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Objective:

In its efforts to optimize its training program within the available resources, and taking into consideration the holistic approach requested by States Parties, the Capacity Building and Training (CBT) section has adopted the Training Cycle Approach for National Data Centres 1.0 (TCAN 1.0). The objective of the Training Cycle Approach is to efficiently conduct a series of interrelated training activities that help the States Parties in building and enhancing their capacity in using the International Monitoring System (IMS) data and the International Data Centre (IDC) products, and at the same time to promote networking among different National Data Centres (NDCs). The focus of the TCAN 1.0 is on improving the NDC staff analytical skills by providing them with the different tools prepared by the IDC.

The Target Audience

In the aim of maintaining the momentum of getting more Secure Signatory Accounts (SSA) and at the same time sustaining the established SSA activities, the capacity building efforts are focused on, inter-alia, the following two groups of States Parties:

- Countries that do not have access to IMS Data and IDC Products; and
- Countries that have access but make limited use (less than 10 MB).

Tools of the TCAN 1.0

The following tools help the CBT to efficiently and effectively implement the training activities:

- The continuous development and enhancement of E-Learning materials, including providing them in the 6 UN languages
- The total inclusion of NDC-in-a-Box (NIAB) software package in the trainings
- The implementation of the NDC Preparedness Exercises NPE-trials in the courses
- The facilitation of networking and regional cooperation among NDCs
- The inclusion of new trainings on Infrasound, ATM and Hydroacoustic technologies.

Duration and Phases

The full duration of the training-cycle is two years.

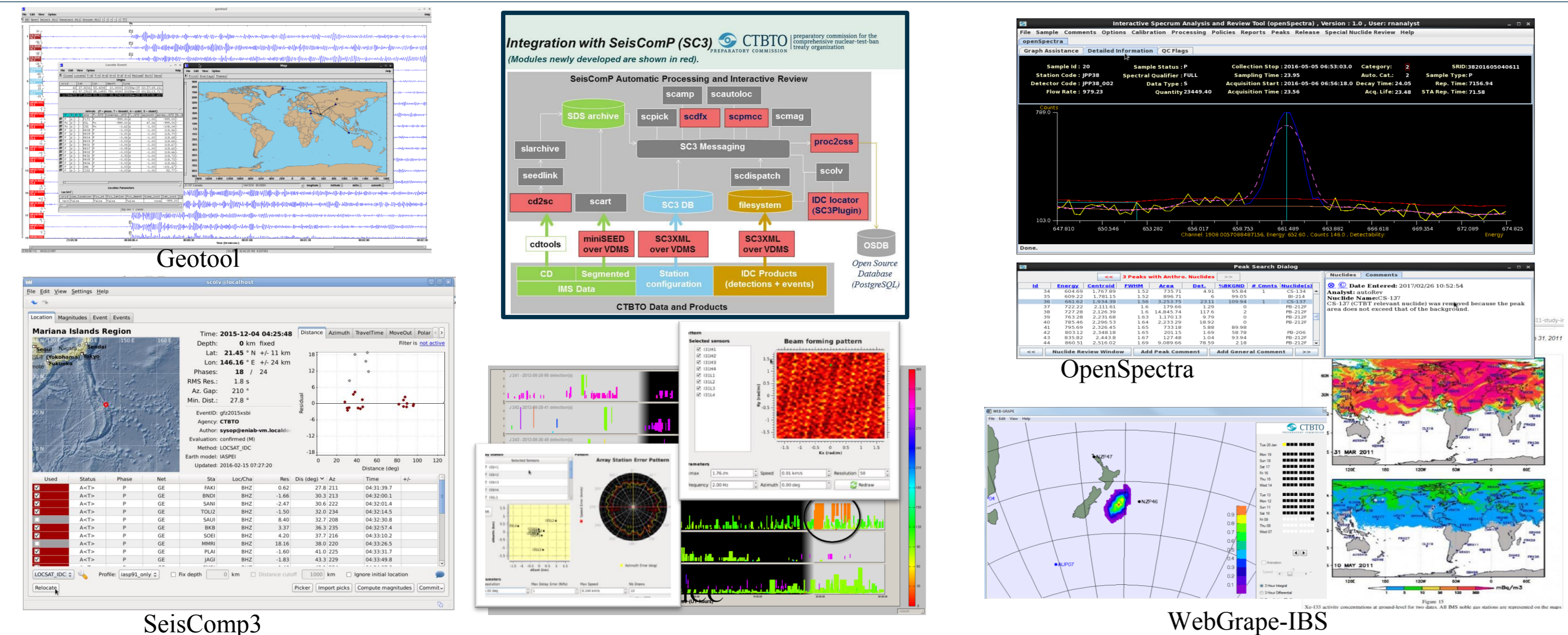
I- Tools

NDC-in-a-Box (NIAB)

- Infrasound Processing (DTK-PMCC and DTK-GPMCC: automatically process and interactively review waveform array data based on PMCC algorithm)
- DTK-DIVA: to help analyse station detection background over long periods of time
- DTK-JADE: monitoring tool allowing to scrutinize seismo-acoustic signals and detections produced by different detectors, while scrolling through large amounts of wav-data. Significantly expands NDCs processing capabilities
- Integration components between SeisComp3 (SC3), IDC Processing, Geotool and DTK tools
- aVDMs: automating requests for data and products from the Verification Data Messaging System
- msm: produces meta-data information (in the form of wfdisc headers) for miniSEED files
- Radionuclide Software: Improved Autosaint, openSpectra, DB schema, configuration, as well as ARR/RRR template
- iNSPIRE: new tool for interactive analysis review, covering particulate, SPALAX noble-gas and beta-gamma coincidence data (to replace norfy). To be operational in 2017
- WebGrape enhancements: PSR calculation methods and Internet Based Service (IBS)

Benefits

- ✓ Realtime automatic processing pipeline
- ✓ Capable of **Infrasound and RN data processing**
- ✓ Enables NDCs to more easily combine IMS data and IDC processing results with data from local and national stations and from other networks
- ✓ Converting station configuration, arrival and event information between the IDC schema (CSS) and the SC3 data model (SC3XML) as well as CD format data to miniSEED.
- ✓ Allows use of ATM tools using online system without software installation and large amount of data download



II- Training Programme:

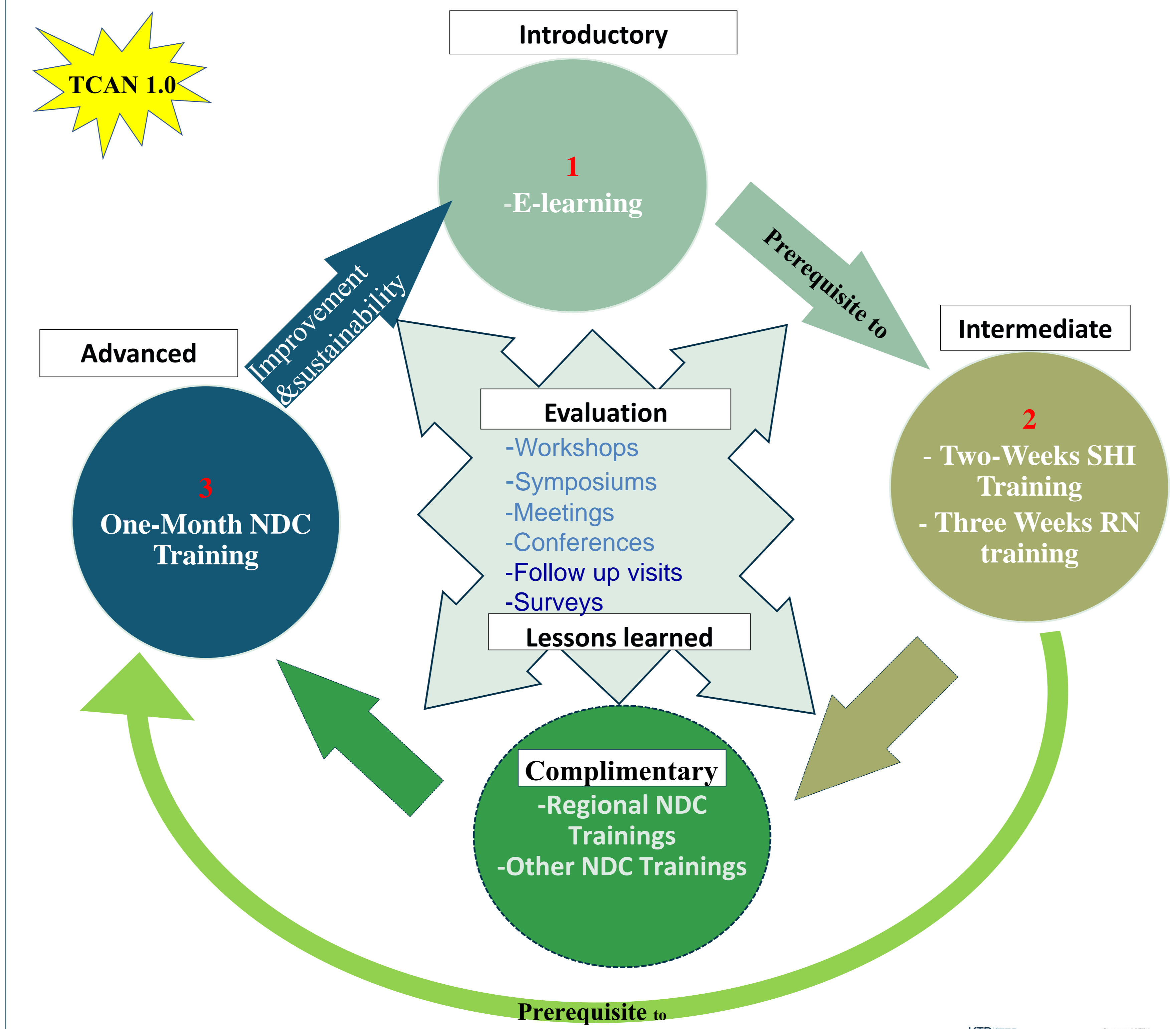
The Training-Cycle Approach falls into a sequence of training phases, each phase is a pre-requisite for the following one:

- 1- Introductory
- 2- Intermediate
- 3- Advanced

Complementary trainings are available to improve the knowledge of the NDC staff and to fill in the gaps with the previous trainees who don't get the opportunity to go through all mandatory phases of the trainings.

Abstract:

The overarching objective of the Capacity Building and Training (CBT) programme is to support the participation of the States Parties in the verification regime of the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), by providing the necessary tools, trainings and equipment for National Data Centres (NDCs). This is envisaged by, inter-alia, assisting the States Parties in developing the technical capabilities in receiving, processing and analysing International Monitoring System (IMS) data at the National Data Centres, and use of International Data Centre products (IDC). In its efforts to optimize its training program within the available resources, the Capacity Building and Training Section in The International Data Centre has adopted the Training Cycle Approach for NDCs (TCAN). The objective of the Training Cycle Approach is to efficiently conduct a series of interrelated training activities that help the States Parties in building and enhancing their capacity in using the IMS data and IDC products, and at the same time to promote networking among different NDCs. The focus of the TCAN is on improving the NDC staff analytical skills by providing them with the different tools prepared by the IDC.



1. INTRODUCTORY PHASE: Prerequisite E-learning Modules for the Intermediate Training

The Knowledge and Training Portal (KTP) is a hub for electronic training courses that can be taken at a convenient time and place of the trainee. It is an open resource of information for the global CTBT verification community. The education and training spaces of the KTP includes 51 modules, out of which 24 are NDC related. So far, 32 modules are available in all 6 UN working languages. For example, the E-learning course on "NDC Capacity Building: Access and Application of IMS Data and IDC Products" has been set as a prerequisite for participation in the NDC two weeks SHI training course and the three weeks RN training course. The introductory training course helps to set the stage for the participants before they join the course, and brings them all on the same basic level of information necessary for the successful conduct of the courses.

2. INTERMEDIATE PHASE: Training Course on NDC Capacity Building

*** Access and analysis of waveform IMS data and IDC products**
Two-week training course on using Seismic, Hydroacoustic and Infrasound (SHI) monitoring technologies, the use of the NDC-in-a-Box package for analysing SHI data and the use of the Atmospheric Transport Modelling (ATM) software. The practical sessions of this course provide highly based on hands-on training on accessing the IMS Data and IDC Products. This training has been set as a prerequisite for participation in the one-month NDC WAVEFORM ANALYST TRAINING COURSE.

*** Access and analysis of Radionuclide IMS data and IDC products**
Three-week Training course on radionuclide data and products access is designed to get the trainees acquainted with the use of standard software packages for processing and analysing particulate and noble gas radionuclide data, as well as post-processing of atmospheric transport modelling output.



3. ADVANCED PHASE : NDC Capacity Building-NDC Waveform Analyst Training Course

One-month NDC Waveform Analyst Training Course which is the last course in the sequence of the TCAN 1.0. The purpose of the course is to provide the participants with the necessary knowledge on the roles of the National Data Centres in the verification regime, and how to build and/or improve the National Data Centre capabilities. Through the practical sessions, the course builds the participants' experience in accessing, using and analysing the IMS data and IDC products. During this training, the trainees will go through all IMS technologies and the training will be concluded by a data Fusion/NDC Preparedness Exercise (NPE) trials, where all participants will work in small groups (Virtual NDC teams) on one of the previous NPE scenarios or a new scenario to build a result and present their findings to the other groups to exchange knowledge on how to deal with specific events and possible violation of the treaty.



4. COMPLEMENTARY TRAININGS :

4.1 REGIONAL NDC TRAINING COURSE

The objectives are to elaborate on the roles of the National Data Centres in the verification regime; to build and/or improve the National Data Centre capabilities; to provide the participants with the sufficient knowledge for accessing and using IMS data and IDC products; and to provide practical experience in analysing IMS data.

4.2 OTHER NDC TRAININGS

- **SEISCOMP3 TRAINING (Intermediate and Advanced)**
To strengthen the capacity of the States Signatories' participation in the verification regime and to enhance their use of PTS data and products for civil and scientific applications using SeisComp3 for real-time data analysis.
- **NDC INFRASOUND DATA ANALYSIS TRAINING (Intermediate and Advanced)**
This specialized event focuses on enhancing the use of Infrasound PTS data and products in the NDCs using the NDC in a Box package, in order to improve their participation in the verification regime and for further use in civil and scientific applications.
- **NDC HYDROACOUSTIC DATA ANALYSIS TRAINING**
This specialized event focuses on enhancing the use of Hydroacoustic PTS data and products in the NDCs using the NDC in a Box package, in order to improve their participation in the verification regime and for further use in civil and scientific applications.
- **NDC TRAINING on ATMOSPHERIC TRANSPORT MODELING (ATM)**
This specialized event focuses on enhancing the use of ATM tools in the NDCs using the NDC in a Box package, in order to improve their participation in the verification regime and for further use in civil and scientific applications.
- **MULTILINGUALS NDC TRAINING (MNT)**
Based on the states parties' request, NDC training can be conducted on one of the six UN languages (Arabic, Chinese, English, Spanish, French and Russian).
- **INTEGRATED NDC TRAINING (INT)**
This is an introductory training integrated with some regional non-IMS workshops, to promote the treaty or to focus on a specific subject.



III- Evaluation and Lessons learned

- ❖ **Measuring satisfaction and changes in knowledge:** An evaluation concluded each training in order to measure participants satisfaction and changes in knowledge, skills and confidence.
- ❖ **Measuring capability and performance increase :** A couple of workshops, symposiums, conferences and meetings organized every year to allow the NDC experts to share experience in fulfilling their verification responsibilities. An NDC Workshop is organized every two years to focus on the ability of National Data Centres (NDCs) to carry out their verification activities including the NDCs feedback to the PTS on the progress results of the NDC Preparedness Exercise (NPE) which is a key topic within the workshop, also all aspects of the data, products, services and support to the NDCs in their work. Those events in addition to the conducted surveys are very useful to measure the NDCs capability and performance increase.

❖ **Follow up visits:**

Based on the NDCs needs and to fill any gaps which may occur during training-cycle, follow up visits can be conducted upon request from the NDCs in order to support them on the establishment, operation and maintenance of their NDCs.



❖ **Lessons learned:**

The TCAN 1.0 was Built on the basis of lessons learned from previous NDC training programmes of the International Data Centre. Focus consultations with experts and stakeholders facilitated the project conceptualization, focusing, planning and targeting. A preparatory phase was used to facilitate the focusing of the new approach. TCAN 1.0 started with pilot trainings, drawing lessons and building on the basis of experience over time. This process will continue and the new lessons learned will be implemented over the time.

Conclusions

At the end of the cycle, the NDC trained staff have the knowledge, skills and confidence to deal with different scenarios of potential violations of the CTBT. The qualified well-trained staffs are able to apply the relevant technical and scientific expertise that best fit their national authorities' expectation. They are also able to provide useful results using data fusion for the purpose of facilitating the work of the on-site Inspection team if decided to be carried on after the entry into force of the Treaty. Capability and Performance of the NDCs will increase.