CTBT: Science and Technology Conference 2025 - SnT2025

Monday, 8 September 2025 - Friday, 12 September 2025

Hofburg Palace & Online

Scientific Programme

Themes and Topics of SnT2025

Keywords indicate what might fit under the Topic, including priorities. Possible submissions are not limited to the keywords.

Glossary
ATM atmospheric transport modelling
CYG CTBTO Youth Group
FAIR findability, accessibility, interoperability, and reusability
HPC high performance computing
IDC International Data Centre
IFE Integrated Field Exercise
IMS International Monitoring System
NDC National Data Centre
OSI On-Site Inspection
SnT CTBT: Science and technology
vDEC CTBTO virtual Data Exploitation Centre

Theme 1. The Earth as a Complex System

Physical processes and parameters relevant for monitoring CTBT compliance

T1.1 The Atmosphere and its Dynamics

Keywords: Acoustic propagation and attenuation; transport of radionuclides; global circulation; volcano-acoustics; climatology; meteorology; noise sources

T1.2 The Solid Earth and its Structure

Keywords: Seismicity; seismic propagation and attenuation, tectonics, locating seismic disturbances, subsurface properties; subsurface pathways of radionuclides

T1.3 The Oceans and their Properties

Keywords: Oceanography; hydroacoustics; ocean observatories, propagation, 2-D and 3-D models; T-phase modelling; acoustic blockage, ocean acoustic tomography and thermometry; undersea volcanoes; tsunamigenic events; soundscapes; marine mammals

T1.4 Multidisciplinary Studies of the Earth's Subsystems

Keywords: Data analysis; modelling, physics, data fusion, phase conversion, coupling across interfaces; climate change; interference between anthropogenic aspects and the Earth system processes

Theme 2. Monitoring events and Nuclear Test Sites

Verification related aspects of nuclear tests

T2.1 Characterization of Treaty-Relevant Events

Keywords: Announced tests; detection, understanding the full extent of signals that may be generated by a nuclear explosion; location in time and space, analysis, characterization of the source, discrimination, screening criteria, differentiating nuclear tests from other human-made or natural events, discrimination and identification of small events; OSI-relevant observables

T2.2 Seismoacoustic Sources in Theory and Practice

Keywords: Differences between earthquake and explosion signatures, differences between chemical and nuclear explosions, seismoacoustic sources that could be confused with those from a nuclear explosion

T2.3 Atmospheric and Subsurface Radionuclide Background and Dispersion

Keywords: Natural and human-made sources of radioisotopes, release of radionuclides, atmospheric transport modelling, anomalies of atmospheric radioactivity, isotopic ratios that could be confused with those from a nuclear explosion, radionuclide migration

T2.4 Historical Data from Nuclear Test Monitoring

Keywords: Historical records, digitizing, archive preservation; reprocessing; discrimination; metadata; event bulletin; lessons learned for current monitoring and future OSI; data for training and exercises

Theme 3. Monitoring and On-Site Inspection Technologies and Techniques

Sensor technologies, algorithms, signal processing, accelerated computing

T3.1 Seismic, Hydroacoustic and Infrasound Technologies and Applications

Keywords: Acquisition and forwarding of continuous and segmented data; data assimilation; design of sensor systems; advanced sensors

T3.2 Radionuclide Technologies and Applications

Keywords: Sampling and sample processing, data acquisition, particulate sample systems, gamma–gamma coincidence counting; new generation noble gas systems, radionuclide laboratories

T3.3 On-Site Inspection Relevant Techniques and insights from IFE25

Keywords: Visual observations; remote sensing including multispectral, satellite imagery; remotely controlled platforms; measurements of radioactivity and energy resolution analysis; environmental sampling and analysis in mobile and field-based facilities; seismic and non-seismic geophysical techniques; drilling; synergy between techniques; OSI-relevant equipment

T3.4 Integrating Data from Different Monitoring Technologies

Keywords: Data fusion algorithms; integration of ancillary data to supplement IMS data for expert technical analysis; diverse sources of remotely sensed data; augmented reality

T3.5 Analysis of Seismic, Hydroacoustic and Infrasound Monitoring Data

Keywords: Signal processing; data analysis algorithms; machine and deep learning, HPC; bulletin quality; advanced probability approaches; adaptation and integration of methods used in other fields

T3.6 Analysis of Radionuclide Monitoring Data

Keywords: Spectrum calibration and analysis algorithms; enhancing quality of automated processing, machine and deep learning, HPC; estimation of radionuclide concentrations from known sources, improvement of event screening

Theme 4. Sustainment of Networks, Performance Evaluation, and Optimization

Engineering and operational aspects

T4.1 Performance Evaluation of the International Monitoring System

Keywords: Performance metrics; network coverage; data availability, quality and timeliness; resilience; preparedness exercises; feedback on IDC products and services; national operations and procedures

T4.2 Systems Engineering for International Monitoring System and On-Site Inspection

Keywords: Power systems; system refurbishment and modernization; communication infrastructure; sensor network design and operation

T4.3 Use of enabling Information Technologies

Keywords: Data protection; cyber security for Treaty monitoring and OSI; FAIR data; authentication of samples; simulation, computational models

T4.4 International Monitoring System Sustainment into the future

Keywords: Maintenance strategies and quality assurance, failure risk mitigation, infrastructure assessment and upgrades, systems integration and optimization, technology obsolescence and foresight, enhanced monitoring and state of health, repair, predictive and preventative maintenance, life cycle, recapitalization, efficiency and cost effectiveness, reliability and security, equipment databases, information management and automation

T4.5 On-Site Inspection Team Functionality, and insights from IFE25

Keywords: Search logic; methodology, concept for operations and building capacities; OSI data processing tailored workflows; information flow; health and safety of inspectors; training, tabletop and build-up exercises

Theme 5. CTBT Science and Technology in the Global Context

Impact from past SnTs and collaborations, broader perspectives

T5.1 Synergies with Global Challenges

Keywords: Civil and scientific applications of IMS data; natural hazards early warning systems, disaster risk reduction, nuclear and radiological emergencies; climate change studies; sustainable development goals; international collaboration; vDEC projects

T5.2 Regional Empowerment

Keywords: Capacity building and training; technical assistance; regional networking; cooperation among NDCs; multilingualism

T5.3 Outreach

Keywords: Treaty advocacy; education, mentoring programme; science communication, public information, raising awareness and understanding, outreach initiatives; human resources development; early career professionals; diversity and gender equality