

CTBT – The Arms Control Holy Grail

by Peter D. Marshall, O.B.E.



With the signing of the Comprehensive Nuclear-Test-Ban Treaty (CTBT) on 24 September 1996 the most significant step towards nuclear non-proliferation since the signing of

the Nuclear Non-Proliferation Treaty was taken. The CTBTO Preparatory Commission which, together with its Provisional Technical Secretariat (PTS), is to establish all the facilities specified in the Treaty to enable States Signatories to verify compliance with the provisions of the Treaty, started work shortly afterwards. The CTBT contained an unprecedented technical verification package, including the establishment of a total of 321 seismological, hydroacoustic, infrasound and radionuclide monitoring stations in 90 countries – the International Monitoring System (IMS). In addition to the establishment of the IMS, the Preparatory Commission had to create an International

Data Centre (IDC) and to define the process required to conduct an on-site inspection (OSI).

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The build-up of the verification regime

The task of establishing the IMS and IDC systems, as well as the OSI procedures, is a major engineering and logistical challenge. Where no stations currently exist, a specific procedure, which can be very time consuming, must be followed. Agreements have to be negotiated with host States to allow PTS staff to enter that State's territory to carry out work. Once this has been done, site surveys are conducted to ensure that the proposed location is adequate for the purpose of Treaty monitoring. The next stage is to acquire the equipment – which for each of the technologies is of the highest specification – and arrange for its installation. A satellite communication link, part of the Global Communication Infrastructure (GCI), is set up to get the data to the IDC in Vienna. The IDC uses this data to prepare a bulletin of events detected and located for distribution within two days to all States who wish to receive it. These bulletins can be tailor-made to a State Signatory's individual monitoring requirements.

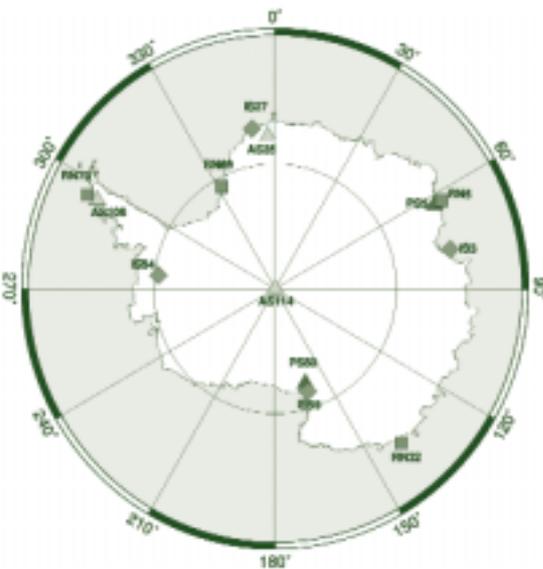
The status of the IMS network

At the present time only part of the IMS is operational. The speed at which stations are installed is determined by a number of factors, including budgetary constraints and the availability of specialised equipment. What is

already clear is that the performance of the final IMS network for Treaty monitoring will significantly exceed the necessarily conservative estimates of the experts in Geneva who established the original specifications.

Other potential uses of the CTBT verification technologies

Once the IMS and the IDC are complete, the State Signatories will have access to a unique database. Much of this data could be of very significant value for a variety of scientific studies which would benefit mankind as well as provide assurance that the provisions of the CTBT are being adhered to. Earthquake hazard and risk assessment, monitoring of global warming, atmospheric and meteorological studies, early warning of the potential dangers of volcanic eruption and studies of pollutant and biological species are just a few of the studies which would benefit from timely access to the IMS data. The IMS is to earth scientists what the Hubble telescope is to astronomers or the latest atom-smasher to nuclear scientists.

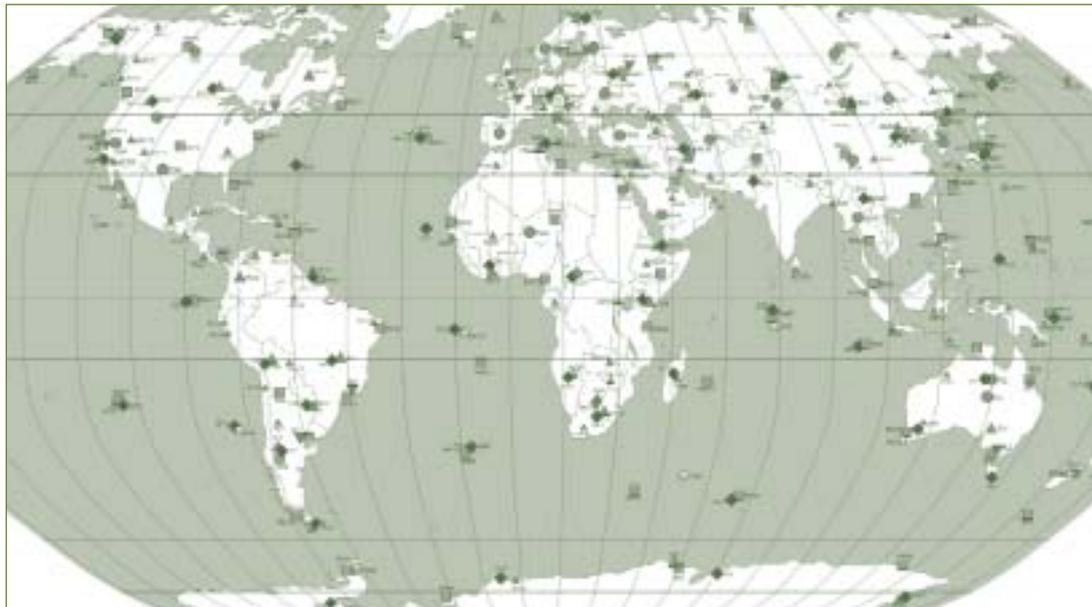


OVERVIEW OF THIRTEEN IMS STATIONS LOCATED IN ANTARCTICA



The CTBT, arms control and nuclear non-proliferation

The CTBT can make a number of significant contributions to arms control but perhaps the most important is the establishment, upon entry into force, of a verifiable regime in which nuclear explosion tests are prohibited, thus arresting the development of new nuclear weapons. Growing international concern about the threats posed by the proliferation of weapons of mass destruction recognizes the CTBT as a major step forward in reducing such threats.



GLOBAL OVERVIEW OF THE 337 IMS MONITORING FACILITIES LOCATED IN 90 COUNTRIES

“With a verifiable CTBT in force the nuclear non-proliferation objectives of much of the international community will be significantly strengthened. All States Parties are provided with a reduced threat to their national security thus making the world a safer place for humankind.”

When the CTBT, often described as the Holy Grail of arms control, was signed, President Clinton described the event as “the longest-sought, hardest-fought prize in arms control.” Given that the first attempt to impose restraints on nuclear testing and thus control nuclear weapon development were made over 50

years ago, this is perhaps a very reasonable statement. With a verifiable CTBT in force the nuclear non-proliferation objectives of much of the international community will be significantly strengthened. All States Parties are provided with a reduced threat to their national security thus making the world a safer place for humankind.

The excellent work of the Preparatory Commission and its PTS will, with the entry into force of the Treaty, put an unprecedented brake on horizontal and vertical nuclear proliferation. However, there is still much work, both technical and diplomatic, to be done before the search for the arms control Holy Grail is over. ■

Biographical note

After several years working on ground shock from underground explosions, Peter Marshall became a founder member of the United Kingdom Forensic Seismology Research Group at AWE Blacknest and conducted research on the technical problems of test-ban monitoring. During more than 40 years of research up to his retirement in June 2002, he published over 100 scientific papers related to test-ban seismology. Peter Marshall acted as technical adviser to successive UK Delegations on test-ban treaty issues since 1975 and served as Chairman of the Expert Group during the 1994-1996 CTBT negotiations in Geneva. He is now enjoying a busy retirement.