

# CTBTO Spectrum

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## Who we are

The Comprehensive Nuclear-Test-Ban Treaty bans all nuclear weapon test explosions. The Treaty is a cornerstone of the international nuclear non-proliferation regime. It opened for signature in New York on 24 September 1996, and today has achieved strong worldwide support.

The CTBTO Preparatory Commission is an international organization consisting of a plenary body composed of all States Signatories and the Provisional Technical Secretariat. It carries out the necessary preparations for the effective implementation of the Treaty, and prepares for the first session of the Conference of the States Parties to the Treaty after its entry into force.

## CTBT contribution to global seismology: An ISC perspective

By Dr Avi Shapira

Seismic monitoring is one of the most important verification technologies applied to monitor compliance with the Comprehensive Nuclear-Test-Ban Treaty (CTBT). The 170 International Monitoring System (IMS) seismic stations transmit data through the Global Communications Infrastructure (GCI) to the International Data Centre (IDC) in Vienna, Austria. Here, the data are processed, and, together with IDC products, released to Member States for further analysis. As seismic stations mainly monitor the earth's crust, almost all the data in the IDC Reviewed Event Bulletin (REB) refer to earthquakes.

Since 2000 the International Seismological Centre (ISC) based at Thatcham, United Kingdom, has been receiving all REBs once a year and integrating them into its ISC Bulletin, thus making CTBT seismic data available to the international seismological community. The Centre was founded in 1964 and reconstituted in 1970 as an international, non-governmental body. The ISC is a non-profit organization, charged with the final collection, analysis and publication of earthquake source information from around the world. It is widely recognized as the most comprehensive, reliable listing of global seismicity data.

The ISC has the world's largest seismic parametric database (data regarding the time, location, magnitude of earthquakes, associated arrival time and amplitude measurements at the seismic stations). Every year the ISC receives earthquake catalogues and seismic phase readings from almost 3,000 seismograph stations (see Figure 1), representing every part of the

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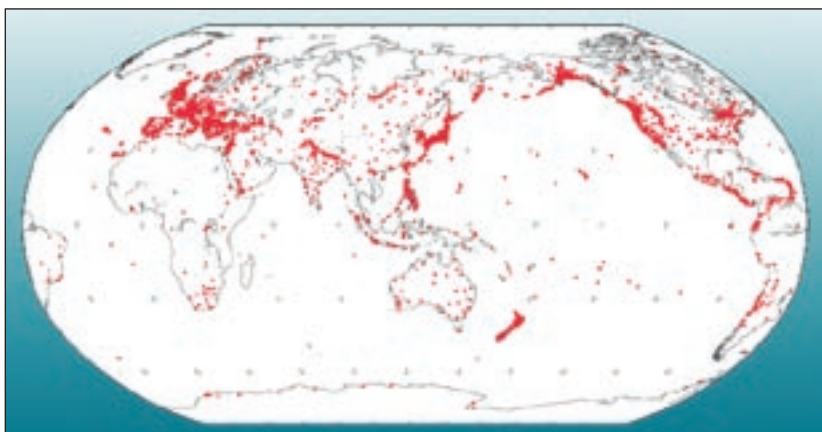


FIGURE 1: LOCATION OF STATIONS CONTRIBUTING TO THE ISC BULLETIN IN 2003



## Editorial



*The steady stream of countries joining the Comprehensive Nuclear-Test-Ban Treaty (CTBT) since its opening for signature in September 1996 confirms the growing commitment*

*by the international community to the norm against nuclear test explosions.*

*As of 6 December 2004, a total of 174 States have signed the Treaty and 120 States have ratified it, including 33 of the 44 States listed in its Annex 2, whose ratification is required for entry into force. The CTBT has often been described as a cornerstone of the global nuclear disarmament and non-proliferation regime. But regional nuclear non-proliferation regimes also play an important role in complementing the global regime. This issue of CTBTO Spectrum focuses on the Latin America and the Caribbean (LAC) geographical region and the CTBT. It is the first issue in a series which will be covering all six Treaty-defined regions.*

*With 33 Member States, LAC is a key player in regional nuclear disarmament and non-proliferation. The LAC region's commitment in this respect is embodied in the participation of all its Member States in the 1967 Treaty of Tlatelolco, which established the first Nuclear-Weapon-Free Zone. The LAC region has always played an important role in contributing towards ensuring the entry into force and universality of the CTBT. When the Treaty opened for signature in 1996, 21 LAC States signed it. In the meantime, the number of signatures has increased to 27, with 20 LAC countries having also ratified the CTBT as of 6 December 2004.*

*The Provisional Technical Secretariat (PTS) has initiated a number of bilateral*

*and multilateral activities to enhance understanding of the Treaty in the region and to advance national implementation of the CTBT. At the same time, the PTS continues the timely build-up of the verification regime in the region, mastering considerable logistical and engineering challenges. Altogether 49 International Monitoring System (IMS) facilities are located in Latin America and the Caribbean. Nineteen of those have already been installed or upgraded and are currently under testing, including two radionuclide laboratories. About six additional stations are under contract negotiation, while the number of certified facilities meeting the technical specifications of the Commission stands at fifteen.*

*Besides looking at the many interactions between the LAC region and the CTBT, this issue of CTBTO Spectrum provides an overview of the Commission's work over the past six months, including an update on the latest session of the Preparatory Commission and a profile of the newly elected Executive Secretary. The cover story by Dr Avi Shapira gives an example of how the scientific community can make use of data deriving from CTBT verification technologies. Finally, an interview with Péricles G. Alves, Director of the United Nations Regional Centre for Disarmament in Lima, Peru, and a special feature article by Ambassador Luis Alfonso de Alba, Chairman of the First Committee*

*of the 59th General Assembly, provides new insight into both the historic and the current role of the LAC region in nuclear non-proliferation and disarmament.*

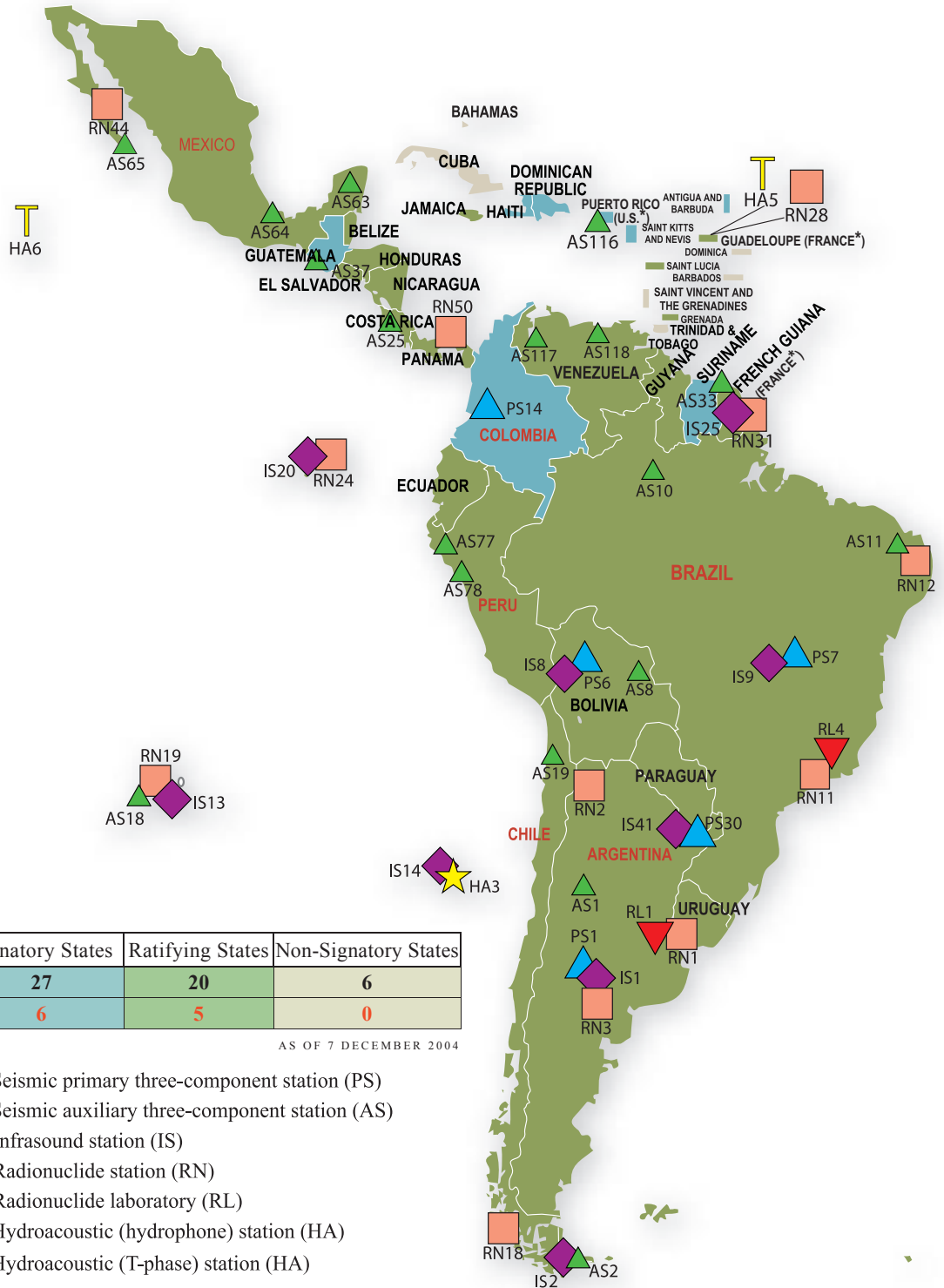
*In concluding, I would like to quote one of the many voices in the region that continue to express their support for the CTBT and the issue of nuclear non-proliferation and disarmament. Ambassador Paulette Bethel, Permanent Representative of the Bahamas to the United Nations, on behalf of the Caribbean Community (CARICOM), stated at the April 2004 session of the Preparatory Committee for the 2005 Review Conference of States Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT):*

*"The elimination of the testing of nuclear weapons remains a critical element in the overall process of nuclear disarmament and non-proliferation. To this end, CARICOM States call for a renewed commitment to promoting the entry into force and the implementation of both the letter and the spirit of the CTBT... Without real commitments to progressively eliminate nuclear arsenals, and prevent the proliferation of nuclear technology for non-peaceful purposes, we run the risk of nullifying all of the commitments that we as Member States have made over the previous decade for social, economic and human development. That risk, combined with the continuing menace of nuclear conflagration, is unacceptably high."*

Wolfgang Hoffmann  
Executive Secretary  
Preparatory Commission for the Comprehensive  
Nuclear-Test-Ban Treaty Organization

# Latin America and the Caribbean

Status of signature and ratification  
Annex 2 States  
IMS facilities as defined in the Treaty



Signatory States	Ratifying States	Non-Signatory States
27	20	6
6	5	0

AS OF 7 DECEMBER 2004

- ▲ Seismic primary three-component station (PS)
- ▲ Seismic auxiliary three-component station (AS)
- ◆ Infrasound station (IS)
- Radionuclide station (RN)
- ▼ Radionuclide laboratory (RL)
- ★ Hydroacoustic (hydrophone) station (HA)
- ⊥ Hydroacoustic (T-phase) station (HA)

\*IMS facilities hosted by countries outside the Treaty-defined Latin America and the Caribbean (LAC) region

## Latin America and the Caribbean and the CTBT

Latin America and the Caribbean have a distinguished record in the field of nuclear non-proliferation and disarmament. This column examines the role played by the region in the Comprehensive Nuclear-Test-Ban Treaty (CTBT) and the CTBTO Preparatory Commission.

In accordance with Article II, paragraph 28, of the CTBT, States Parties to the Treaty are divided into six geographical regions for the purpose of electing the members of the Executive Council of the CTBTO once the Treaty enters into force. Latin American and Caribbean States will designate nine of the 51 seats on the

Executive Council for election by the Conference of the States Parties. Annex 1 to the Treaty lists the 33 States comprising the region:

Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay, Venezuela.

Of these, 27 had signed the CTBT and were hence members of the CTBTO Preparatory Commission by the end of November 2004. Instruments of ratification had been deposited by 20 of these Signatories. Among the 44 States listed in Annex 2 of the Treaty, whose ratification is a condition for its entry into force, six are from the region (underlined above). Five of these 'Annex 2 States' have already ratified the Treaty, making a significant contribution towards its entry into force.

Representatives of States from the region participate in all the activities of the Commission. The region has already provided three chairpersons to the Commission, the Permanent Representatives in Vienna of Brazil (1998), Mexico (2000), and Peru (2003). Several of the Commission's technical meetings have also been held in Latin America and the Caribbean States. These include a regional workshop on international cooperation, national implementation and ratification of the CTBT in Lima, Peru, in 2000, and a sub-regional workshop for the

**“We, the Foreign Ministers who have issued this statement, reaffirm our support for the Comprehensive Nuclear-Test-Ban Treaty (CTBT), which would rid the world of nuclear weapons test explosions and would contribute to systematic and progressive reduction of nuclear weapons and the prevention of nuclear proliferation.**

**“The CTBT is a major instrument in the field of nuclear disarmament and non-proliferation. The Treaty was an integral part of the 1995 agreements by the States Parties to the Nuclear Non-Proliferation Treaty (NPT) allowing the indefinite extension of the Treaty. The early entry into force of the CTBT was recognized at the 2000 Review Conference of the NPT as a practical step to achieving NPT nuclear disarmament and non-proliferation objectives, and has also been reaffirmed as being of central importance by the UN General Assembly.**

**“We affirm that the CTBT will make an important contribution towards preventing the proliferation of materials, technologies and knowledge that can be used for nuclear weapons, one of the most important challenges the world is facing today. Thus, the entry into force of the Treaty, within the broader framework of multilateral arms control and non-proliferation efforts, is more urgent today than ever before...**

**“We appeal to all States to make maximum efforts to achieve a major step toward the early entry into force of the CTBT. On our part, we dedicate ourselves to realizing this goal.”**

EXCERPTS FROM THE JOINT MINISTERIAL STATEMENT IN SUPPORT OF THE CTBT RELEASED BY 42 FOREIGN MINISTERS ON 23 SEPTEMBER 2004 IN NEW YORK, FOLLOWING A MEETING CONVENED ON THE MARGINS OF THE UN GENERAL ASSEMBLY. AS OF 1 NOVEMBER 2004, 65 STATES HAVE ASSOCIATED THEMSELVES WITH THE STATEMENT.



UNITED NATIONS HEADQUARTERS, NEW YORK



## Operations and Maintenance Workshop

Caribbean States on the same subject in Runaway Bay, Jamaica, in 2002.

Thirteen Latin American and Caribbean States host monitoring facilities forming part of the International Monitoring System (IMS). To date, the Commission has concluded formal IMS Facility Agreements with five of these States, namely Argentina, Peru, Guatemala, Paraguay and Panama. With nine IMS facilities, Argentina has the highest number of facilities in the region, while Brazil and Chile host seven each. Several stations are located on remote and environmentally sensitive islands, such as the Galapagos Islands, Ecuador; Easter Island and Juan Fernández Island, Chile; and Socorro Island, Mexico.

As regards regional organizations, the Provisional Technical Secretariat maintains a close working relationship with the United Nations Regional Centre for Disarmament and with the Association of Caribbean States. In addition, on 18 September 2002, the Executive Secretary of the Preparatory Commission and the Secretary General of the Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (OPANAL) signed an agreement on cooperation between the two organizations at the seat of the Commission in Vienna. This agreement was the first relationship agreement concluded by the Commission with a regional organization, an acknowledgement of the historic commitment of Latin American and Caribbean States to nuclear non-proliferation and disarmament. ■

The Operations and Maintenance Workshop (O&M), held from 11-15 October 2004 in Baden, Austria, attracted the highest number

opportunity to organize discussion forums to enhance the communication between the PTS, station operators and NDC staff.



OPERATIONS AND MAINTENANCE WORKSHOP PARTICIPANTS, BADEN, AUSTRIA

of participants of all workshops organized by the Provisional Technical Secretariat (PTS) so far. Two hundred and six attendees from 53 Member States (118 station operators or National Data Centre staff, 20 equipment provider representatives), 60 PTS staff and eight members of the External Review Team made this workshop on the provisional Operations and Maintenance a successful and memorable event.

The presentations and discussions focused on four themes: Station Operation and Management; Sustainability and Development; System Performance; and Training. They were held in parallel groups and wrapped up in daily plenary sessions. On the last day of the workshop, Dr Mike Berry, chairperson of the workshop, presented detailed summary comments in several areas, including communications, contracts, finances, maintenance, coordination, and tools and databases in O&M. The workshop also gave the

On the last day, 78 station certification certificates were presented in a ceremony to station operators, recognizing their important contribution to the effective functioning of the IMS network.

A final report of the workshop will be delivered to Working Group B in February 2005. ■



MR NORBERT OPIYO AKECH, KENYA, RECEIVES STATION CERTIFICATION CERTIFICATES FROM MR THOMAS HOFFMANN, CHIEF OF ACOUSTIC MONITORING SECTION (LEFT)

## Report on the November 2004 session

The Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) held its Twenty-Third Session from 15 to 19 November 2004 in Vienna under the chairmanship of Ambassador Yukio Takasu of Japan. One-hundred-and-five Member States participated in the session. The League of Arab States attended as an observer.

### The report of the Executive Secretary

Mr Wolfgang Hoffmann, Executive Secretary of the CTBTO Preparatory Commission, reported on progress in the implementation of the verification regime and on administrative, legal and coordination matters. He informed the delegates that 98 out of the 337 International Monitoring System (IMS) facilities have now been certified, an increase of eleven facilities since the last issue of *CTBTO Spectrum*. Moreover, legal arrangements between Member States and the Commission are now in place for 324 IMS stations in 82 countries.

Mr Hoffmann stressed the significance of the operation and maintenance (O&M) function for the Provisional Technical Secretariat (PTS). He informed delegates about his modifications in the O&M coordination with a view to better handling this ever growing requirement. He also reported that as of 8 November 2004, the collection rates of assessed contributions amounted to 91.27 % for 2004 and 95.08 % for 2003.

### The plenary debate

The main focus of the plenary debate was on the appointment of a new Executive Secretary. States Signatories stressed the importance of arriving at a consensus for a candidate. Other important issues discussed were the review of the PTS

organizational structure by an external review team and budgetary matters.

Member States welcomed the signing of the Comprehensive Nuclear-Test-Ban Treaty (CTBT) by the United Republic of Tanzania and the ratification by the Democratic Republic of the Congo, Liechtenstein, Togo, Tunisia and the United Republic of Tanzania since the last session of the Commission. There was broad support expressed for the convening of a Conference on Facilitating the Entry into Force of the CTBT in 2005. Several delegates also articulated their appreciation and support for the Joint Ministerial Statement on the CTBT, issued on the margins of the last United Nations General Assembly. Furthermore, Member States welcomed the agreement on cooperation between the Association of Caribbean States and the Commission.

### Conclusions

For the first time in its history, the Commission approved the 2005 Programme and Budget amounting to US\$ 51 047 250 and € 42 540 900 in a split currency system as a measure to deal with the adverse effects of currency fluctuations. The Commission also authorized the PTS to finalize arrangements with the Austrian Government regarding additional conference facilities at the Vienna International Centre.

Ambassador Taous Feroukhi of Algeria was elected as the next chairperson of the Commission for 2005. In addition, under the skilful leadership of the 2004 Commission's Chairman Ambassador Takasu, who steered the negotiations, the Commission elected and appointed by acclamation Ambassador Tibor Tóth of Hungary as the next Executive Secretary. He will assume the office on 1 August 2005. ■

## Profile of newly elected Executive Secretary: Ambassador Tibor Tóth



Ambassador Tibor Tóth is currently the Permanent Representative of Hungary to the United Nations Office, the Conference on Disarmament, and other International

Organizations in Geneva. His entire career is devoted to disarmament and non-proliferation, especially as regards weapons of mass destruction. As a participant at the final stages of the Comprehensive Nuclear-Test-Ban-Treaty (CTBT) negotiations in Geneva in 1996, he has been closely involved with the CTBT since its beginnings.

Between 1997 and 2001, Ambassador Tóth served as Permanent Representative to the CTBTO Preparatory Commission. In his capacity as Chairperson of Working Group A of the Commission he has been leading efforts of States Signatories to build-up the budgetary, financial, administrative and legal infrastructure of the Organization.

Ambassador Tóth was also involved in the negotiations of the Chemical Weapons Convention (CWC) between 1982 and 1992, and served as Permanent Representative of Hungary to the Preparatory Commission of the Organization for the Prohibition of Chemical Weapons (OPCW) in The Hague in 1993. He served as the President of the BWC Review Conference between 2001 and 2002 and chaired the Biological Weapons Convention (BWC) follow-up conferences between 1991 and 2003. Furthermore, in 2003 he was appointed Chairperson of the BWC Meeting of Experts.

He served as Permanent Representative of Hungary to the United Nations Office in Geneva from 1990 to 1993, and in Vienna between 1997 and 2001.

Born in 1954, Ambassador Tóth holds a Masters degree from the University of International Relations in Moscow. ■

# Outreach activities

*The Provisional Technical Secretariat (PTS) conducts a variety of activities focusing on enhancing the Treaty understanding of decision-makers and the general public. It generates political support, encourages international cooperation and builds national technical capacities through training.*

## External relations

One of the outputs arising from the Preparatory Commission's mandate is to assist States in the promotion of signature and ratification of the Comprehensive Nuclear-Test-Ban Treaty. On this basis, External Relations coordinates a series of activities at the Provisional Technical Secretariat (PTS) in Vienna, and with States and international organizations outside of the Commission's seat, aiming to raise awareness of the Treaty and its contribution to international peace and security.

A widespread network of diplomatic contacts allows the Secretariat to participate in multilateral conferences. For instance, the PTS took part in the third African Union Summit, which was held in Addis Ababa, Ethiopia, from 30 June to 8 July 2004, in an observer capacity. It also attended the thirty-fifth Pacific Islands Forum Summit from 3 to 10 August 2004, upon the invitation of the Government of Samoa. As a guest organization, the Preparatory Commission was represented in the XIV Ministerial Conference of the Non-Aligned Movement in Durban, South Africa, from 17 to 19 August 2004, in which the Ministers stressed the significance of achieving universal adherence to the Treaty.

The Secretariat also engages in consultations with international organizations on agreements concerning

weapons of mass destruction. The PTS participated together with the Organization for the Prohibition of Chemical Weapons and the United Nations Regional Disarmament Center for Latin America and the Caribbean in such a workshop organized by the Bahamas, and Antigua and Barbuda, on 25 and 27 October 2004, respectively.

The PTS participates regularly in several United Nations forums, such as the April 2004 preparatory sessions for the 2005 Review Conference of States Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). In October this year, the Executive Secretary addressed the General Assembly, and the Director of Legal and External Relations gave a presentation at the First Committee. ■

## International cooperation

In the eight years since its inception the Commission has organized over a dozen international cooperation workshops both at the regional and global level. The workshops not only aim to enhance Treaty understanding, support the verification regime build-up and early entry into force, but also focus on ways and means to facilitate cooperation among States.

Much knowledge has been gained from these workshops, not least the understanding that while there is a global consensus on basic principles and objectives, there are different and creative regional approaches to their achievement. The workshops have also highlighted that at the regional level States can best assist one another and/or cooperate collectively on upgrading their capacities, and when needed request facilitation by the PTS. Developing countries may lack resources and the latest technologies but they lack neither interest nor reliable capacity when it

comes to Treaty support. Furthermore, these States are also interested in examining other potential benefits of Treaty membership, including civil and scientific applications of the verification technologies. ■

## Training

The major programmes of the PTS offer a wide range of training courses for National Data Centres staff and station operators. These courses provide useful information for Member States to take greater advantage of the International Monitoring System data and the products and services of the International Data Centre.

The On-Site Inspection (OSI) Division also conducts annual introductory courses which aim to familiarize experts from States Signatories with the OSI regime and its development. The courses focus mainly on the OSI process and its context; the phenomenology of nuclear explosions; OSI technologies; and the rights and obligations of the inspection team and the inspected State Party.



OSI EQUIPMENT PRESENTATION, 8TH OSI INTRODUCTORY COURSE, VIENNA, AUSTRIA

The eighth OSI Introductory Course was held in April 2004 in Vienna. A total of 44 trainees from 33 States Signatories participated, representing all the geographical regions of the Treaty. ■



## In the spotlight

### Mr Péricles Gasparini Alves, Director of the UN Regional Centre for Peace, Disarmament and Development in Latin America and the Caribbean

**Q:** *Regional nuclear non-proliferation regimes can be seen as complementary to the global regime established under the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and the global norm against nuclear test explosions stipulated in the Comprehensive Nuclear-Test-Ban Treaty (CTBT).*

*What is the role of the Latin American and Caribbean region (LAC) in this respect?*

**A:** The region has played both a conceptual and normative role in this respect. Conceptually, the region has demonstrated that despite the fact that ‘the genie is out of the bottle’, namely, nuclear weapons do indeed exist, security strategies do not necessarily need to be based on the nuclear option as argued by the Mutually Assured Destruction doctrine developed in the 1950s and 60s. On the contrary, the region clearly adopted the political decision that diplomacy and, ultimately, non-nuclear armaments, should be sufficient for its defence and therefore, nuclear disarmament and non-proliferation should be the main goal when it comes to nuclear issues. With respect to its normative role, the LAC region was innovative in designing an alternative choice to the nuclear option – a Nuclear-Weapon-Free Zone (NWFZ) – thereby creating both a viable tool to enhance security, as well as a precedent to be followed.

**Q:** *Nuclear-Weapon-Free Zones have come to be recognized by the international community as part of the process of nuclear non-proliferation and disarmament. The 1967 Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (Treaty of Tlatelolco) established the first nuclear-weapon-free zone in a densely populated area and has served as a model for subsequent NWFZ agreements. In October 2002, the Treaty entered*

*into force for all 33 countries in Latin America and the Caribbean when Cuba deposited its instrument of ratification.*

*How has the Tlatelolco Treaty contributed to national and regional security?*

**A:** It is clear today, as we look back, that the Treaty of Tlatelolco has contributed substantially to national and regional security in LAC. For instance, countries in the region that share basic security values have been able to use the Treaty as an instrument for opposing military use of nuclear energy. It has allowed for a certain unification of positions with regard to international security issues, including disarmament. The Treaty was the first disarmament agreement to establish an effective system of control under a permanent supervisory organ, the Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (OPANAL), which is already an important achievement in itself. It also had an impact on the people in the region and on those from other regions, who saw LAC as a model region for future NWFZ agreements.

The Treaty of Tlatelolco has also contributed to regional security by establishing the notion of exclusion, whereby nuclear weapons would not find any justification within a given geographic zone. This is of particular importance due to the fact that, unlike the Antarctic Treaty, the Treaty of Tlatelolco encompasses a densely populated and sizeable territory.

Additional Protocol I to the Treaty stipulates that States which adhere to the Protocol, shall undertake to apply the statute of denuclearization in respect of war-like purposes in the territories for which, *de jure* or *de facto*, the Parties are internationally responsible and which lie within the limits of the

geographic zone established in the Treaty. Additional Protocol II states that the nuclear weapons States should not undertake to use or threaten to use nuclear weapons against the contracting parties of the Treaty. These undertakings have had significant implications for both regional and global security.

**Q:** *The United Nations Regional Centre for Peace, Disarmament and Development in Latin America and the Caribbean (UN-LiREC), located in Lima, Peru, was established in 1987.*

*What are the Centre’s main goals and activities and how do they link to other activities in the region?*

**A:** The work of the Centre covers four basic areas: sub-regional and regional security matters; global security issues; the role of the United Nations in the region; and peace education. All of its programmes and projects in areas such as multilateral agreements related to weapons of mass destruction; confidence- and security-building measures; disarmament and development; and firearms (small arms and light weapons) are undertaken in association with some 50 other partners (governmental and non-governmental institutions) from within and outside the region. This is reflected in the recent report by the Secretary-General to the General Assembly on the activities of the Centre, where the Centre is described as a ‘catalyst, platform and/or a service provider for States in the region’.

**Q:** *The LAC region plays an important role in promoting the entry into force and universality of the CTBT. The Provisional Technical Secretariat (PTS) for the CTBTO Preparatory Commission has undertaken a number of activities to enhance understanding of the Treaty in the region and continues the timely build-up of the international monitoring system. So*





**“The fact that 82% of the countries in the region have made a political commitment towards the Treaty, clearly indicates the significant support for the CTBT.”**

*far, 27 of 33 States in the LAC region, have signed the Treaty, while 20 have ratified it.*

*How is UN-LiREC supporting the cause of CTBT within LAC?*

**A:** UN-LiREC is an integral part of the United Nations Department for Disarmament Affairs (DDA). It implements several activities entrusted to DDA by the General Assembly in the field of disarmament in the region. For example, UN-LiREC has developed two projects which promote signature, ratification and implementation of the CTBT. As part of the first project, the Centre conducted between 2001 and 2002 joint PTS and UN-LiREC missions to inform or testify at Foreign Relations Committee hearings in Chile, Colombia, Paraguay, and Uruguay, about Treaty obligations and benefits. Three of these countries have since ratified the Treaty.

As a second project, in 2004 UN-LiREC has organized consultation missions in the Bahamas and Antigua and Barbuda, where emphasis was placed on explaining Treaty obligations and benefits. Barbados, Belize and Dominica are some of the countries which will be visited by the Centre, the PTS and the Organization for the Prohibition of Chemical Weapons (OPCW) in 2005.

Moreover, UN-LiREC supports the Preparatory Commission by assisting the PTS in organizing and

participating in regional events, whereby the Centre serves as a platform for discussion and development of issues related to the Treaty.

**Q:** *In the framework of the 59th session of the United Nations General Assembly, 42 Foreign Ministers adopted a statement in support of the CTBT, which was later joined by many more countries.*

*Are there other initiatives in the region to promote the CTBT?*

The fact that 82% of the countries in the region have made a political commitment towards the Treaty, clearly indicates the significant support for the CTBT. Furthermore, the forthcoming 2005 Review Conference of the States Parties to the Nuclear Non-Proliferation Treaty (NPT) and the implementation of the proposal to convene an international Conference on Nuclear-Weapon-Free Zones which is expected to take place in Mexico in 2005, provide opportunities for the LAC countries to support the broader goals of the CTBT, as reflected in its preamble – namely, nuclear disarmament and non-proliferation. These and other initiatives in New York, Mexico, Washington, Geneva and Vienna recognize the vital importance of multilateralism in achieving both nuclear disarmament and non-proliferation objectives. Such cooperation is especially needed to achieve the goals of the CTBT and to ensure the full implementation of the Final Document of the 2000 NPT Review Conference. ■

## UN-LiREC

*Mr Péricles Gasparini Alves is the Director of the United Nations Regional Centre for Peace, Disarmament and Development in Latin America and the Caribbean (UN-LiREC), which is located in Lima, Peru. The Centre was established in 1987 pursuant to General Assembly resolution 41/60 J of 3 December 1986 and functions under the auspices of the United Nations Department for Disarmament Affairs. It is mandated to provide, upon request, substantive support to the region's States for their implementation of initiatives and measures in the field of peace and disarmament, and for the promotion of economic and social development.*



UN-LIREC OFFICE BUILDING, LIMA, PERU

*Since its activities were revamped in December 1998, the Centre has supported the countries in Latin America and the Caribbean by: promoting sub-regional, regional and cross-regional disarmament and non-proliferation activities; serving as a platform for identifying synergies between security and development issues; and contributing to the establishment of a more secure environment for economic and social development in the region. ■*

## The contribution of Latin America and the Caribbean to a strong nuclear disarmament and non-proliferation regime

By Ambassador Luis Alfonso de Alba

The overwhelming destruction and suffering caused by the tragic events of 1945 in Hiroshima and Nagasaki marked the beginning of international awareness on the imperative need to revert to a nuclear-weapon-free world. Since then many countries and individuals have been working towards that end.

In 1963 Latin American leaders promoted the idea of a treaty for a nuclear-weapon-free zone (NWFZ) in Latin America and the Caribbean, as a first step towards a nuclear-weapon-free world. Mexican diplomat and Nobel Prize Laureate, Alfonso García Robles, played a pivotal role in the negotiations and promotion of the treaty.

After years of negotiations, in 1967 the Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean, better known as the Treaty of Tlatelolco, established the first nuclear-weapon-free zone in a densely populated area. It has been a model and reference for the creation of other nuclear-weapon-free zones in different parts of the world, thus contributing to international peace and stability. But, as stated in its preamble, establishing militarily denuclearized zones is not an end in itself but rather a means for achieving general and complete disarmament at a later stage.

With the ratification of Cuba in 2002, the regime established by the Tlatelolco Treaty is now complete. The only pending issue, which

Latin American Governments are strongly working on, is the withdrawal of the unilateral declarations made by the nuclear weapons States when they signed or ratified Additional Protocols I and II of the Treaty. These unilateral declarations imply exceptions to the commitment of non-use of nuclear weapons against any of the States Parties of the Tlatelolco Treaty.

In the current international scenario and particularly now that all States in the region have explicitly renounced the nuclear option, the *raison d'être* for maintaining these unilateral declarations can no longer be justified. The collective Latin American decision to renounce the nuclear option should be reciprocated by the nuclear weapons States. In these difficult times, withdrawing the unilateral declarations would send a positive message to the international community.

In a broader perspective, Latin American countries have also played a very important role since the beginning of the negotiations that led to the Treaty on the Non-Proliferation of Nuclear

Weapons (NPT) and they continue to be active players in this context.

In 2000, during the NPT Review Conference the five nuclear weapons States agreed unequivocally to totally eliminate their nuclear arsenals, which would eventually lead to nuclear disarmament. Thirteen steps towards nuclear disarmament were agreed upon. Unfortunately, since this important accomplishment, there have been indications that some States no longer support all of these steps.

The Comprehensive Nuclear-Test-Ban Treaty constitutes a fundamental instrument in the nuclear disarmament and non-proliferation regime. Since its inception it has had strong support from Latin American and Caribbean countries. Practically all Annex 2 States in Latin America have ratified the Treaty, thus facilitating its entry into force. To date, 49 monitoring facilities are located in Latin America and the Caribbean. Furthermore, Mexico has been a particularly strong advocate of the Treaty, calling for its early entry into force and for a strong verification regime, as well as promoting resolutions on the Treaty in various forums.

In spite of these efforts, carried out not only by Latin American countries but also by a significant number of other countries, the ultimate goal of a nuclear-weapon-free world still faces serious difficulties. Mexico will continue to pursue actively this objective by pressing for the compliance with the 2000 NPT agreements.

It is essential that all the countries that have explicitly renounced the nuclear option (be it those already



UNITED NATIONS FIRST COMMITTEE MEETING, NEW YORK, OCTOBER 2004



“In a world full of new challenges and with new threats emerging, including the possibility of non-state actors acquiring weapons of mass destruction, we must all join forces to reduce the dangers posed by proliferation and to strive for the total elimination of nuclear weapons, as both nuclear disarmament and non-proliferation are mutually reinforcing processes.”

belonging to a nuclear-weapon-free zone or those aspiring at establishing one), join efforts to expand and strengthen the regimes aiming for a nuclear-weapon-free world. Following this logic, last year Mexico launched an initiative to hold a conference of States Parties to NWFZs and States interested in establishing new NWFZs, with a view to consolidate the coordination and cooperation between denuclearized zones and to promote a global non-proliferation regime.

This initiative is widely supported by the Latin American countries, as reflected in a resolution by the Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (OPANAL), and by States Parties and Signatories of the Treaties of Rarotonga, Bangkok and Pelindaba. In order to prepare for the conference the Permanent Representatives of these States in New York have already started to work on a draft declaration.

The objective of this conference is to consider means to enhance the dialogue, cooperation and sharing of experiences between States Parties, Signatories and other interested States, with the aim to promote convergence in the implementation of the provisions of the treaties and to strengthen non-proliferation. This conference will take place before the next NPT Review Conference in 2005 in Mexico City and will be open to all NPT States Parties, as well as to civil society actors. I am sure that this initiative will contribute significantly to the strengthening of the nuclear disarmament and non-proliferation regime as a whole.

In a world full of new challenges and with new threats emerging, including the possibility of non-state actors acquiring weapons of mass destruction, we must all join forces to reduce the dangers posed by proliferation and to strive for the total elimination of nuclear weapons, as both nuclear disarmament and non-proliferation are mutually reinforcing processes. ■

### Biographical note



*Luis Alfonso de Alba, Permanent Representative of Mexico to the International Organizations in Geneva, was elected Chairman of the United Nations*

*First Committee on Disarmament and International Security in June 2004. Earlier this year, he represented the New Agenda Coalition at the third session of the Preparatory Committee of the 2005 NPT Review Conference.*

*Ambassador de Alba joined the diplomatic service in 1981 and served in several high-ranking positions, including Deputy Permanent Representative of Mexico to the United Nations in New York and Deputy Permanent Representative of Mexico to the Organization of American States in Washington, D.C. Ambassador de Alba holds a B.A. in International Affairs from the Institute d'Etudes des Relations Internationales in Paris, France. ■*

# Verification highlights

*The Comprehensive Nuclear-Test-Ban Treaty (CTBT) includes a definition of a global verification regime to monitor compliance with the Treaty. Establishing this regime, which must be capable of detecting nuclear explosions underground, underwater and in the atmosphere, is the main activity of the Preparatory Commission for the CTBTO. The verification regime must be operational at the Treaty's entry into force. The regime consists of an International Monitoring System (IMS) supported by an International Data Centre (IDC), consultation and clarification, on-site inspections (OSI) and confidence-building measures.*

## Challenges of establishing IMS stations: From Patagonia to Baja California



VIEW OF SAN JUAN BAUTISTA, ROBINSON CRUSOE ISLAND, CHILE

## Global IMS station status

The International Monitoring System (IMS) consists of 321 stations and 16 laboratories employing four different technologies (seismic, hydroacoustic, infrasound and radionuclide), located in 89 countries.

Currently, 190 of these stations are installed and are either certified as part of the IMS or substantially meet specifications. Of these 190 installed stations, approximately 140 are sending data to the International Data Centre in Vienna. An additional 78 stations are either already under construction or under contract negotiation, while another 72 stations and two radionuclide laboratories have contracts for operations and maintenance.

Even as the IMS network reaches completion, much work remains to be done. The Provisional Technical Secretariat (PTS) is moving from a development stage to a mature operational and maintenance stage. By the end of 2007, the PTS expects that over 90 per cent of the IMS network will be completed and sending data to Vienna. ■

The Latin America and the Caribbean (LAC) region is one of the six regions defined under the Comprehensive Nuclear-Test-Ban Treaty (CTBT). It encompasses 33 countries and a population of approximately 535 million. The LAC States host 43 International Monitoring System (IMS) facilities in locations ranging from Ushuaia, the southernmost city in the world in Patagonia, Argentina, to Baja California, Mexico, and from the Caribbean Sea to some of the most remote islands in the South Pacific. The area covers 7° longitude and a huge variety of topographies and climate zones.

The logistical and engineering hurdles facing the installation of facilities in this region can be considerable. The site locations are frequently off the beaten track, making the transport of people and construction materials complicated and time-consuming. Recently, two of the most challenging missions took place on Robinson Crusoe Island, located some 650 kilometres off the Chilean coast, and on Socorro Island, 480 kilometres south of the tip of Baja California, Mexico.

In April 2004, three IMS staff members undertook a four week mission on Robinson Crusoe Island to install infrasound station IS14. Robinson Crusoe Island is the very island where the sailor Alexander Selkirk was marooned for over



CARRYING INFRASOUND EQUIPMENT TO INSTALLATION SITE, ROBINSON CRUSOE ISLAND, CHILE, APRIL 2004



A MULE TRANSPORTING A GENERATOR, ROBINSON CRUSOE ISLAND, CHILE, APRIL 2004



BOAT UNLOADING SEISMIC EQUIPMENT ON PLAYA NORTE, SOCORRO ISLAND, CHILE, MAY 2004

four years. His recollections of the ordeal sparked the imagination of Daniel Defoe for his famous novel ‘Robinson Crusoe’. The island which belongs to the Juan Fernández archipelago, rises dramatically from the Pacific to peaks of over 900 metres. It is a protected national park, and a UNESCO World Biosphere Reserve. Robinson Crusoe Island has the archipelago’s only permanent population, centred in the town of San Juan Bautista. The 650 islanders’ industry focuses largely on deep sea fishing and the harvest of spiny lobsters which are traded over the South American continent, and tourism is very low key.

Infrasound station IS14 is an eight element station divided into two sub-arrays, with array elements spread out on four hills located at distances between 1.5 to 8 kilometres from San Juan Bautista, while the Central Processing Facility (CPF) is located in the town, as is the shore facility for hydroacoustic station HA03. The topography surrounding it is ruggedly volcanic, with steep slopes that can exceed 50 metres altitude difference per kilometre. All the array elements can be reached by mountain trails. However, the island only has a few cars and relies on the mule population, which provide the most effective mode of transport on the steep

and narrow mountain trail. The Provisional Technical Secretariat (PTS) team, therefore, had to quickly familiarize themselves with this unusual style of commuter travel. Furthermore, rain immediately turns the trails into mud slides, so the team was highly dependent on weather conditions.

The vaults and station equipment for IS14 were flown to the site by helicopter, but to keep costs down, all pipes, masts, electronic equipment and tools needed for the installation – a total weight of several hundred kilograms – were transported by up to ten mules per day. Depending on the location of the infrasound elements, the mules needed up to four hours to reach the site, and for the installation of a very

remote array element it was necessary to camp at the site for four nights.

Despite adverse weather conditions and a challenging topography, the PTS team successfully installed IS14 and performed all the necessary certification tests before returning to Vienna.

Another mission to a remote island, in May 2004, provided an IMS team with firsthand experience of how an ‘island paradise’ can turn within hours into something quite different. The mission to install and test seismic equipment for the T-phase hydroacoustic station HA06 took place on Socorro Island.

Socorro Island is the summit of a massive, predominately submarine volcano, covered with dense vegetation and black lava rocks. In the scuba diving community it is considered a heavenly playground for manta rays and other underwater species, including whale sharks and humpback whales. It is, however, only accessible between December and early June. A small Mexican naval base of about 45 people is located on the island during these months. The rest of the year the island is uninhabited due to its location on the hurricane path.

*continued on page 20*



INFRASOUND ELEMENT H2, ROBINSON CRUSOE ISLAND, CHILE, APRIL 2004

# Verification highlights

## OSI Strategic Plan

On-site inspections (OSI) are considered to be the final verification measure of the Comprehensive Nuclear-Test-Ban Treaty (CTBT). The major elements of an OSI are the operational manual, inspectors, equipment and infrastructure. These elements were developed at the beginning somewhat independently of each other, but have now matured enough to be mutually integrated to establish the OSI regime. In order to achieve OSI readiness at entry into force of the Treaty, a comprehensive OSI Strategic Plan has been developed.

Three strategic goals have been defined in order to fulfil this plan. The first goal is to conduct a near full scale OSI field experiment in 2007 (FE07); the second goal is to achieve operational readiness for the conduct of one OSI, confirmed by a mock OSI in 2009 (OR09); the final goal is to establish the capability to conduct two simultaneous OSIs after entry into force. The time lines for achieving these goals are essential to allow completion of the build-up of all components of the overall CTBT verification regime in parallel, and of the OSI regime in particular.

The OSI Strategic Plan will be used as an internal reference for drafting programmes and budgets for the coming years. ■

## OSI aviation communication exercise

In June 2004, the On-Site Inspection (OSI) Division conducted an aviation communication exercise in Stockerau, Austria, with the goal to find a solution which enables a team of inspectors to communicate freely with each other inside a helicopter and, at the same time, keep a record of all the communications that take place during the entire flight. The solution had to be totally independent from the helicopter's internal intercom system and wireless in order to provide the maximum flexibility for the team to move around inside the cabin. In addition, the solution had to concur with the aviation rules and regulations, and with the telecommunications authorities. Other equipment was also tested, such as, a GPS/GIS (Global Positioning System/ Geographic Information System), a camera and a satellite phone.



Two-way personal radios showed significant advantages over other systems, specifically because due to their low output power, the interference with other headsets and the aircraft electronic equipment turned out to be minimal. The noise level inside a helicopter usually ranges between 90-100 decibels, therefore headsets with two-way radios and a special boom microphone with a large noise attenuation to transmit voice and minimize the surrounding noise were necessary. For this reason, a model was adapted where the transmitter circuit is embedded in the headset and as a result there is no need for any additional equipment or cables.

The PTT (Push To Talk) button is fitted on the left earphone and the antenna is mounted on the right earphone, thus providing true mobility for the users in the cabin. ■



NAVIGATING ON-BOARD A HELICOPTER USING THE MOBILE GEOGRAPHIC INFORMATION SYSTEM



## Global Communications Network Management System upgraded

The Network Management System (NMS) of the Global Communications Infrastructure (GCI) received a much-needed upgrade in April this year, just in time for the System-Wide Performance Test. The upgrade improves significantly the monitoring capabilities of the NMS. It provides a web portal from which the Provisional Technical Secretariat staff, network operators and National Data Centres' operators can check the status of their GCI link. Users can spot if a link is up or down, read the start and end time of an outage, and generate reports on historical response time and carried traffic. Interested GCI users can access the NMS web portal at: <http://nmsweb.gci.ctbto.org>.

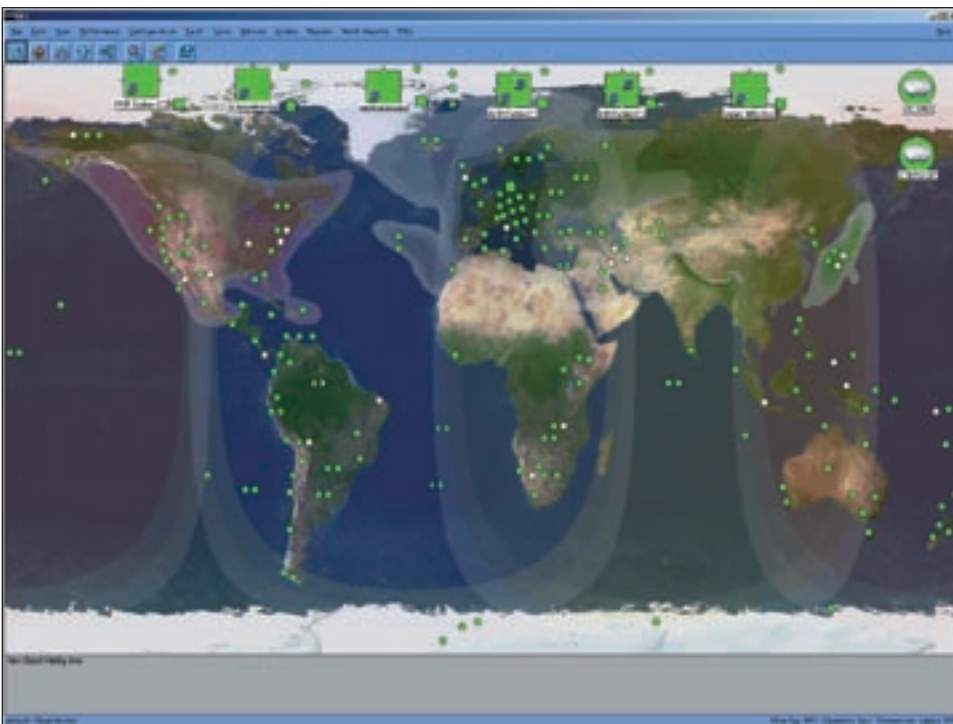
In 2002, the International Data Centre/GCI Section, in conjunction with the GCI subcontractor, identified a need to upgrade and enhance the NMS for the GCI. The existing system had been in place for around five years and was running out of capacity to deal with an ever expanding and increasingly complex network.



WEB PORTAL FOR NETWORK MANAGEMENT SYSTEM USERS

The upgraded system was carefully designed over the next year. In order to have the enhanced monitoring capabilities in place for the System-Wide Performance Test, the Secretariat

worked closely with the developer to implement the project in record time. The project commenced on 5 February 2004 and the new system replaced the old one on 24 April, with only six minutes downtime on the Network Management Systems. This caused no network downtime at all.



VIEW OF THE NEAR REAL-TIME GCI WORLD MAP USED BY GCI NETWORK OPERATORS

The system achieved a number of technical firsts. The most significant features of the NMS II are: enhanced monitoring resolution (down from 30 minutes to 60 seconds); migration of all data; warehousing and storage. The upgrade also involved a complete hardware replacement project. Furthermore, in order to meet the specific requirements of one of the most complex global networks anywhere, a number of specific tools had to be built and – most importantly – integrated into the existing system. As a result, the GCI NMS II is a seamless fusion of over 20 different component systems, some off the shelf, many bespoke, but all working together to provide some of the most advanced network management ever built. ■

# Potential civil and scientific applications

## Tristan da Cunha: An example of using CTBT data

*The International Monitoring System (IMS) uses seismic, hydroacoustic, infrasound and radionuclide monitoring technologies capable of detecting evidence of nuclear explosions underground, underwater and in the atmosphere in order to monitor compliance with the Comprehensive Nuclear-Test-Ban Treaty (CTBT). These verification technologies, together with the data, technologies and products of the International Data Centre (IDC), have potential civil and scientific applications which can provide significant benefits to States and the international scientific community.*

On the night of 29/30 July 2004, the 300 inhabitants of the remote island of Tristan da Cunha were disturbed by a sequence of earthquakes, evoking terrible memories in the older residents of the 1961 eruption and the subsequent evacuation.

As reported in the last issue of *CTBTO Spectrum*, a Provisional Technical Secretariat (PTS) team installed three International Monitoring System (IMS) stations – infrasound, radionuclide and hydroacoustic – on the island in late March. Shortly after installation, the data were used in what is possibly the first application of CTBT data for disaster mitigation, thus serving as an example of civil and scientific applications of CTBT verification data.

Tristan da Cunha is an active volcano, 13 kilometres in diameter and rising two

kilometres above sea level. The first report of possible new activity came from the station operator. Then PTS staff examined the data from the hydroacoustic station HA09 which, being a T-phase station, is perfectly suited to record seismic signals from nearby earthquakes (see Figure 1.) They established quickly that the recorded signals were typical of an earthquake swarm associated with a volcano. The peak in the earthquake activity, however, had already passed and activity was slowly dying down.

It was possible to determine that the earthquakes were located somewhere to the south and east of Edinburgh, the island's only settlement, and between 30

and 40 kilometres away. Since Edinburgh is on the north-west shore of the island, the earthquakes could have occurred deep beneath the volcano. They could also have occurred at a shallower depth, offshore to the south-east, an interpretation supported by reports of volcanic rocks (pumice) floating in the water near the island.

The British Geological Survey (BGS) sent a scientist to the island to investigate the reports and examine the pumice. She determined that the pumice was fresh and was typical of an underwater eruption. This, together with the IMS data, indicates that there had been an eruption from an unknown underwater volcano, somewhere to the south-east of Tristan da Cunha.

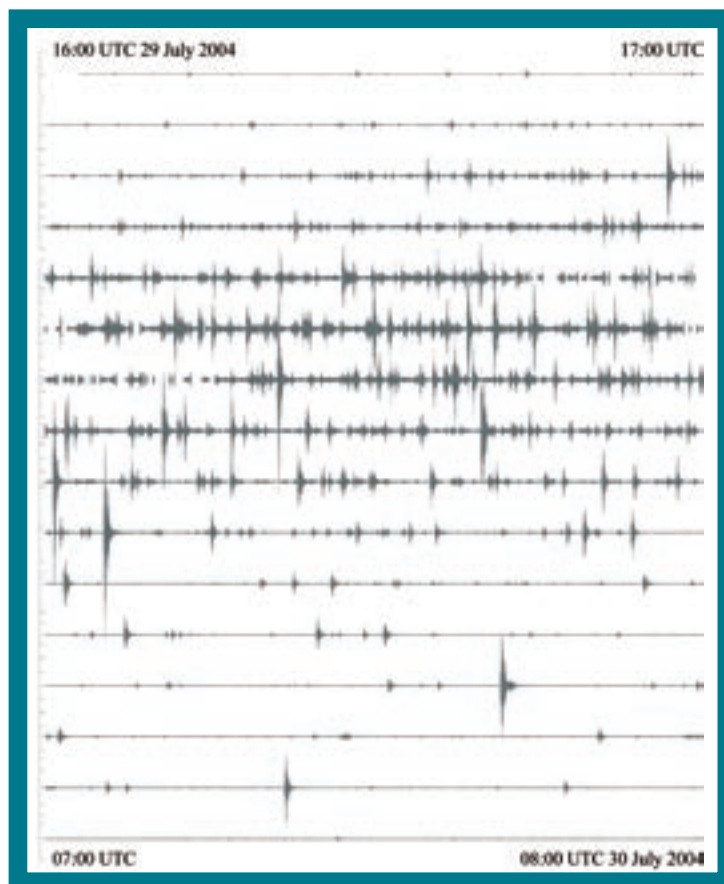


FIGURE 1: SEISMIC PLOT SHOWING THE SEISMIC ACTIVITY RECORDED BETWEEN 16:00 UTC ON 29 JULY 2004 AND 08:00 THE NEXT DAY. THE DATA SHOWN ARE FROM THE VERTICAL COMPONENT OF H09W1. EACH LINE REPRESENTS DATA COLLECTED OVER ONE HOUR; 16 CONSECUTIVE HOURS OF DATA ARE SHOWN; DATA ARE PLOTTED AT THE SAME AMPLIFICATION.

HA09 data is now being forwarded to the BGS so it can monitor the volcano. At the time of writing, several months after the eruption, small earthquakes continue to be recorded at a declining rate.

This example merits close examination by anyone interested in the civil use of the CTBTO verification technologies. If IMS data are to be used to monitor a nearby volcano, the data need to be available in real-time at the responsible technical institute. Furthermore, the procedures for monitoring and interpreting the data need to be established in advance, so that authorities will be able to react rapidly to a developing situation. Natural disasters, unfortunately, do not normally give enough warning for this to be done ahead of time. ■





## CTBT contribution to global seismology ...

*continued from cover page*

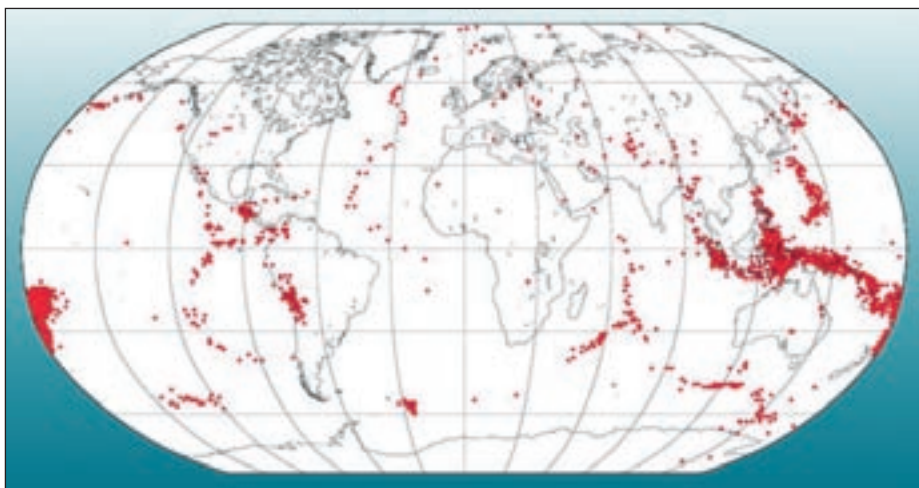


FIGURE 2: LOCATIONS OF EVENTS WHICH OCCURRED IN 2001 AND WERE ONLY REPORTED TO THE ISC THROUGH THE IDC REVIEWED EVENT BULLETINS

globe. The Centre's main task is to re-determine earthquake locations and magnitudes, and to search for previously unidentified earthquakes. More about the ISC and its products can be found on its web site: [www.isc.ac.uk](http://www.isc.ac.uk).

In recent years, the most significant new contributions to global seismology have been the installation of the global IMS seismic network and the release of the parametric data by the IDC, which are systematically included in the ISC Bulletin. In many cases, the IDC locations serve as first approximations to the ISC location procedures and the IDC phase readings help improve the accuracy of locations in the ISC Bulletin, thus providing the seismological community with increasing numbers of observations and accurate data which are used in seismological research.

Despite the relatively small number of IMS stations, about 10% of the phase readings in the ISC Bulletin come from the IDC and help in event location. Furthermore, thanks to the IDC's careful analysis procedures, the

ISC Bulletin is enriched with many events that are not reported by any other seismological agency. The map in Figure 2 shows the locations of events reported in the 2001 ISC Bulletins that were only reported by the IDC. Therefore, it is evident that the CTBTO network and operations help to close the gaps in monitoring areas where no national or regional networks exist, particularly in the oceans.

The ISC purposely waits until all possible data has been collected from all operating seismic stations before editing its bulletin. Following this practice the ISC is likely to prepare the most complete and accurate earthquake catalogue, which, in turn, is used by the IDC to evaluate its own performance in terms of completeness and location accuracy.

There is no doubt that the close interaction between the ISC and the Preparatory Commission contributes significantly to improving the performance of both organizations. This cooperation is an example of the direct civil and scientific applications of CTBT verification data and

technologies. These data facilitate a wide spectrum of seismological studies, such as the exploration of the three-dimensional structure of the earth; earthquake hazard and risk assessments; earthquake forecasting and engineering; earthquake source processes; and tectonics. Therefore, it is important that the States Signatories and the scientific community continue to work towards further progress in the field of CTBT data accessibility. ■

### Biographical note



*Avi Shapira is based in Thatcham, United Kingdom, where he heads the International Seismological Centre (ISC).*

*Originally from Israel, he holds a Doctor of Science degree from the Uppsala University in Sweden. Dr Shapira has held several research positions related to seismology, including Director-General of the Geophysical Institute of Israel and advisor to the Government of Israel on earthquake preparedness. He is the author of approximately 45 peer reviewed papers, over 50 invited reviews and publications in proceedings of conferences, and over 150 reports and abstracts on seismological research. ■*

# Verification science

## The role of the IDC analyst in the verification process

*The network of the International Monitoring System (IMS) with its associated communications infrastructure and the International Data Centre (IDC) was designed by a Group of Scientific Experts at the Conference on Disarmament in Geneva to be fully capable of monitoring compliance with the Treaty. New research and improved communications technology continuously strengthens and refines the detection capabilities of the IMS. This column introduces some of the latest developments in the field of verification science.*

One largely unknown area of verification science is the role of the analyst in monitoring Treaty compliance. Monitoring the pulse of the entire earth, the analyst represents the human component of the International Data Centre (IDC) verification effort. They have the exceptionally complex and daunting task of reviewing and assimilating any anomaly in the data occurring anywhere at any time, which might later prove to be the signature of a nuclear explosion. An analyst functions as a near real-time professional investigator of geophysical and radioisotope data.

A daily blizzard of gigabytes of data from up to 321 International Monitoring System (IMS) stations provide automatic processing for lists of seismic and acoustic disturbances (events) in the earth, and gamma ray spectra recorded worldwide. These constitute the starting point for the analyst's work. Combining the latest verification technology with analyst experience, judgment and detective skills, each analyst must go far beyond what automatic processing can achieve. The analyst must correct and improve the automatic results, which would otherwise offer many non-existent or poorly located events to the National Data Centres (NDCs). Despite continuous improvement

of the automatic system, the knowledge and judgement of the analyst will remain essential to the quality of the information.

signals that are indistinguishable to the untrained eye. This confidence is developed only with a thorough understanding of



IDC ANALYST REVIEWING RAW DATA AND AUTOMATED LISTS TO PRODUCE QUALITY-CONTROLLED BULLETINS

An analyst must also search for missed events or relevant radionuclides. This judgement requires years of experience and accumulated knowledge in the complex behaviour of the earth. If an event is judged to be real, the analyst interactively estimates its most likely location and time, and the identity of each Treaty-relevant radionuclide must also be established. This process is somewhat like a police forensic investigation, except the analyst is under time pressure to solve each event in a matter of minutes. (After entry into force of the Treaty, the analysts will be mandated to complete the report for each 24-hour period, within only about two days of the time of the event.)

Each analyst is presented with a very large number of puzzle pieces (thousands per day for the entire IMS station network), most of which do not fit together, and they must make the best of what information is available. The analyst must make rapid judgements with confidence, often using

basic principles, together with extensive practical experience working on global geophysical or radionuclide phenomena.

The final reviewed products are the Reviewed Event Bulletin (REB) and the Reviewed Radionuclide Report (RRR), which are well known and keenly awaited by specialists at NDCs. The high quality and completeness of these products depend crucially upon the analyst's efforts. This imposes a responsibility on the analyst, who is aware that even a small error in judgement could have major adverse consequences should an event of special concern be detected by the IMS stations, but not appear correctly in the REB. The CTBT analyst provides a last line of defence for the integrity of IDC Standard Products. The analyst is therefore a key player in supporting the operational credibility of the monitoring system and thus in supporting the Treaty's role as a strong deterrent to would-be violators. ■

# Secretariat snapshots

## Creating global synergies through local application: The status of the introduction of IMIS in the PTS

When the Administration Division began its search to modernize its financial software and to handle its new requirement – accounting for a split currency system – it sought to eliminate redundancies, implement efficiencies through the use of automation, and create synergies within the Secretariat. In deciding to use the Integrated Management Information System (IMIS), an Enterprise Resource Planning software package (ERP) developed by the United Nations to manage its administrative operations, the Division exceeded its expectations. IMIS not only proves to be the best value for money, but the implementation effect has already created far-reaching synergies. Internally, it has brought

together staff from Personnel, Finance, Procurement and General Services Sections in the Administrative Division and from the International Data Centre.

Within the Vienna International Centre, through a Standing Agreement for System Maintenance, the Provisional Technical Secretariat (PTS) has begun a productive collaboration with the United Nations Office on Drugs and Crime. Globally, it has already engaged colleagues from the United Nations Office at New York, the United Nations Economic and Social Commission for Western Asia, the United Nations Economic Commission for Africa and the United Nations Office at Nairobi. Thus, the implementation of the IMIS

has fostered cooperation and the exchange of ideas within the community of international organizations.

By January 2005, the PTS expects to implement the four basic building blocks of the system: Personnel, Entitlements, Payroll and Finance. With IMIS in place, the Administration Division will be able to reduce redundancies by decreasing the number of legacy systems on which it depends. Thanks to the UN investment in ERP Research and Development, the PTS will continue to derive long-term benefits as IMIS improvements are made, such as the soon-to-come migration to a web-based platform. ■

## CTBTO exhibition on tour

A small, portable version of the CTBTO exhibition on the Comprehensive Nuclear-Test-Ban Treaty (CTBT) and the work of the CTBTO Preparatory Commission has been displayed at the Summit of the African Union in Addis Ababa, Ethiopia. The Summit was held from 30 June to 8 July 2004.

The exhibition was also installed at a radionuclide workshop in Strassoldo, Italy, this August. In October, it was mounted at an Operations and Maintenance Workshop in Baden, Austria. Furthermore in October, it formed the backbone of an information stand on the CTBTO Preparatory Commission during the Open Day to celebrate the 25th anniversary of the Vienna International Centre. Over 15 000 people attended the Open Day, providing a large audience for the CTBTO display.

The CTBTO exhibition was first displayed at the 2003 Conference on



CTBTO EXHIBITION IN STRASSOLDO, ITALY, AUGUST 2004

Facilitating the Entry into Force of the CTBT. It is modular in design, allowing different elements of the

work of the Preparatory Commission to be highlighted as required. ■

## Treaty Status

Signatures .....	174
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Annex 2 Ratifications .....	33

AS OF 7 DECEMBER 2004

## Challenges of establishing IMS stations...

*continued from page 13*

To install the seismic system for the T-phase station, a boat was necessary. The commander of the naval base provided the mission with a boat, as well as three soldiers. These soldiers managed to land on the shore, where the unloading of the delicate equipment was done with great care. Then the navy boat departed, intending to leave the IMS installation team on their own for the next three days.

The IMS team had to carry the seismic equipment on their shoulders up a steep hill before installation could start. They worked steadily until the evening of the following day, when big clouds started to cover the

horizon. Unfamiliar with local weather conditions, the installation team continued their activity. Suddenly the navy boat came back. The soldiers rushed everybody to pack their belongings and relevant equipment as quickly as possible, and evacuated the entire IMS team. The boat made a rough crossing back to the naval base just in time to avoid the tropical storm which was bearing down on the island. Had the team remained at the site, their likelihood of surviving the heavy winds without injury would have been very slim. As soon as the winds eased, the installation team returned to the site to test the functionality of the equipment. Remarkably, it had survived the storm. ■

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## Calendar of Meetings 2005

### Preparatory Commission:

24th Session	27 – 30 June 2005
25th Session	14 – 18 November 2005

### Working Group A:

27th Session	6 – 10 June 2005
28th Session	3 – 7 October 2005

### Working Group B:

24th Session	14 Feb. – 4 March 2005
25th Session I	23 May – 3 June 2005
25th Session II	29 August – 9 Sept. 2005

### Advisory Group:

24th Session I	18 – 23 April 2005
24th Session II	17 – 20 May 2005
25th Session	12 – 16 September 2005

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