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World map of the International Monitoring System (IMS) facilities

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Insert 1

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

BRIEF BACKGROUND

- The Comprehensive Nuclear-Test-Ban Treaty (CTBT) was adopted in New York on 10 September 1996. The Treaty, which prohibits nuclear explosions in any environment, consists of 17 Articles, 2 Annexes and a Protocol.

- Article XIV specifies the conditions for the Treaty's entry into force. This will take place 180 days after the 44 States listed in Annex 2 to the Treaty have all ratified it. *(For the list of Annex 2 States, please see insert 4.)*

- The negotiators of the CTBT also included a mechanism under Article XIV to accelerate the Treaty's entry into force, if this had not taken place three years after the anniversary of its opening for signature.

- Ratifying States can request the Secretary-General of the United Nations, who is the Depositary of the Treaty, to convene a Conference to examine how the ratification process can be accelerated.These Conferences can be convened at subsequent anniversaries until the Treaty enters into force.

SIGNIFICANCE OF THE TREATY

The Treaty constrains the development and qualitative improvement of nuclear weapons. The CTBT constitutes an effective measure of nuclear disarmament and non-proliferation.

DATE AND VENUE OF THE 2003 CONFERENCE

At the request of the ratifying States, the Secretary-General of the United Nations has convened the 2003 Conference on Facilitating the Entry into Force of the CTBT. The Conference will take place from 3 to 5 September 2003 at the Austria Centre, Vienna, Austria.

OBJECTIVE

Decide which measures consistent with international law may be taken to accelerate the ratification process in order to facilitate the entry into force of the CTBT.

PARTICIPATING STATES AND ORGANIZATIONS

Representatives of States which have ratified the CTBT are invited to participate in deliberations. Signatory States, non-signatory States, international organizations and non-governmental organizations are invited to attend as observers.

PRESIDENT-DESIGNATE OF THE CONFERENCE

His Excellency Erkki Tuomioja, Minister for Foreign Affairs of Finland.

CHAIRPERSON OF THE PREPARATORY PROCESS

Ambassador Tom Grönberg, Permanent Representative of Finland to the international organizations in Vienna.

ANTICIPATED OUTCOME

- The main outcome of the Conference will be the Final Declaration. This document will include measures consistent with international law that may be undertaken to accelerate the ratification process in order to facilitate the early entry into force of the Treaty.

- It is anticipated that a number of States which have not yet signed or ratified the Treaty will decide to do so prior to or during the Conference, as has been the case in previous Article XIV Conferences.

PREVIOUS CONFERENCES

Conferences on Facilitating the Entry into Force of the CTBT have been held in Vienna in 1999 and in New York in 2001. *(For a summary of the Conferences, please see insert 3.)*

Insert 2

Provisional agenda of the 2003 Conference

1. Opening of the Conference by the Secretary-General of the United Nations or his representative

2. Election of the President

3. Adoption of the rules of procedure

4. Adoption of the agenda and other organizational matters

5. Election of officers other than the President

6. Credentials of representatives to the Conference:

   (a) Appointment of the members of the Credentials Committee

   (b) Report of the Credentials Committee

7. Confirmation of the Secretary of the Conference

8. Welcoming address on behalf of the host country

9. Address by the Executive Secretary of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization

10. Presentation of a progress report on cooperation to facilitate the entry into force of the Treaty

11. General exchange of views by ratifiers and signatories on facilitating the entry into force of the Comprehensive Nuclear-Test-Ban Treaty[1]

12. Consideration of specific measures to facilitate the entry into force of the Comprehensive Nuclear-Test-Ban Treaty

13. Statements by non-signatory States[1]

14. Statement on behalf of NGOs[2]

15. Consideration and adoption of a final document

16. Any matters arising from paragraph 3 of Article XIV of the Treaty

17. Adoption of the report of the Conference

18. Closure of the Conference

[1] *As general guidance, it is assumed that speakers, at the discretion of the President, will talk for up to five minutes each.*
[2] *Time limit of approximately five minutes, at the discretion of the President.*

Insert 2

Proposed timetable for the work of the Conference

WEDNESDAY, 3 SEPTEMBER 2003

10:00 a.m.-12:30 p.m.

Item 1 Opening of the Conference by the Secretary-General of the United Nations or his representative

Item 2 Election of the President

Item 3 Adoption of the rules of procedure

Item 4 Adoption of the agenda and other organizational matters

Item 5 Election of officers other than the President

Item 6(a) Credentials of representatives to the Conference: Appointment of the members of the Credentials Committee

Item 7 Confirmation of the Secretary of the Conference

Item 8 Welcoming address on behalf of the host country

Item 9 Address by the Executive Secretary of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization

Item 10 Presentation of a progress report on cooperation to facilitate the entry into force of the Treaty

Item 11 General exchange of views by ratifiers and signatories on facilitating the entry into force of the Comprehensive Nuclear-Test-Ban Treaty

12:30 p.m.

Opening of the PTS exhibition, "CTBT: A Global Verification Regime"

1:15-2:45 p.m.

VERTIC seminar, "Verifying the Nuclear-Test-Ban Treaty: Participation, Progress and Potential"

3:00-6:00 p.m.

Item 11 (cont.) General exchange of views by ratifiers and signatories on facilitating the entry into force of the Comprehensive Nuclear-Test-Ban Treaty

THURSDAY, 4 SEPTEMBER 2003

9:30 a.m.-12:00 noon

Item 11 (cont.) General exchange of views by ratifiers and signatories on facilitating the entry into force of the Comprehensive Nuclear-Test-Ban Treaty

1:30-3:15 p.m.

Seminar on the Benefits of the Comprehensive Nuclear-Test-Ban Treaty

3:30-6:00 p.m.

Item 12[3] Consideration of specific measures to facilitate the entry into force of the Comprehensive Nuclear-Test-Ban Treaty (Committee of the Whole)

FRIDAY, 5 SEPTEMBER 2003

10:00 a.m.-1:00 p.m.

Item 11 (cont.) General exchange of views by ratifiers and signatories on facilitating the entry into force of the Comprehensive Nuclear-Test-Ban Treaty

Item 13 Statements by non-signatory States

Item 14 Statement on behalf of NGOs

Item 6(b) Credentials of representatives to the Conference: Report of the Credentials Committee

Item 15 Consideration and adoption of a final document

Item 16 Any matters arising from paragraph 3 of Article XIV of the Treaty

Item 17 Adoption of the report of the Conference

Item 18 Closure of the Conference

[3] *Time permitting, consideration of item 12 could begin in the morning meeting on 4 September.*

Insert 3

Summary of previous Conferences on Facilitating the Entry into Force of the Comprehensive Nuclear-Test-Ban Treaty

In the period immediately prior to the opening of the 1999 Conference and the conclusion of the 2001 Conference, 33 States ratified the Comprehensive Nuclear-Test-Ban Treaty (CTBT), including five of the States listed in Annex 2 to the Treaty. A total of eight States also signed the CTBT during this time.

CONFERENCE ON FACILITATING THE ENTRY INTO FORCE OF THE COMPREHENSIVE NUCLEAR-TEST-BAN TREATY, VIENNA, 6-8 OCTOBER 1999

A total of 92 States Ratifiers and Signatories met in Vienna in 1999 to promote the early entry into force of the CTBT. Representatives of non-signatory States, international and non-governmental organizations also attended the Conference.

The Conference was opened by Mr Jayantha Dhanapala, Under-Secretary-General for Disarmament Affairs of the United Nations. His Excellency Mr Wolfgang Schüssel, Vice-Chancellor and Federal Minister for Foreign Affairs of Austria, gave a welcoming address on behalf of the host State.

During the three-day meeting, participants discussed the extent to which the requirement for the Treaty's entry into force had been met. Discussions also focused on which measures consistent with international law might be used to accelerate ratification of the Treaty.

In the Final Declaration, Member States reaffirmed their commitment to the Treaty's basic obligations and their undertaking to refrain from acts which would defeat the object and purpose of the Treaty pending its early entry into force. States non-signatories were called upon to sign and ratify the Treaty as soon as possible.

CONFERENCE ON FACILITATING THE ENTRY INTO FORCE OF THE COMPREHENSIVE NUCLEAR-TEST-BAN TREATY, NEW YORK, 11-13 NOVEMBER 2001

A total of 118 States participated in the 2001 Article XIV Conference in New York along with representatives of both international and non-governmental organizations. The Conference was chaired by the Deputy Foreign Minister of Mexico, Mr Miguel Marin Bosch.

The Secretary-General of the United Nations, Mr Kofi Annan, opened the Conference, calling the Treaty "a crucial element in the non-proliferation regime".

During discussions, delegates referred to the Treaty as one of the cornerstones of the disarmament and non-proliferation process. Reference was also made to the Treaty's role within the context of the fight against terrorism.

In the Final Declaration of the Conference, participants called upon all States to maintain a moratorium on nuclear weapon test explosions or any other nuclear explosions. The States renewed their commitment to work for universal ratification of the Treaty and its early entry into force.

Insert 4

Mechanism for the Treaty's entry into force

The provisions of a treaty generally determine the requirements for its entry into force. In the case of the CTBT, the Treaty requires ratification by the 44 States listed in its Annex 2. *(Please refer to the list overleaf.)*

Annex 2 States are those States that possess nuclear power or research reactors, and participated in the work of the Conference on Disarmament which drafted the CTBT in 1996. The CTBT will enter into force 180 days after all the Annex 2 States have ratified it.

Signature and ratification by States other than the 44 Annex 2 States is also important since this indicates support for the Treaty and willingness to help the CTBT move towards early entry into force. As the number of signatures and ratifications continues to increase, the Treaty draws closer to achieving universality and the important goal of enhancing international peace and security.

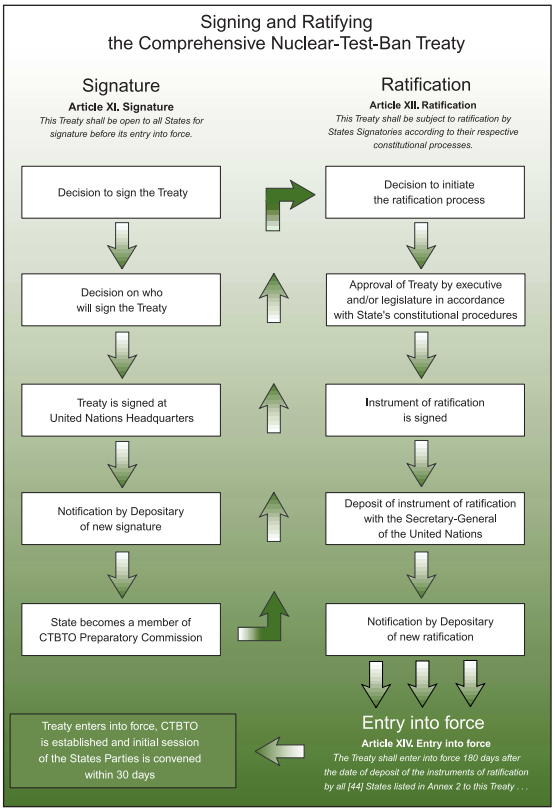

FIGURE 1. SIGNATURE AND RATIFICATION PROCESS

SIGNATURE OF THE CTBT

Signature is accomplished when an authorized representative of a State signs the Treaty at the United Nations Headquarters in New York.

The national steps leading to signature of the CTBT are the same as for other treaties.

- When a government decides to sign the Treaty, a decision must be made as to who will represent the State when signing the Treaty.
- The capacity of that representative to sign must be determined. Unless the representative is the Head of State or Government or the Minister for Foreign Affairs, he or she will have to be issued with or possess full powers to sign the Treaty.

States Signatories are bound by the basic obligations of Article I of the Treaty not to carry out any nuclear weapon test explosion or any other nuclear explosion. Signatories are also obliged to refrain from acts that would defeat the object and purpose of the Treaty.

RATIFICATION OF THE CTBT

Ratification follows signature and indicates the final consent of a State to be bound by the terms of the Treaty.

- First of all, the instrument of ratification needs to be signed by the Head of State or Government or the Minister for Foreign Affairs, or another authorized representative.
- The ratification process is completed on the date on which the State deposits its instrument of ratification with the United Nations Secretary-General in New York.

On 5 May 2003, Mauritania became the 100th State to ratify the Treaty. This figure signified an important milestone on the road to the universality of the CTBT.

ANNEX 2 TO THE TREATY
LIST OF STATES PURSUANT TO ARTICLE XIV

1. Algeria
2. Argentina
3. Australia
4. Austria
5. Bangladesh
6. Belgium
7. Brazil
8. Bulgaria
9. Canada
10. Chile
11. China
12. Colombia
13. Democratic People's Republic of Korea
14. Democratic Republic of the Congo (formerly Zaire)
15. Egypt
16. Finland
17. France
18. Germany
19. Hungary
20. India
21. Indonesia
22. Iran (Islamic Republic of)
23. Israel
24. Italy
25. Japan
26. Mexico
27. Netherlands
28. Norway
29. Pakistan
30. Peru
31. Poland
32. Romania
33. Republic of Korea
34. Russian Federation
35. Slovakia
36. South Africa
37. Spain
38. Sweden
39. Switzerland
40. Turkey
41. Ukraine
42. United Kingdom of Great Britain and Northern Ireland
43. United States of America
44. Viet Nam

Insert 5

Summary of the Comprehensive Nuclear-Test-Ban Treaty (CTBT)

The Comprehensive Nuclear-Test-Ban Treaty bans all nuclear weapon test explosions, for military or civilian purposes.

It comprises a preamble, 17 articles, two annexes and a Protocol with two annexes.

The preamble outlines the significance of the Treaty.

Article I stipulates the basic obligations of the Treaty, and prohibits State Parties from carrying out any nuclear-weapon test explosion in any environment.

Article II provides for the establishment of the Comprehensive Nuclear-Test-Ban Treaty Organization in Vienna to ensure the Treaty's implementation as well as providing a forum for consultation and cooperation.

Article III focuses on national implementation measures.

Article IV elaborates on the global verification regime to monitor compliance with Treaty provisions. The regime is to comprise a global network of monitoring stations (the International Monitoring System, supported by the International Data Centre in Vienna), a consultation and clarification process, on-site inspections, and confidence-building measures.

Article V outlines measures to redress a situation which contravenes CTBT provisions and to ensure compliance with the Treaty.

Article VI deals with the settlement of disputes that may arise concerning the application or the interpretation of the Treaty.

Article VII contains the procedure for amending the Treaty.

Article VIII stipulates when a review of the Treaty will take place after its entry into force.

Article IX states that the Treaty is of unlimited duration.

Article X deals with the status of the Protocol and the Annexes.

Article XI concerns signature of the Treaty.

Article XII deals with ratification of the Treaty.

Article XIII concerns accession to the Treaty.

Article XIV establishes the requirements for the Treaty's entry into force. This will take place 180 days after the 44 States listed in Annex 2 to the Treaty have all ratified it. Article XIV also includes a mechanism to accelerate the Treaty's entry into force, if this has not taken place three years after the anniversary of its opening for signature.

Article XV specifies that the Treaty shall not be subject to reservations.

Article XVI stipulates the functions of the Depositary of the Treaty.

Article XVII deals with the authenticity of the Arabic, Chinese, English, French, Russian and Spanish texts of the Treaty.

Annex 1 to the Treaty lists States by geographical regions for the purposes of elections to the Executive Council.

Annex 2 to the Treaty lists the 44 States that must ratify the Treaty for it to enter into force.

Protocol Part I describes the functions of the International Monitoring System (IMS) and the International Data Centre (IDC).

Protocol Part II sets up the procedures for on-site inspections.

Protocol Part III deals with confidence-building measures.

Annex 1 to the Protocol lists the facilities comprising the IMS network.

Annex 2 to the Protocol lists the characterization parameters for IDC standard event screening.

(The full Treaty text can be found at www.ctbto.org)

Insert 6

STAFF MEMBERS OF THE PTS CELEBRATE THE SIXTH ANNIVERSARY OF THE OPENING FOR SIGNATURE OF THE CTBT

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

INTRODUCTION

The Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO Preparatory Commission) was established by the States Signatories to the Treaty on 19 November 1996 at the United Nations in New York.

MANDATE

The Commission's mandate is:

a) to establish the global verification regime, which needs to be operational when the Treaty enters into force; and
b) to prepare for the first Conference of the States Parties.

STATUS

- The Preparatory Commission is an international organization with a strong technical focus.
- In June 2000, a relationship agreement between the United Nations and the Preparatory Commission entered into force. The relationship agreement provides a framework for cooperation between the two organizations.

COMPOSITION

The Preparatory Commission is composed of all States which sign the CTBT. States Signatories participate in the Preparatory Commission's decision-making process and support its activities through the payment of assessed contributions.

STRUCTURE

The Preparatory Commission consists of two main organs: a **plenary body** composed of all States Signatories and the **Provisional Technical Secretariat**.

The plenary body has three subsidiary organs:

- Working Group A on budgetary and administrative matters;
- Working Group B on verification issues;
- An Advisory Group made up of financial experts from States Signatories. It advises the Commission and its subsidiary bodies on financial, budgetary and associated administrative issues.

The Provisional Technical Secretariat (PTS) started work in Vienna in March 1997 under its Executive Secretary, Wolfgang Hoffmann. The global character of the PTS is reflected in its multinational composition, with 271 staff members from 70 States Signatories as of 30 June 2003.

FINANCIAL BASIS

The Preparatory Commission's budget for 2003 is US$88,581,700. The Commission's focus is very technical, with some 83% of the budget allocated to the establishment of the global verification regime. The rate of payments of assessed contributions by Member States continues to be high, indicating strong support for the Commission's work.

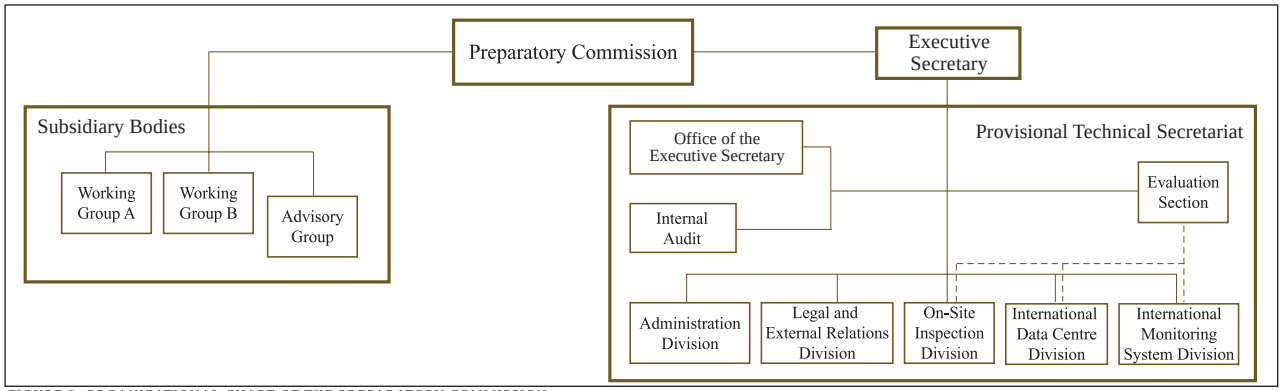

FIGURE 2. ORGANIZATIONAL CHART OF THE PREPARATORY COMMISSION

Insert 7

LAYING THE CABLE FOR THE HYDROACOUSTIC STATION ON JUAN FERNÁNDEZ ISLAND

RADIO FREQUENCY POWER AMPLIFIER AT COCOS ISLANDS RADIONUCLIDE STATION, AUSTRALIA

Global verification regime

Article IV of the Comprehensive Nuclear-Test-Ban Treaty provides for the establishment of a unique global verification regime. The purpose of the regime is to ensure that non-compliance with the provisions of the Treaty can be detected in a timely manner.

The regime consists of:

A. The International Monitoring System (supported by the International Data Centre and the Global Communications Infrastructure)
B. A consultation and clarification process
C. On-site inspections
D. Confidence-building measures

The Treaty stipulates that the verification system must be operational by the time the CTBT enters into force. The Preparatory Commission and its Provisional Technical Secretariat are responsible for this task.

International Monitoring System

The International Monitoring System (IMS) comprises a global network of 337 monitoring facilities (170 seismic stations, 11 hydroacoustic stations, 60 infrasound stations, 80 radionuclide stations and 16 radionuclide laboratories). Many stations are located in remote areas in order to provide global coverage. This has presented logistical and engineering challenges unprecedented in the history of arms control.

OBJECTIVE

To monitor the earth in order to detect and provide data on possible nuclear explosions and ambiguous events.

MONITORING TECHNOLOGIES

When a nuclear device is detonated, two basic phenomena occur: energy is released and physical products are created. The energy interacts with the environment and propagates as sound vibrations through the solid earth, ocean or atmosphere. The physical products created are released into the surrounding medium and can leak back into the atmosphere from underground or underwater.

The IMS uses seismic, infrasound, hydroacoustic and radionuclide monitoring technologies to register vibrations underground, in the air and in the sea, and to detect radionuclides released into the atmosphere by nuclear explosions. Once fully established, the IMS will be capable of detecting nuclear explosions of very low yield detonated in any environment on earth.

The **seismological** component of the IMS detects and locates seismic events. The seismic network comprises 50 primary stations supplemented by 120 auxiliary stations. Seismic data allow for the distinction between an underground nuclear explosion and an earthquake.

The **infrasound** network of 60 stations uses microbarometers (acoustic pressure sensors) to detect low-frequency sound waves in the atmosphere produced by natural and man-made events.

Infrasound data are used to locate and distinguish between atmospheric explosions, natural phenomena such as meteorites, exploding volcanoes and meteorological events, and man-made phenomena such as space debris, rocket launches and aircraft in supersonic flight.

Hydroacoustic monitoring detects acoustic waves produced by natural and man-made phenomena in the oceans. The hydroacoustic network consists of 11 stations and covers the world's oceans. Few stations are required because of the very efficient propagation of acoustic energy in the oceans.

TRANSFERRING EQUIPMENT FOR THE HYDROACOUSTIC SHORE FACILITY AT CROZET ISLAND

INSTALLATION OF INFRASOUND STATION, NEWPORT, USA

The data from these stations are used to distinguish between underwater explosions and other phenomena such as submarine volcanoes and earthquakes, which also propagate acoustic energy into the oceans.

The **radionuclide** network of 80 stations uses air samplers to detect radioactive particles released from atmospheric explosions or vented from underground or underwater explosions.

IMS radionuclide laboratories analyse air samples for radionuclide materials that may have been produced by a nuclear explosion. The presence of specific radionuclides provides unambiguous evidence of a nuclear explosion. The presence of noble gases is particularly important in detecting releases from underground explosions. Half of the stations in the radionuclide network will also have the capacity to detect noble gases.

ACHIEVEMENTS

Since the Treaty opened for signature in 1996, significant progress has been made in the establishment of the IMS. Site surveys for 88% of the total number of stations have now been completed. Altogether, 150 stations have been built or substantially meet specifications, of which 55 have been certified, a process that is necessary for the stations to become part of the IMS network. An additional 80 stations are currently under construction or in contract negotiations. Some 80 facilities are already contributing data to the International Data Centre (IDC) in Vienna, where they are processed and, together with IDC products, released to States Signatories for further analysis.

International Data Centre

The IMS network is supported by the International Data Centre (IDC), which is located at the Commission's headquarters in Vienna.

OBJECTIVE

To support the verification responsibilities of States by providing objective products and services necessary for effective global monitoring.

ACTIVITIES

The IDC is responsible for receiving, collecting, processing, analysing and reporting on, and archiving data from IMS stations and laboratories. The results of the work at the IDC are put together as different types of reports, usually referred to as IDC products. Data are processed immediately upon arrival at the IDC and the first automated products are released within minutes.

IDC PRODUCTS

IDC products comprise automated lists of seismic, hydroacoustic and infrasound signals and radionuclides which have been detected at the IDC. Using information from all seismoacoustic IMS stations, the IDC also produces lists of events that it has detected.

The automated lists are then reviewed by analysts who prepare quality-controlled bulletins. The data, products and bulletins are transmitted immediately to States Signatories for their feedback. Data, products and bulletins are received and distributed using the Global Communications Infrastructure.

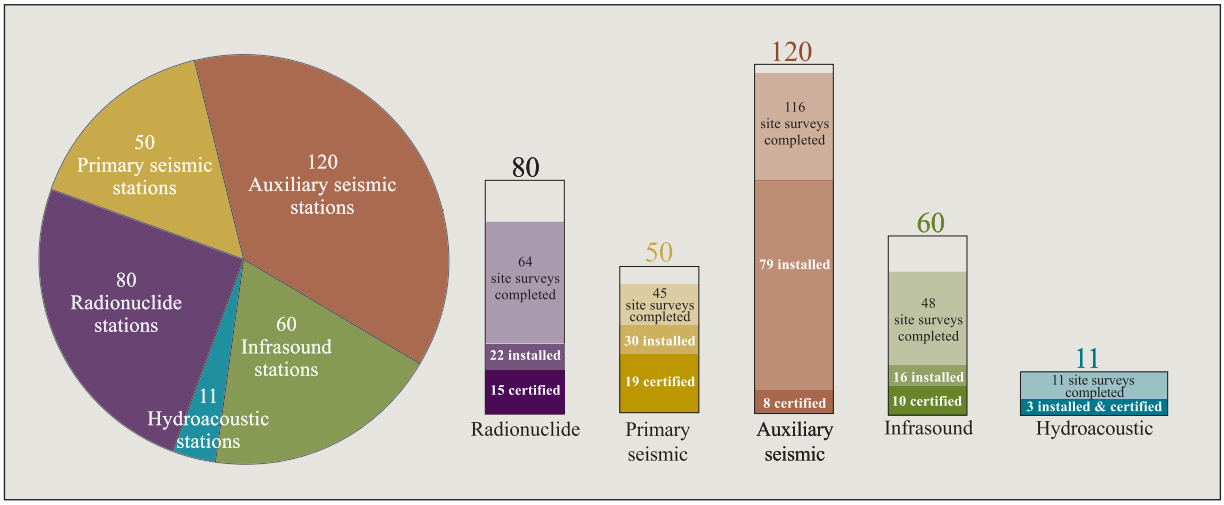

FIGURE 3. OVERVIEW OF IMS STATION STATUS AS OF 30 JUNE 2003

CHECKING THE METEOROLOGICAL INSTRUMENTATION AT INFRASOUND STATION AT WINDLESS BIGHT, ANTARCTICA

MANUAL AIR SAMPLER, RADIONUCLIDE STATION, TAHITI

HYDROACOUSTIC STATION SHORE FACILITY ON JUAN FERNÁNDEZ ISLAND

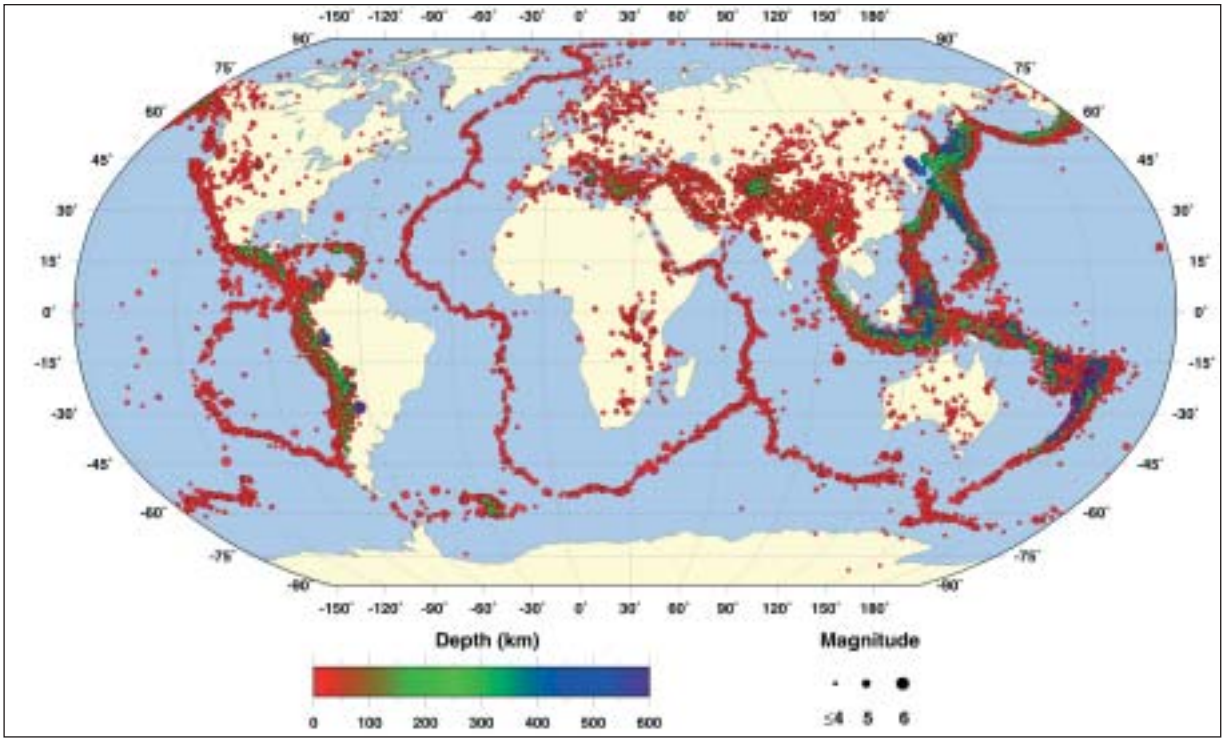

FIGURE 4. SINCE FEBRUARY 2000, AROUND 70,000 SEISMOACOUSTIC EVENTS HAVE BEEN INCLUDED IN THE IDC'S REVIEWED EVENT BULLETINS.

IDC STANDARD SERVICES

The IDC provides States Signatories with open, equal, timely access to all IMS data and products. The IDC continuously monitors and reports on the operational status of IMS facilities, communication links and its own processing systems.

IDC REQUESTED SERVICES

States Signatories receive training and technical assistance, such as help in developing the capacity to retrieve, process and analyse IMS data at a national data centre, and how to access the data and products in a convenient way.

ACHIEVEMENTS

On average, 30 Gbytes of IDC products and IMS data and data segments are distributed to authorized users each month. Since February 2000, when States Signatories approved the experimental distribution of data and products, over two million such items have been distributed to 468 authorized users from 66 different States Signatories. To date, around 70,000 events worldwide (such as earthquakes, mining blasts or volcanic eruptions) have been detected and reported to States Signatories. In this way, the IDC continues to be a valuable archive and resource of global monitoring.

GLOBAL COMMUNICATIONS INFRASTRUCTURE (GCI)

The GCI provides communications links between IMS facilities and the IDC. The GCI is the first global satellite communications network to be based on Very Small Aperture Terminal (VSAT) technology. Monitoring facilities and States Signatories in all areas of the world can exchange data via their local VSAT earth stations through one of six geosynchronous satellites. The satellites route the transmissions to hubs on the ground, and the data are then sent to the IDC by terrestrial links. The GCI also transmits data and reports relevant to Treaty verification to States Signatories. The GCI is designed to be cost-effective, to operate to 99.5% availability, and to provide data within seconds from origin to final destination.

ACHIEVEMENTS

Today, there are VSAT installations in every region of the world. As of June 2003, 190 GCI-site surveys had already been completed and 150 VSATs and 10 special circuits had been installed at IMS stations, national data centres (NDCs) and development sites. There are now an additional 50 VSAT installations at various stages of development.

ARRAY ELEMENT OF INRASOUND STATION, MADAGASCAR

HELICOPTER FOR OVERFLIGHT FOR OSI FIELD EXPERIMENT IN KAZAKHSTAN

MEASURING RADIATION DOSE LEVELS, OSI FIELD EXPERIMENT IN KAZAKHSTAN

Consultation and clarification process

- Before requesting an on-site inspection, States Parties are encouraged by the Treaty to try to resolve, either among themselves or with the assistance of the Organization, any matters which may indicate possible non-compliance with the CTBT's basic obligations.
- A State Party must provide clarification of an ambiguous event within 48 hours of receiving a request.
- If the requesting State Party considers the clarification obtained to be unsatisfactory, measures to redress the situation may be contemplated in accordance with Article V of the Treaty, including sanctions.

On-site inspections

OBJECTIVE

The purpose of an on-site inspection (OSI) is:

- To clarify whether a nuclear weapon test or any other nuclear explosion has been carried out in violation of the Treaty; and
- To gather facts, to the extent possible, which might assist in identifying any possible violator, thus serving as a final verification measure of the CTBT.

REQUEST FOR AN ON-SITE INSPECTION

- The CTBT does not contain provisions for routine inspections.
- An OSI can only be carried out once the Treaty has entered into force.
- If a State Party to the CTBT suspects that a nuclear explosion may have been carried out in violation of the Treaty, that State may request an OSI.
- An OSI request must include, *inter alia*, the proposed boundaries of the area to be inspected and the location and the estimated time of the event triggering the request.
- States Parties are prohibited from making frivolous or abusive OSI requests.
- An OSI will require 30 affirmative votes in the 51-member Executive Council.

CONDUCT OF AN ON-SITE INSPECTION

- The State Party to be inspected is obliged to accept the OSI. The CTBT stipulates that inspections are to be conducted in the least intrusive manner possible.

ON-SITE INSPECTION REPORTS

- OSI reports must contain, *inter alia*, the factual findings of the inspection team relevant to the purpose of the inspection.
- A draft inspection report is submitted to the inspected State Party, which has 48 hours in which to provide comments and explanations.
- The inspection report is then transmitted by the Director-General to the requesting State Party, the inspected State Party, the Executive Council and to all other States Parties.
- If the Executive Council decides that further action is necessary, it can take appropriate measures as stipulated in Article V of the Treaty, which include the possible use of sanctions.

OPERATION MANUAL

An OSI Operational Manual (OM) is being developed to guide the Inspection Team, focusing on a description of procedures for an effective OSI.

Confidence-building measures

Confidence-building measures serve a twofold purpose:

- They contribute to the prompt resolution of compliance concerns relating to chemical explosions.
- They assist in the calibration of IMS stations by improving knowledge of how vibrations propagate through the earth's structure, thus enhancing the accuracy of the location of seismic events.

Working Group B, which is the Preparatory Commission's organ dealing with verification issues, has developed guidelines and reporting formats for the implementation of confidence-building measures with respect to chemical explosions.

For more information about the global verification regime, please refer to our Basic Facts booklets, which can be obtained at www.ctbto.org.

Insert 8

IMS TECHNICAL TRAINING PROGRAMME, BEIJING, CHINA, 24-28 JUNE 2002

Membership benefits

In signing and ratifying the CTBT, a State contributes to the enhancement of international peace and security. Stressing the need for continued systematic and progressive efforts to reduce nuclear weapons globally, States Signatories recognize that ending nuclear weapon test explosions, by constraining the development and qualitative improvement of nuclear weapons, constitutes an effective measure of nuclear disarmament and non-proliferation in all its aspects.

Signing the Treaty provides States with concrete benefits in terms of access to specialized services and products. Member States benefit from access to the International Monitoring System (IMS) – the largest and most extensive network of seismic, hydroacoustic, infrasound and radionuclide monitoring facilities in the world, and one which no State could hope to establish alone. All States have access to full technical support and training as well.

Member States have also identified a number of potential civil and scientific applications of the verification technologies, which could contribute to sustainable development and human welfare.

ACCESS TO SERVICES AND PRODUCTS

Through the International Data Centre (IDC), States Signatories are provided with open, equal, timely and convenient access to all IMS data (raw or processed), all IDC products, and all other IMS data in the IDC archive or in IMS facilities. This high-quality, cost-free data is made available in the form of a variety of automated lists and reviewed event bulletins. These products assist States in locating, analysing and identifying seismological and acoustic events and radionuclides that have been detected in the IDC.

EXPERTS COMMUNICATION SYSTEM

State-nominated users can participate in discussions on upcoming meetings or contribute to papers under preparation via the Experts Communication System (ECS) protected web site, which offers registered users a forum for information exchange, a list of meetings, a discussion board and a documents database.

TECHNOLOGICAL ASSETS

The 337 International Monitoring System facilities which are located around the globe are established by the Preparatory Commission, but are owned and operated by the host countries. States that host IMS facilities receive technical and financial assistance from the Preparatory Commission for the establishment, upgrading, operation and maintenance of these facilities. Other technical support is provided to States, where necessary, to facilitate national implementation of the Treaty, including the establishment of national data centres.

WORKSHOPS AND TRAINING ACTIVITIES

IDC TRAINING COURSE FOR ANALYSTS, VIENNA, AUSTRIA, 1 MARCH-31 AUGUST 2002

The Provisional Technical Secretariat (PTS) has developed a number of training courses and workshops in various verification-related disciplines in which trainees acquire skills to facilitate implementation of the Treaty at the national level. These training activities also enable trainees to contribute towards the enhancement of their country's scientific capacity.

Between November 1997 and August 2003, the IMS division organized five introductory training programmes about the International Monitoring System for the different geographical regions. A total of 45 segments of technical training programmes for station operators and managers on the different IMS

technologies have been conducted and one workshop on the operation and maintenance of IMS stations.

The IDC has organized eight training courses for analysts, four training courses for national data centre (NDC) technical staff and three training courses for NDC managers since 1997. In addition, four workshops on aspects related to transmission of data through the Global Communications Infrastructure have been held.

By the end of August 2003, the OSI division had conducted nine workshops to address technical matters related to the OSI regime. It had also organized ten training courses including experimental ones, three field experiments and two tabletop exercises simulating elements of an on-site inspection.

A total of five workshops on evaluation have taken place so far and four workshops on quality assurance issues.

The Preparatory Commission also acts as an information clearing house, coordinating PTS and Member States' initiatives to provide experts from developing States with training opportunities.

INTERNATIONAL COOPERATION

The Preparatory Commission organizes international cooperation activities such as workshops, seminars and information visits to the PTS for experts from developing countries. Such activities are designed to:

- Enhance understanding of the significance of the Treaty and its work and contribute to national capacity building.
- Promote cooperation among States through experience sharing and information exchange.

INTERNATIONAL COOPERATION WORKSHOP IN FIJI, 16-17 JUNE 2003

A series of international cooperation workshops has been held around the globe, bringing together over 400 participants from over 180 States. These workshops have contributed actively to advancing Treaty understanding and the Commission's work. Most recently, States from the Pacific were invited to attend the *Workshop on CTBTO International Cooperation and National Implementation of the Treaty for States in the Pacific* in Fiji from 16 to 17 June 2003.

The Preparatory Commission is responsible for disseminating information about training courses from which Member States might benefit. A database of training-related information such as courses provided by the Commission, a list of trainees and proposed follow-up activities is currently being elaborated. International cooperation activities are also supported by voluntary contributions.

POTENTIAL CIVIL AND SCIENTIFIC APPLICATIONS

The Treaty encourages Member States to benefit from the application of the verification technologies for peaceful purposes. In May 2002, a group of senior scientific experts met in London to identify and examine the potential civil and scientific applications of the Treaty's technologies. Consultations to examine these potential benefits are continuing.

The findings of the experts' meeting in London suggested ways in which the verification regime could help Members States to enhance their meteorological and environmental monitoring and seismic assessment capabilities. The Treaty's state-of-the-art verification technologies have the capacity to provide information about the earth's crust, seas and atmosphere. Other uses could include radionuclide dispersion detection and support for atmospheric studies.

Insert 9

Profiles of the President-designate of the Conference and the Chairperson of the preparatory process

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

His Excellency Erkki Tuomioja, Minister for Foreign Affairs of Finland, has been chosen as President-designate of the Conference on Facilitating the Entry into Force of the Comprehensive Nuclear-Test-Ban Treaty. The Conference will formally elect the President at its opening meeting.

Mr Tuomioja is a Doctor of Political Sciences and a Master of Economic and Business Administration. He has been a Docent of Political History at the University of Helsinki since 1997.

Between 1970 and 1979, Mr Tuomioja served as a Member of Parliament. He was Deputy Mayor of the City of Helsinki from 1979 to 1991 and has been a Member of Parliament again since 1991.

Mr Tuomioja served as Vice Chairperson of the Social Democratic Party parliamentary group between 1991 and 1999.

In April 1999, Mr Tuomioja was appointed Minister of Trade and Industry where he remained until February 2000, when he became Minister for Foreign Affairs.

Mr Tuomioja also has a strong background in journalism and worked as a television reporter between 1967 and 1969, and as editor-in-chief of the periodical *Ydin* from 1977 to 1991.

PROFILE OF THE CHAIRPERSON OF THE PREPARATORY PROCESS OF THE CONFERENCE ON FACILITATING THE ENTRY INTO FORCE OF THE CTBT

Ambassador Tom Grönberg, Permanent Representative of Finland to the international organizations in Vienna, is chairing the preparatory process of the Conference on Facilitating the Entry into Force of the CTBT.

After obtaining his Master of Law Degree from the University of Helsinki in 1966, Mr Grönberg worked as a solicitor until he was appointed Head of International Services at the Finnish Broadcasting Company in 1970. Between 1973 and 1975, he served as the Prime Minister's secretary.

Mr Grönberg joined the Ministry for Foreign Affairs of Finland in 1975, serving as Deputy Director General for the Finnish International Development Agency until 1983. He subsequently served as Ambassador to Kenya, Ethiopia and Uganda between 1983 and 1987 and also as the Permanent Representative of Finland to UNEP and Habitat in Nairobi, Kenya.

In 1987 he returned to Finland, where he was appointed Director General for the Legal Department. He also served as State Agent for Finland at the European Court for Human Rights and at the International Court of Justice in the Hague. Between 1990 and 1996 he was a member of the Permanent Court of Arbitration and in 1994 he served as Permanent Representative to the Council of Europe in Strasbourg.

Mr Grönberg has served as Ambassador of Finland to Austria and Slovenia and as the Permanent Representative to IAEA, UNIDO and UNOV since 1998.

Acronyms of organizations:
IAEA – International Atomic Energy Agency
UNEP – United Nations Environment Programme
UN-HABITAT – United Nations Human Settlements Programme
UNIDO – United Nations Industrial Development Organization
UNOV – United Nations Office at Vienna

Insert 10

Brief history of the CTBT

1945
United States conducts its first nuclear explosive test on 16 July. In August, two atomic bombs explode over Hiroshima and Nagasaki, Japan.

1949
Soviet Union conducts its first nuclear explosive test.

1952
United Kingdom conducts its first nuclear explosive test.

1954
Individuals and groups worldwide increasingly concerned about radioactive fall-out from nuclear test explosions and the escalating arms race. Prime Minister Jawaharlal Nehru of India proposes for the first time a suspension of nuclear-weapon testing.

1958
Conference of Experts meets in August in Geneva to discuss the feasibility of monitoring a nuclear test ban. Expert tri-partite (Soviet Union, United Kingdom and the United States) negotiations begin in October and come to an indefinite adjournment in 1962.

1959
Antarctic Treaty, providing for the demilitarization and denuclearization of the Antarctic continent, opens for signature.

1960
France conducts its first nuclear explosive test.

1963
Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water (Partial Test Ban Treaty) is signed by the United Kingdom, the Soviet Union and the United States. The treaty does not include verification procedures or international inspections.

1964
China conducts its first nuclear explosive test.

1967
Treaty for the Prohibition of Nuclear Weapons in Latin America and, as amended in 1990, the Caribbean (Treaty of Tlatelolco), establishing a nuclear-weapon-free zone covering Latin America and the Caribbean, opens for signature.

1968
Treaty on the Non-Proliferation of Nuclear Weapons (NPT) opens for signature. The Preamble of the NPT and its Article VI include a specific reference to a linkage between nuclear-weapon States disarmament and non-proliferation.

1974
India conducts a nuclear explosion and asserts that it was for ‘peaceful’ purposes. Treaty on the Limitation of Underground Weapon Tests (Threshold Test-Ban Treaty), limiting the yield of such tests to 150 kilotons, is signed by the Soviet Union and the United States.

1976
Treaty on Underground Nuclear Explosions for Peaceful Purposes (Peaceful Nuclear Explosions Treaty), limiting the maximum yield of peaceful nuclear explosions to 150 kilotons, is signed by the Soviet Union and the United States.

1985
South Pacific Nuclear Free Zone Treaty (Treaty of Rarotonga), establishing a nuclear-free zone in the South Pacific, opens for signature.

1990
Soviet Union conducts what is to be its last nuclear explosive test.

1991
Russia announces in January a four-month unilateral moratorium on nuclear testing, which is subsequently extended three times, the last of which is by presidential decree in July 1993. Parties to the Partial Test Ban Treaty hold an amendment conference to discuss a proposal to convert the Treaty into an instrument banning all nuclear weapon tests for all time. United Kingdom conducts what is to be its last nuclear explosive test.

1992
Newly independent State of Kazakhstan announces that it will close its nuclear test site. France announces a unilateral moratorium on nuclear testing until the end of 1992, which is extended in January 1993. United States conducts what is to be its last nuclear explosive test. United States legislation (Hatfield amendment) establishes a moratorium on nuclear-explosive testing, which is extended in July 1993.

1993
Conference on Disarmament establishes Ad Hoc Nuclear-Test-Ban Committee to negotiate a Comprehensive Test-Ban Treaty (CTBT). United Nations General Assembly welcomes this development.

1994
Russia advocates the signing of a CTBT in 1995, the 50th anniversary of the United Nations. China urges for negotiations to conclude a CTBT not later than 1996.

1995
United States announces extension of its moratorium on nuclear testing until the entry into force of a CTBT. NPT Review and Extension Conference and, later, United Nationa General Assembly call for the conclusion of CTBT negotiations in 1996. France announces it will halt all tests by May 1996 and sign a CTBT. Southeast Asia Nuclear Weapon Free-Zone Treaty (Treaty of Bangkok), establishing a nuclear-weapon-free zone in Southeast Asia, opens for signature.

1996
France conducts its last nuclear explosive test on 27 January. Two days later, France permanently closes its testing programme. African Nuclear-Weapon-Free Zone Treaty (Treaty of Pelindaba), establishing a nuclear-weapon-free zone in Africa, opens for signature. China conducts its last nuclear explosive test on 29 July and announces the beginning of a moratorium on nuclear testing effective the next day.

Conference on Disarmament unable to reach consensus on the draft Comprehensive Nuclear-Test-Ban Treaty; 127 States sponsor a draft resolution by the UN General Assembly, which adopts the Treaty on 10 September 1996 by 158 in favor, three against, with five abstentions.

24 September 1996
CTBT is opened for signature at New York; 71 States, including the five nuclear-weapon States, sign the Treaty on that day.

May 1998
India and Pakistan conduct nuclear explosive tests. Both countries then declare moratoria on further nuclear testing.

October 1999
Conference on Facilitating the Entry into Force of the Comprehensive Nuclear-Test-Ban Treaty is held in Vienna.

September 2000
At the United Nations Millennium Summit, the Secretary-General calls upon States, *inter alia*, to sign, ratify or accede to Treaties, in particular 25 core Treaties, including the CTBT. 13 States seize the opportunity to sign and/or ratify the CTBT.

November 2001
Conference on Facilitating the Entry into Force of the Comprehensive Nuclear-Test-Ban Treaty is held in New York. Between 24 October 2000, when the ratifying States requested the Secretary-General to convene the Conference and the opening of the Conference, 22 States ratified the Treaty and four signed it.

May 2003
One hundredth ratification as Mauritania ratifies the CTBT.

June 2003
The United Nations Secretary-General calls for the convening of the 2003 Conference on Facilitating the Entry into Force of the Comprehensive Nuclear-Test-Ban Treaty, which will take place in Vienna from 3 to 5 September.

Featured article

The challenges of installing International Monitoring System facilities in remote areas

When the Provisional Technical Secretariat (PTS) established an infrasound station at Windless Bight in Antarctica in 2001, it represented both a logistical and an engineering feat in terms of coordinating the transportation of installation equipment and constructing a station designed to withstand extreme polar conditions.

Built by the University of Alaska under contract to the PTS between 2000 and 2001, infrasound station IS55 at Windless Bight is one of the 337 monitoring facilities that comprise the International Monitoring System (IMS) network of stations and laboratories that monitor the earth for evidence of a nuclear explosion.

In order to provide uniform coverage of the globe, many stations are located in remote areas that are difficult to access. Antarctica is one of the most challenging areas, as are some of the more remote Oceanic islands. The IMS will have 13 stations in Antarctica by the time the Comprehensive Nuclear-Test-Ban Treaty (CTBT) enters into force: four radionuclide stations, four infrasound stations and five seismic stations.

There are no developed ports on the continent and only a few locations have a basic wharf facility. Most coastal stations have offshore anchorages, and supplies are transferred from ship to shore by small boats, barges and helicopters. Satellite communication on the Antarctic continent is extremely difficult due to the high latitudes and is only possible from certain research facilities.

Buried in snow

Windless Bight, described by the polar explorer, Robert Scott, in The Worst Journey in the World about his expedition to Antarctica, is a desolate snow-covered environment devoid of any vegetation, where temperatures plummet to below minus 40 degrees Celsius. In contrast to the rest of Antarctica, and as the name suggests, there are virtually no surface winds in Windless Bight so the wind noise is generally low. Infrasound station IS55 uses very sensitive microphones to detect low frequency sound waves from atmospheric explosions. Over time, the wind-noise reducing pipe arrays become buried due to snow cover, meaning that the equipment has to be removed annually and reinstalled on top of fresh new snow.

MOVING THE HYBRID DIESEL/SOLAR POWER SUPPLY UNIT AT WINDLESS BIGHT

The station, which is equipped with a hybrid solar/diesel power supply to ensure continuous operations, uses the United States National Science Foundation's communication system (which funds and manages the United States

Antarctic Programme) to transmit data to Denver, Colorado. The data are then picked up by the CTBT's Global Communications Infrastructure and sent on to the International Data Centre (IDC) in Vienna, where they are processed to detect, locate and analyse events. The data and associated IDC products are transmitted on request to the States Signatories.

While the earth's polar regions offer compelling scientific research possibilities, their isolation and extreme climates render such opportunities extremely challenging. The South Pole is also the only permanently inhabited place on earth that cannot see geosynchronous communication satellites, due to the distance of the South Pole from the Equator. While the United States National Science Foundation can use other satellites in an inclined orbit to reach the South Pole, there is still no satellite coverage for up to eight hours a day. The IMS operates an auxiliary seismic station at the South Pole, again using the United States National Science Foundation's communication system to transmit important seismic data to Vienna.

The Provisional Technical Secretariat also has a seismological station at Mawson, 5463 km southwest of Hobart, Tasmania, on the coast of Antarctica. Work at Mawson station is often hampered by the strong katabatic winds, which are produced by the flow of cold dense air down a slope, causing severe wind chill temperatures. The harbour is usually filled completely with sea-ice, averaging 2 metres in thickness. Bad weather conditions in the Antarctic mean that the working season is very short, lasting only from December to February.

Establishing an IMS station is a very lengthy process. After the conclusion of agreements with the host States, site surveys must be conducted to ensure that the proposed location is suitable for Treaty monitoring. Site preparation normally includes the construction of shelters for instruments, the establishment of a suitable power supply, the erection of antennas or the laying of cables for communicating data from the sensors to the central site, and security fencing. The next stage involves acquiring and then installing the equipment. Transporting the equipment to remote places often involves prolonged, expensive ship journeys, as was the case when the IMS installed a hydroacoustic station on the Crozet Islands.

A population of 28 people and about 35,000 penguins

The Crozet Islands are an isolated series of subantarctic rocks in the South Indian Ocean, uninhabited except for scientific personnel, penguins and wildlife. At the time of writing, there are only 28 residents in the Crozet Islands.

CROZET ISLAND RESIDENTS

Lying in the path of the Roaring Forties, winds frequently exceed 100 km per hour. The islands are barren, with low temperatures and long winters and an average of 300 days of rain each year. The infrastructure is poor, with no airport, port or transport system. A station has been established at the Port-Alfred base on one of the islands. As there is no natural harbour, all supplies for the base must first be landed on the beach and then brought up to the base using tractors.

The hydroacoustic station in the Crozet Islands was partly installed in 2000, with installation completed between March and April 2003. The 53 day mission to install equipment at hydroacoustic station HA04 and to connect the VSAT link to Paris entailed a 2500 km journey by ship from Cape Town to the Crozet Islands.

Work on the Crozet Islands was severely hampered by appalling weather conditions and a series of unforeseen technical problems. With winds reaching 165 km per hour and waves from distant storms as high as eight metres, many entries in the chronicle kept by the PTS staff of their mission opened with a weather update. "We had sun, high winds, cloud, rain, snow and hail. And that was all between the time I finished my shower and had my first cup of coffee".

On 2 April 2003, the chronicle reported: "We have suffered from numerous minor problems, such as a buoy blowing away in bad weather". This resulted in a grappling operation to recover the cable and a subsequent loss of time. After a particularly frustrating day, the chronicle observed: "Well, life at sea teaches one how to face adversity and difficult situations".

Despite various setbacks, the mission was successful. Over 30 km of the original optical fibre cable were recovered from 1500 metres below the ocean's surface and replaced with new cable. Six hydrophones were installed at the station, and the VSAT link was connected so that data could be transmitted to Paris and then on to the IDC in Vienna.

The remotest inhabited island in the world

The IMS facilities are located on many other remote islands including Tristan da Cunha and Juan Fernández Island. Tristan da Cunha is composed of four islands. The main island, Tristan da Cunha, is regarded as the remotest inhabited island in the world. Located in the South Atlantic Ocean, its nearest neighbour is St. Helena 2334 kms to the north, while Cape Town is 2778 kms to the east. There is only one inhabited area, which is a small village of just under 300 people, the total population of Tristan da Cunha.

Tristan da Cunha is an active volcano, 12 km in diameter and over 2000 metres high. In 1961 a dramatic volcanic eruption forced the evacuation of the entire island, although the vast majority of the islanders chose to return after the eruption. Communication with the outside world is limited. There is a radio telephone link via Cape Town Radio which connects to the international telephone service, and a public satellite phone was installed in 1998. The island's Administrator now has email. The island is only accessible by sea, with fishing vessels bringing most of the cargo and mail to the island. There is no port or any significant landing facility. The island is subject to extremely high winds, rendering access to Tristan da Cunha even more difficult. Hurricane force winds ravaged the island in May 2001, resulting in the loss of its satellite phone link and the destruction of much of the island's infrastructure.

In November 2001, a site survey for three IMS stations was conducted on Tristan da Cunha. The site survey team consisted of two representatives of the British Geological Survey and six PTS staff members. The PTS chartered a ship from the Government of the Republic of South Africa to transport the team and all the necessary equipment to Tristan da Cunha from Cape Town, which took five days each way. Despite bad weather, all three site survey operations were completed successfully.

Robinson Crusoe Island

Robinson Crusoe Island is the main island of the archipelago known as the Juan Fernández Islands. Located in the Pacific Ocean, the island owes its name to the story of the famous castaway and has an area of approximately 65 km², consisting predominantly of volcanic rock. Although there are a few cars on the island, roads are virtually non-existent and transport is mainly by mule.

The PTS installed a hydroacoustic station on Juan Fernández Island (Robinson Crusoe Island) in January 2003 after hiring a ship from the Gulf of Mexico to transport equipment to the island. A site survey for an infrasound station has also been carried out. A central facility has been installed to host the shore component of the hydroacoustic station as well as the infrasound station.

JUAN FERNÁNDEZ ISLAND (ROBINSON CRUSOE ISLAND)

Confronted with extreme geographical and climatic conditions, transporting equipment to isolated areas in order to install or upgrade monitoring stations is a costly, time-consuming and complicated exercise. By establishing stations in such places, the IMS network provides complete global coverage, thereby acting as a powerful deterrent to potential violators. As Peter Marshall, former technical adviser to successive UK delegations on test-ban treaty issues, reflected: "The IMS is to earth scientists what the Hubble telescope is to astronomers or the latest atom-smasher to nuclear scientists".