A Period of Continuous Progress

INTRODUCTION
Since 2000, the Preparatory Commission has registered remarkable achievements in fulfilling its mandate and advancing the Treaty and its verification system.

In 2000, the Treaty had been ratified by only 51 States. Today the number has tripled and the Treaty enjoys 153 ratifications and 182 signatures.

The political support for the Treaty and the work of the Commission has reached an unprecedented level. There is an almost universal recognition that the Treaty is an effective instrument of collective security and an important pillar of the nuclear non-proliferation and disarmament regime. A growing number of States, politicians and representatives of civil society are spearheading the campaign for ratification of the Treaty by those States which have yet to do so, including those of Annex 2.

Though the Treaty is yet to enter into force, its ratification and signature by a large community of States have already established an unwavering international norm against nuclear explosions.

ADVANCING THE VERIFICATION SYSTEM
Progress in the development of the system for verification of compliance with the Treaty is impressive.

The total number of certified stations and laboratories in the International Monitoring System (IMS) rose from zero in early 2000 to 264 at the end of December 2010. Such a rapid increase in the number of facilities installed and certified has been a source of major improvement for coverage and network resilience.

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The October 2006 announced nuclear test by the Democratic People’s Republic of Korea showed the importance of noble gas monitoring for the verification system. Since then, greater emphasis has been placed on this technology. The number of noble gas systems that were installed at the end of 2010 at IMS radionuclide stations stands at 27. In 2010, the first three noble gas systems (out of 40 foreseen by the Treaty) were certified. This is a major milestone and demonstrates the maturing of noble gas systems as a result of the International Noble Gas Experiment.

Establishing the Treaty’s monitoring system, consisting of 337 facilities and 40 noble gas systems, is not just about building stations. It is about taking a holistic approach to establishing and sustaining an intricate ‘system of systems’ that requires considerable testing, evaluation, maintenance and improvement. Since 2000, the Commission has sharpened its focus on engineering and development activities to increase the detection capability of the system and ensure robust performance of its monitoring.
technologies. Furthermore, attempts have been made to achieve higher levels of data availability.

As the IMS installation and certification phase approaches completion, it is also becoming all the more important to review and improve the operation and support of the facilities. Life cycle sustainment is essential to preserve the investment in the system. Operational experience with the system has increased over time. This has helped in developing an IMS sustainment structure for more effective preventive and corrective maintenance, for the recapitalization of IMS facility components and for logistical strategies. Over the years, the Commission has undertaken to develop station specific documentation, as well as capacity building activities and training programmes to enhance the capabilities of the station operator as the entity closest to the facility. As a result, there has been a continuous improvement in data availability, which reached 85% in 2010.

Over the last few years, the Commission has been developing and implementing a Quality Management System, encompassing a quality policy and manual as well as a quality assurance/quality control programme for the IMS network. This programme aims at verifying that stations conform to their certified operational tolerances, prescribing preventive action to avoid non-conformance and initiating corrective action when non-conformance is discovered. Currently, procedures for station and network calibration and data quality monitoring and assessment are being tested, as well as processes and tools to monitor and continually improve the performance of the network. Monitoring software includes state of health tools to provide precise troubleshooting.

Along with the continuous expansion of the IMS network, the activities and services of the International Data Centre (IDC) have significantly multiplied. The volume of data and data products has shown momentous growth. The average daily number of events contained in the Reviewed Event Bulletin grew from 50 in 2000 to more than 100 in 2010. With further expansion of the IMS seismic network and reduction of the global detection threshold, this figure will continue to rise further.

The automatic and interactive processing of infrasound data, after attaining the desired level of capability and maturity, is now being reintroduced into routine operations at the IDC. The hydroacoustic network is also surpassing its anticipated performance, as shown by its ability to locate occasional in-water explosive events down to tens of kilograms of TNT.

There has been considerable progress in the overall quality of radionuclide particulate analysis. Noble gas data have also been integrated into the IDC processing, leading to a key achievement with the first certification of an IMS noble gas system on 19 August 2010. The addition of such systems will strengthen the capacity of the IMS and continues the cutting-edge approach to the creation of the verification system.

The Commission has made good headway in atmospheric transport modelling. This is being applied to backtrack dispersed radioactive material, and the most recent advances in the domain of atmospheric transport as well as the most comprehensive meteorological data sources are integrated into IDC operations.

The computer infrastructure of the Commission has been completely
overhauled in recent years. This has facilitated the migration of all verification related applications to an open source environment. In order to accommodate the growing amount of verification data, a new mass storage system and multi-tiered storage area network have been commissioned. Satellite capacity was also expanded to cover increased demand for IMS data and IDC products.

In short, the incremental development of the verification system and solid operational experience provide reliable continuous, near real time and real time flow of data and data products to the States Signatories. The performance of the verification system during the two announced nuclear tests by the Democratic People's Republic of Korea in 2006 and 2009 is a clear example of such reliability. The timely, integrated and coherent performance of the system provided a high level of assurance about its capabilities.

The progress in the on-site inspection (OSI) regime has been steady. The strategic goal of the Commission has been to achieve OSI readiness at entry into force of the Treaty. To that end, the OSI methodology and necessary policies have been developed. In 2002, a field experiment was held in Kazakhstan to test OSI procedures and inspection dynamics. Directed exercises have also been held to test procedures and equipment for radionuclide monitoring, environmental sampling and operations. They have also helped the work on recording of seismic aftershocks, deployment of noble gas equipment and use of equipment employed during the continuation period of an inspection.

These activities culminated in the large and complex Integrated Field Exercise (IFE) in Kazakhstan in September 2008. It involved over two hundred participants, operating for one month in an extremely remote area, and over fifty tonnes of equipment. The exercise contributed greatly to the further development of the OSI regime by serving as a basis for the preparation of the action plan as well as further refinement of OSI policies, procedures, and specifications for methodology and equipment.

The steady progress in the on-site inspection regime led to the conduct of the first ever complex Integrated Field Exercise in 2008.

Workshops have provided an invaluable input towards the build-up of the OSI regime. They have, moreover, addressed essential topics, including the development of OSI techniques and equipment, their specific applications, the debriefing after the IFE and the draft OSI Operational Manual.

The training concept for OSI inspectors has been developed, contributing to a training cycle for OSI surrogate inspectors. This includes a curriculum of courses, identification of training venues and e-learning modules for remote training to facilitate efficient training activities. The first group of experts participated in an abridged training cycle in preparation for a roster of future OSI surrogate inspectors. The second training cycle is ongoing. In parallel, outreach training has been extended to States Signatories in the form of regional OSI introductory courses for experts from States Signatories and OSI introductory courses for members of Permanent Missions in Vienna. So far, more than six hundred participants have attended these courses.

Using a system engineering approach, the PTS has initiated the development of a highly adaptable and extendable OSI support solution that is capable of integrating existing systems while allowing adaptations to be made with minimal impact on critical operations in the future. The proposed solution is to design an Integrated Inspection Support System (IISS) that will be capable of providing the OSI verification regime with the right personnel, equipment and supplies at the right time, in the right place and in the right quantities. The expected outcome will combine the efficiencies and benefits of a flexible and mobile system with precise delivery of support to the point needed. The IISS is designed to be a fusion of information, logistics and operation support technologies to provide rapid response and to deliver tailored packages and sustainment directly at the required level.

ADVANCING WITH SCIENCE AND TECHNOLOGY

The advanced verification system demands close linkage with science and technology. The ability of the system to detect, locate and identify any nuclear test relies on keeping pace with advances in science and technology. That is why the Commission, since its inception, has always strived to intensify interaction and forge an effective strategic partnership with the scientific community.
The first significant initiative in building such a close cooperation was launched in 2006, when a scientific symposium entitled “CTBT: Synergies with Science, 1996–2006 and Beyond” was organized. The symposium was held on the tenth anniversary of the Treaty. It brought together more than three hundred participants, including key figures in the field of nuclear non-proliferation and disarmament and scientists from internationally prominent universities and institutions, as well as representatives of States Signatories.

With a view to furthering the synergies with the scientific community and promoting cooperation, the Commission embarked on another initiative in June 2009. The International Scientific Studies Conference was an important milestone in efforts to engage the global scientific community in support of CTBT verification objectives. It succeeded in drawing many more participants. Around six hundred people from almost one hundred countries, including nearly five hundred scientists, attended the conference and contributed to its work.

**MANAGEMENT AND OVERSIGHT**

Since 2002, the Commission has been working with a zero real growth budget and its level of staff has also remained the same since 2003. Managing the onerous increase in the workload with a constant level of resources has been a serious challenge. In addition, a policy on the limitation of tenure was implemented, leading to a full rotation by the end of 2009 of the Professional staff that were working at the Secretariat as of the end of 1997. During the same time frame, internal and external financial challenges had to be dealt with and they were successfully mitigated. Though arduous, the Commission has succeeded in turning the challenge into an opportunity by taking various measures to maximize resource savings and efficiency gains. It has reviewed its policies, redefined its priorities, promoted internal synergies and improved its human resource management. It has also begun to streamline its procurement and outreach activities and cut travel and publication costs. At the same time, new and innovative management tools, such as results based management, project management and quality management, have been employed to provide for greater synergies and optimal use of resources.

Over the years, the Commission has worked hard to enhance oversight, transparency and accountability. States Signatories have now at their disposal many means by which they can review and monitor the performance of the Commission and actively participate in its planning. These, in brief, include Programme and Budget proposals, comprehensive Programme and Budget Performance Reports, the Medium Term Plan, a detailed annual report on human resource management and an annual report by Internal Audit.

States Signatories have continuous access online to information on 10 key performance indicators (KPIs) related to the strategic goals of the Commission through a platform presenting verification system performance in near real time. They also receive information on over fifty performance related parameters through the monthly performance reports.

All these tools have enabled the Commission to establish a strategic dialogue with States Signatories on the performance of the Commission and its future direction.