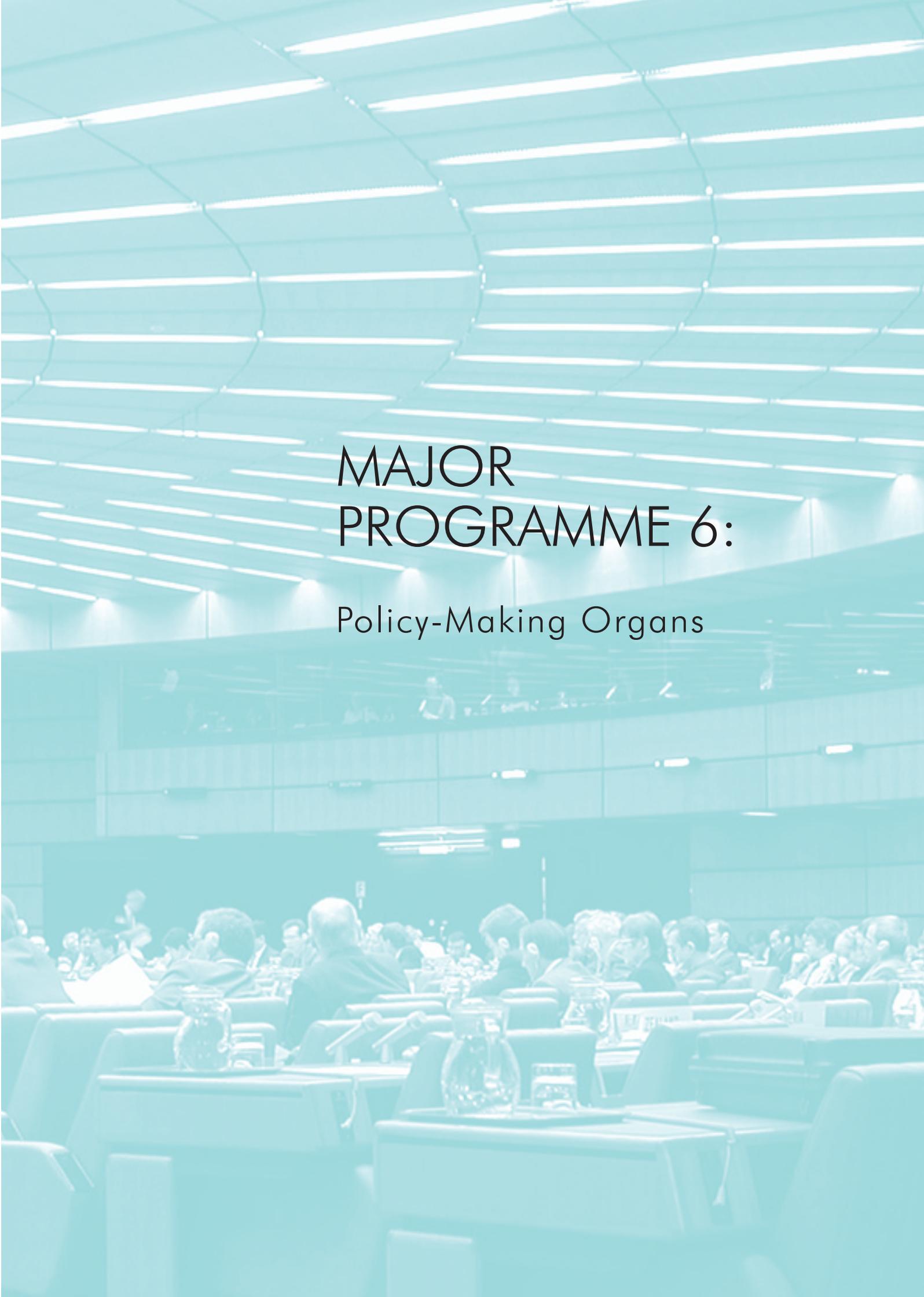
The Evaluation Section assisted in the external evaluation of the IDC and Communications Major Programmes by providing the evaluation team with documentation on evaluation and QA, both of a general nature and also related specifically to these programmes. This documentation additionally served as a basis for Section interviews with the team.

WORKSHOPS

Two PTS workshops were organized in 2000 to provide additional contributions on QA and evaluation for work related to the development of the verification system and for increasing interaction with experts from States Signatories, especially NDCs.

A workshop on PTS/NDCs Cooperation and Interaction on Evaluation Related Issues, held in Edinburgh from 9 to 12 May, was organized in cooperation with the United Kingdom NDC. The participants produced recommendations for the development of evaluation tools and metrics applicable to the verification regime. Subsequent to discussion in WGB, the PTS organized, as a follow-up, a 'one data day' exercise on IMS data and IDC products.

A workshop on Quality Assurance Issues Related to the Operational Manuals for the CTBT Verification Regime was held in Vienna from 7 to 9 November as a response to the increased interest shown in the subject by the States Signatories. The workshop offered recommendations on the drafting process and content for the IMS, IDC and OSI Operational Manuals, taking into account the specific procedures, technologies and different stages of development for each of the manuals. An important view offered for the first time related to the need for coherence and complementarity among the operational manuals, in recognition of their shared objective to ensure the reliability of the verification regime as a whole.

The background image shows a large, modern conference room with a curved ceiling and many people seated at tables. The room is brightly lit with recessed ceiling lights. The people are seated at long tables, and there are water jugs and glasses on the tables. The overall atmosphere is professional and formal.

MAJOR PROGRAMME 6:

Policy-Making Organs

MAJOR PROGRAMME 6: Policy-Making Organs

The Preparatory Commission was chaired for the first six months of 2000 by H.E. Ambassador Pavel Vacek, Permanent Representative of the Czech Republic, and for the second half of the year by H.E. Ambassador Olga Pellicer, Permanent Representative of Mexico. The Commission held three sessions in 2000 and, in addition to the matters pertaining to its work programme, adopted decisions, inter alia, on an Agreement to Regulate the Relationship between the United Nations and the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization, and on the Signature and Ratification of the Comprehensive Nuclear-Test-Ban Treaty on the Occasion of the Millennium Summit.

The Preparatory Commission's subsidiary bodies, Working Group A (WGA) and Working Group B (WGB) and its Advisory Group, each met three times in 2000. WGA, which was chaired by H.E. Ambassador Tibor Tóth, Permanent Representative of Hungary, made recommendations, subsequently adopted by the Commission, on administrative and budgetary matters, including the approval of the Financial Rules of the Commission.

WGB, chaired by Mr. Ola Dahlman (Sweden), considered verification related issues. The recommendations of WGB, subsequently adopted by the Commission, addressed, inter alia, the content of the 2000 and 2001 verification work programmes and the draft Agreement between the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization and the World Meteorological Organization (WMO).

The Advisory Group, chaired by Mr. André Gué (France), considered and provided advice on financial, budgetary and administrative issues, including the 1999 accounts of the Commission and the draft Financial Rules.





MAJOR PROGRAMME 7:

Administration, Coordination
and Support

MAJOR PROGRAMME 7: Administration, Coordination and Support

The Office of the Executive Secretary, the Division of Administration and the Legal and External Relations Division provided services to the Preparatory Commission and directed and managed the activities of the PTS.

CONFERENCE SERVICES

Staff of the Conference Services Section assisted the Chairpersons of the Policy-Making Organs (PMOs) in the preparation and conduct of their meetings. Activities included provision of clerical support, operation and maintenance of equipment, and drafting and editing of conference documents, including the report of each session. During 2000, a total of 479 conference documents were prepared and distributed to States Signatories.



A PTS task force, headed by the Chief of Conference Services, assisted in informal consultations of States Signatories on facilitating the early entry into force of the Treaty. These consultations were convened by Japan as a follow-up to the 1999 conference held pursuant to Article XIV of the Treaty (Conference on Facilitating the Entry into Force of the Comprehensive Nuclear-Test-Ban Treaty) and in preparation of the 2001 conference, scheduled for September 2001 in New York. PTS staff coordinated preparations for the 2001 conference with the United Nations Secretariat.

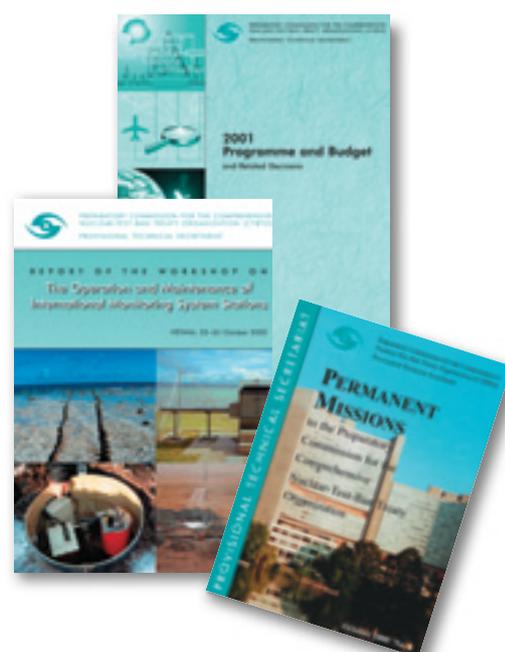


In 2000, a computer based Document Management System (DMS) became operational. The DMS comprises a workflow system, by means of which the conference documents of the Preparatory Commission are processed online, and a secure documents database. The next stage of the project foresees a direct link of the documents database to the ECS, which gives registered users from States Signatories access to documents of the Commission and allows them to contribute to discussion documents. This link with the ECS will enable registered users to access the database via the Internet.

A new version of the Electronic Document Archive CD-ROM, containing the reports of the First to the Twelfth Session of the Preparatory Commission, as well as other background information and documents, was distributed to States Signatories in 2000. Conference documents and reports continued to be made available in electronic form on the ECS. Altogether 662 documents, including conference documents, were uploaded in 2000.

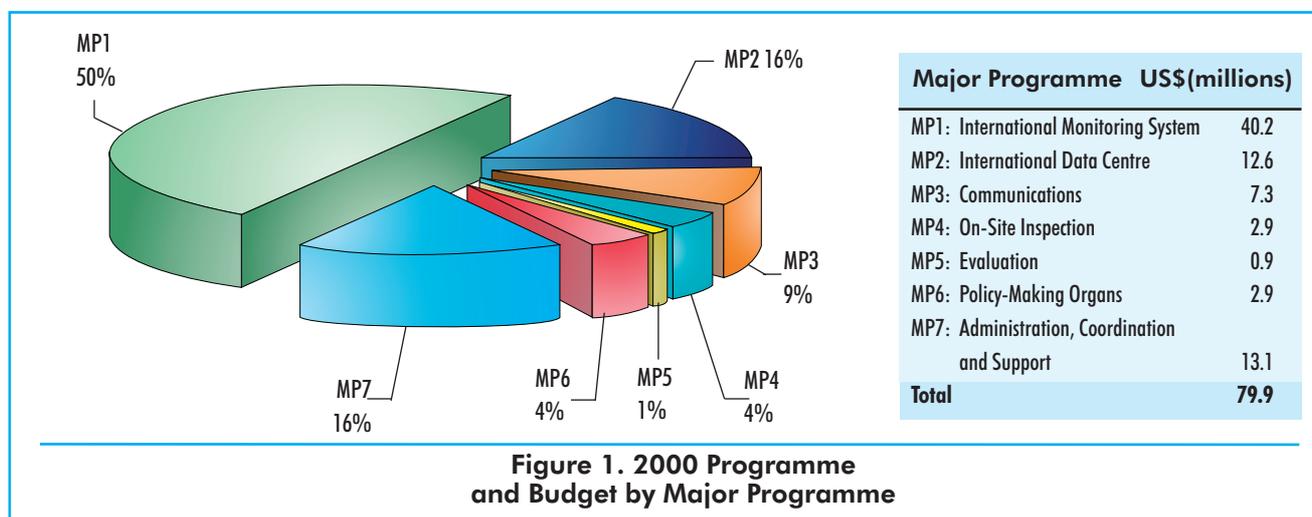
A publishing unit, comprising two editors and a layout designer, was established in 2000. The unit worked to ensure consistent high standards in the content and presentation of documents, both in hard copy and in electronic form. Apart from working on the documents for the PMOs, the unit also assisted other Divisions of the PTS in the preparation of workshop reports, technical reports, manuals, presentations, etc.

The Protocol Office in the Conference Services Section assisted States Signatories in accrediting their Permanent Representatives to the Preparatory Commission. In 2000, 24 new Permanent Representatives were accredited, bringing the total number to 93, as compared with 85 at the end of 1999.



The budget for 2000, at an exchange rate of 12.50 Austrian schillings to 1 US dollar, amounted to US\$79,949,100, which represented an increase of 7% over 1999. The increase was largely related directly to the continuation of the build-up of the IMS network. Of the total budget, 80% was allocated to verification related activities, including an allocation of \$33,152,000 to the Capital Investment Fund (CIF). A breakdown of the 2000 Programme and Budget by Major Programme is shown in Figure 1.

FINANCIAL SERVICES



By 31 December 2000, 63 States Signatories had made full payments and 17 had made partial payments of assessed contributions for 2000, amounting to 95.28% of the total 2000 assessed contributions.

The expenditures for the Programme and Budget in 2000 amounted to \$72.8 million¹, of which \$33.8 million¹ was from the CIF.

In 2000, disbursements in the amount of \$58,000¹ and obligations in the amount of \$700,000¹ in indirect taxes were recorded by the PTS.

¹ The figures provided are provisional and not yet audited.

PROCUREMENT

The Procurement Section executed the procurement requirements of the verification and administrative Divisions, processing about 260 procurements during the year. The financial obligations incurred by the Section in 2000 amounted to \$39.6 million. Under the GCI contract, payments for a total amount of \$4.8 million were made in 2000.

The PTS Vendor Database was further developed and expanded, on the basis of a questionnaire sent to potential vendors and suppliers. The Procurement Section made a number of approaches regarding the introduction of a Procurement Management System. A decision on a system should be made early in 2001.

Financial Rule 11.5.06, Exceptions to Competitive Procedures, stipulates that the Preparatory 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 2000, 20 contracts falling into this category were concluded, with a total value of \$15.2 million.

PERSONNEL

Throughout 2000, the Personnel Section continued to secure the necessary human resources for the operations of the PTS. As of 31 December 2000, the PTS had 248 staff members from 68 countries, as compared with 216 staff members at the end of 1999. Table 3 presents the distribution of regular staff members by field of work.

Table 3. Regular Staff Members by Field of Work

Field of Work	Professional	General Service	Total
Evaluation Section	4	1	5
International Monitoring System Division	29	17	46
International Data Centre Division	65	25	90
On-Site Inspection Division	11	5	16
Total, verification	109 (72.19%)	48 (49.44%)	157 (63.31%)
Office of the Executive Secretary	3	3	6
Internal Audit	2	1	3
Division of Administration	24	36	60
Legal and External Relations Division	13	9	22
Total, non-verification	42 (27.81%)	49 (50.56%)	91 (36.69%)
Total	151 (100%)	97 (100%)	248 (100%)

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

As the initial build-up of the PTS was completed, the work of the Personnel Section moved towards maintaining the strength of the workforce and specific issues of staff administration. The framework established by the Staff Regulations and Rules was refined by further developing and improving administrative practices.

Issues of importance included additional compensation for heavy duty travel, on-call systems to maintain continuity in computing operations, and special working arrangements for weekends and holidays to allow for the issuance of REBs in accordance with the requirements of States Signatories. The Personnel Section further developed its comprehensive programme of training courses offered to staff members, in particular in the areas of information technology and management training.

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 services and control of non-expendable property. The Section also had responsibility for office allocation and space management.

In 2000, the General Services Section successfully implemented two computer systems. The first of these, the Asset Management System, was put in place to control the physical inventory of PTS property. The system also provides information for the financial statements of the Preparatory Commission. The other system implemented was an archiving module of the DMS, used for the electronic archiving of correspondence. The Section also continued to administer and maintain the travel automation system (ATLAS).

The General Services Section continued its close cooperation with the other organizations based at the Vienna International Centre in the following committees: the Buildings Management Advisory Committee (which it chaired for part of 2000), the Buildings Management Working Group, the Asbestos (removal) Task Force, the Childcare Centre Committee, the Commissary Advisory Committee and the Joint Advisory Group on Garage Operations. The Section was also involved in negotiations on the Major Repair and Replacement Fund with representatives of the Government of Austria.

Five States (Guyana, Kiribati, Nauru, Nigeria and Sierra Leone) signed and 18 States (Bangladesh, Belarus, Cambodia, Chile, Gabon, Iceland, Kenya, Kiribati, the Lao People's Democratic Republic, Lithuania, Maldives, Morocco, Nicaragua, Portugal, the Russian Federation, The former Yugoslav Republic of Macedonia, Turkey and the United Arab Emirates) ratified the Treaty in 2000. Of the 18 States which ratified, Bangladesh, Chile, the Russian Federation and Turkey belong to the 44 States, listed in Annex 2 to the Treaty, whose ratification is required for entry into force. Ukraine, another Annex 2 State, announced the completion of its national ratification procedure. As of 31 December 2000, the Treaty had 160 States Signatories and 69 ratifications, 30 of which were by States listed in Annex 2.

Pakistan continued to maintain observer status with the Preparatory Commission; dialogue with India continued. Efforts were made at opening direct contacts with the Democratic People's Republic of Korea.

The External Relations Section worked in cooperation and coordination with the verification Divisions to enhance understanding of the global verification regime. To this end, the governments of 26 States hosting IMS facilities were briefed in their respective capitals. Permanent Missions and capitals were encouraged to participate in the work of the Preparatory Commission and its PMOs. Representatives of 75, 77 and 79 States, respectively, participated in the work of the Eleventh (April), Twelfth (August) and Thirteenth (November) Sessions of the Commission. In addition, 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, increase the number of States Signatories and further ratification. Contacts were developed with the African, Caribbean and Pacific Group of States, the Association of Southeast Asian Nations, the Economic Community of West African States and the European Union. Relations were also developed with the United Nations Disarmament Centres in Lima, Peru, and Lomé, Togo.

EXTERNAL RELATIONS

As of 31 December 2000, the Treaty had 160 States Signatories and 69 ratifications, 30 of which were by States listed in Annex 2 to the Treaty.

As of 31 December 2000, 65 States had notified the Preparatory Commission of their designation of National Authorities or focal points, in accordance with the provisions of Article III, paragraph 4, of the Treaty.

During 2000, the Executive Secretary and staff of the External Relations Section consulted with 78 Permanent Missions of States not represented in Vienna. Visits were also made to 37 States. The Executive Secretary addressed the United Nations General Assembly, for the first time, on the basis of the relationship agreement between the two organizations; the 2000 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT Review Conference); and the forty-fourth session of the General Conference of the International Atomic Energy Agency. By invitation, PTS staff briefed or participated in the fifth session of the Conference of the States Parties of the Organisation for the Prohibition of Chemical Weapons at The Hague; the thirtieth session of the General Assembly of the Organization of American States (OAS) in Windsor, Ontario, Canada; the OAS Hemispheric Security Committee in Washington, D.C.; the thirty-sixth session of the summit of the Organization of African Unity in Lomé; and the thirteenth ministerial conference of the Non-Aligned Movement in Cartagena, Colombia.

In a follow-up to the Conference on Facilitating the Entry into Force of the Comprehensive Nuclear-Test-Ban Treaty held in Vienna in 1999, and the initiative of the United Nations Secretary-General to advance signature and ratification of multilateral agreements deposited with him, the Executive Secretary wrote to the Foreign Ministers of 101 States, inviting their governments to sign and/or ratify the Treaty.

INTERNATIONAL COOPERATION

The International Cooperation Section assisted in promoting cooperation among States Signatories to facilitate exchanges relating to technologies used in the verification of the Treaty.

In 2000, in coordination with the External Relations Section, the International Cooperation Section focused its activities on three geographical regions: Africa,



Latin America and the Caribbean, and South-East Asia, the Pacific and the Far East. With the strong support of the Governments of China and Peru, the Section organized two regional workshops on CTBTO International Cooperation and National Implementation/Ratification Procedures. The workshops, in Beijing in June, and in Lima in November–December, were successful in identifying a range of measures to advance implementation of the Treaty in the respective geographical regions. Consultations were also conducted with

African and other States on follow-up to the workshop for the African region, held in Cairo in 1999.

Several technologically advanced States were contacted with a view to soliciting further support for the work of the International Cooperation Section. Discussions

were held with a number of developing States, upon their request, to assist their efforts to address technological needs in the verification related technologies. The Section also arranged the donation of phased-out computer equipment to two States for operation of their NDCs.

Discussions were held with delegations to develop concepts and a framework for an interregional workshop to be organized for States which had not been able to participate at previous regional workshops. Upon the proposal of the Turkish authorities, Istanbul was identified as the prospective venue for the workshop. Preliminary discussions on the substantive aspects of the preparations were held.

The International Cooperation Section also had preliminary discussions with States of West and Central Africa on a subregional workshop to be held in 2001. The Section had exploratory discussions with representatives of the Pacific Islands Forum, Australia and New Zealand on the possible structure for a workshop in the subregion in 2001.

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

The increased momentum in implementing the work programme of the Preparatory Commission led to a corresponding increase in the activities of the Legal Services Section. In the administrative field, the Section provided advice related to compliance with the regulations, rules and directives on contractual, administrative, financial and personnel questions. It also assisted at meetings of the PMOs and in technical training programmes.

The Legal Services Section worked to implement the requirement of the Preparatory Commission for the conclusion of IMS facility agreements or arrangements in order to enable the implementation of the work programme of the Commission in the territory of States hosting IMS facilities. Seven new facility agreements or arrangements were concluded during 2000, bringing the total to 15 (Table 4). Of these, as of 31 December 2000, nine had entered into force and one was being applied provisionally. Fourteen interim exchanges of letters were also completed in 2000, authorizing the Commission to undertake activities in host States pending the conclusion of a formal facility agreement or arrangement. As of 31 December 2000, a total of 288 facilities in 67 States were covered by appropriate legal arrangements.

A model agreement on payment of allowances to those States operating independent or partitioned subnetworks of the GCI (i.e. States that will collect and submit data to the IDC) was drafted by the Legal Services Section and approved by the Thirteenth Session of the Preparatory Commission. An agreement with Australia as the first of 15 proposed arrangements between the Commission and governments was signed in Vienna on 22 December 2000.

The Legal Services Section gave advice on the interpretation and implementation of the Host Country Agreement with Austria, especially provisions concerning the rights and privileges of the Preparatory Commission and its officials. The Section also assisted in the drafting and negotiation of 14 agreements

LEGAL SERVICES

AGREEMENTS OR ARRANGEMENTS UNDER INTERNATIONAL LAW

Table 4. States with Which IMS Facility Agreements or Arrangements Have Been Concluded

Argentina ^a	Jordan	South Africa
Australia	Kenya	Spain ^b
Canada	Mongolia ^a	Sri Lanka ^a
Cook Islands	New Zealand	Ukraine ^a
Finland	Niger	United Kingdom ^a

^a Agreement or arrangement has not entered into force.
^b Agreement is being applied provisionally.

or arrangements for technical meetings that were held outside of Vienna.

The Agreement to Regulate the Relationship between the United Nations and the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization was signed by the Secretary-General of the United Nations and the Executive Secretary of the Commission on 26 May 2000 and entered into force on 15

June 2000 upon its approval by the General Assembly. A subsequent implementing arrangement with the United Nations Development Programme on the provision of support services was also concluded, as well as an arrangement for the use of the United Nations laissez-passer by officials of the Commission.

The Legal Services Section also prepared and negotiated an Agreement which provides for cooperation between the WMO and the Preparatory Commission, particularly in the exchange of meteorological data. The Agreement was approved by the Commission in November 2000.

TREATY ISSUES

The Legal Services Section prepared opinions and advice on the interpretation of provisions of the Treaty, the Text on the Establishment of the Preparatory Commission and the Rules of Procedure of the Commission. These included a draft decision on the Signature and Ratification of the Comprehensive Nuclear-Test-Ban Treaty on the Occasion of the Millennium Summit, adopted at the Twelfth Session of the Commission in August; a decision of the Commission on the protection of its emblem, adopted at its Thirteenth Session in November; confidentiality matters related to IMS data and IDC products; and OSI issues.

In order to assist the Preparatory Commission in its deliberations, the Legal Services Section drafted a compilation of all changes and corrections that may need to be made to the coordinates of IMS facilities listed in Annex 1 to the Protocol to the Treaty. The changes will be made either according to the Treaty or according to the Vienna Convention on the Law of Treaties, and will be submitted for approval to the initial session of the Conference of the States Parties after entry into force of the Treaty.

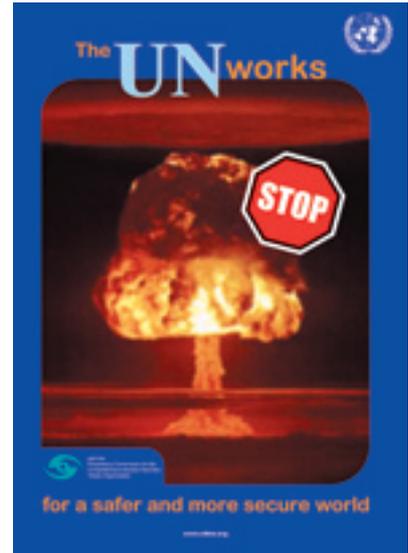
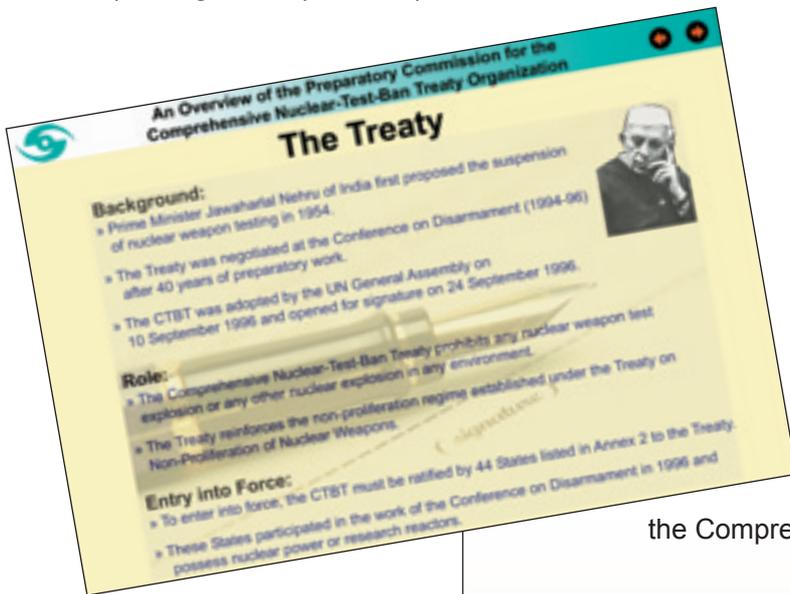
PUBLIC INFORMATION



The Public Information Section focused on production of electronic outreach materials and enhanced interaction with the media and non-governmental organizations (NGOs). The Section also coordinated activities relating to the development of corporate identity and the new public web site for the Preparatory Commission.

The Section created a CD-ROM entitled *CTBT 1997–2000 Achievements* for distribution at the 2000 NPT Review Conference to representatives of States that were unable to follow the work of the Preparatory Commission in Vienna, as well as to NGOs and media representatives. A shorter version of the video documentary entitled *Verifying the Nuclear-Test Ban – CTBTO: For a safer and more secure world* was distributed to States Signatories, NGOs and the media. Computer based presentations on work of the Commission were produced for the United Nations Disarmament Fellows and other briefings, and were also used during the United

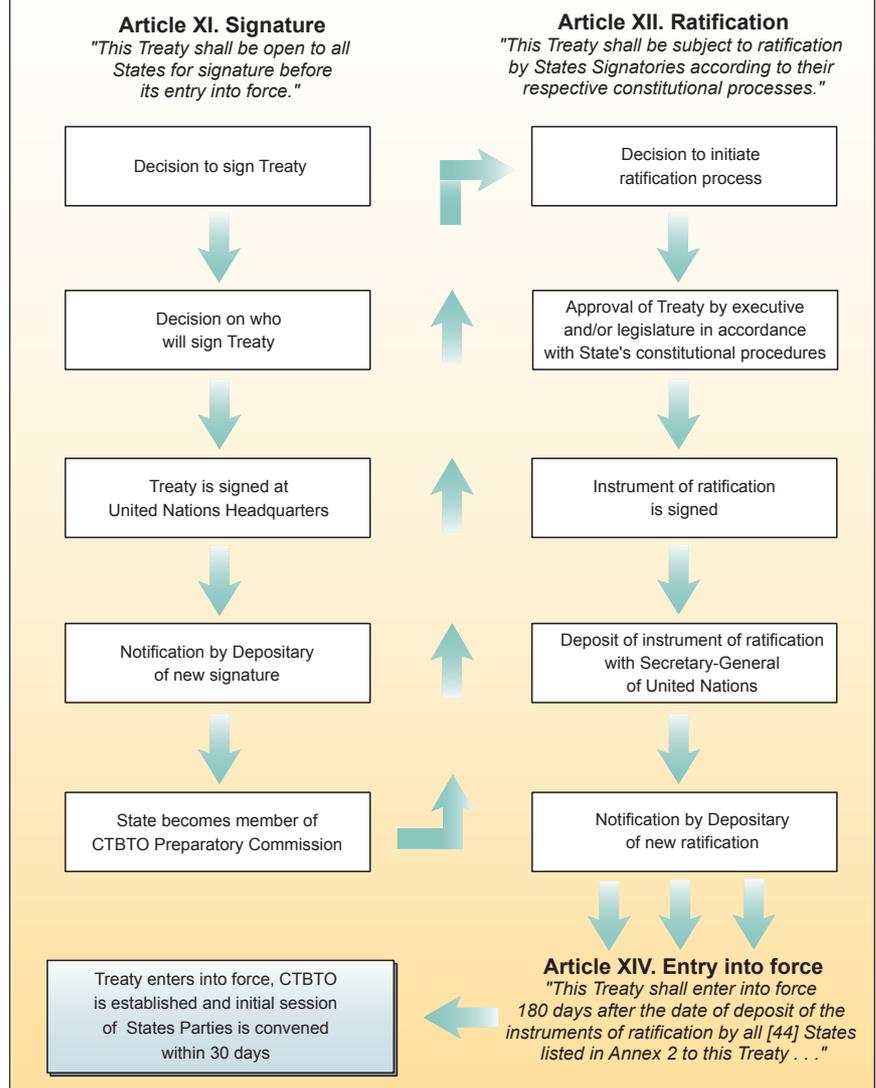
Nations/NGO Disarmament Week at United Nations Headquarters in New York in October. A brochure entitled *Advancing the Entry Into Force of the Comprehensive Nuclear-Test-Ban Treaty* was prepared for the Millennium Summit for States that have yet to sign or ratify the Treaty.



To mark the third anniversary of the establishment of the Preparatory Commission in Vienna on 17 March 1997, a press conference, a panel discussion and technical presentations on the theme, *CTBT Three Years On – Significance, Achievements, The Way Forward*, were organized in Vienna on 4 April 2000.

The Public Information Section arranged for journalists to travel to Freyung, Germany, for the inauguration of infrasound station IS26 in October. A press briefing was organized in cooperation with the German authorities. The Section also collaborated with a German TV broadcaster to insert coverage on the role of the verification regime in a documentary entitled *Welt der Wunder*, which was aired in October. The Section conducted a total of 15 briefings for various audiences and organized four press conferences. Thirty-eight press releases were issued and eight issues of *CTBTO News* were distributed.

Signing and Ratifying the Comprehensive Nuclear-Test-Ban Treaty



INTERNAL AUDIT

Internal Audit conducted audits and reviews relating to the GCI contract; the accounting information system for the General Fund and the CIF; the Provident Fund, including a review of its accounting system, calculation and distribution of dividend payments, and payments to separated staff members; the travel system, including a review of shipment of household effects for new and separating staff members; settlement of education grants for the school year 1999–2000 in relation to the education grant advances for the school year 2000–2001; and hiring of individual consultants and procurement of consultancy agreements with firms. Internal Audit also provided input into the development of various other draft administrative directives and programmatic systems.

During the first quarter of 2000, Internal Audit reviewed bank reconciliation statements prepared by the Financial Services Section to ascertain the accuracy and agreement of the cash in bank balances as reflected in accounting books as of 31 December 1999 with the bank balances of the same date confirmed with depositary banks. It also prepared an audit plan and strategy for the review of reduced assessment claims from a financial viewpoint and contributed to the development of PTS cost validation procedures for such claims.

Internal Audit coordinated with the External Auditor for the audit of the 2000 accounts of the Preparatory Commission by providing the External Auditor with information on the status of implementation by the PTS of the recommendations contained in his 1999 report and by furnishing him with copies of Internal Audit reports prepared in 2000.

SUPPLEMENTARY
INFORMATION

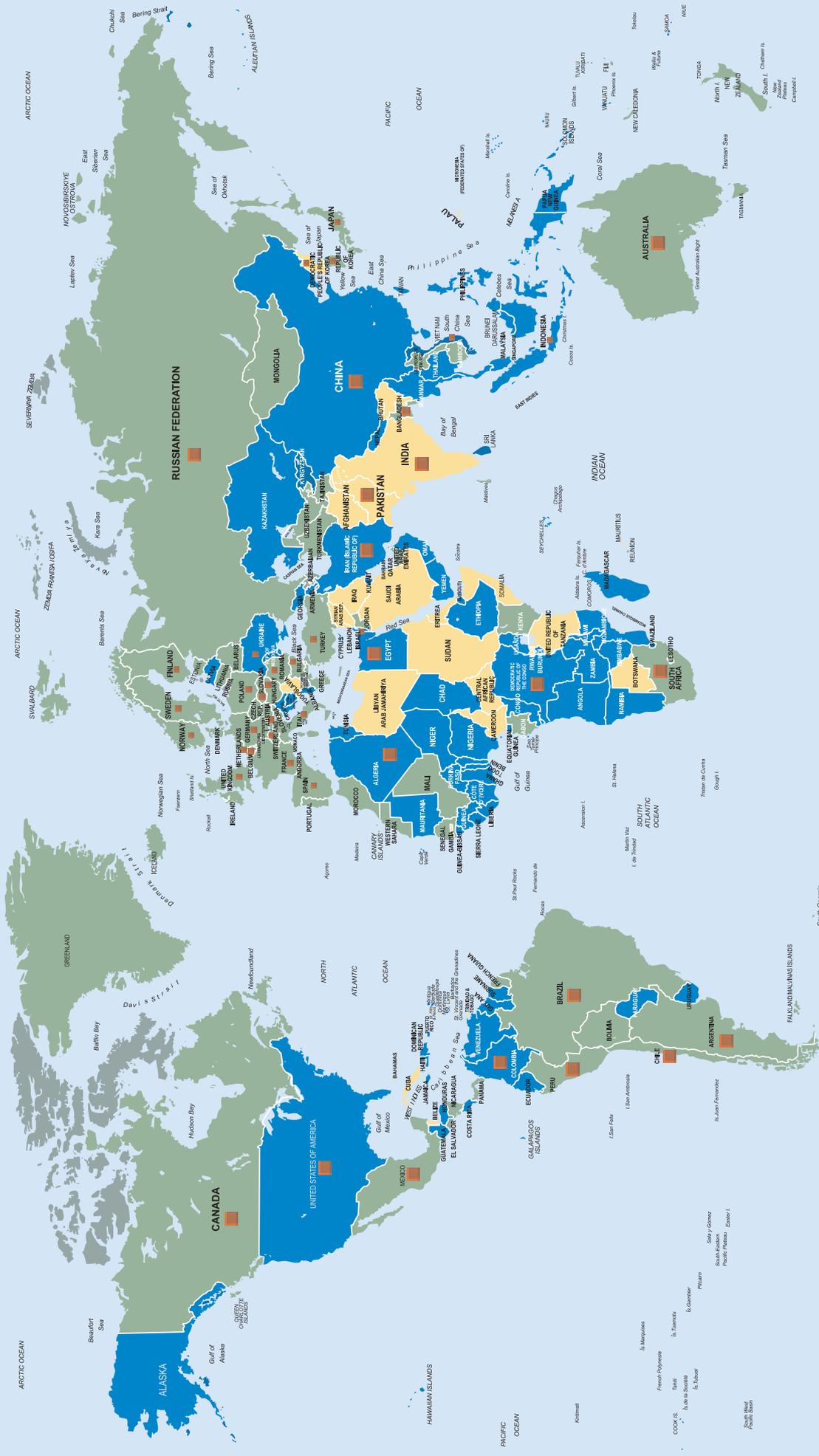
States Whose Ratification is Required for the Treaty to Enter into Force

As of 31 December 2000, of the 44 States whose ratification is required for the Treaty to enter into force, **30 States** had ratified the Treaty, **11 States** had signed the Treaty, **3 States** had not signed the Treaty.

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	
United Kingdom	24 September 1996	6 April 1998
United States of America	24 September 1996	
Viet Nam	24 September 1996	

The Preparatory Commission can only announce a ratification once the Depositary of the Treaty, the Secretary-General of the United Nations, informs it that an instrument of ratification of a State Signatory has been received in accordance with Article XIV of the Treaty.

Status of Signature and Ratification of the Treaty (31 December 2000)



States Signatories that have ratified

States Signatories yet to ratify

Non-signatory States

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

Status of Signature and Ratification of the Treaty (31 December 2000)

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		
Benin	27 September 1996	
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		
Canada	24 September 1996	18 December 1998
Cape Verde	1 October 1996	
Central African Republic		
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	
Côte d'Ivoire	25 September 1996	
Croatia	24 September 1996	
Cuba		
Cyprus	24 September 1996	
Czech Republic	12 November 1996	11 September 1997

State	Date of Signature	Date of Ratification
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	
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	
Haiti	24 September 1996	
Holy See	24 September 1996	
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	
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
Kuwait	24 September 1996	
Kyrgyzstan	8 September 1996	
Lao People's Democratic Republic	30 July 1997	5 October 2000
Latvia	24 September 1996	

STATUS OF SIGNATURE AND RATIFICATION
OF THE TREATY

State	Date of Signature	Date of Ratification
Lebanon		
Lesotho	30 September 1996	14 September 1999
Liberia	1 October 1996	
Libyan Arab Jamahiriya		
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	
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 September 1996	
Namibia	24 September 1996	
Nauru	8 September 2000	
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	
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	
Peru	25 September 1996	12 November 1997
Philippines	24 September 1996	
Poland	24 September 1996	25 May 1999
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	

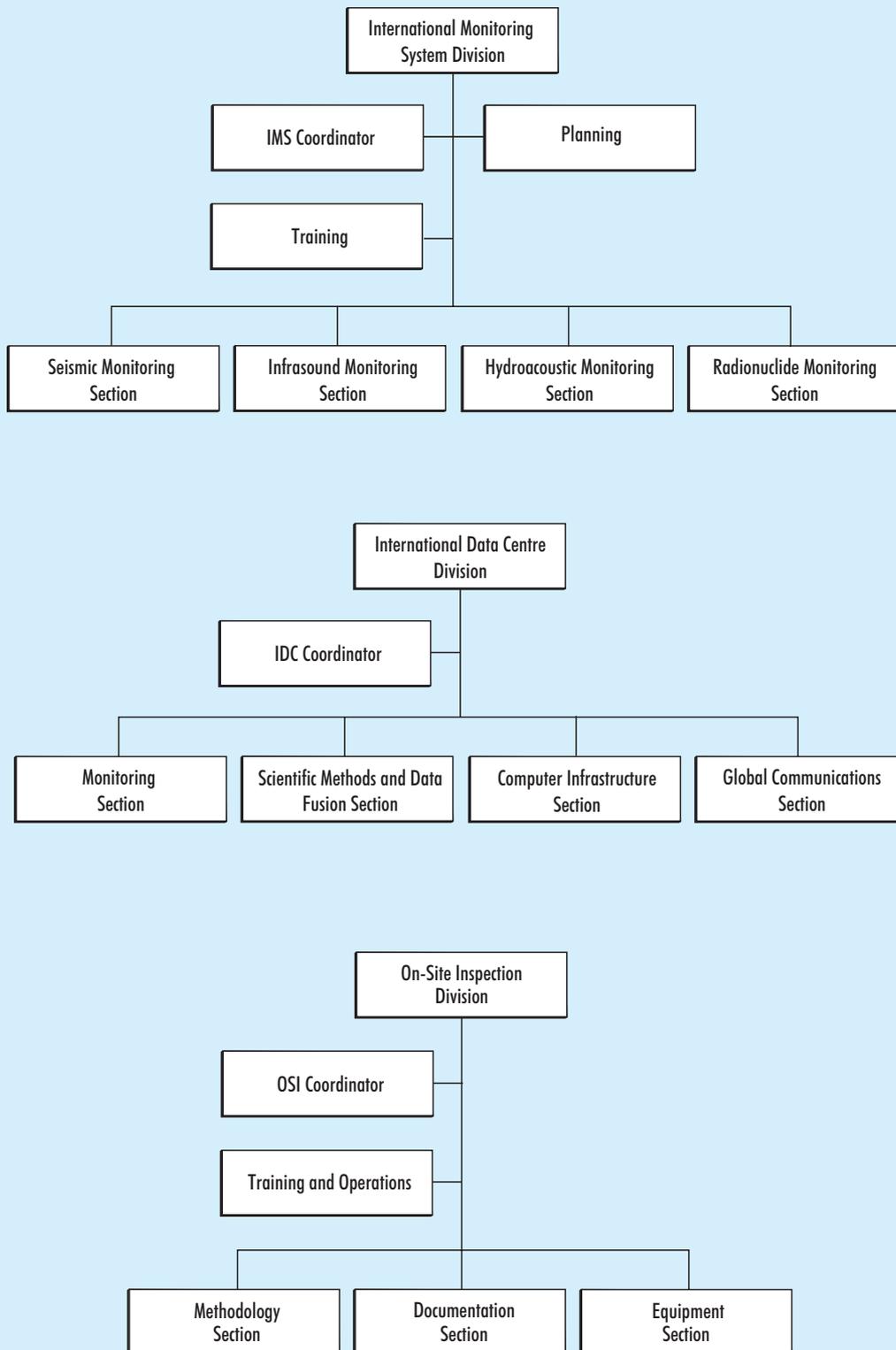
State	Date of Signature	Date of Ratification
Saint Vincent and the Grenadines		
Samoa	9 October 1996	
San Marino	7 October 1996	
Sao Tome and Principe	26 September 1996	
Saudi Arabia		
Senegal	26 September 1996	9 June 1999
Seychelles	24 September 1996	
Sierra Leone	8 September 2000	
Singapore	14 January 1999	
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	
Ukraine	27 September 1996	
United Arab Emirates	25 September 1996	18 September 2000
United Kingdom	24 September 1996	6 April 1998
United Republic of Tanzania		
United States of America	24 September 1996	
Uruguay	24 September 1996	
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		
Zambia	3 December 1996	
Zimbabwe	13 October 1999	

Facilities of the CTBT International Monitoring System

State	Primary Seismic Stations	Auxiliary Seismic Stations	Radio-nuclide Stations	Radio-nuclide Labs	Hydro-acoustic Stations	Infra-sound 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 ^a		1					1
Greece		1					1
Guatemala		1					1
Iceland		1	1				2
To be determined	1	1	1			1	4
Indonesia		6					6
Iran (Islamic Republic of)	1	2	1			1	5
Israel		2		1			3
Italy		1		1			2
Japan	1	5	2	1		1	10
Jordan		1					1
Kazakhstan	1	3				1	5
Kenya	1					1	2
Kiribati		1					1
Kuwait		1					1
Kyrgyzstan		1					1
Libyan Arab Jamahiriya			1				1

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

State	Primary Seismic Stations	Auxiliary Seismic Stations	Radio-nuclide Stations	Radio-nuclide Labs	Hydro-acoustic Stations	Infra-sound 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
TOTAL	50	120	80	16	11	60	337



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