CTBT: Challenge for Multilateral Verification

Although multilateral discussions relating to a nuclear test ban have taken place in the Conference on Disarmament (CD) for more than 20 years, there has never been agreement on a multilateral negotiating mandate. For a brief period in the late 1970s, tripartite negotiations were undertaken by three nuclear weapon states (the US, the USSR and the UK) but there was little tangible progress. With the July 3 decision of President Clinton, in conformity with legislation passed by Congress, to continue the US test moratorium (on a no-first-test basis) until at least September 1994, the way appears clear to initiate CTBT negotiations in the CD in January.

Combination of methods needed to provide assurance of compliance.

The CTBT negotiations are likely to differ significantly from other multilateral negotiations both within the Conference on Disarmament and in other fora. The East-West confrontational environment, within which other significant multilateral negotiations were initiated, has disappeared. As a result, the organizational structure and the bureaucratic strictures can be significantly altered to smooth and energize the negotiating process. From the standpoint of verification, there is a reasonably well understood concept of what technologies are required.

Verification of a treaty to ban nuclear explosive tests in all environments will require confidence that possible violations can be detected, located and unambiguously identified.

The verification regime must be capable of resolving concerns about compliance and, if necessary, of triggering a political process to address non-compliance. It must be not just reactive, but proactive. This includes the ability to take collective preventive action, if possible before a test occurs. The verification regime must also be non-discriminatory, as well as balanced in terms of intrusiveness. The negotiating requirement, therefore, is to identify a package of technologies based on experience to date that will provide effective verification, taking advantage of the synergistic effects among cooperative techniques such as seismic detection, imagery exploitation, on-site inspection, data analysis and notifications.

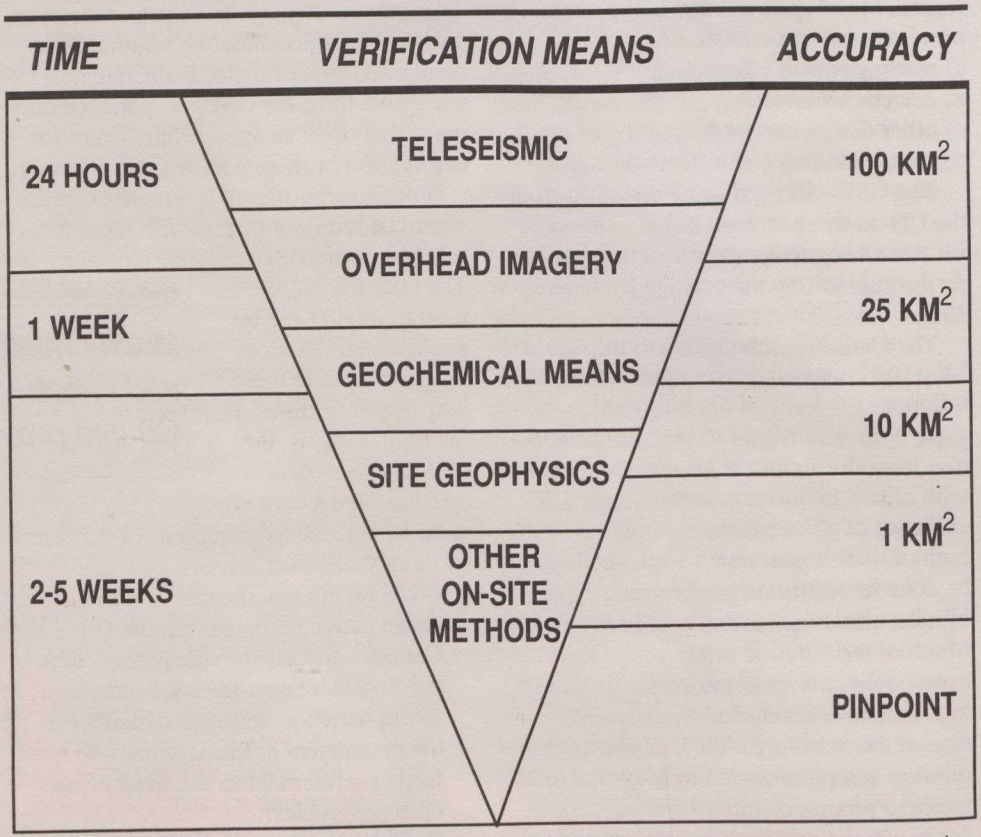
There is general agreement in the CD that the core of the verification of a comprehensive test ban treaty is seismic technology. The basic concept of an international seismic data exchange system for verifying a CTBT is already well-defined by the CD's Group of Scientific Experts (see article on next page). A resulting difference — in terms of verification — between the CTBT and other treaties is that much of the seismic network required for verification can be put together from existing infrastructure.

Nevertheless, in Canada's view and that of many other countries, seismic technology *alone* is unlikely to provide an adequate and effective level of assurance of compliance with a CTBT. What is needed is a package of verification methodologies that operate together to reinforce each other. For example, an international seismic monitoring network might detect an anomalous event, which in turn would trigger the use of other verification methodologies to help locate and identify that event. Such a multi-layered approach to CTBT verification is illustrated in the diagram below.

The following are some technologies that could contribute to an effective test ban verification package:

- seismic technologies;
- ground-based cross-border radionuclide network sensing;
- an airborne radionuclide network;
- satellite sensors;
- satellite imaging;
- airborne imaging;
- on-site inspections;
- chemical analysis;
- collateral analysis;
- hydroacoustics; and
- data fusion.

Thus, another difference between a



The synergy of seismic and non-seismic methods for the verification of an underground nuclear test is shown here. The "time" refers to the approximate time from the underground test to the completion of the analysis acquired by each "verification means." The "accuracy" in locating an underground test constitutes a rough order-of-magnitude estimate for each verification technique.