INTEGRATED CAPACITY DEVELOPMENT
The Commission offers States Signatories training courses and workshops on technologies associated with the three pillars of the verification regime – the IMS, the IDC and OSI – as well as on the political, diplomatic and legal aspects of the Treaty. These courses help to strengthen national scientific and decision making capabilities in relevant areas and assist in developing capacities in States Signatories to effectively confront the political, legal, technical and scientific challenges facing the Treaty and its verification regime.

In some cases, the Commission provides equipment to NDCs to increase their capacity to participate actively in the verification regime by accessing and analysing IMS data and IDC products. There is a need to update the knowledge and experience of national experts as technologies expand and improve. By enhancing the technical capabilities of States Signatories, these activities empower all stakeholders to participate in the implementation of the Treaty and to enjoy the civil and scientific benefits of its verification regime.

Training courses are held at the Commission headquarters in Vienna and at other locations, often with the assistance of hosting States. The capacity building programme is funded through the Regular Budget of the Commission and through voluntary contributions. All training activities have a well-defined target group, offer detailed content, and are complemented by the educational platform and other outreach activities to the broader scientific community and civil society.
ACTIVITIES

The Commission offered States Signatories a wide range of training courses and workshops aimed at strengthening capacities in areas relevant to the Treaty. Capacity development activities also included the provision of hardware and software to NDCs, especially those in developing countries, enabling them to access and analyse IMS data and IDC products. They also included training courses and workshops on various OSI activities.

INTERNATIONAL DATA CENTRE AND NATIONAL DATA CENTRE TRAINING COURSES AND WORKSHOPS

Integrated capacity development and training activities in 2019 included nine NDC training events, nine station operator courses, three technical workshops, six technical meetings, two NDC workshops, SnT2019, as well as the participation of experts from developing countries in official technical meetings of the Commission. The first NDC training for French speaking NDCs took place in Antananarivo, Madagascar in April 2019.

The Radionuclide Laboratory Workshop 2019 was held from 18 to 21 June 2019 in Vienna. Forty-eight experts from 19 States Signatories and the PTS attended the workshop. The purpose of the workshop was to discuss and to address developments and issues pertaining to laboratory operations; to review and to plan PTEs for particulate samples and noble gas intercomparison exercises, certification, surveillance assessment and measurements; to discuss CTBT/PTS/INF.96/Rev.10; to share operational experiences and lessons learned towards quality improvement and to discuss advances in gamma spectrometry and noble gas measurements.

The International Hydroacoustics Workshop was held from 8 to 11 July 2019 in Vienna. A total of 30 participants from 11 States Signatories and the PTS contributed to this event. The objective of the workshop was to support the verification regime of the Commission by continuing the now established forum for scientific and technical knowledge exchange on three themes: (a) technological advancements in marine engineering pertinent to the sustainability and improvement of the hydroacoustic component of the IMS, (b) data analysis and signal processing methods for CTBT verification purposes and (c) three dimensional modelling for long range hydroacoustic signal propagation.

The Infrasound Technology Workshop 2019 was held from 10 to 14 November 2019 in Aqaba, Jordan. Eighty-six experts from 33 States Signatories and the PTS attended the workshop. The purpose of the workshop was to create an international forum for presenting and discussing recent advancements in infrasound research and the operational capabilities of global and regional networks. The workshop also reaffirmed the pivotal role of the PTS in the infrasound community and highlighted the usefulness of the technology for civil and scientific applications.

The NDC Capacity Building Workshop and Regional Seismic Travel Time in combination with Data Sharing and Integration Training took place in Chiang Mai, Thailand, from 28 October to 1 November 2019. Twenty-eight experts from 21 States Signatories and the PTS attended the workshop. The objectives for the NDC Capacity Building Workshop were to strengthen participants’ knowledge of the CTBT and the work of the Preparatory Commission, to further build up the national and regional capacities in implementing the Treaty and participating in the verification regime and to promote the civil and scientific application of verification technologies.
The International Noble Gas Experiment Workshop was held from 2 to 6 December 2019 in Freiburg, Germany, and attracted 111 experts from 24 States Signatories and the PTS. The purpose of the workshop was to present and evaluate the most recent advances in noble gas monitoring in support of the CTBT.

Activities under the EU Council Decision VII project for 2018-2019 continued supporting capacity building in Africa, South East Asia, the Pacific and the Far East and the Middle East and South Asia regions.

The PTS performed five follow-up maintenance visits during 2019 to assist the capacity of States Signatories to participate fully in the verification regime and to enhance their civil and scientific activities by obtaining, analysing and reporting on IMS data and IDC products. Planning was initiated for the installation of nine capacity building systems in 2020.

Approximately 120 participants subscribed to the NDC e-learning course on access to and application of IMS data and IDC products in 2019.

**OSI TRAINING COURSES AND WORKSHOPS**

The technique specific courses of the advanced block of the third training cycle concluded in October 2019. These courses focused on the application of inspection techniques as specified in the treaty protocol and targeted the various technical sub-teams of the third training cycle. The details of the courses conducted during 2019 are provided below.

The rapid deployment, sustainment and recovery course was conducted at the Austrian Armed Forces International Training Centre in Götzendorf, Austria, from 8 to 12 April 2019, with support from the Government of Austria. The objective of the course was to provide hands-on training on the OSI specific concepts, equipment and procedures related to rapid deployment, in-field sustainment and recovery of an OSI mission. The course covered all phases of an OSI, with emphasis on the inspection phase. The operations support sub-team of the third training cycle, comprising 19 experts from 17 States Signatory, attended the course.

The geophysical and seismic techniques course was conducted at the newly inaugurated TeST Centre and at nearby Austrian military training sites from 1 to 17 July 2019. The objective of the course was to provide hands-on equipment training on the use of geophysical inspection techniques (ground based magnetic field mapping, electrical conductivity measurements, ground penetrating radar, gravitational field mapping and seismic inspection techniques including seismic aftershock monitoring systems, active seismic techniques and resonance seismometry). The course, attended by 16 seismic experts from 14 Signatory States and 9 geophysical experts from 8 Signatory States, also covered the operation and maintenance of the equipment and the use of related data processing software and hardware.

The additional overflight techniques course was conducted from 23 September to 2 October 2019 in Ottawa, Canada, with support from Natural Resources Canada. The objective of the course was to train surrogate inspectors to install and operate airborne inspection technologies according to approved procedures on OSI-relevant airframes. Participants were trained in airborne survey design, pre- and inflight airborne operations and the use of a common airborne position finding system and each of the permitted airborne technologies. The course was attended by 11 airborne survey experts from 11 Signatory States.

The radionuclide and noble gas techniques course was conducted from 13 to 25 October 2019 at the TeST Centre. The objective of the course was for trainees to acquire competencies required to perform activities related to paragraphs 69(c-d) of the Protocol and obtain practical knowledge and capabilities on all OSI equipment related to radionuclide and noble gas sampling, handling and analysis. The course was attended by 27 experts from 23 Signatory States.

The OSI training of trainers course was conducted from 17 to 21 June 2019 and was the first training event held at the new TeST Centre. The objective of this course was to expand the core group of OSI external facilitators to a number that can sustain consistent delivery of OSI training in the future, and to expand the geographical and gender balance of this instructor group that is representative of a typical OSI trainee group. The course was successfully attended by 30 experts with various OSI technical backgrounds from 27 Signatory States.

The integration of the OSI inspectorate database with the services, training and management system and the conference, training and workshop registration platform was completed in 2018. This new mechanism was used to support the processing of nominations and registrations for all OSI training events in 2019.

The development phase of the inspectorate call-up mechanism concluded in November 2019 with the validation of the call-up system during BUE-L. The call-up platform succeeded in reaching all test subjects in all geographical regions during the exercise. Prior to BUE-L, the call-up mechanism was tested during every technique specific course of the third training cycle.

A cloud based remote e-training system on inspection team functionality and the GIMO system that was launched in September 2018 continued to support the activities of the third training cycle in 2019. The integration of geospatial data simulation into this remote training platform allows for additional training scenarios with critical inspection team functionality concepts, such as the updating of search logic and the proposing and prioritizing of missions, and allows trainees to conduct virtual operational steps such as inspection team meetings and the narrowing of search zones. This remote GIMO training platform will be opened to the rostered surrogate inspectors of the first and second training cycles. The development and implementation of this training system, which simulates the daily operations cycle of an individual inspector and uses data simulation models to conduct virtual field missions, will be tested and validated during the BUEs scheduled for 2020.

The advanced course of the third training cycle was held at the Denel Overberg Test Range in South Africa in October 2018. Seventy candidates representing 44 States Signatories from all regions participated. The goal of the advanced course was to prepare trainees for OSI activities grounded in inspection team functionality and field team functionality concepts. A variety of training methodologies with a focus on practical learning, such as field training...
exercises, were used. The trainees demonstrated competence in implementing information led search logic during the launch, pre-inspection and inspection phases of an OSI. The course also included soft skills training on negotiation techniques, cross-cultural communications, decision making mechanisms, leadership styles and team building. The course was hosted by the South African Council for the Non-Proliferation of Weapons of Mass Destruction and the South African Council for Geoscience.

The ground and airborne based visual observation course of the third training cycle was held at the same training site immediately after the advanced course. It was the first in a series of technique specific courses that will be delivered to the various technical sub-teams of the third training cycle. A total of 16 candidates from the visual observation sub-team, representing 15 States Signatories, participated. The objective of the course was to provide hands-on practice in identifying potentially relevant OSI observables acquired through both ground and airborne visual observation techniques. This included the planning, preparation and execution of helicopter overflight activities. This course was also hosted by the South African Council for the Non-Proliferation of Weapons of Mass Destruction and the South African Council for Geoscience. The host agencies also provided the use of a helicopter, its aircrew and fuel as a contribution in kind.

The integration of the OSI inspectorate database with the services, training and management system and the conference, training and workshop registration platform was completed in 2018. Legacy data from the previous inspectorate database was migrated to the services, training and management system test environment to assess compatibility and to determine the requirements for further developments to support the functionality requirements of the OSI inspectorate database. This new mechanism was used to support the processing of nominations and registrations for all OSI training events in 2018.

An initial test of the OSI inspectorate call-up mechanism was conducted during the advanced course in South Africa. During the 24 hour test period, all participants in the third training cycle received automatically generated SMS and email messages instructing them to respond to a theoretical call-up for an OSI. The call-up platform succeeded in reaching all test subjects in all geographical regions.

A cloud based remote e-training system on inspection team functionality and the GIMO system was launched in September 2018 in support of the future activities of the third training cycle. The integration of geospatial data simulation into this remote training platform allows for additional training scenarios with critical inspection team functionality concepts such as the updating of search logic and the proposing and prioritizing of missions, and allows trainees to conduct virtual operational steps such as inspection team meetings and the narrowing of search zones. This secure platform also provides the possibility of developing various OSI scenarios with realistic geospatial data for classroom based training. The development and implementation of this training system, which simulates the daily operations cycle of an individual inspector and uses data simulation models to conduct virtual field missions, will be used for all training for the remainder of the third training cycle.
PARTICIPATION OF EXPERTS FROM DEVELOPING COUNTRIES

The Commission continued to implement the project to facilitate the participation of experts from developing countries in its official technical meetings. The aims of this project are to strengthen the universal character of the Commission and to build capacity in developing countries. A detailed annual report on the status of implementation of the project was issued in November 2019 (CTBT/PTS/INF.1515). In November 2018, the Commission extended the project for a further three years (2019-2021), subject to the availability of sufficient voluntary contributions.

In 2019, the project supported the participation of experts from 10 States: Argentina, Chile, Costa Rica, Malaysia, Morocco, Namibia, Nepal, Niger, the Sudan, and Tunisia. These experts took part in the Fifty-Second and Fifty-Third Sessions of WGB, including formal meetings and meetings of expert groups. They also benefitted from technical discussions with the PTS on key verification related issues.

Since its inception in 2007, the project has supported 49 experts from 38 States: 11 in Africa (Algeria, Burkina Faso, Ethiopia, Kenya, Madagascar, Morocco, Namibia, Niger, South Africa, the Sudan and Tunisia), 1 in Eastern Europe (Albania), 10 in Latin America and the Caribbean (Argentina, Bolivia, Brazil, Chile, Costa Rica, the Dominican Republic, Ecuador, Mexico, Paraguay and Peru), 6 in the Middle East and South Asia (Iraq, Jordan, Kyrgyzstan, Nepal, Sri Lanka and Yemen) and 10 in South East Asia, the Pacific and the Far East (Indonesia, Malaysia, Mongolia, Myanmar, Papua New Guinea, the Philippines, Samoa, Thailand, Vanuatu and Viet Nam). Sixteen of the supported experts are women. Ten of these States are or were least developed countries.

Voluntary contributions from China, Germany, Kazakhstan, Turkey, the United Kingdom and the EU were used to finance the project in 2019, and a part of these funds was carried over to 2020. The Commission continues to seek additional voluntary contributions to ensure the financial sustainability of the project.