

Reading the waves: How the CTBTO strengthens its monitoring system with knowledge

BY KIRSTIE GREGORICH HANSEN

Each day Esmeralda Banganan scrutinizes hundreds of waveforms that come in from around the world. She's part of a team of 20 top notch analysts who work at the International Data Centre (IDC) at the Vienna headquarters of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO). Where the average person sees squiggles on a page, Esmeralda sees volcano rumblings or a mine blast from 10,000 km away, as she applies filters to screen out such "noise" and look for telltale signs of nuclear explosions.

Since its inception, the CTBTO has helped thousands of people to develop skills like Esmeralda's – by training staff working at National Data Centres (NDC) across the globe to better understand and monitor their data and, as importantly, to interpret the analyzed information that flows back to them from Vienna. In short, to put meaning to those squiggles, and give NDC staff the expertise to decide if a detected event was a nuclear explosion.

"We want to reach a stage where even countries that don't have monitoring stations are able to receive and understand what Comprehensive Nuclear-Test-Ban Treaty (CTBT) data is all about," Lassina Zerbo the Director of the IDC said.

"It is important for the legitimacy of the Treaty that it is not only the

big players that decide whether we are dealing with a nuclear explosion or not. It is important when the Treaty has entered into force that countries that are not nuclear powers know if someone is breaching the Treaty and conducting a nuclear test explosion.

Instead of having one country saying 'I have the proof', we want all countries to have the knowledge to be able to affirm if it was, or was not, a nuclear test," Zerbo said.

One popular support tool in the CTBTO's educational kit is the 'NDC-in-a box', a special software package to help users receive and analyze data. The CTBTO is helping its Member States to use and install the software worldwide.

A WELL-OILED VERIFICATION REGIME

It is said that 'capacity building' is the essential lubricant of international development. That is certainly the case for keeping the CTBT's monitoring system running smoothly. When complete it will comprise 321 monitoring stations and 16 laboratories, many of them built in remote locations – from tiny islands, to blazing deserts or forested Alps. Those working on the ground need to be equipped with the skills to maintain the stations. The more stations transmitting data to Vienna on a daily basis, the stronger and wider the detection net to catch any signals of

a nuclear explosion. The CTBTO helps to train station operators for exactly that purpose. In January 2010 for example, a course took place in Paris, training radionuclide station operators to perform the repairs necessary during the operation of a SPALAX Noble Gas Detector System, designed to pick up radioactivity in the air.

PREPARING FOR THE FUTURE

The targeted training the CTBTO provides is not just about the here and now. It's helping Member States to prepare for the future, the day the Treaty will enter into force. Each year future inspection teams are groomed in preparation for on-site inspections by taking part in on-site technical workshops and training activities.

INFORMATION EXCHANGE

Achieving entry into force and universalization of the Treaty is a key driving force at the CTBTO. Around 25 workshops with the dual aim of increasing the number of signatures and ratifications and achieving the build-up of the verification regime have taken place since 1996, when the Treaty opened for signature. Part of their aim is to encourage States to share and learn from each other's experiences in establishing and operating the stations.

"To try to get more developing countries buying into the Treaty, we need to give them something that interests them," Zerbo said. That has involved a restructuring of the workshops to include ways that the CTBT data can also be used for civil and scientific applications.



Photo: Todd Vincent

LEAD WAVEFORM ANALYST

Member of the Monitoring and Data Analysis team Ezekiel Jonathan analyzes data received from IMS stations around the world

The possibilities of establishing tsunami early warning systems for the African and Caribbean regions for example, were discussed at workshops in Namibia, the Dominican Republic and Mexico in 2009.

Other possibilities include assistance for natural disaster mitigation, like volcanic eruptions or earthquake monitoring, or even environmental monitoring to study isotopes of radionuclides that could affect the population's health.

USING THE WEB FOR E-LEARNING

The learning doesn't stop when the workshops and hands-on-training cease. Through e-learning, the CTBTO provides Member States with 24-hour access to internet based lectures and tutorials covering a wide range of verification-related topics. The project was initiated with European Union funding. Comprehensive e-learning modules are made available in each of the six official United Nations languages.

For more information on upcoming training opportunities visit: www.ctbto.org

**FAST FACTS
CTBTO's Capacity Building Activities**

WHO CAN BENEFIT?

- Monitoring station operators
- National Data Centre operators
- Inspection teams in preparation for on-site inspections

WHAT'S PROVIDED?

- Technical support
- Hands on training and workshops
- Hardware, software, including the 'NDC-in-a box' to receive and help analyze data.
- Workshops to promote the universalization of the Treaty and the build-up of the verification regime.
- Ongoing training via e-learning

WHAT WAS THE IMPACT IN 2009?

- Over 400 participants involved in 20 plus workshops and training activities.
- One hundred NDC staff trained through development workshops and advanced capacity building training programmes.
- Nine capacity building systems (computer hardware and equipment) delivered to NDCs.
- Ten scientists, mainly from developing countries trained for three months at the IDC in how to utilize data from Vienna. In turn they provide the CTBTO with an international pool of analysts.
- Three training activities for surrogate inspectors and diplomats to prepare for on-site inspections as well as one technical workshop, one field exercise and two field operational tests.

BIOGRAPHICAL NOTE

KIRSTIE GREGORICH HANSEN

worked as a journalist before joining the International Atomic Energy Agency (IAEA) in 2002. She worked in the press office and news and information section at the IAEA for seven and a half years. She joined the CTBTO Public Information team in February 2010.